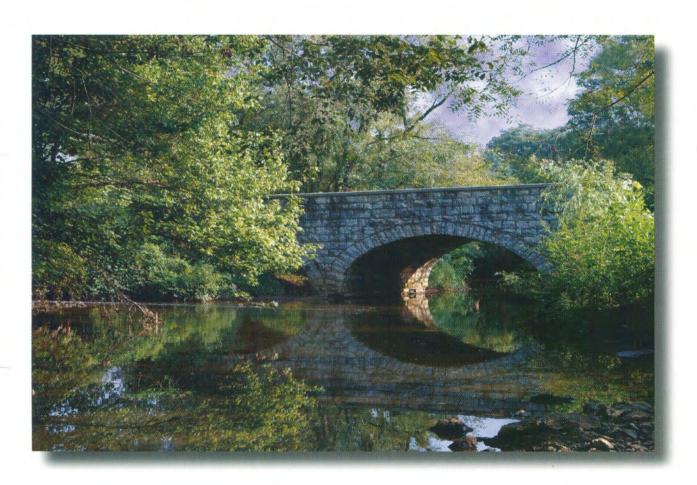


Buy Clean Manual Interactive CD-ROM



EPP: What Is it?

Environmentally Preferable Purchasing (EPP) is the practice of purchasing products that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose.

EPP: What Is it?

EPP products can include:

- Recycled content products
- Less toxic products
- Water conserving products
- Energy conserving products
- More durable products
- Biodegradable products
- Products with less packaging

History of EPP

- 1993 President Clinton signed Executive Order 12873
- 1998 Executive Order 13101
 - ⇒ Required EPA to develop guidance for environmentally preferable purchasing.
- EPA's EPP Website
 - ⇒ http://www.epa.gov/oppt/epp/ (will open in default web browser)

Benefits of EPP Program

- Recycled aluminum cans require 95% less energy to manufacture.
- Using 1 ton of recycled paper saves 20 trees and 7,000 gallons of water.
- 100 Energy Star computers and monitors can save \$10,000 in energy costs over 5 years.
- Correlation between improved health and working environment when using certain EP products.

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- Identify key team players:
 - ⇒ Superintendent
 - ⇒ Director of Facilities
 - ⇒ Purchasing Personnel
 - ⇒ Principal
- Forge partnership between Facilities Director & Purchasing Department
- Develop an EPP Policy Statement

- Inventory current cleaning products
 - ⇒ Product Inventory Sheet
- Identify cleaning product ingredients & safety concerns
 - ⇒ Use Material Safety Data Sheets (MSDS)
- Develop and list desired product attributes
 - ⇒ EPP Selection Criteria Checklist

- Develop a purchasing policy and EPP bid specifications
- Identify alternative cleaners
- Make the switch!
 - ⇒ Establish target date and inform all involved parties
 - ⇒ Arrange training for custodial staff
 - ⇒ Change out cleaning products

- Understanding basics of implementing an EPP program
 - ⇒Brief "walk-through" of the process
 - ⇒ Recognize general tools necessary to implement a program at your school.
 - ⇒You won't be an expert!!

EPP Product Inventory

- Step One Product Inventory
 - ⇒ Make a comprehensive list of the types and quantities of cleaners used
 - ⇒ Establishes a baseline
 - ✓ Superscore floor stripper
 - ✓ H₂Orange₂ Concentrate 117 all purpose cleaner
 - ✓ Simple Green Cleaner/degreaser

EPP Product Inventory Sheet

EPP Product Ingredients and Safety Concerns

- Step Two Identify Ingredients and Safety Concerns
 - ⇒ Use your material safety data sheets (MSDS) that are provided with your cleaning products
 - ✓ Recipe of ingredients and their hazards
 - ⇒ Also review labels on products for additional information

EPP Product Ingredients and Safety Concerns

- Step Two Label Information
 - ⇒ Keep away from heat and flame
 - ⇒ Do not use while smoking
 - ⇒ WARNING! Causes irritation Vapors harmful

Attributes

- Step Three Use MSDS to Identify Attributes
 - ⇒ What Are Attributes?
 - ✓ Product characteristics that impact human health & the environment
 - **⇒** Examples
 - ✓ Carcinogens does it contain carcinogens?
 - ✓ Flammability is it highly flammable?
 - ✓ Biodegradability is the product biodegradable?

Purchase Policy/Bid Specifications

- Step Four Develop a purchase policy and bid specifications
 - ⇒ Purchase policy allows all personnel to understand the school's purchasing goals
 - ⇒ Bid specifications are necessary for your vendors so they know what kind of products you want
 - ⇒ Keep them as simple as possible
 - ⇒ Require training (if necessary) for custodial staff

Alternative Cleaners

- Step Five Identify Alternative Cleaners
 - ⇒ Start with current vendor
 - Request MSDS's, samples, and if possible, product demonstrations
 - ⇒ Much information available through the internet
 - ⇒ <u>Green Seal</u>—non-profit group that identifies and promotes products that have reduced impact to the environment

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Make the Switch

• Step Six – Make the Switch

- ⇒ Establish beginning and ending target dates to complete the change
- ⇒ Plan on training for your custodial staff don't forget to see if your vendor can provide this!
- ⇒ Have a plan to dispose of your old cleaning products
 - ✓ Donate to organizations that can use them
 - ✓ Will your vendor take them for you?
 - ✓ No other option contact your state environmental regulatory agency for proper disposal

Glossary of Environmentally Preferable Purchasing Terms

Acids — Solutions with a pH range between 0 to 6.9. They are corrosive between pH 0 and 2.0 and produce severe burns on contact. See also pH.

Uses: Many cleaning products (e.g., delimers, bathroom cleaners, bowl cleaners) are acidic.

Acute health effects - Effects which occur rapidly as a result of short-term (usually less than 24 hours) exposures. Acute effects are usually of short duration, but long-term effects can occur after one exposure. Examples include irritation, corrosivity, chemically induced unconsciousness (narcosis), or death.

Acute toxicity - The potential of a chemical substance to cause adverse health effects from short-term exposure.

Aerosol propellants - Gases used to pressurize spay products. <u>Chlorofluorocarbons</u> which deplete the ozone layer, may be found in old cleaning products. Today other chemicals, such as isobutene, a petroleum product may be used. Hydrocarbon propellants like isobutene contribute to smog problems because of their contribution to tropospheric (ground level) ozone formation.

<u>Alkalies</u> (bases) - Solutions with a pH range between 7.1 to 14.0. An alkali is corrosive when pH is higher than 11.5. See also pH.

Uses: Many cleaning products (e.g., bleach, detergents, dishwashing soaps, drain openers and oven cleaners) are alkalies.

Ambient air pollutants - Pollutants for which ambient air quality standards have been developed. These pollutants include nitrogen oxides, sulfur dioxide, ozone precursors, particulate matter, carbon monoxide, and lead.

<u>Bioaccumulate</u> - The process where chemicals are collected and stored in plant and animal tissue. Some products may contain ingredients that will be taken up by smaller aquatic plants and animals and increase in concentration through the food chain as these plants and animals are consumed by larger animals.

Biobased product - Commercial or industrial products (other than food or feed) that utilize biological products or renewable, domestic, agricultural (plant, animal and marine),

or forestry materials.

Biodegradable - The ability of a substance, material or product ingredient to readily decompose under natural conditions by the action of microbes.

Biological oxygen demand (BOD) - Refers to increase use of oxygen by microorganisms in surface water when they metabolize organic chemicals. The total BOD load in an aquatic ecosystem is an important water quality parameter because this increased use of oxygen reduces amounts available to aquatic organisms like fish. At the same time, it is important to note that the availability of carbon sources (essentially what BOD measures) is often not the primary limiting factor in the growth of microorganisms in an aquatic ecosystem. In many aquatic ecosystems, other nutrients grow and it is the additional loading of these nutrients, rather than carbon, that is the primary factor in excessive microbial growth and oxygen depletion.

Carcinogen - Chemical capable of causing cancer.

Cardiac sensitizer - Chemical which, upon repeated exposure, can in some persons cause the heart to become sensitive to the stimulant properties of epinephrine (which is produced by the body's adrenal glands). Subsequent exposure to the sensitizer may cause fatal cardiac arrhythmias. Some chlorinated solvents are sensitizers.

CAS number - Chemical Abstract System number. A unique number used to identify each chemical.

Central nervous system depressant - Chemical toxic to neurons in the brain. With increasing acute exposure, CNS depressants cause headache, dizziness, confusion euphoria, drowsiness, loss of consciousness and death through inhibition of breathing. Chronic exposure may cause tremors, personality changes, visual impairment, and loss of hearing, memory, or intellectual capacity. Many organic solvents are CNS depressants.

Chronic health effects - Effects which generally occur as a result of long-term exposure, and are long duration. Examples include cancer, liver damage and chronic bronchitis.

Chronic toxicity - A chemical that is toxic over continual/repeated exposure.

Combustible - A substance having a flash point at or above 100° Fahrenheit up to and including 150° Fahrenheit, according to the Consumer Product Safety Commission. The Occupational Safety and Health Administration defines a combustible liquid as having a

flashpoint at or above 100° Fahrenheit but below 200° Fahrenheit.

Corrosive - Chemical which, upon contact can cause deep tissue damage, such as burns to eyes or skin.

Dyes - (Includes azo, basic disperse, fiber-reactive, vat dyes and fluorescent agents) May cause allergic reactions.

Uses: As colorants or whitening agents in many products, including all-purpose cleaners, disinfectants, fabric softeners.

Flammable - A substance having a flashpoint above 20° and below 100° Fahrenheit, according to the Consumer Product Safety Commission. An extremely flammable substance has a flashpoint at or below 20° Fahrenheit.

Flashpoint - Lowest temperature for sufficient vapor to form in the presence of oxygen to permit ignition.

Fragrances - Any of 4,000 chemicals. May cause skin irritation, discoloration, rashes or allergic reactions. May be irritating to the eyes and respiratory tract.

Uses: Many cleaning products, either to simulate the smell of "fresh air", flowers, etc., or to mask odors of other chemicals in the product.

Hazardous ingredient - Toxic, corrosive, ignitable, or <u>reactive ingredient</u>



<u>Incompatible</u> - Chemicals which are incompatible react violently or produce toxic byproducts.

Irritation - Redness, swelling or tissue damage caused by chemicals. The degree of irritation is dependent on dose. Chemical irritation may result in mild skin itching, or fatal damage to the lungs.

LC50/Lethal concentration - A measure of acute toxicity. The lethal concentration that if inhaled will kill half of a group of organisms in an experiment in a given time. In EPA's Toxic Substances Control Act program, a chronic LC50 or Ec50 <0.1 mg/L is highly toxic; and a chronic LC50 or EC50 > 10 mg/L is a low toxicity.

LD50/Lethal dose - A measure of acute toxicity. The lethal dose that will kill 50% of lab

animals exposed to it orally or through the skin. The lower the LD50, the more toxic the compound.

Mutagen - A chemical that can alter genetic material in humans.

Organic chemical - A chemical which contains carbon. Chemicals which do not contain carbon are termed "inorganic".

Oxidizer (oxidizing agent) - A chemical capable of reacting with other chemicals in an "oxidation" reaction. Chemical reactions involving strong oxidizers may release heat or be explosive.

Ozone depletion

- Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.

PH - A measure of the acidity or alkalinity of a solution. A pH of 7 is considered neutral. A pH greater than 7 indicates alkalinity. A pH less than 7 indicates acidity. In the absence of specific test data on irritation, pH provides some insight into whether a product will be corrosive or cause irritation. Products with very high or very low pH (11.5 or 2) should be assumed to be corrosive. High or low pH values (e.g., between 9 and 11, or between 4 and 2) indicate the product would be more irritating than neutral pH products where the pH is closer to 7.

Sensitizer - A chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction after repeated exposure to the chemical.

Solvent - Liquid used to dissolve other substances. Aqueous solvents consist primarily of water, while organic solvents can include a variety of organic chemicals such as acetone, benzene, toluene, ethyl acetate, xylene and turpentine. Most organic solvents are <u>Volatile</u>

<u>Organic Compounds (VOCs)</u> that contribute to smog problems because of their contribution to tropospheric (ground level) ozone formation.

Teratogen - A chemical that causes malformation in the fetus and/or birth defects in humans.

Volatile Organic Compounds (VOCs)

- In this context, VOC means any organic compound (carbon containing) which has a vapor pressure of greater than 0.1 mm Hg or, if the vapor pressure is unknown, has 12 or fewer carbon atoms. VOCs in cleaning products are of potential concern because of indoor air exposures to office workers and others. They are also of concern because they contribute to the formation of smog in outdoor air. Some chemicals considered VOCs include acetone, benzene, perchloroethylene, among many others.

Glossary of Common Cleaning Chemicals

Acetone [CAS No. 67-64-1] - Flammable volatile liquid with distinctive odor. Reacts explosively with hydrogen peroxide. Irritating to eyes, respiratory tract and skin. May be absorbed by inhalation. Can cause changes in liver's ability to metabolize inhalation. Can cause damage, dizziness, sedation and coma.

Uses: Spot and graffiti remover, solvent.

Ammonia compounds - (Includes ammonium chloride [CAS No. 12125-02-9], ammonium hydroxide [CAS No. 1336-21-6], benzalkonium chloride [CAS No. 8001-54-5]) - Usually liquids with a pungent odor. Corrosive in concentrations found in commercial products (over 10%). Forms irritating chloramine gas when combined with chlorine-containing products. Fumes can cause irritation of the eyes, respiratory tract. Liquid can cause skin burns. Toxic to fish, and reduces oxygen in surface water.

Uses: In many cleaning products, depending on concentration, as antiseptic, bactericide, fungicide, sanitizer, deodorant. Used in detergents as a surfactant. Also found in floor polish, glass window cleaners, household hard surface cleaners, rug and upholstery cleaners.

Ammonium chloride [CAS No. 12125-02-9] - Colorless crystals which are soluble in water and ammonia. Dust is mildly irritating to eyes, nose and throat. See also Ammonia compounds, Quaternary ammonium chloride. Ammonium chloride is harmful to aquatic life in very low concentrations.

2-Butoxy ethanol [CAS No. 111-76-2] (Also known as Ethylene glycol monobutyl ether; Monobutyl ethylene glycol) – Incompatible with bleach. May damage eyes and respiratory tract. Absorbed defects in lab animals. With chronic exposure, causes central nervous system toxicity, testicular atrophy.

Uses: In many cleaning products, including glass, window and all-purpose cleaners.

Benzene [CAS No. 71-43-2] - Flammable liquid with a sweet odor. Toxic to bone marrow,

and cause of leukemia in humans. In 1978, the Consumer Product Safety Commission outlawed its use in many cleaning products, although it may still be found in old stocks. Degrades slowly. See BOD discussion.

Uses: Spot remover, carpet spotter, laundry starch preparations.

Carbolic Acid - See Phenol

Caustic soda - See Lye.

Chlorine [CAS No. 7782-56-5] (including sodium hypochlorite, Clorox) - Strong oxidizer. Produces toxic chloramines gas when mixed with ammoniated cleaning products. Corrosive to eyes and skin. Fumes are irritating or corrosive to the respiratory tract. Can kill microscopic life in waterways, septic tanks and sewage treatment plants. Toxic to aquatic life.

Uses: Bleach, disinfectants, all-purpose cleaners, mildew remover, bathroom cleaners, spot removers, or in scouring powders.

Chlorine dioxide [CAS No. 10049-04-4] (chlorine oxide) - Strong oxidizing gas which can be dissolved in cold water. It may react with hot water or steam to produce toxic and corrosive fumes of hydrochloric acid. Severe respiratory and eye irritant.

Uses: Bactericide & antiseptic.

Dicholoromethane - See Methylene chloride.

Dimethylbenzene - See Xylene.

Ethanol (alcohol) [CAS No. 64-17-5] - Clear liquid which can be absorbed by inhalation and across skin. Central nervous system depressant. Vapors can produce some eye and upper respiratory tract irritation.

Uses: Detergents, disinfectants, carpet cleaners, tub and tile cleaners, air fresheners.

Ethylene glycol monobutyl ether - See 2 - Butoxy ethanol.

Limonene (d-Limonene, 4-isopropenyl-1-methylcyclohexene [CAS No. 5989-27-5]) - A flammable, colorless liquid in some plants. Skin irritant, sensitizer. If ingested in sufficient quantity, may be toxic to kidneys. When heated to decomposition, emits acrid smoke, fumes.

Uses: Aerosol, non-aerosol deodorants/air fresheners, bathroom tub and tile cleaners, hard surface cleaners, liquid laundry detergents, dry cleaning pre-spotter, polishing

preparations, mechanics soap, oven cleaners, rug/upholstery cleaners, other specialty cleaning and sanitation products.

Lye (caustic soda, sodium hydroxide [CAS No. 1310-73-2], potassium hydroxide [CAS No. 1310-58-3]) - Corrosive white crystals or colorless liquid. Liquid may cause severe eye burns or blindness, or skin burns with subsequent tissue scarring.

Vapors are irritating to the eyes and respiratory tract. Aerosol formulations present an inhalation hazard.

Uses: Drain opener, oven cleaner, detergents.

Methylbenzene - See Toluene.

Methylene Chloride (methylene dichloride; dichloromethane) [CAS No. 75-09-2] - Colorless liquid. Incompatible with strong oxidizers and caustics. Central nervous system depressant. Probable human carcinogen.

Uses: Disinfectant, all-purpose cleaner, degreaser, septic tank cleaner, laundry starch preparations, rug and upholstery cleaners.

Monobutyl ethylene glycol - See 2-Butoxy ethanol.

Naphthalene [CAS No. 91-20-3] - White crystalline solid with the odor of mothballs. Skin exposure may cause severe dermatitis. Irritating to eyes and respiratory tract. Inhalation may cause headache, nausea, confusion, damage to red blood cells. Possible human carcinogen.

Uses: Detergents, air fresheners, spotters.

Nitrobenzene [CAS No. 98-95-3] - A yellow oily liquid with an odor like shoe polish. May be absorbed via inhalation and through the skin. Chronic inhalation may cause liver damage. May bind with blood to reduce oxygen availability. Central nervous system depressant.

Uses: Furniture polish, floor polish.

Perchloroethylene (tetrachlorethylene; ethylene tetrachloride; PERC) [CAS No. 127-18-4] - Colorless volatile liquid about $1\frac{1}{2}$ times heavier than water. Central nervous system depressant, liver and kidney toxicant. Inhalation may cause respiratory tract irritation or cardiac arrhythmias. Irritating to the skin and eyes on direct contact. When released in water, can smother small aquatic life. Can be toxic to sewage treatment bacteria.

Uses: Graffiti remover, carpet spotter, metal cleaner, degreaser, dry cleaning solvent, furniture polish, household hard surface cleaners, laundry starch preparations, oven

cleaner.

Petroleum distillates - The lighter liquid hydrocarbons refined from crude oil by distillation, including petroleum ether, naphtha, mineral oil, mineral spirits, Stoddard solvent and kerosene. (Heavier distillates include propane and butane). Liquid petroleum distillates contain varying, but usually small amount of aromatic hydrocarbons (benzene, toluene, xylene, cycloparaffins, naphthenes). Liquid petroleum distillates are flammable. They are skin, eye and respiratory tract irritants. See also volatile organic compounds. Uses: Found in many janitorial cleaning products.

Phenol (carbolic acid) [CAS No. 108-95-2] - Colorless crystals, which can be dissolved in water or some organic solvents. Liquids have sweetish, sickening odor and can burn skin and eyes. In aqueous solution, phenol is not highly volatile, but it is readily absorbed through the skin. Abnormal pigmentation commonly occurs following dermal contact with phenol compounds. Vapors are strongly irritating to eyes, nose and throat. Exposure by inhalation to a low concentration of phenol six times for five minutes produced increased sensitivity to light.

Uses: In detergents, disinfectants, deodorants, furniture polish, air fresheners, mold and mildew removers.

Phosphates - Phosphate-containing compounds increase biological oxygen demand in surface water.

Uses: In detergents, bathroom cleaners, floor strippers.

Phosphoric acid [CAS No. 7664-38-2] - Colorless, odorless liquid. Corrosive to ferrous metals and alloys. Should not be mixed with bleach or ammonia. Phosphorus-containing compounds increase biological oxygen demand in surface water. When used as an agent for metal cleaning, phosphoric acid may react with impurities in the metal and release phosphine gas.

Uses: Metal brightness, cleaners, detergents, sanitizers.

Pine oil [CAS No. 8002-09-3] - Flammable liquid. An irritant to the eyes, upper respiratory tract and skin. May cause mild respiratory and central nervous system depression, and kidney toxicity.

Uses: In floor polish, glass window cleaners, hard surface cleaners, liquid detergents, toilet bowl cleaners, disinfectants.

Potassium metabisulfite [CAS No. 16731-55-8] - Colorless crystals which are soluble in water and ammonia. Dust is mildly irritating to eyes, nose and throat. See also Sulfur

compounds.

Uses: Washing powders.

Quaternary ammonium chloride (dodecyl dimethyl ammonium chloride) [CAS No. 7135-51-5] - A flammable liquid. Corrosive. An irritant to the eyes, skin, upper respiratory tract. May cause central nervous system depression. Ingestion may cause pain, swelling, breathing difficulty, convulsions. Ammonium chloride is harmful to aquatic life in very low concentrations.

Uses: Disinfectant, sanitizer.

Sodium bisulfite - See Sulfur compounds.

Sodium dodecyl benzene sulfonate [CAS No. 25155-30-0] - Environmental hazard. Increases biological oxygen demand in surface water. See also Biological oxygen demand. **Uses:** As a wetting agent (surfactant) in heavy duty laundry products; metal cleaners, specialty cleaners and sanitation products.

Sodium hydroxide - See Chlorine.

Sulfur compounds (Including potassium metabisulfite [CAS No. 16731-55-8] and sodium bisulfate [CAS No. 7631-90-5]) - Corrosive irritant to skin, eyes, and mucous membranes; sulfur-containing compounds may be allergenic and may produce skin rashes or difficulty breathing in persons with asthma. When used in rust removers, may produce fumes of sulfur dioxide, a respiratory irritant.

Uses: Antioxidant and preservative in a variety of cleaning products.

Tetrachloroethlene - See Perchloroethylene.

Toluene (methylbenzene) [CAS No. 108-88-3] - Volatile, flammable liquid with strong chemical odor. Eye, skin and respiratory irritant. Central nervous system depressant. Cardiac sensitizer. Prolonged or repeated exposure may cause liver, kidney damage or anemia. Exposure during pregnancy may result in birth defects.

Uses: Solvent in a variety of products such as graffiti remover, floor polish, furniture polish, laundry starch preparations, household hard surface cleaners.

Trichloroethane (1,1,1-trichloroethane [CAS No. 71-55-6]; 1,1,2-trichloroethane [CAS No. 79-00-5]) - Colorless liquid with mild chloroform-like odor. Because it is four times heavier than air, vapors tend to collect in low spaces. Corrosive to aluminum. Repeated dermal exposure may result in skin irritation. Central nervous system depressant. Cardiac sensitizer. The 1,1,1-isomer is also a Class 1 ozone depleter (like CFCs) being phased out

under the Clean Air Act.

Uses: Solvent, degreaser, spotting fluid, drain cleaner; formerly used as an aerosol propellant.

Trichloroethylene [CAS No. 79-01-6] - Colorless liquid with mild chloroform-like odor. Because it is four times heavier than air, vapors tend to collect in low spaces. Suspected human carcinogen. Central nervous system depressant. Cardiac sensitizer. Associated with birth defects of the heart, and in animals, decreased fetal weight and abnormal sperm.

Uses: Degreaser, solvents, graffiti remover.

Xylene (dimethylbenzene) [CAS No. 1330-20-7] - Colorless, flammable liquid with a sweet odor. May attack some forms of plastic and rubber. Incompatible with strong oxidizers. Vapor may cause irritation of the eyes, nose and throat. Central nervous system depressant. Chronic exposure to xylene may cause dry irritated skin, reversible eye damage, anemia and toxicity to white and red blood cells.

Uses: Solvent, air fresheners, stainless steel cleaner, floor polish.







U.S. EPA Region 4

Buy Clean Initiative Training Manual for Eastern Kentucky School Districts

Developed by

Kentucky Pollution Prevention Center

420 Lutz Hall University of Louisville Louisville, Kentucky 40292

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Chapter 1

1.0 History of Environmentally Preferable Purchasing (EPP)

Environmentally Preferable Purchasing (EPP) was first introduced in 1993 when President Clinton signed Executive Order (EO) 12873, Federal Acquisition, Recycling, and Waste Prevention. In 1998, President Clinton signed EO 13101, Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition, which superceded the previous EO. However, it did retain similar requirements for the U.S. Environmental Protection Agency (EPA) to develop guidance to address environmentally preferable purchasing. EPA subsequently developed a Final Guidance on Environmentally Preferable Purchasing (www.epa.gov/opptintr/epp/finalguidancetoc.htm). EPA's final guidance document was designed to help federal agencies comply with President Clinton's EO 13101.

1.1 What is Environmentally Preferable Purchasing?

The federal government defines environmentally preferable purchasing, or EPP as it is more commonly known, as "...products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service."

What this really means is the goal of an EPP program is to get purchasers to select products that have a reduced effect on human health and the environment, when compared to other competitive products. Purchasers should consider the *life cycle* of the product. A product's life cycle considers all aspects of the product such as purchasing of raw material, manufacturing, packaging and distribution, use, and finally, disposal.

Environmentally preferable products can include items such as:

- Recycled content products
- Less toxic products
- Products with less packaging
- Water conserving products
- Biodegradable products

1.2 Does Our School Have to Use EPP?

Although Kentucky does require that schools implement recycling, as long as it is economically feasible, there are no state requirements or federal requirements for schools to implement the EPP program.

The goal of this training manual and the accompanying training is to help schools develop their own EPP Program. Although EPP can and does focus on many types of different products, the goal of this training focuses on identifying EPP products with respect to janitorial cleaning supplies. After this training is completed, it will be up to the individual schools to decide if they want to implement EPP.

1.3 Who are KPPC and SAR?

The Kentucky Pollution Prevention Center (KPPC) was established in 1994 through a Kentucky legislative mandate. KPPC serves as the state's resource for pollution prevention (P2) technical assistance to Kentucky industries, businesses, schools, and many other organizations. KPPC is located within the Speed Scientific School at the University of Louisville, but is responsible for working with organizations throughout the Commonwealth. Many of KPPC's services are free, non-regulatory, and confidential.

SAR is a non-profit organization that was established in 1997. SAR focuses on promoting environmental awareness and recycling among schools located in eastern Kentucky.

Initially, SAR worked with just a few schools in only a few counties, however their region eventually grew to over 205 schools representing nearly 21 counties.

KPPC and SAR understand the importance of environmental stewardship among our communities. The EPP program is an important step towards a safer and cleaner environment. It is our goal that this training manual will provide the foundation necessary for your school to implement a successful EPP program.

Chapter 2

2.0 Why Implement an EPP Program?

Implementing an environmentally friendly purchasing program for janitorial cleaning products is much more than simply "doing the right thing for the environment." Schools today face many difficult and challenging issues, not the least of which is trying to ensure that students learn in a clean and healthy environment. Children can spend up to eight hours a day in the school building; thus a healthy indoor environment is crucial. Just as important however, is that faculty and staff also work in a healthy, clean environment.

Allergic reactions to "sick" indoor environments keep 10,000 American children out of school each day. The Janitorial Products Pollution Prevention Project

(www.westp2net.org/Janitorial/jp4.htm), which was conducted in the San Francisco Bay area, found that six percent of the cleaning products that were analyzed were "so dangerous, that they should not be used" and an "additional 35 percent were dangerous, but can be used successfully with extreme care." The project identified some of the most dangerous products as acid toilet bowl cleaners; floor finish strippers; heavy-duty, high strength degreasers; sewer drain openers, and oven cleaners.¹

As part of this same study, an 18-month evaluation of janitors in Santa Clara County was undertaken and found that the 27,000 janitors working in the county sustained approximately 1,200 injuries annually, 20 percent of which were mostly chemical burns to the eyes or skin. A further review of just 25 percent of the county's janitors found that

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¹ www.westp2net.org/Janitorial/jp4.htm

they used 400,000 pounds of hazardous materials annually in cleaning, or approximately 60 pounds a year per janitor.²

Based upon the statistics presented above, it is obvious that schools do face difficult challenges in maintaining healthy buildings to all involved individuals – teachers, staff, and students. However, if adopting an EPP program for janitorial products is beneficial to schools, then why are more schools not taking advantage of this program? A summary provided below helps identify advantages and disadvantages to such a program, and may help your school overcome these obstacles in the future.

EPP Program for Janitorial Cleaning Products

♦ Advantages

- Creates a safer environment for students, faculty and staff;
- May reduce the potential for concerns about chemical compatibility;
- Disposal of environmentally friendly products will be easier;
- Potentially fewer cleaning products;
- Potential to streamline purchasing with fewer products;
- Reduce the chance for exposure to dangerous chemicals; and
- Environmental stewardship "Lead the Charge".



Disadvantages

- It is new people may not want to cooperate;
- It is different people are unsure of different ideas;
- Change is often challenging and can be time consuming; and
- Training will likely be necessary.

5

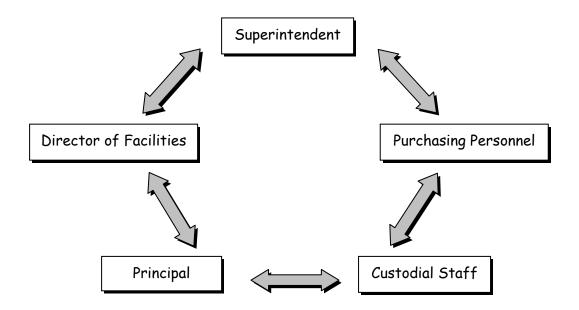
² www.cleaninapro.com

Remember, change is always difficult. But, it is important to stress to those directly involved (janitorial cleaning staff, purchasing department, etc.) the benefits that these individuals can enjoy. As with anything, making sure that people from all departments within the school are involved is extremely important to the success of your program.

Chapter 3

3.0 Your EPP Team: Who & Why

An environmental purchasing effort requires the involvement of a number of key players. Facilitating communication and partnerships between these individuals and departments will be key to the success of your school's effort.



3.1 Key Team Players

The *Superintendent* encourages widespread participation in the program by issuing a policy statement or directive communicating the school district's commitment to EPP (some sample policy statements are provided at the end of this chapter). Faculty and staff will follow the lead once the climate of acceptance has been conveyed from the highest school authority.

The *Director of Facilities* provides technical expertise to identify environmental and health risks and helps to develop criteria and specifications for selecting safer products that also meet performance standards. This position is ultimately responsible for final product approval.

Purchasing Personnel develop product bid specifications, maintain a listing of acceptable product alternatives and costs, and process orders.

The *Principal* allows and encourages participation at the individual school, therefore, setting the climate of acceptance for faculty and staff at a more direct level.

Custodial Staff identify product performance needs and use products. *Custodial staff* input and participation is essential for success of the program.

3.2 Forge Partnership Between Facilities Director and Purchasing Department

An effective partnership between the facilities director and the purchasing department is key. The two entities must work together to design the bid specifications to meet the goal of the project while ensuring product performance. Purchasing personnel will rely on the facilities director for technical input in the bid specifications.

3.3 Custodial Staff Input

As the ultimate end-user of the products, custodial staff involvement in the decision-making process is critical to the success of the program. It is important to recognize and utilize the expertise of the staff as the products are evaluated. Additionally, it will increase the morale of custodians who recognize the school's concern for their health and working conditions and who appreciate the opportunity to participate in making decisions about their work.

Example EPP Policy Statements

- 1. The Douglass County School District is committed to providing a safe and healthy environment for its faculty and students. To help achieve this, schools are encouraged to implement an environmentally preferable purchasing (EPP) program for janitorial cleaning products. Purchasing environmentally friendly cleaning products demonstrates our goal to live and work in a cleaner environment.
- 2. The Douglass County School District is committed to minimizing the adverse environmental impacts of its purchases through environmentally preferable purchasing (EPP) for janitorial cleaning products. EPP not only protects the environment; but also protects human health, thus ultimately improving the overall quality of the District's school purchases by placing an increased value on the well being of its faculty, staff and students.
- 3. The purchase and use of products and services can have a profound impact on the environment. The Douglass County School District recognizes the positive impact that it can make on the environment through the purchasing decisions that its employees make. It is the intent of the District to integrate environmentally preferable purchasing (EPP) considerations into purchases of janitorial cleaning products. Although the environment may not be the core of our professional mission, the integration of these factors will result in economic, health and environmental gains that will further our goals while providing a safe and clean environment for our faculty, staff and students.

Chapter 4

4.0 How to Implement an EPP Program

Implementing an EPP program will require time and effort from a variety of individuals. Though it may seem like a huge task, large state governments like the State of Massachusetts have developed their own successful EPP program. The implementation process has been separated into a series of steps that will hopefully allow things to move more smoothly.

4.1 Step One - Inventory Current Cleaning Products

A Product Inventory Sheet is included in **Appendix A**. This is used to identify the types and quantities of products that your custodial staff is currently using. This basically includes toilet bowl cleaners, floor cleaners, glass cleaners, etc. Remember, this program only focuses on custodial cleaning products and does not look at other products outside of this specific area.

In order to collect accurate product inventory information, you will want to interview your purchasing personnel, custodial staff, and others that may have knowledge of your cleaning products. It is important to talk to all groups; you may be temporarily out of stock of a particular product and not know it unless you talk to all parties. Make sure you have developed a complete list of all the cleaning products used.

4.2 Step Two - Identify Cleaning Product Ingredients & Safety Concerns

After you have fully inventoried your custodial cleaning products, you will then need to identify the health and safety of each product. Remember, the purpose of implementing

this EPP program is to find substitute cleaning products that have reduced effects on the health of your people, and on the environment where they work.

There are two primary ways to evaluate the health and safety of your cleaning products; use the material safety data sheet (MSDS) that should accompany each cleaning product you use, or read the labels on each cleaning product. The MSDS provides more detailed information and will be briefly discussed in this section, but a more thorough discussion of an MSDS is presented in **Appendix B**.

An MSDS provides information about a particular product and hazards that may be associated with that product. The federal Occupational Safety and Health Administration (OSHA) mandate MSDS's. OSHA requires every company that manufactures or distributes hazardous chemicals in the United States to prepare an MSDS. An MSDS must provide a variety of fundamental information related to the chemical that will allow the user to recognize and prepare for potential hazards associated with the chemical and prepare for and react to emergency situations. It is required by law that employers provide copies of MSDS's to employees that use those specific products.

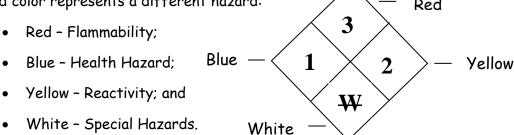
OSHA requires specific elements that must be contained within all MSDS's. However, it does not mandate the format this information is presented. Therefore, you will receive MSDS's from different companies that will not look alike. Examples of several different types of MSDS's are provided in **Appendix** C.

At a minimum, OSHA requires that every MSDS contain the following information:

- Chemical identity The identity of the substance as it appears on the label.
- Manufacturers name and contact information Manufacturer's name, address, telephone number and emergency telephone number. The date the MSDS was prepared and an optional signature of the preparer.
- <u>Hazardous ingredients/identity information</u> Lists the hazardous components by chemical identity and other common names. Includes OSHA Permissible Exposure Limit (PEL), ACGIH Threshold Level Value (TLV) and other recommended exposure limits. Percentage listing of the hazardous components is optional.
- <u>Physical/chemical characteristics</u> Boiling point, vapor pressure, vapor density, specific gravity, melting point, evaporation rate, solubility in water, physical appearance and odor.
- Fire and explosion hazard data Flash point (and method used to determine it), flammability limits, extinguishing media, special firefighting procedures, unusual fire and explosion hazards.
- Reactivity data Stability, conditions to avoid, incompatibility (materials to avoid), hazardous decomposition or byproducts, hazardous polymerization (and conditions to avoid).
- Health hazard data Routes of entry (inhalation, skin, ingestion), health hazards (acute = immediate and chronic = build up over time), carcinogenicity, signs and symptoms of exposure, medical conditions generally aggravated by exposure, emergency and first aid procedures.
- Precautions for safe handling and use Steps to be taken in case material is released or spilled, waste disposal method, precautions to be taken in handling or storage, other precautions.
- Control measures Respiratory protection, ventilation (local, mechanical exhaust, special or other), protective gloves, eye protection, other protective clothing or equipment, work/hygienic practices.

Some MSDS's will have the National Fire Protection Association (NFPA) safety diamond. The diamond is divided into four sections, each designated with a different color that contains a number between 0 and 4; the lower the number, the less the hazard. Each section and color represents a different hazard:

— Red



Additional information on the NFPA safety diamond is provided in **Appendix D**. The Hazardous Materials Identification System (HMIS) can also be used to help identify hazardous materials. The HMIS uses horizontal bars rather than a diamond and focuses on worker exposure versus fire hazards. The numbers for both models represent the same level of hazard. Additional information on the HMIS is also provided in **Appendix D**.

Health	2	Blue
Flammability	1	Red
Reactivity	0	Yellow
Personal Protection	В	White

Although MSDS's provide much good information, they can have errors, the data can be incomplete, etc. - in short, they may not tell the whole story. That is why it is equally important to look at the cleaning product labels, in addition to the accompanying MSDS's. Look for warnings on the labels such as CORROSIVE, CAUTION, WARNING, DANGER,

POISON, FLAMMABLE, COMBUSTIBLE, etc. If, after reviewing the MSDS and the product label you are still unable to make a decision as to the safety of the product, contact the product manufacturer, vendor, distributor, etc. and request additional information.

4.3 Step Three - Listing Product Attributes

Identifying health and safety impacts of your cleaning products is not enough. You will need to take the information that you learned (via the MSDS's, product labels, etc.) and develop standards that you can compare your products against. Unfortunately, there are no universal standards that have been established to determine if certain cleaning products are environmentally preferable. However, some organizations have identified "attributes" they consider when purchasing environmentally friendly cleaning products. Several EPP projects have been implemented that focused on janitorial cleaning products. These include a joint study conducted by the Government Services Administration (GSA) and the EPA in 1993, and a second program implemented in the City of Santa Monica. Both studies (among others) are included in Chapter 6 - EPP Case Studies and have identified key environmental attributes that were considered when purchasing environmentally friendly cleaning products. These attributes are presented below.

- \square <u>Skin/Eye Irritation</u> the potential for adverse reactions from skin/eye exposure to the product.
- <u>Chronic health risks</u> the likely chronic health risks from skin and inhalation exposure to the product.
- Biodegradability toxic chemicals usually degrade to less toxic forms. The faster a chemical degrades, the lower the exposure potential. As a rule of thumb, for an "environmentally-preferable" product, more than half should biodegrade within 28 days. The balance of the product should biodegrade within a few months after its application.

<u>Carcinogens</u> - products that contain known or suspected carcinogens (cancer causing) should not be used.
<u>Percentage of volatile organic compounds (VOCs)</u> - VOCs are known to contribute to smog formation and create health risks. Products that do not contain VOCs in concentrations that exceed 10% of the weight of the product are preferred.
Amount of product packaging – products with reduced packaging decrease the volume of waste that must be disposed.
<u>Presence of ozone depleters</u> - ozone-depleting compounds should be minimized. Click on this link, http://www.epa.gov/ozone/ods.html to view a list of ozone-depleting substances provided by the U.S. EPA.
<u>Potential exposure to the concentrated cleaning solution</u> - the product dispensing method should include safety precaution designs to minimize exposure to the concentrated solution.
Flammability - non-flammable products are preferable.
<u>Presence of fragrances and dyes</u> - cosmetic additives can be considered unnecessary additives that increase overall life-cycle impacts and that could increase health and safety and ecological concerns.
<u>Energy needs</u> - products that work effectively in cold water reduce energy consumption.
<u>Presence of petroleum or hydrocarbons</u> – petroleum or hydrocarbon chemicals should be minimized whenever possible.
<u>Corrosiveness</u> - does the product have an unusually low or high pH? Water has a pH of 7.0.

These attributes are not meant to be inclusive of all attributes that other organizations have identified. However, they provide an excellent framework from which your school can develop an environmentally friendly procurement program for janitorial cleaning

products. Appendix E contains a blank EPP Selection Criteria Checklist with a list of attributes that your school may want to use. For simplicity, the checklist does not include all attributes listed in this chapter. Also included in Appendix E is a sample Selection Criteria Checklist for a glass cleaner.

4.4 Step Four - Developing a Purchasing Policy/Bid Specifications

You must develop bid specifications for your potential vendors. This will take some time, but the effort is well worth it. Develop the bid specifications so that they are clear and easy to understand. It will require much less of your time in the long run if the specifications are easy to read and very succinct. Your bid specifications will include the same attributes you selected from the previous section.

To help you develop your own bid specifications, an example is included in **Appendix F**. Although this may be more detailed than what you initially need, it should give you a good start. It is probably a good idea to require product samples as part of your bid specifications so you can test them at your school.

4.5 Step Five - Identifying Alternative Cleaners

Finding a list of vendors, let alone a list of alternative cleaners can be a time-consuming project. It is best to start with your current vendor to see if they carry the products that you are seeking. The next step is to search other vendors and find out the types of products they may carry.

Your current vendor, along with others you may contact may not readily have the information necessary to make your decisions. But, you are in the driver's seat, if they want your business, they will do what is necessary. It will likely take time and patience.

They are probably not accustomed to their customers asking for the kind of information you need. Ask for MSDS's for the products you want. If these are not readily available, request that they get this information from the manufacturers directly. They may not want to go to this trouble. You can either try to find another vendor, or ask who the manufacturer is and make a request for the MSDS's directly. Always ask for samples of the products that you are interested in. Many vendors will want to visit your school to demonstrate their product. Take them up on this. This will give you an opportunity to meet them directly and determine if they are someone that you want to do business with. Be sure to arrange their visit with your custodial staff. They will want to be there for the product testing.

4.6 Step Six - Make the Switch!

You have come this far, now it is time to finish the job. You will want to establish a target date when you would like to have your EPP program in place. Without a target date, it is easy to get sidetracked, and before you know it, too much time has elapsed along with any enthusiasm your school may have had. It is important to establish a realistic target date; too short and you are sure to miss it, too long and folks may lose interest. There is no rule of thumb here. You will have the best idea as to how long it will take your school to implement the program.

Training will be absolutely necessary. Your new products may require a completely different approach; therefore it will be necessary to arrange training for your custodial staff. Ask the vendor that you have selected to provide training to use their product. If they want your business, they will be happy to provide this training. Remember, this is something new, so don't be alarmed if your staff is less than enthusiastic. It is important to explain why you are changing the program, and stress the health benefits they can

expect. Change for no reason will be met with frustration, lack of cooperation, and ultimately may result in your program failing.

Don't forget that as you phase the program in, you will need to dispose of your old cleaning products. There are several options you have available:

- Donate them to other organizations that can use them;
- See if your vendor will take them (not very likely, but it won't hurt to ask); and
- Proper disposal make sure you know the proper disposal method for all of your old products! Contact the Kentucky Division of Waste Management at 502-564-6716 with disposal questions.

Remember, you may have limited storage for your cleaning products, so it is best to try and dispose of as many of your old cleaning products as possible, before your new, environmentally friendly products arrive!

Chapter 5

5.0 Evaluate Your EPP Program's Success

In Spring 2002, KPPC will mail a follow-up survey to all schools associated with this grant. The scope of the survey will address whether or not the schools implemented or attempted to implement an EPP program based upon information received through the Buy Clean training program conducted in October 2001. The survey will attempt to quantify any changes the schools experienced based upon implementation.

Information obtained through the survey is crucial, as it will provide an idea of whether or not this program is feasible to implement within the existing school structure. It will also indicate whether the information provided in the training manual was sufficient to allow schools to implement the program without additional technical oversight. Input from the survey will be used in developing any future revisions to the manual.

Topics to be addressed in the survey include:

- A copy of the initial *Product Inventory Sheet* and *EPP Selection Criteria Checklist* filled out by the school at the beginning of the process.
- A list of alternative products selected to be used and what original products each replaced along with an updated *EPP Selection Criteria Checklist*.
- Any cost factors associated with the change addressing whether new products selected are more expensive or less expensive than existing products.
- Staff acceptance and involvement in the project.
- Overall school climate on implementing the program.
- Any physical or environmental changes experienced since implementation.

- Reasons for not participating for any schools who did not attempt to implement the EPP program.
- Reasons for failing to implement the program for those who attempted but did not follow-through.

Chapter 6

6.0 EPP Case Studies

Three different EPP Case Studies focusing on janitorial cleaning products are covered in this chapter. These include:

- City of Santa Monica;
- Yellowstone and Grand Teton National Parks; and
- Joint Government Services Administration and EPA Project.

A brief discussion of each project is provided below:

6.1 City of Santa Monica

The City of Santa Monica, California has a population of 90,000 and generates more than \$520 million per year on tourism. In 1998, the city decided to replace their janitorial cleaning products with more environmentally friendly substitutes. Through this project, they were able to eliminate 3,200 pounds annually of hazardous materials by replacing 15 of 17 cleaning products with less toxic or nontoxic alternatives. In addition, they were able to reduce their spending by five percent on custodial products.

6.2 Yellowstone and Grand Teton National Parks

Yellowstone and Grand Teton National Parks significantly reduced the toxicity of their janitorial cleaning products. During the product inventory, 130 different cleaning products were identified in use at Yellowstone; another 30 were found on shelves but were not being used. Many of the products contained chemicals known to have significant health impacts to workers. The parks chose to use the bid specifications that were first developed by the City of Santa Monica. Important lessons learned during this project included:

- Early coordination with warehouse manager and purchasing departments;
- Identifying someone that will serve as the "champion" to push the project along; and
- Obtaining top management support that is regularly communicated.

6.3 GSA and EPA Cleaning Products Pilot Project

A cooperative effort between the U.S. General Services Administration (GSA) and the U.S. Environmental Protection Agency (EPA) was initiated to facilitate the purchase of environmental preferable cleaning products. The joint GSA/EPA project team developed a matrix that can be used to identify and compare commercial cleaning products with reduced impacts to human health and the environment.

Chapter 7

7.0 EPP Resources

There are many different resources available for environmentally preferable purchasing. Many of the sites listed on the following pages will include additional links to still other sites with even more information.

7.1 EPP Online Resources

EPA's Environmentally Preferable Purchasing Program Web Site www.epa.gov/oppt/epp

Includes EPA's guidance on EPP, descriptions of federal pilot projects, and tools and resources – including the EPP database, collections of case studies, and electronic copies of the EPP Update.

EPP Update

www.epa.gov/opptintr/epp/docupdates.htm

EPA's semi-annual newsletter on EPP program activities. Issues of this publication are available online.

FPP Database

http://notes.erg.com

Contains information on more than 600 products and services. It provides links to contract language and specifications created and used by federal and state governments and others to buy environmentally preferable products and services.

EPPNET

www.nerc.org/eppnet.html

The Northeast Recycling Council (NERC) established the EPPNET list server to link federal, state, local, and private procurement and environmental officials. Potential participants must first register for approval.

Hospitals for a Healthy Environment (H2E) Environmentally Preferable Purchasing Guide

www.geocities.com/EPP_how_to_guide

While aimed at hospitals, the principles and steps in this EPP guide are applicable to any type organization. This Web site is a cooperative project of the U.S. EPA and the American Hospital Association.

National Pollution Prevention Roundtable (NPPR) EPP Discussion Group www.p2.org/workgroup/epp

The EPP Discussion Group was formed in 1999 to promote networking and communication among people practicing EPP and people interested in learning about EPP; minimize duplication of effort on EPP issues through increased communication; and serve as a resource to NPPR members interested in EPP.

The Environmentally Preferable Purchasing Guide

www.swmcb.org/EPPG/1_1.htm

Published by the Solid Waste Management Coordinating Board, a group consisting of six metropolitan counties in Minnesota, this online EPP guide is aimed at government and school purchasers. The guide reviews more than 30 product areas, providing information on cost, performance, specifications, and availability.

King County, Washington Environmental Purchasing Program

www.metrokc.gov/procure/green

King County's Web site provides a history of the county's EPP policies, descriptions of its experience with various environmentally preferable products, bid and contract specifications, and local vendor information.

Massachusetts Environmentally Preferable Products Procurement www.state.ma.us/osd/enviro/enviro.htm

The Commonwealth of Massachusetts is one of the first states in the country to initiate an EPP program. Its Web site includes state EPP policies and regulations, bid and contract specifications, and product information and experience.

Minnesota Materials Management Division Environmentally Responsible Purchasing

www.mmd.admin.state.mn.us/envir.htm

Provides new updates on various products available to state agencies, lists environmentally responsible products and services available, highlights state legislative and executive order requirements, and includes an electronic version of the state's biennial report on EPP.

City of Santa Monica's Purchasing Policy

www.ci.santa-monica.ca.us/environment/policy/purchasing

Provides criteria for procuring products and services, negotiating contracts and bid specifications, and complying with city ordinances through environmental preferable purchasing.

Office of the Federal Environmental Executive

www.ofee.gov

The Office of the Federal Environmental Executive serves to implement E. O. 13101, which is designed to further expand and strengthen the federal government's commitment to recycling and buying recycled-content and environmentally preferable products. The Web site contains various reports and resources.

U.S. Department of Energy's Federal Energy Management Program (FEMP) www.eere.energy.gov/femp

FEMP seeks to help government agencies reduce energy and water use, manage utility costs, and promote renewable energy. The Web site provides information about the program's mission, technical assistance resources, and documents highlighting program success stories

Medical Academic and Scientific Community Organization, Inc. (MASCO) http://www1.netcasters.com/mercury/

MASCO has developed a mercury database for 1,147 different compounds. Users can select one of the compounds listed from the database and then calculate the quantity of mercury in the compound based upon the total amount used.

Cleaner Technologies Substitute Assessment (CTSA)

http://www.epa.gov/opptintr/dfe/tools/ctsa.htm

CTSA is a methodology for evaluating the comparative risk, performance, cost, and resource conservation of alternatives to chemicals currently used by specific industry sectors. It was developed by the EPA Design for the Environment (DfE) Program, the

University of Tennessee Center for Clean Products and Clean Technologies, and other partners in voluntary, cooperative, industry-specific pilot projects.

7.2 EPP Documents

To order hard copies of these publications (except WasteWise Updates), contact the Pollution Prevention Information Clearinghouse at 202-260-1023 or by e-mail: ppic@epa.gov. The following documents are also available online at www.epa.gov/opptintr/epp/documents/doccase.htm

Federal Pioneers: Environmentally Preferable Purchasing Stories from the Federal Government

EPA 742-F-00-008. September 2000.

Includes case studies on 27 successful applications of EPP in the federal government. The examples include everything from photocopiers to custodial services. They are from a diverse group of agencies - from the Department of Interior to the Navy - demonstrating the different ways EPP can be applied and providing models for other federal purchasers.

Private Sector Pioneers Report

EPA742-R-99/001. June 1999.

Highlights the EPP efforts of 18 private companies. Besides expanding the market of green products, many of the companies in the report are preventing pollution and saving millions of dollars through EPP.

State and Local Government Pioneers: How State and Local Governments Are Implementing Environmentally Preferable Purchasing Practices

EPA742-R-00/004. November 2000.

Illustrates how more than 40 state and local governments are implementing EPP. The study shows that green purchasing is expanding beyond recycled content products to include many other environmental attributes, such as chlorine-free, reduced volatile organic compounds content, use of alternative fuels, and reduced product packaging.

Green Spending: A Case Study of Massachusetts' Environmental Purchasing Program.

EPA742-R-98/002. August 1998.

Highlights the unique approach taken by the Commonwealth of Massachusetts in its environmental purchasing program. The commonwealth's proactive decisions regarding environmental purchasing have made the state a leader among state governments in EPP.

Leading by Example: How EPA Incorporated Environmental Features into New Buildings.

EPA742-R-98/001. January 1998.

Provides two case studies to demonstrate how large building projects can cost-effectively incorporate environmental features, while also addressing the concerns unique to each site. The case studies describe how EPA balanced function, cost, and environmental impact while designing and constructing two new EPA facilities.

Defending the Environment at the Department of Defense.

EPA742-R-99/002. July 1999.

Documents how the U.S. Department of Defense (DOD) introduced EPP into routine renovations of the Pentagon and several other DOD facilities.

Chapter 8

8.1 Glossary of Environmentally Preferable Purchasing Terms

Acids - Solutions with a pH range between 0 to 6.9. They are corrosive between pH 0 and 2.0 and produce severe burns on contact. See also pH.

Uses: Many cleaning products (e.g., delimers, bathroom cleaners, bowl cleaners) are acidic.

Acute health effects - Effects which occur rapidly as a result of short-term (usually less than 24 hours) exposures. Acute effects are usually of short duration, but long-term effects can occur after one exposure. Examples include irritation, corrosivity, chemically induced unconsciousness (narcosis), or death.

Acute toxicity: The potential of a chemical substance to cause adverse health effects from short-term exposure.

Aerosol propellants - Gases used to pressurize spay products. Chlorofluorocarbons, which deplete the ozone layer, may be found in old cleaning products. Today other chemicals, such as isobutene, a petroleum product may be used. Hydrocarbon propellants like isobutene contribute to smog problems because of their contribution to tropospheric (ground level) ozone formation.

Alkalies (bases) - Solutions with a pH range between 7.1 to 14.0. An alkali is corrosive when pH is higher than 11.5. See also pH.

Uses: Many cleaning products (e.g., bleach, detergents, dishwashing soaps, drain openers and oven cleaners) are alkalies.

Ambient air pollutants: Pollutants for which ambient air quality standards have been developed. These pollutants include nitrogen dioxide, sulfur dioxide, ozone precursors, particulate matter, carbon monoxide, and lead.

Bioaccumulate: The process where chemicals are collected and stored in plant and animal tissue. Some products may contain ingredients that will be taken up by smaller aquatic plants and animals and increase in concentration through the food chain as these plants and animals are consumed by larger animals.

Biobased product: Commercial or industrial products (other than food or feed) that utilize biological products or renewable, domestic, agricultural (plant, animal and marine), or forestry materials.

Biodegradable: The ability of a substance, material or product ingredient to readily decompose under natural conditions by the action of microbes.

Biological oxygen demand (BOD) - Refers to increase use of oxygen by microorganisms in surface water when they metabolize organic chemicals. The total BOD load in an aquatic ecosystem is an important water quality parameter because this increased use of oxygen reduces amounts available to aquatic organisms like fish. At the same time, it is important to note that the availability of carbon sources (essentially what BOD measures) is often not the primary limiting factor in the growth of microorganisms in an aquatic ecosystem. In many aquatic ecosystems, other nutrients grow and it is the additional loading of these nutrients, rather than carbon, that is the primary factor in excessive microbial growth and oxygen depletion.

Carcinogen - Chemical capable of causing cancer.

Cardiac sensitizer - Chemical which, upon repeated exposure, can in some persons cause the heart to become sensitive to the stimulant properties of epinephrine (which is produced by the body's adrenal glands). Subsequent exposure to the sensitizer may cause fatal cardiac arrhythmias. Some chlorinated solvents are sensitizers.

CAS number - Chemical Abstract System number. A unique number used to identify each chemical.

Central nervous system depressant - Chemical toxic to neurons in the brain. With increasing acute exposure, CNS depressants cause headache, dizziness, confusion euphoria, drowsiness, loss of consciousness and death through inhibition of breathing. Chronic exposure may cause tremors, personality changes, visual impairment, and loss of hearing, memory, or intellectual capacity. Many organic solvents are CNS depressants.

Chronic health effects - Effects which generally occur as a result of long-term exposure, and are long duration. Examples include cancer, liver damage and chronic bronchitis.

Chronic toxicity: A chemical that is toxic over continual/repeated exposure.

Combustible - A substance having a flash point at or above 100° Fahrenheit up to and including 150° Fahrenheit, according to the Consumer Product Safety Commission. The Occupational Safety and Health Administration defines a combustible liquid as having a flashpoint at or above 100° Fahrenheit but below 200° Fahrenheit.

Corrosive - Chemical which, upon contact can cause deep tissue damage, such as burns to eyes or skin.

Dyes - (Includes azo, basic disperse, fiber-reactive, vat dyes and fluorescent agents) May cause allergic reactions.

Uses: As colorants or whitening agents in many products, including all-purpose cleaners, disinfectants, fabric softeners.

Flammable - A substance having a flashpoint above 20° and below 100° Fahrenheit, according to the Consumer Product Safety Commission. An extremely flammable substance has a flashpoint at or below 20° Fahrenheit.

Flashpoint - Lowest temperature for sufficient vapor to form in the presence of oxygen to permit ignition.

Fragrances - Any of 4,000 chemicals. May cause skin irritation, discoloration, rashes or allergic reactions. May be irritating to the eyes and respiratory tract.

Uses: Many cleaning products, either to simulate the smell of "fresh air", flowers, etc., or to mask odors of other chemicals in the product.

Hazardous ingredient - Toxic, corrosive, ignitable, or reactive ingredient.

Incompatible - Chemicals which are incompatible react violently or produce toxic byproducts.

Irritation - Redness, swelling or tissue damage caused by chemicals. The degree of irritation is dependent on dose. Chemical irritation may result in mild skin itching, or fatal damage to the lungs.

LC50/Lethal concentration - A measure of acute toxicity. The lethal concentration that if inhaled will kill half of a group of organisms in an experiment in a given time. In EPA's Toxic Substances Control Act program, a chronic LC50 or Ec50 <0.1 mg/L is highly toxic; and a chronic LC50 or EC50 > 10 mg/L is a low toxicity.

LD50/Lethal dose - A measure of acute toxicity. The lethal dose that will kill 50% of lab animals exposed to it orally or through the skin. The lower the LD50, the more toxic the compound.

Mutagen - A chemical that can alter genetic material in humans.

Organic chemical - A chemical which contains carbon. Chemicals which do not contain carbon are termed "inorganic".

Oxidizer (oxidizing agent) - A chemical capable of reacting with other chemicals in an "oxidation" reaction. Chemical reactions involving strong oxidizers may release heat or be explosive.

Ozone depletion - Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.

pH - A measure of the acidity or alkalinity of a solution. A pH of 7 is considered neutral. A pH greater than 7 indicates alkalinity. A pH less than 7 indicates acidity. In the absence of specific test data on irritation, pH provides some insight into whether a product will be corrosive or cause irritation. Products with very high or very low pH (11.5 or 2) should be assumed to be corrosive. High or low pH values (e.g., between 9 and 11, or between 4 and 2) indicate the product would be more irritating than neutral pH products where the pH is closer to 7.

Sensitizer - A chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction after repeated exposure to the chemical.

Solvent - Liquid used to dissolve other substances. Aqueous solvents consist primarily of water, while organic solvents can include a variety of organic chemicals such as acetone, benzene, toluene, ethyl acetate, xylene and turpentine. Most organic solvents are Volatile Organic Compounds (VOCs) that contribute to smog problems because of their contribution to tropospheric (ground level) ozone formation.

Teratogen - A chemical that causes malformation in the fetus and/or birth defects in humans.

Volatile Organic Compounds (VOCs) - In this context, VOC means any organic compound (carbon containing) which has a vapor pressure of greater than 0.1 mm Hg or, if the vapor pressure is unknown, has 12 or fewer carbon atoms. VOCs in cleaning products are of potential concern because of indoor air exposures to office workers and others. They are also of concern because they contribute to the formation of smog in outdoor air. Some

chemicals considered VOCs include acetone, benzene, perchloroethylene, among many others.

8.2 Glossary of Common Cleaning Chemicals

Acetone [CAS No. 67-64-1] - Flammable volatile liquid with distinctive odor. Reacts explosively with hydrogen peroxide. Irritating to eyes, respiratory tract and skin. May be absorbed by inhalation. Can cause changes in liver's ability to metabolize inhalation. Can cause damage, dizziness, sedation and coma.

Uses: Spot and graffiti remover, solvent.

Ammonia compounds - (Includes ammonium chloride [CAS No. 12125-02-9], ammonium hydroxide [CAS No. 1336-21-6], benzalkonium chloride [CAS No. 8001-54-5]) - Usually liquids with a pungent odor. Corrosive in concentrations found in commercial products (over 10%). Forms irritating chloramine gas when combined with chlorine-containing products. Fumes can cause irritation of the eyes, respiratory tract. Liquid can cause skin burns. Toxic to fish, and reduces oxygen in surface water.

Uses: In many cleaning products, depending on concentration, as antiseptic, bactericide, fungicide, sanitizer, deodorant. Used in detergents as a surfactant. Also found in floor polish, glass window cleaners, household hard surface cleaners, rug and upholstery cleaners.

Ammonium chloride [CAS No. 12125-02-9] Colorless crystals which are soluble in water and ammonia. Dust is mildly irritating to eyes, nose and throat. See also Ammonia compounds, Quaternary ammonium chloride. Ammonium chloride is harmful to aquatic life in very low concentrations.

2-Butoxy ethanol [CAS No. 111-76-2] (Also known as Ethylene glycol monobutyl ether; Monobutyl ethylene glycol) - Incompatible with bleach. May damage eyes and respiratory tract. Absorbed defects in lab animals. With chronic exposure, causes central nervous system toxicity, testicular atrophy.

Uses: In many cleaning products, including glass, window and all-purpose cleaners.

Benzene [CAS No. 71-43-2] - Flammable liquid with a sweet odor. Toxic to bone marrow, and cause of leukemia in humans. In 1978, the Consumer Product Safety Commission outlawed its use in many cleaning products, although it may still be found in old stocks. Degrades slowly. See BOD discussion.

Uses: Spot remover, carpet spotter, laundry starch preparations.

Carbolic Acid - See Phenol

Caustic soda - See Lye.

Chlorine [CAS No. 7782-56-5] (including sodium hypochlorite, Clorox) - Strong oxidizer. Produces toxic chloramines gas when mixed with ammoniated cleaning products. Corrosive to eyes and skin. Fumes are irritating or corrosive to the respiratory tract. Can kill microscopic life in waterways, septic tanks and sewage treatment plants. Toxic to aquatic life.

Uses: Bleach, disinfectants, all-purpose cleaners, mildew remover, bathroom cleaners, spot removers, or in scouring powders.

Chlorine dioxide [CAS No. 10049-04-4] (chlorine oxide) - Strong oxidizing gas which can be dissolved in cold water. It may react with hot water or steam to produce toxic and corrosive fumes of hydrochloric acid. Severe respiratory and eye irritant.

Uses: Bactericide & antiseptic.

Dicholoromethane - See Methylene chloride.

Dimethylbenzene - See Xylene.

Ethanol (alcohol) [CAS No. 64-17-5] - Clear liquid which can be absorbed by inhalation and across skin. Central nervous system depressant. Vapors can produce some eye and upper respiratory tract irritation.

Uses: Detergents, disinfectants, carpet cleaners, tub and tile cleaners, air fresheners.

Ethylene glycol monobutyl ether - See 2 - Butoxy ethanol.

Limonene (d-Limonene, 4-isopropenyl-1-methylcyclohexene [CAS No. 5989-27-5]) - A flammable, colorless liquid in some plants. Skin irritant, sensitizer. If ingested in sufficient quantity, may be toxic to kidneys. When heated to decomposition, emits acrid smoke, fumes.

Uses: Aerosol, non-aerosol deodorants/air fresheners, bathroom tub and tile cleaners, hard surface cleaners, liquid laundry detergents, dry cleaning pre-spotter, polishing preparations, mechanics soap, oven cleaners, rug/upholstery cleaners, other specialty cleaning and sanitation products.

Lye (caustic soda, sodium hydroxide [CAS No. 1310-73-2], potassium hydroxide [CAS No. 1310-58-3]) Corrosive white crystals or colorless liquid. Liquid may cause severe eye burns or blindness, or skin burns with subsequent tissue scarring.

Vapors are irritating to the eyes and respiratory tract. Aerosol formulations present an inhalation hazard.

Uses: Drain opener, oven cleaner, detergents.

Methylbenzene - See Toluene.

Methylene Chloride (methylene dichloride; dichloromethane) [CAS No. 75-09-2]. Colorless liquid. Incompatible with strong oxidizers and caustics. Central nervous system depressant. Probable human carcinogen.

Uses: Disinfectant, all-purpose cleaner, degreaser, septic tank cleaner, laundry starch preparations, rug and upholstery cleaners.

Monobutyl ethylene glycol - See 2-Butoxy ethanol.

Naphthalene [CAS No. 91-20-3] White crystalline solid with the odor of mothballs. Skin exposure may cause severe dermatitis. Irritating to eyes and respiratory tract. Inhalation may cause headache, nausea, confusion, damage to red blood cells. Possible human carcinogen.

Uses: Detergents, air fresheners, spotters.

Nitrobenzene [CAS No. 98-95-3] - A yellow oily liquid with an odor like shoe polish. May be absorbed via inhalation and through the skin. Chronic inhalation may cause liver damage. May bind with blood to reduce oxygen availability. Central nervous system depressant.

Uses: Furniture polish, floor polish.

Perchloroethylene (tetrachlorethylene; ethylene tetrachloride; PERC) [CAS No. 127-18-4] - Colorless volatile liquid about $1\frac{1}{2}$ times heavier than water. Central nervous system depressant, liver and kidney toxicant. Inhalation may cause respiratory tract irritation or cardiac arrhythmias. Irritating to the skin and eyes on direct contact. When released in water, can smother small aquatic life. Can be toxic to sewage treatment bacteria. **Uses:** Graffiti remover, carpet spotter, metal cleaner, degreaser, dry cleaning solvent, furniture polish, household hard surface cleaners, laundry starch preparations, oven cleaner

Petroleum distillates - The lighter liquid hydrocarbons refined from crude oil by distillation, including petroleum ether, naphtha, mineral oil, mineral spirits, Stoddard solvent and kerosene. (Heavier distillates include propane and butane). Liquid petroleum distillates contain varying, but usually small amount of aromatic hydrocarbons (benzene, toluene, xylene, cycloparaffins, naphthenes). Liquid petroleum distillates are flammable. They are skin, eye and respiratory tract irritants. See also volatile organic compounds. Uses: Found in many janitorial cleaning products.

Phenol (carbolic acid) [CAS No. 108-95-2] - Colorless crystals, which can be dissolved in water or some organic solvents. Liquids have sweetish, sickening odor and can burn skin and eyes. In aqueous solution, phenol is not highly volatile, but it is readily absorbed through the skin. Abnormal pigmentation commonly occurs following dermal contact with phenol compounds. Vapors are strongly irritating to eyes, nose and throat. Exposure by inhalation to a low concentration of phenol six times for five minutes produced increased sensitivity to light.

Uses: In detergents, disinfectants, deodorants, furniture polish, air fresheners, mold and mildew removers.

Phosphates - Phosphate-containing compounds increase biological oxygen demand in surface water.

Uses: In detergents, bathroom cleaners, floor strippers.

Phosphoric acid [CAS No. 7664-38-2] - Colorless, odorless liquid. Corrosive to ferrous metals and alloys. Should not be mixed with bleach or ammonia. Phosphorus-containing compounds increase biological oxygen demand in surface water. When used as an agent for metal cleaning, phosphoric acid may react with impurities in the metal and release phosphine gas.

Uses: Metal brightness, cleaners, detergents, sanitizers.

Pine oil [CAS No. 8002-09-3] - Flammable liquid. An irritant to the eyes, upper respiratory tract and skin. May cause mild respiratory and central nervous system depression, and kidney toxicity.

Uses: In floor polish, glass window cleaners, hard surface cleaners, liquid detergents, toilet bowl cleaners, disinfectants.

Potassium metabisulfite [CAS No. 16731-55-8] - Colorless crystals which are soluble in water and ammonia. Dust is mildly irritating to eyes, nose and throat. See also Sulfur compounds.

Uses: Washing powders.

Quaternary ammonium chloride (dodecyl dimethyl ammonium chloride) [CAS No. 7135-51-5] A flammable liquid. Corrosive. An irritant to the eyes, skin, upper respiratory tract. May cause central nervous system depression. Ingestion may cause pain, swelling, breathing difficulty, convulsions. Ammonium chloride is harmful to aquatic life in very low concentrations.

Uses: Disinfectant, sanitizer.

Sodium bisulfite - See Sulfur compounds.

Sodium dodecyl benzene sulfonate [CAS No. 25155-30-0] - Environmental hazard. Increases biological oxygen demand in surface water. See also Biological oxygen demand. **Uses:** As a wetting agent (surfactant) in heavy duty laundry products; metal cleaners, specialty cleaners and sanitation products.

Sodium hydroxide - See Chlorine.

Sulfur compounds (Including potassium metabisulfite [CAS No. 16731-55-8] and sodium bisulfate [CAS No. 7631-90-5]) - Corrosive irritant to skin, eyes, and mucous membranes; sulfur-containing compounds may be allergenic and may produce skin rashes or difficulty breathing in persons with asthma. When used in rust removers, may produce fumes of sulfur dioxide, a respiratory irritant.

Uses: Antioxidant and preservative in a variety of cleaning products.

Tetrachloroethlene - See Perchloroethylene.

Toluene (methylbenzene) [CAS No. 108-88-3] - Volatile, flammable liquid with strong chemical odor. Eye, skin and respiratory irritant. Central nervous system depressant. Cardiac sensitizer. Prolonged or repeated exposure may cause liver, kidney damage or anemia. Exposure during pregnancy may result in birth defects.

Uses: Solvent in a variety of products such as graffiti remover, floor polish, furniture polish, laundry starch preparations, household hard surface cleaners.

Trichloroethane (1,1,1-trichloroethane [CAS No. 71-55-6]; 1,1,2-trichloroethane [CAS No. 79-00-5]) - Colorless liquid with mild chloroform-like odor. Because it is four times heavier than air, vapors tend to collect in low spaces. Corrosive to aluminum. Repeated dermal exposure may result in skin irritation. Central nervous system depressant. Cardiac sensitizer. The 1,1,1-isomer is also a Class 1 ozone depleter (like CFCs) being phased out under the Clean Air Act.

Uses: Solvent, degreaser, spotting fluid, drain cleaner; formerly used as an aerosol propellant.

Trichloroethylene [CAS No. 79-01-6] - Colorless liquid with mild chloroform-like odor. Because it is four times heavier than air, vapors tend to collect in low spaces. Suspected human carcinogen. Central nervous system depressant. Cardiac sensitizer. Associated with birth defects of the heart, and in animals, decreased fetal weight and abnormal sperm.

Uses: Degreaser, solvents, graffiti remover.

Xylene (dimethylbenzene) [CAS No. 1330-20-7] - Colorless, flammable liquid with a sweet odor. May attack some forms of plastic and rubber. Incompatible with strong oxidizers. Vapor may cause irritation of the eyes, nose and throat. Central nervous system depressant. Chronic exposure to xylene may cause dry irritated skin, reversible eye damage, anemia and toxicity to white and red blood cells.

Uses: Solvent, air fresheners, stainless steel cleaner, floor polish.

Appendix A Product Inventory Sheet

Product Inventory Sheet

School: Date:						
Product Name	Use	Lbs. Gals.	Lbs. Gals.			
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13						

14.

15.

Appendix B Explanation of Sample Material Safety Data Sheets

INTRODUCTION TO MATERIAL SAFETY DATA SHEETS (MSDS)

An understanding on how to interpret an MSDS is your best defense against accidents and injury. On the following pages are descriptions of the sections contained in an MSDS, and short notes that will help you find and interpret the information the Occupational Safety and Health Administration (OSHA) requires on a typical good-quality sheet.

There is no single mandatory format for the MSDS. Therefore each MSDS may look a little different, but all will provide, at a minimum, the required information as mandated by OSHA's Hazard Communication Standard. Variety will occur in the section titles, and contents of sections. Some manufacturers may be more explicit with their information than others.

I. CHEMICAL IDENTIFICATION

This section, (also denoted as Product Information, or Material Identification) identifies the chemical or trade name product on the label, and its supplier. The manufacturers name, address, telephone number, and emergency telephone number will be located here. This section may also contain descriptive terms to further help identify the material, such as chemical family, molecular weight, and chemical formula. The material identity, including its chemical, common names and synonyms will be found in this section. For example, brand name or trade name: Clorox; chemical name: sodium hypochlorite; common name: bleach.

II. COMPONENTS OR INGREDIENTS

Chemical names and percentages of the chemicals that comprise the product will be identified in this section. Some manufacturers may only list those components that present a physical or health hazard and are present at or above 1% in the mixture. If a component is identified as a carcinogen by the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), or by OSHA, it will generally be noted here, or footnoted in this section, when present at or above 0.1% in the product. Some manufacturers use a separate section for noting carcinogenicity, or may include this status in the "Health Hazard" section.

The only time you won't find the identity of a chemical component listed here is when the company has claimed it as a trade secret. The MSDS will still describe hazards and safety precautions of the trade secret chemicals.

III. PHYSICAL AND CHEMICAL DATA

This section describes the product appearance, odor, and other physical and chemical characteristics. Some of the following items may be applicable to the material:

Boiling Point (BP):

The boiling point is the temperature at which a liquid turns into a vapor. Flammable materials with low BPs generally present fire hazards. In the case of a chemical mixture, the manufacturer may either list the BP value as a range of temperatures or that of the component with the lowest value.

Melting Point:

The melting point is the temperature at which a solid changes to a liquid.

Boiling Point and Melting Points are helpful in preventing dangerous changes in state, such as from a liquid to a breathable gas.

Vapor Pressure:

Vapor pressures are useful in learning how quickly a material becomes airborne within the workplace and thus how quickly a worker is exposed to it. Vapor pressures reported on MSDS are in millimeters of mercury (mm Hg) at 68° F(20° C), unless otherwise stated. In the case of a chemical mixture, the manufacturer may list the value as a range or that of the component with the highest value.

For example; values less than 1.0 mm Hg at $20^{\circ}C$ would be considered "non-volatile" and above 100 would be considered "highly volatile."

Vapor Density:

The vapor density is compared to air which equals 1. Materials lighter than air have vapor densities less than one. Materials heavier than air have vapor densities greater than one. All vapors and gases mix with air, but the lighter materials tend to rise and dissipate (unless confined). Heavier vapors and gases are likely to concentrate in low or enclosed places, and may create toxic, fire or explosion hazards.

Evaporation Rate:

The evaporation rate is the rate at which a material vaporizes from the liquid or solid state when compared to a known material's vaporization rate. This rate is useful in evaluating a material's health and fire hazards.

Specific Gravity:

The specific gravity is an expression of the density (or heaviness) of a material as compared to water = 1. Insoluble materials with specific gravity of greater than one will sink in water. Insoluble materials with a specific gravity less than one will float on water, which is an important consideration for fire suppression and spill cleanup.

Water Solubility:

Water solubility expresses the percentage of a material that will dissolve in water. Water solubility is useful in determining cleanup methods for spills and fire-extinguishing methods for a material.

pH:

The pH value represents a scale from 0-14 that describes the acidity or alkalinity of a material. Water has a pH of 7. pH is an important consideration when determining corrosive properties. Materials on the low end of the scale will be more acidic, materials on the high end of the scale will be more alkaline or caustic.

- pH 1-5 strongly acidic (For comparison Coke & Pepsi have a pH of around 3.4)
- pH 5-7 weakly acidic
- pH 7-9 weakly basic/caustic
- pH 9-14 strongly basic /caustic

Appearance and Odor:

Appearance and odor refer to the general characteristics of the material, e.g. powder, colorless liquid, aromatic odor. The visual appearance of a product is also useful as an aid in verifying the product and that it is correctly labeled.

IV. PHYSICAL HAZARDS

This section gives potential flammability and explosion hazards, recommended procedures in handling these hazards, and storage considerations. This section also contains reactivity data. Many manufacturers divide the physical hazards category into two sections, the "Fire and Explosion Data" and "Reactivity Data."

A. FIRE AND EXPLOSION DATA

Flash Point:

The flash point is defined by the National Fire Protection Association (NFPA) as the lowest temperature at which a flammable liquid gives off sufficient vapor to form an ignitable mixture with air near its surface or within a vessel. Special precautions should be taken when the product has a low flash point. Materials

having a low flash point are a greater fire hazard than materials having a high flash point.

Flammable Limits (Explosive Limits):

Flammable limits refer to the range of flammable gas or vapor concentrations between which ignition will occur if an ignition source is present. LFL (or LEL) is the lower flammable limit. UFL (or UEL) is to the upper flammable limit. All concentrations between LFL and UFL are in the flammable range, and special precautions are needed to prevent ignition or explosion.

Ignition Temperature:

The ignition temperature is the lowest temperature at which a combustible material ignites in air and continues to burn independently of the source of heat.

Autoignition Temperature:

Autoignition temperature describes the minimum temperature to which a substance must be heated, without the application of a flame or spark, which will cause that substance to ignite.

Hazardous Decomposition Products:

This area will describe the known or expected hazardous products resulting from heating, burning, or other reactions.

Extinguishing Media:

Extinguishing media specifies the firefighting agents that should be used to extinguish fires. Some chemicals react violently in the presence of water, so other methods, such as the use of foam or CO₂ (carbon dioxide) should be followed.

Firefighting Equipment:

This will describe equipment used to protect firefighters from toxic products of vaporization, combustion, or decomposition in fire situations.

Firefighting Methods:

If unusual fire hazards are involved or special firefighting procedures mandated, this will be specified here.

NFPA Codes:

Fire Diamond - National Fire Protection Association -NFPA Hazard Rating. Per "NFPA 704" publication. A visual system, as illustrated on the following pages, that provides a general idea of the inherent hazards, and their severity, of materials relating to fire prevention, exposure, and control. The NFPA fire diamond is read in the preferred order; (A) Health, (B) Flammability, (C) Reactivity, (D) Special.

Position A - Health Hazard (Blue).

DEGREE OF HAZARD; LEVEL OF SHORT-TERM PROTECTION

0 = Ordinary Combustible Hazards in a Fire

Exposure to materials under fire conditions will offer no hazard beyond that of ordinary combustible material.

1 = Slightly Hazardous

Exposure to material will cause irritation but only minor residual injury even if no treatment is given.

RED flammability BLUE health WHITE special

2 = Hazardous

Intense or continued exposure to material can cause temporary incapacitation or possible residual injury unless prompt medical treatment is given.

3 = Extreme Danger

Short exposure to material can cause serious temporary or residual injury even if prompt medical treatment is given.

4 = Deadly

Very short exposure to material can cause death or major residual injury even if prompt medical treatment is given.

Position B - Flammability (Red).

SUSCEPTIBILITY TO BURNING

0 = Will Not Burn

Material that will not burn.

1 = Will Ignite if Preheated

Flash point above 200°F. Material that must be preheated before ignition can occur.

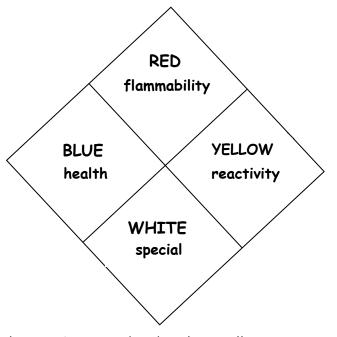
2 = Will Ignite if Moderately Heated Flash point below 200°F. Material that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.

3 = Will Ignite at Most Ambient Conditions

Flash point below 100°F. A liquid or solid that can be ignited under almost all ambient temperature conditions.

4 = Burns Readily at Ambient Conditions

Flash point below 73°F. Material will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, or will burn readily when dispersed in air.



Position C - Reactivity, Instability (Yellow).

ENERGY RELEASED IF BURNED, DECOMPOSED, OR MIXED

0 = Stable and Not Reactive with Water

Material is normally stable, even under fire exposure conditions, and is not reactive with water.

1 = Unstable if Heated

Material is normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.

2 = Violent Chemical Change

Material is normally unstable and readily undergoes violent chemical change but does not detonate. Also may react violently with water or may form potentially explosive mixtures with water.

3 = Shock and Heat May Detonate

Material is capable of detonation or explosive reaction but requires a strong initiating source; or which must be heated under confinement before initiation; or may react explosively with water.

4 = May Detonate

Material is readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.

Position D - Special Hazard (White).

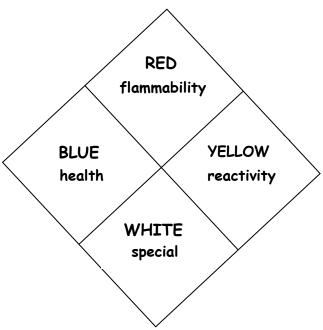
OXY = Oxidizer

ACID = Acid

ALKALI = Alkali

COR = Corrosive

-W- = Use No Water, reacts!



B. REACTIVITY DATA:

This area will describe chemical incompatibilities, and whether or not the substance is stable. This section is important in determining which situations and substances to keep the product away from to avoid unfavorable conditions.

Chemical Incompatibilities:

This section will list the chemicals that might cause the product to burn, explode, release dangerous byproducts or otherwise "react" unfavorably, when they come in contact with the product.

Chemical Instabilities:

This section will describe environmental conditions to avoid, such as heat or direct sunlight, to prevent hazardous reactions.

Hazardous Polymerization:

This area will tell you if the material will polymerize, or react with itself. Hazardous polymerization is a reaction which takes place at a rate which produces rapid build-up of large amounts of energy (heat and pressure) that can lead to explosion. This section indicates whether hazardous polymerization may or may not occur, and under what storage conditions.

V. HEALTH HAZARDS

Manufacturers provide data on health hazards under a variety of section titles, including health effects, and first aid procedures. At a minimum this information should contain information regarding signs and symptoms of overexposure, primary routes of entry, first aid and emergency procedures, as well as medical conditions aggravated by overexposure.

Exposure Recommendations:

Exposure recommendations may be listed here or under the "Components or Ingredients" section. These recommendations are descriptors establishing the concentration of the chemical to which you can be safely exposed. They are often listed as permissible exposure limit (PEL) or threshold limit value (TLV).

PEL:

Permissible exposure limit is a term established by OSHA that may be expressed as a Time Weighted Average (TWA) or as a ceiling exposure limit. The PEL indicates the permissible concentration of air contaminants to which nearly all

workers may be repeatedly exposed eight hours a day, forty hours a week, over a working lifetime (30 years) without adverse health effects.

TLV:

Threshold Limit Value is a term used by ACGIH to express airborne concentration of a material to which almost all workers can be exposed without adverse effects. ACGIH expressed TLVs in three ways:

TLV-TWA: The allowable Time-weighted Average concentration for a normal 8-hour workday or 40-hour work week.

TLV-STEL: The Short-Term Exposure Limit, or maximum concentration for a continuous 15-minute exposure period (maximum of four such periods per day, with at least 60 minutes between exposure periods, and provided the daily TLV-TWA is not exceeded).

TLV-C: The ceiling exposure limit-the concentration that should not be exceeded even instantaneously.

Emergency and First Aid Procedures:

This section will describe how to administer first aid and emergency procedures in case of eye and skin contact, ingestion, and inhalation.

Primary Routes of Entry:

The MSDS will explain the most likely route of exposure and entry into your body based on properties and expected usages of the chemical or trade name product.

This may include, inhaling, swallowing, or absorption through your skin.

Acute and chronic health effects:

These sections will explain what signs and symptoms to watch out for, e.g. headache, dizziness, nausea, or rashes.

Acute health effects or acute exposure is an adverse effect due to a single or short term overexposure, with symptoms developing rapidly. It refers to the most common effects that would be expected to occur from direct contact (eye, skin, inhalation, or ingestion) of the product.

OSHA's definition of highly toxic and toxic are included on the following page:

A highly toxic substance is one having:

- 1. An oral LD₅₀ of 50 mg/kg or less.
- 2. A dermal LD₅₀ of 200 mg/kg or less.
- 3. An inhalation LC_{50} of 200 ppm or less of gas or vapor; or 2 mg/l or less of mist, fume or dust.

A toxic substance is one having:

- 1. An oral LD₅₀ between 50 and 500 mg/kg.
- 2. A dermal LD₅₀ between 200 and 1000 mg/kg.
- 3. An inhalation LC_{50} between 200 ppm, 2000 ppm of gas or vapors, or between 2 and 20 mg/l of mist fume or dust.

Chronic health effects or chronic exposure refer to the adverse effects that are most likely to occur from repeated, prolonged or long term exposure. It describes symptoms that develop over a long period of time, or that recur frequently.

LC_{50} Lethal Concentration 50, or median lethal concentration:

The concentration of a material in air that on the basis of laboratory tests (respiratory route) is expected to kill 50% of a group of test animals when administered as a single exposure in a specific time period, usually one hour. The LC_{50} is expressed as parts of material per million parts of air, by volume (ppm) for gases and vapors, as micrograms of material per liter of air (ug/l), or milligrams of material per cubic meter of air (mg/m³) for dusts and mists, as well as for gases and vapors.

LC_{Lo} Lethal Concentration Low:

The lowest concentration of a substance in air reported to have caused death in humans or animals. The reported concentrations may be entered for periods of exposure that are less than 24 hours (acute) or greater than 24 hours (subacute and chronic).

LD₅₀ Lethal Dose 50:

The single dose of a substance that causes the death of 50% of an animal population from exposure to the substance by any route other than inhalation. Other lethal-dose percentages, such as LD_1 , LD_{10} , LD_{30} , and LD_{99} may be in the scientific literature. LD_{50} is usually expressed as milligrams or grams of material per kilogram of animal weight (mg/kg or g/kg).

LD_{Lo} Lethal Dose Low:

The lowest dose of a substance introduced by any route, other than inhalation, reported to have caused death in humans or animals.

HMIS Codes:

The Hazardous Materials Identification System, **HMIS**, was developed by the National Paint & Coatings Association (NPCA) to help employers comply with OSHA's Hazard Communication (HCS), 29 CFR 1910.1200

The system utilizes colored bars, numbers and symbols to convey the hazards of chemicals used in the workplace.

Do not confuse HMIS® labels (colored bars) with NFPA labels (colored diamonds). The two systems are similar but **not** identical.

Health (BLUE)

The Health section conveys the health hazards of the material. In the latest version of HMIS®, the blue Health bar has two spaces, one for an asterisk and one for a numeric hazard rating.

If present, the asterisk signifies a chronic health hazard, meaning that long-term exposure to the material could cause a health problem such as emphysema or kidney damage. NFPA lacks this important information because the NFPA system is meant only for emergency or acute (short-term) exposures.

According to NPCA, the numeric hazard assessment procedure is **different** than that used by NFPA. However, there was no publicly available information explaining the differences. On a qualitative level, the numbering systems are more or less identical, with a 0 to 4 scale where 0 indicates minimal hazard and 4 indicates an extreme hazard.

Flammability (RED)

According to the NPCA, the criteria used to assign numeric values (0=low hazard to 4=high hazard) are identical to those used by NFPA. In other words, in this category, the systems are identical.

Reactivity (YELLOW)

According to the NPCA, the criteria used to assign numeric values (0=low hazard to 4=high hazard) are identical to those used by NFPA. In other words, in this category, the systems are identical.

Personal Protection (WHITE)

This is by far the largest area of difference between the NFPA and HMIS® systems. In the NFPA system, the white area is used to convey special hazards whereas HMIS® uses the white section to indicate what personal protective equipment (PPE) should be used when working with the material.

VI. SPILL OR LEAK PROCEDURES

This section will describe precautions and actions to be taken in the event of a spill or leak and methods of clean-up and disposal.

VII. PROCEDURES AND PRECAUTIONS FOR SAFE HANDLING, STORAGE AND USE:

This section may alternatively be titled Special Protection, Personal Protective Equipment, or Safe Handling and Storage Requirements. This area of the MSDS contains control measures such as personal protective equipment recommendations, engineering controls and work practices that are necessary for the safe handling and use of the product. If protective equipment is needed, this section will list the specific types that are recommended, such as respirators, gloves, and goggles. Specific steps and precautions to take to safeguard your health, such as proper ventilation requirements, also are described here. Ventilation is described using two terms; local or general. Local ventilation refers an exhaust duct system with a hood or enclosure. General ventilation refers to a dilution fan in the wall or ceiling. Storage and handling requirements addressed in this section may

include such things as grounding containers during a transfer of flammables to prevent static electricity as an ignition source.

VIII. SPECIAL PRECAUTIONS OR OTHER COMMENTS:

The manufacturer may describe special precautions if there is something other than standard information the user should be aware of. Regulatory compliance issues such as Department of Transportation (DOT) policies for handling and transportation, or Resource Conservation and Recovery Act (RCRA) classification for proper disposal may also be addressed here.

Appendix C Sample Material Safety Data Sheets

Liquid Enzymes

Glass Cleaner

Powerful window cleaner... light duty all purpose cleaner. Easily removes smears, smudges, fingerprints, oils, grease, and soils. Exclusive B-52 Anti-Static Agent helps repel dust particles.

DIRECTIONS

DIRECTIONS
Glass & Most Sorraces
Spray a light man over the entire surface.
Spraeaat drice and polish dry HEL PFUL HINT:
For best results use two cloths or paper towels — wipe off with Usanstand polish with the second. the second

Acrylic (Thermoplastic) Surfaces

PRO-LINK Glass Cleaner is excellent for acrylic surfaces. Remove loose dirt particles by rinsing surface with water. Spray a light mist over the entire surface. Use two very soft cloths or paper towels - wipe off with the first and polish with the second.

Computer & Office Machines

Always spray PRO-LINK Glass Cleaner on paper

Reorder No.

D(D)E Marketed by/Distribue par/Distribuidos po



Glass Cleaner

Glass & Acrylic Formula

- FAST WIPE-OUT
- ANTI-STATIC
- **NON-FOGGING**
- FILM FREE
- **B-52 POLISHING AGENT**

Net Contents: 32 Fl. Oz. (1 U.S. Qt.) 946 ml

towels and then wipe the area to be cleaner. Never spray directly onto any working part.

Recommended for Use on acrylic (thermoplastic) surfaces. Excellent because it is ammonia free. Also use on any surface not harmed by water. — stainless steel, chrome, mirrors, TV screens, plastic, tile, counters, tabletops, vinyl upholstery, baked enamel surfaces, etc.

Precautionary Statements:

CAUTION:

KEEP OUT OF REACH OF CHILDREN.

Statement of Practical Treatment:

Contains Isopropanol.

Use in a well ventilated area. In case of accident, wash with soap and water. Call physician. CONTAINS: Water [7732-18-5], Isopropanol [67-63-0]

See MSDS For Complete Safety Information. FOR INDUSTRIAL AND INSTITUTIONAL USE ONLY

KEEP FROM FREEZING

Reorder No.

San Antonio, TX 78209 USA • London, Ontario N6H 5E1 Canada

EMERGENCY MEDICAL TELEPHONE NUMBER 1-800-228-5635

MATERIAL SAFETY DATA SHEET



Medical Conditions Generally Aggravated by Exposure: Skin conditions and respiratory

Emergency and First Aid Procedures: Eyes - Flush eye immediately with plenty of water. Get medical attention. Skin – Wash off with soap and water. Inhalation – Move to fresh air. Keep at rest. Get prompt medical attention. Ingestion – Do not induce vomiting. Keep at rest. Get

Steps To Be Taken in Case Material is Released Or Spilled: Eliminate all sources of ignition

ediately. Contain spill and ventilate area to remove fumes. Collect in an approved container

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

SECTION I - IDENTITY AND MANUFACTURER'S INFORMATION

PRO-LINK

PRO-LINK 1-800-74-LINKS

8301 Broadway #301 San Antonio, Texas 78209 USA

Phone: 210-930-1191 Fax: 210-930-1712

Product Name: PRO•LINK Glass Cleaner

Date Prepared: 1-1-96

Prepared by Regulatory Affairs Department

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

CAS#'s OSHA PEL ACGIH TLV Other Limits %(Optional)

2 Propanol

67-63-0

400 ppm

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point... 212'F Vapor Pressure (mm Hg.)... N/E Vapor Density (AIR=1)... N/E Solubility in Water... Complete Appearance and Odor... Lt. blue/Alcohol odor

Specific Gravity (H₂0=1)... 0.985 Percent Volatile By Volume (%)... 100% **Evaporation Rate**

H₂O=1 Other=1

Waste Disposal Method: If this material becomes a waste material, refer to latest EPA or state regulations regarding proper disposal. Precautions To Be Taken In Handling And Storing: Keep liquid and vapors away from heat, sparks, and flame, Keep container tightly closed when not in use. Store at ambient

temperatures. Use with adequate ventilation.

Other Precautions: Keep out of reach of children. Wash with soap and water after use.

SECTION VIII - CONTROL MEASURES

Respiratory Protection (Specify Type): Not required. Ventilation: Yes Local Exhaust: Not required.

Mechanical (Gen.): As required Protective Gloves: Rubber

with sand or absorbent clay.

Special: Not required Eye Protection: Goggles

Other: Not required

Other Protective Clothing Or Equipment: Not required
Work/Hygiene Practices: Good housekeeping practices apply. Wash thoroughly after handling.

NOTICE: NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OR MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OF ANY OTHER NATURE, ARE MADE WITH RESPECT TO INFORMATION CONCERNING THE PRODUCT REFERRED TO IN THIS MATERIAL SAFETY DATA SHEET. The goal of defining precisely, in measurable terms, every possible health effect that may occur in the workplace as a result of chemical exposures cannot realistically be accomplished. The information and recommendations contained in this Material Safety Data Sheet are supplied pursuant to 29 C.F.R. 1910.1200 of the Occupational Safety and Health Standards Hazard Communication Rule. The information and recommendations set forth herein are presented in good faith and believed to be correct as of the date hereof, PRO-LINK. however, makes no representations as to the completeness or accuracy thereof, and information is supplied upon the express condition that the persons receiving the same will be required to make their own determination as to its suitability for their purposes prior to use. In no event will PRO-LINK be responsible for any damages of any nature whatsoever resulting from the use of, reliance upon, or the misuse of this information. The information as supplied herein is simply to be informative and intended solely to alert the user of the substance which is the subject matter of this Material Safety Data Sheet. The ultimate compliance with federal, state or local regulations concerning the use or disposal of this compound, or compliance with respect to product's liability. rests solely upon the purchaser thereof.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): 123°F TCC Flammable Limits: N/A Plastin From (interior Used): 163-7 100. Prantinable Limits; N/A LEL: NOt Det. Extinguishing Media: CO2; Water Foam Special Fire Fighting Procedures: Keep away from heat, spark, or flames. Do not enter fire area without proper equipment, including self-

Unusual Fire and Explosion Hazards: Treat as combustible liquid.

SECTION V - PHYSICAL HAZARDS

Stability Unstable
X Stable Conditions to Avoid: Elevated temperature, ignition sources.

Incompatibility: Do not mix with other chemicals.
(Materials to Avoid)

Hazardous Decomposition: Carbon Dioxide, Carbon Monoxide.

Conditions to Avoid: N/A

Products or By-products
Hazardous May Occur
Polymerization X Will Not Occur

SECTION VI - HEALTH HAZARDS

Route(s) of Entry: Inhalation? X Skin? X Ingestion? X Health Hazards (1, Acute and 2, Chronic) Acute - Irritation of skin or eyes

Chronic - Chronic data is not presently available. Chemical Listed as Carcinogen or Potential Carcinogen:

National Toxicology Program: I.A.R.C. Monographs:

Yes Yes

X No X No X No Signs and Symptoms of Exposure: Irritation or bur ning sensation

Envirox LLC

MATERIAL SAFETY DATA SHEET

SECTION I - PRODUCT INFORMATION

PRODUCT NAME:

H₂Orange, Concentrate 117

PRODUCT CLASSIFICATION: Water Soluble Cleaner

MANUFACTURER: Envirox LLC

P.O. Box 140, Georgetown, IL 61846

TELEPHONE: 217-662-2130

EMERGENCY TELEPHONE: 217-431-5154

SECTION II - INGREDIENTS

HAZARDOUS INGREDIENTS:

Hydrogen Peroxide < 4%

SECTION III - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N/A

FLAMMABLE EXPLOSIVE LIMITS % BY VOLUME:

Lower: N/A Upper: N/A

FIRE EXTINGUISHING MEDIA: CO2 or Dry Chemical

SPECIAL FIRE-FIGHTING PROCEDURES:

None known

UNUSUAL FIRE AND EXPLOSION HAZARD:

None known

SECTION IV - PHYSICAL DATA

BOILING POINT:

112 Degrees F.

SPECIFIC GRAVITY (Water=1):

1.02 Complete Unknown

SOLUBILITY IN WATER: MELTING POINT:

3.6

PH: APPEARANCE:

Clear

ODOR:

Citrus

SECTION V - PRODUCT HEALTH HAZARD DATA

PRINCIPAL ROUTES OF ABSORPTION:

Inhalation - N/A

Ingestion -

May cause stomach upset

Skin -

May cause skin irritation if left on for long periods

of time.

Skin -

May cause eye irritation

POSSIBLE SYMPTOMS OF OVEREXPOSURE:

Dry skin or stinging sensation

EMERGENCY AND FIRST AID PROCEDURES:

Inhalation - N/A

Ingestion -

Drink several glasses of water and consult physician.

If irritation occurs, rinse thoroughly with water for at least 5 minutes. Apply moisturizing cream. If

irritation persists, consult physician.

SECTION V - PRODUCT HEALTH HAZARD DATA (continued)

Eye -

Flush eyes with water for at least 15 minutes holding lids apart to ensure complete irrigation. If irritation persists, consult physician.

SECTION VI - REACTIVITY DATA

STABLE:

Yes

STABILITY CONDITIONS TO AVOID:

None known

INCOMPATIBILITY (Materials to Avoid:

Strong Reducing Agents

HAZARDOUS DECOMPOSITION PRODUCTS:

None known

HAZARDOUS POLYMERIZATION: Will not occur

SECTION VII - SPILL, LEAK OR DISPOSAL PROCEDURES

WASTE DISPOSAL METHOD:

Biodegradable Product. Dispose of container according to state, federal and local laws.

PRECAUTIONS IN HANDLING AND STORING:

Store indoors. Store away from

strong reducing agents.

OTHER PRECAUTIONS TO BE TAKEN: None known

SECTION VIII - SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS:

Local Exhaust OK

PROTECTIVE EQUIPMENT:

Eye -

Safety Glasses recommended when handling concentrate.

Skin -

Rubber Gloves recommended if skin is sensitive.

OTHER PROTECTIVE PRECAUTION:

None

HMIS Codes:

Health: 0

Flammability: 0

Reactivity: 0

The exact composition of this material is a trade secret.

The information contained herein is correct to the best of our knowledge. The recommendations or suggestions contained in this Data Sheet are made without guarantee or representation as to results. We suggest that you evaluate these recommendations and suggestions in your own laboratory prior to use. Our responsibility for claims arising from breach of warranty, negligence, or otherwise is limited to the purchase price of the material. Freedom to use any patent owned by anyone is not to be inferred from any statement contained herein. WITH REGARD TO THE MATERIAL, SELLER MAKES NO WARRANTY OF ANY KIND WHATEVER, EXPRESS OR IMPLIED, AND ALL WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED BY SELLER.

MATERIAL SAFETY DATA SHEET: SIMPLE GREEN®

I. PRODUCT & COMPANY INFORMATION

SIMPLE GREEN® CLEANER / DEGREASER PRODUCT NAME:

Page 1 of 4

COMPANY NAME: SUNSHINE MAKERS, INC. Version No. 1006

15922 Pacific Coast Highway

Issue Date: March, 1999

Huntington Harbour, CA 92649 USA Telephone: 800-228-0709 • 562-795-6000

Fax: 562-592-3034

Website: www.simplegreen.com

For 24-hour emergency, call Chem-Tel, Inc.: 800-255-3924

USE OF PRODUCT: An all purpose cleaner and degreaser used undiluted or diluted in water for direct, spray,

and dip tank procedures.

II. INGREDIENT INFORMATION

The only ingredient of Simple Green® with established exposure limits is undiluted 2-butoxyethanol (<6%) (Butyl Cellosolve; CAS No. 111-76-2): the OSHA PEL and ACGIH TLV is 25 ppm (skin). Note, however, that Butyl Cellosolve is only one of the raw material ingredients that undergo processing and dilution during the manufacture of Simple Green®. Upon completion of the manufacturing process, Simple Green® does not possess the occupational health risks associated with exposure to undiluted Butyl Cellosolve. Verification of this is contained in the independent test results detailed under "Toxicological Information" on Page 3 of this MSDS.

The Butyl Cellosolve in Simple Green® is part of a chemical category (glycol ethers) regulated by the Emergency Planning and Community Right-to-Know Act (SARA, Title III, section 313); therefore, a reporting requirement exists. Based upon chemical analysis, Simple Green® contains no known EPA priority pollutants, heavy metals, or chemicals listed under RCRA, CERCLA, or CWA. Analysis by TCLP (Toxicity Characteristic Leaching Procedure) according to RCRA revealed no toxic organic or inorganic constituents.

All components of Simple Green® are listed on the TSCA Chemical Substance Inventory.

III. HAZARDS IDENTIFICATION

UN Number: Dangerous Goods Class: Not required Nonhazardous

Hazard Rating (NFPA/HMIS)

Health = 1*

Reactivity = 0

Fire = 0

Special = 0

0 = minimal

1 = slight

2 = moderate

3 = serious

4 = severe

^{*}Mild eye irritant, non-mutagenic and non-carcinogenic. None of the ingredients in Simple Green® are regulated or listed as potential cancer agents by Federal OSHA, NTP, or IARC.

IV. FIRST AID MEASURES

SYMPTOMS OF OVEREXPOSURE AND FIRST AID TREATMENT

Eye contact: Reddening may develop. Immediately rinse the eye with large quantities of cool water; continue 10-15

minutes or until the material has been removed; be sure to remove contact lenses, if present, and to lift

upper and lower lids during rinsing. Get medical attention if irritation persists.

Skin contact: Minimal effects, if any; rinse skin with water, rinse shoes and launder clothing before reuse. Reversible

reddening may occur in some dermal-sensitive users; thoroughly rinse area and get medical attention if

reaction persists.

Swallowing: Essentially non-toxic. Give several glasses of water to dilute; do not induce vomiting. If stomach upset

occurs, consult physician.

Inhalation: Non-toxic. Exposures to concentrate-mist may cause mild irritation of nasal passages or throat; remove to

fresh air. Get medical attention if irritation persists.

V. FIRE FIGHTING MEASURES

Simple Green® is stable, not flammable, and will not burn.

Flash Point/Auto-Ignition: Not flammable. Flammability Limits: Not flammable.

Extinguishing Media: Not flammable/nonexplosive. No special procedures required.

Special Fire Fighting Procedures: None required.

VI. ACCIDENTAL RELEASE MEASURES

Recover usable material by convenient method; residual may be removed by wipe or wet mop. If necessary, unrecoverable material may be washed to drain with large quantities of water.

VII. HANDLING, STORAGE & TRANSPORT INFORMATION

No special precautions are required. This product is non-hazardous for storage and transport according to the U.S. Department of Transportation Regulations. Simple Green® requires no special labeling or placarding to meet U.S. Department of Transportation requirements.

UN Number: Not required Dangerous Goods Class: Nonhazardous

VIII. EXPOSURE CONTROLS

Exposure Limits: The Simple Green® formulation presents no health hazards to the user when used according to label directions for its intended purposes. Mild skin and eye irritation is possible (please see Eye contact and Skin contact in Section IV.).

Ventilation: No special ventilation is required during use.

Human Health Effects or Risks from Exposure: Adverse effects on human health are not expected from Simple Green®, based upon twenty years of use without reported adverse health incidence in diverse population groups, including extensive use by inmates of U.S. Federal prisons in cleaning operations.

Simple Green® is a mild eye irritant; mucous membranes may become irritated by concentrate-mist.

Simple Green® is not likely to irritate the skin in the majority of users. Repeated daily application to the skin without rinsing, or continuous contact of Simple Green® on the skin may lead to temporary, but reversible, irritation.

Medical Conditions Aggravated by Exposure: No aggravation of existing medical conditions is expected; dermal-sensitive users may react to dermal contact by Simple Green®.

IX. PERSONAL PROTECTION

No special requirements under normal use conditions. Precautionary Measures:

Caution, including reasonable eye protection, should always be used to avoid eye contact Eye Protection:

where splashing may occur.

No special precautions required; rinse completely from skin after contact. Skin Protection:

Respiratory Protection: No special precautions required.

Work and Hygienic Practices: No special requirements. Wash or rinse hands before touching eyes or contact lenses.

X. PHYSICAL AND CHEMICAL PROPERTIES

Appearance/odor: Translucent green liquid with characteristic sassafras odor.

Vapor Pressure: 17 mm Hg @ 20 °C; 22 mm Hg @ 25 °C Specific Gravity: 1.0257

Vapor Density: 1.3 (air = 1) pH of concentrate: 9.5 Evaporation: >1 (butyl acetate = 1) 8.5 lbs./gallon Density:

Boiling Point: 110 °C (231 °F)

Freezing Point: -9 °C (16 °F) If product freezes, it will reconstitute without loss of efficacy when brought back to room

temperature and agitated.

VOC Composite Partial Pressure: 0.006 mm Hg @ 20 °C

Volatile Organic Compounds (VOCs): 7.96 g/L per ASTM Method 3960-90. Per California AQMD's VOC test method, product must be diluted at least 2 parts of water to 1 part Simple Green® in order to meet SCAQMD Rule 1171 & Rule 1122 and BAAQMD Regulation 8-16 VOC requirements for solvent cleaning operations.

Water Solubility: Completely soluble in water. The higher salt concentrations in marine ecosystems will lead to complexes with Simple Green® that may become visible at ratios above one part Simple Green® to 99 parts seawater.

At 600 °F: 1.86% by weight. Ash Content:

Nitrogen: <1.0% by weight (fusion and qualitative test for ammonia). **Nutrient Content:**

Phosphorus: 0.3% by formula.

Sulfur: 0.6% by weight (barium chloride precipitation method).

Detection: Simple Green® has a characteristic sassafras odor that is not indicative of any hazardous situation.

XI. STABILITY AND REACTIVITY INFORMATION

Nonreactive. Simple Green® is stable, even under fire conditions, and will not react with water or oxidizers. Hazardous polymerization will not occur.

TOXICOLOGICAL INFORMATION XII.

Nonhuman Toxicity

Acute Mortality Studies:

>5.0 g/kg body weight Oral LD₅₀ (rat): Dermal LD₅₀ (rabbit): >2.0 g/kg body weight

Dermal Irritation: Only mild, but reversible, irritation was found in a standard 72-hr test on rabbits. A value of 0.2 (non-irritating) was found on a scale of 8.

Eve Irritation: With or without rinsing with water, the irritation scores in rabbits at 24 hours did not exceed 15 (mild irritant) on a scale of 110.

Subchronic dermal effects; No adverse effects, except reversible dermal irritation, were found in rabbits exposed to Simple Green® (up to 2.0 g/kg/day for 13 weeks) applied to the skin of 25 males and 25 females. Only female body weight gain was affected. Detailed microscopic examination of all major tissues showed no adverse changes.

Fertility Assessment by Continuous Breeding: The Simple Green® formulation had no adverse effect on fertility and reproduction in CD-1 mice with continuous administration for 18 weeks, and had no adverse effect on the reproductive performance of their offspring.

XIII. BIODEGRADABILITY AND ENVIRONMENTAL TOXICITY INFORMATION

Biodegradability:

Simple Green® is readily decomposed by naturally occurring microorganisms. The biological oxygen demand (BOD), as a percentage of the chemical oxygen demand (COD), after 4, 7, and 11 days was 56%, 60%, and 70%, respectively. Per OECD Closed Bottle Test, Simple Green® meets OECD and EPA recommendations for ready biodegradability.

In a standard biodegradation test with soils from three different countries, Butyl Cellosolve reached 50% degradation in 6 to 23 days, depending upon soil type, and exceeded the rate of degradation for glucose which was used as a control for comparison.

Environmental Toxicity Information:

Simple Green® is considered practically non-toxic per EPA's aquatic toxicity scale. Simple Green® is non-lethal to any of the marine and estuarine test animals listed in the following table at concentrations below 200 mg/L (0.02%). This table shows the Simple Green® concentrations that are likely to be lethal to 50% of the exposed organisms.

	LC ₅₀ in mg/L (ppm)		
	48-hour	96-hour	
Marine Fish:			
Mud minnow (Fundulus heteroclitus)	1690	1574	
Whitebait (Galaxias maculatus)	210	210	
Marine/Estuarine Invertebrates:			
Brine Shrimp (Artemia salina)	610	399	
Grass Shrimp (Palaemonetes pugio)	270	220	
Green-lipped Mussel (Perna canaliculus)	220	220	
Mud Snail (Potamopyrgus estuarinus)	410	350	

XIV. DISPOSAL CONSIDERATIONS

Simple Green® is fully water soluble and biodegradable and will not harm sewage-treatment microorganisms if disposal by sewer or drain is necessary. Dispose of in accordance with all applicable local, state, and federal laws.

XV. OTHER INFORMATION

Containers:	Simple Green® residues can be completely removed by rinsing with water, the container may be
	recycled or applied to other uses

recycled or applied to other uses.

Polyimide insulated wiring is not affected by exposure to Simple Green®. After immersion in Simple **Electrical Wiring** Green® for 14 days at 74°F, the 61 cm piece of polyimide insulated wire passed a one minute dielectric Compatibility: proof test at 2500 volts (ASTM D-149).

Sunshine Makers, Inc., Research and Development Division: 562-795-6000. Contact Point:

*** NOTICE ***

All information appearing herein is based upon data obtained by the manufacturer and recognized technical sources. Judgments as to the suitability of information herein for purchaser's purposes are necessarily purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of this information, Sunshine Makers, Inc. or its distributors extends no warranties, makes no representations and assumes no responsibility as to the suitability of such information for application to purchaser's intended purposes or for consequences of its use.

Appendix D

Explanation of the National Fire Protection Association Safety Diamond and the National Paint & Coatings Association
Hazardous Materials Identification System

Material below reproduced courtesy of the University of Kentucky Environmental Health and Safety Department.

This section has been extracted from an extended description that can be found at: http://ehs.uky.edu/classes/hazcomm/hazcomtrain.html



Here's an example of an alternative labeling system designed by the National Fire Protection Association (NFPA) that uses color, numbers and other information to convey the hazards of the chemical.

The NFPA system uses a diamond-shaped diagram of symbols and numbers to indicate the degree of hazard associated with a particular chemical or material. These diamond shaped symbols are placed on containers of chemicals or materials to identify the degree of hazard associated with the chemical or material. The diagram identifies four color-coded categories of hazard for each material. Each category is divided in levels of hazard potential with increasing numbers indicating increasing hazards. The exception is the white section that provides Special Hazards information. The abbreviated degrees of hazard in each of these categories are given as follows:

Health

The degree of health hazard of a chemical or material is based on the form or condition of the material, as well as its inherent properties. The degree of health hazard of a material should indicate the degree of personal protective equipment required for working safety with the material.

- 1 is for slightly hazardous (toxic) material which requires only minimal protection (for example, safety glasses and gloves) in addition to normal work clothing to work with safely.
- 2 is for moderately toxic or a hazardous or moderately toxic material which requires additional PPE or equipment (e.g. chemical goggles, lab/work smock, local ventilation) in addition to that required for less toxic material. Consult the MSDS for specific health hazard and proper PPE to use with this material.
- 3 or 4 is for highly to extremely toxic (deadly) materials (and any carcinogen, mutagen, or teratogen). These materials will require specialized equipment (e.g. respirator or exhaust hood, full face shield, rubber apron, specialized glove, handling tongs, etc) beyond that required for moderately toxic material. You must consult the MSDS and/or other safety information to determine the hazard (acute or chronic) and the proper PPE and engineering controls to safely use this material.

Flammability or Fire Hazard

The flammability or fire hazards deal with the degree of susceptibility of the material to ignite and burn. The form or condition of the materials, as well as their properties, affects the extent of the hazard. Many hazardous materials such as acetone and gasoline, have a flash point (ignition temperature) far below freezing and will readily ignite with a spark if the vapor concentration is sufficient.

- 1 is for materials with a flash point above 200°F.
- 2 is for materials with a flash point below 200°F but above 100°F.
- 3 is for materials with a flash point below 100°F but above 73°F.
- 4 is for materials with a flash point below 73°F.

Reactivity

The reactivity hazards deal with the potential of a material or chemical to release energy. Some materials are capable of rapid energy release without any catalyst, while others can undergo violent eruptive or explosive reactions if they come in contact with water or other materials. Generally this rating is used to indicate the potential to react if the material is heated, jarred, or shocked.

- 1 indicates a material that may be reactive if heated and one that reacts with water.
- 2 indicates a material that may react violently without detonation.
- 3 indicates a material that may detonate or explode if subjected to a strong initiating force or heating under confinement.
- 4 indicates a material that readily detonates or explodes.

Special Hazard

An open space at the bottom of the NFPA diagram can be used to indicate additional information about the chemical or material. This information may include the chemical or material's radioactivity, proper fire extinguishing agent, skin hazard, its use in pressurized containers, protective equipment required, or unusual reactivity with water.

- OX or OXY indicates a material that is an oxidizer.
- W indicates a material that is water reactive.
- ALK indicates a material that is alkali.
- COR indicates a material that is corrosive.
- RAD indicates a material that is radioactive.

Below are two other examples of an alternative labeling system designed by the National Paint & Coatings Association (NPCA). The labeling scheme is called the Hazardous Material Identification System (HMIS). It uses a similar system to convey the hazards of the chemical.





HMIS® labels can appear in a variety of formats. Some will include additional spaces to list target organ effects, a labeling requirement under the HCS, and other information, but the four colored areas shown here will always be present.

The new HMIS III label provides employees the tools to understand and handle chemicals exhibiting a variety of physical hazards with a far greater degree of precision. Although "Reactivity" has provided useful information for physical hazards, HMIS® III now provides more information about a chemical's physical hazard(s). The new HMIS III not only specifically incorporates each hazard, with specific criteria to evaluate the degree of hazard, but permits employers to identify the hazard present with an icon or symbol. Under the new HMIS® III, a worker can know immediately, for example, that a material he is handling is rated as an explosive, and that it is rated as a "3" giving him or her much more precise and useful information about the safe handling of that material.

Specific sections of an HMIS® label include the following:

Health

• The Health section conveys the health hazards of the material. In the latest version of HMIS®, the blue Health bar has two spaces, one for an asterisk and one for a numeric hazard rating.

If present, the asterisk (*) signifies a chronic health hazard, meaning that long-term exposure to the material could cause a health problem such as emphysema or kidney damage. NFPA lacks this important information because the NFPA system is meant only for emergency or acute (short-term) exposures.

The numbering systems are more or less identical to NFPA, with a 0 to 4 scale where 0 indicates minimal hazard and 4 indicates an extreme hazard.

Flammability

- For HMIS I and II, the criteria used to assign numeric values (0 = low hazard to 4 = high hazard) are identical to those used by NFPA. In other words, in **this** category, the systems are identical.
- For HMIS III, the flammability criteria are defined according to OSHA standards. A 0 to 4 scale is still used.

Reactivity

• The criteria used to assign numeric values (0 = low hazard to 4 = high hazard) were identical to those used by NFPA. In other words, in this category, the systems are identical.

Personal Protection

• HMIS® uses the white section to indicate what PPE should be used when working with the material.

HMIS® uses a letter coding system or variant for this section. Below is the lettering scheme along with a series of graphics meant to reinforce the meaning of each letter:

HMIS ®	Required Equipment
A	Safety Glasses
В	Safety Glasses Gloves
C	Safety Glasses Gloves Apron
D	Face Shield Gloves Apron
E	Safety Glasses Gloves Respirator
F	Safety Glasses Gloves Apron Respirator
G	Safety Glasses Gloves Respirator
Н	Splash Gloves Apron Respirator
I	Safety Glasses Gloves Respirator Respirator
J	Splash Goggles Gloves Apron Respirator
K	Air Line Mask or Hood Gloves Full Suit Boots
L through Z	Site-specific label. Ask your supervisor or safety specialist for handling instructions

The main thing to remember is, the higher the rating number, the more hazardous the chemical.

Appendix E EPP Selection Criteria Checklist

EPP Selection Criteria Checklist

School:		Kentucky Pollution
School Contact:		Prevention
City: State:	-	Center
Phone: Fax:	lan	itorial
	Jan	Itoriai
Product Name:	- Cla	aning 🥽
Use:		
List of Chemicals	Pro	ducts
a		
b	1	ST.Va
C		
d		
e		
f	المراجع	
g		

	Ranking				
*Attributes	low risk		high r	isk	Comments
Carcinogens	1	2	3	4	
Flammability	1	2	3	4	
Corrosiveness (pH)	1	2	3	4	
Chronic Health Risks	1	2	3	4	
Skin/Eye Irritant	1	2	3	4	
Percentage VOCs	1	2	3	4	
Biodegradability	1	2	3	4	
Product Packaging	1	2	3	4	
Energy Needs	1	2	3	4	

Total Score

^{*}These are just a few of the different attributes that schools may want to consider

EPP Selection Criteria Checklist

School: General High School	Kentucky
School Contact: John Doe	Pollution Prevention Center
City: Louisville State: KY	Center
Phone: 555-5555 Fax: 555-5555	Janitorial
Product Name: Generic Glass Cleaner - SAMPLE	Cleaning
Use: Clean Glass	
List of Chemicals	Products
a. Sodium Xylene Sulphonate	
b. Sodium Lauryl Sulfate	
c. 2-Butoxyethanol	
d	
e	
f	

Ranking					
*Attributes	low risk	Marini	high r	risk	Comments
Carcinogens	<u>1</u>	2	3	4	
Flammability	1	2	3	4	
Corrosiveness (pH)	1	2	3	4	
Chronic Health Risks	1	2	<u>3</u>	4	
Skin/Eye Irritant	1	2	3	<u>4</u>	
Percentage VOCs	1	2	<u>3</u>	4	
Biodegradability	1	2	3	4	
Product Packaging	1	2	3	4	
Energy Needs	1	2	3	4	

Total Score

22

*These are just a few of the different attributes that schools may want to consider

Appendix F Sample Bid Specifications

Example Bid Specification Language for Environmentally Preferable Janitorial Cleaning Products

I. Environmentally Preferable Janitorial Cleaning Products Categories

The Douglass County School District has established desirable attributes for the evaluation of five (5) representative categories of janitorial cleaning products as listed below. Offerors may propose more than one product within a product category (example only – brand "X" and brand "Y" for all-purpose cleaner) and/or propose a single product that addresses more than one product category or cleaning task (example only – brand "X" as all-purpose cleaner and general disinfectant).

Janitorial Cleaning Product Categories

- (1) All-Purpose Cleaner
- (2) General Degreaser
- (3) General Disinfectant
- (4) Floor Stripper
- (5) Bathroom Cleaner

II. Desirable Attributes for Janitorial Cleaning Products

The following ten (10) attributes should be present in some verifiable or demonstrable degree in an offered product. It is required that offerors shall provide a Material Safety Data Sheet (MSDS), equivalent information, and/or any additional information specifically requested for each product offered in the product categories specified in Section I to enable the District to evaluate the desirable characteristics with respect to that product.

Failure of a product to meet any of the criteria listed below, or failure to submit acceptable verification that a product meets these criteria, may lead to the automatic rejection of the bid.

- (1) <u>Carcinogen</u>: The District wishes entirely to eliminate the use of products containing known and probable carcinogens. Accordingly, no chemical cleaning product shall contain constituent compounds that are classified as known or probable carcinogens by any of the following organizations:
 - American Conference of Governmental Industrial Hygienists (ACGIH);
 - International Agency for Research on Cancer (IARC);
 - National Institute of Occupational Health and Safety (NIOSH);
 - National Toxicology Program (NTP); and,
 - Occupational Health and Safety Organization (OSHA).

- (2) <u>Flammability/Flash Point</u>: Products that do not ignite easily are favored.
- (3) <u>Corrosiveness (pH)</u>: Products that have a pH closer to neutral are favored.
- (4) <u>Chronic Health Risks</u>: Products that pose no potential for chronic health risks are favored.
- (5) <u>Skin/Eye Irritant</u>: Products that are less irritating to the skin and eyes are favored.
- (6) <u>Volatile Organic Compound (VOC) Content</u>: Products with the lowest VOC levels possible are favored. Most desirable are products that do not contain VOC's in concentrations that exceed 10% of the weight of the product.
- (7) Ozone-Depleting Compounds: Products that do not contain ozone-depleting compounds are favored.
- (8) <u>Biodegradability</u>: Products that are partially or completely biodegradable are favored.
- (9) Product Packaging: Products that are packaged in recyclable or reusable containers (such as use of refillable product distribution devices and/or concentrates) and containers which are made with a percentage of post-consumer recycled materials are favored. Additionally, products that use no, or only a minimal amount of, polypropylene and/or polystyrene ("Styrofoam") packaging are favored.
- (10) <u>Energy Needs</u>: Products that work effectively in cold water, which decreases the amount of energy consumption necessary, are favored.

Some wording for potential additional attributes depending on District priorities:

- (A) <u>No Sealed Aerosol Spray Cans</u>: All chemical cleaning products must be available in either a liquid form or manual pump action sprays and/or concentrates that can be dispensed into pump bottles for use.
- (B) <u>Dyes and Fragrances</u>: Products that do not contain dyes or fragrances are favored.

III. Product Efficacy Testing

In addition to being evaluated for environmental preferability, offered products will be evaluated for their efficacy. That is, a chemical cleaning or recycled content product that meets the desirable attributes still may be deemed ineffective for its intended purpose(s) after testing by the evaluators. Such products will be rejected.

IV. Training Program

The District believes that an effective training program is central to the success of using environmentally preferable products. Vendors who can supply a quality on-site training program and be accessible to trouble-shoot problem applications are favored.

INTRODUCTION
INDEX with CHEMICAL NAMES and SYNONYMS
INDEX with CHEMICAL NAMES
INDEX with CAS NUMBERS
APPENDICES

NIOSH Pocket Guide to Chemical Hazards

INDEX of Chemical Abstract Numbers (CAS NO.)

GUIDE	CAS NO
0023	
0024	
0039 0055	
0114	
0139	
0140	
0144 0149	
0149	
0207	
0288	
0294	
0305	
0323	
0340	
0432	
0434	
0480	
0520 0545	
0545	
0558	
<u>0608</u>	
0614	
0646	
0651 0666	
0667	
0293	50-00-0
0174	50-29-3
0010	50-78-2
0007	<u>53-96-3</u>
0285	55-38-9
0456	55-63-0
0107	56-23-5
0479	<u>56-38-2</u>
0302	<u>56-81-5</u>
0227 0570	57-14-7
0574	57-50-1
0528	57-57-8
0112	<u>57-74-9</u>
0370	<u> 58-89-9</u>
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0419	60-34-4
0206	60-57-1
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0033	62-53-3
0202 0564	62-73-7
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0100	63-25-2
0262	64-17-5

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<u>U316</u>	67-72
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0333	74-90-8 74-93-1
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0123	74-97-5
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0524	74-98-6 74-99-1
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0001	75-07-0
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0073	105-46-4 105-60-2
0097	105-60-2
0097 0266	106-35-4 106-42-3
0670	106-35-4 106-42-3
	106-44-5
0156 0190	106-44-5 106-46-7
	$\frac{106-46-7}{106-49-0}$
	106-44-5 106-46-7 106-49-0 106-50-3
0624 0495 0542	106-50-3
0542	106-51-4 106-87-6
0495 0542 0659 0254 0019 0270 0068	106-51-4 106-87-6 106-89-8 106-92-3
0254	106-89-8 106-92-3
0019	106-92-3
0270	106-89-8 106-92-3 106-93-4 106-97-8
0068 0067 0011	106-97-8
0067	106-99-0
0011	107-02-8
0526 0018 0271	107-03-9
0018	$\frac{107 - 03 - 9}{107 - 05 - 1}$
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0268	107-03-9 107-05-1 107-06-2 107-07-3
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0014	107-12-0 107-13-1
0269	$\frac{107-13-1}{107-15-3}$
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0017 0527	107-18-6 107-19-7
0527	107-19-7
0118 0272 0129 0417	107-15-3 107-16-4 107-18-6 107-19-7 107-20-0 107-21-1
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0129	107-30-2 107-31-3
0417	107-31-3
0328 0590 0186 0488	107-41-5 107-49-3
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0166 0493 0050 0357 0532 0486 0079 0086 0378 0083	108-94-1 108-95-2 108-98-5 109-59-1 109-60-4 109-66-0 109-73-9 109-74-0 109-77-3
0166 0493 0050 0357 0532 0486 0079 0086 0378 0083 0401	$\begin{array}{c} 108 - 94 - 1 \\ 108 - 95 - 2 \\ 108 - 98 - 5 \\ 109 - 59 - 1 \\ 109 - 60 - 4 \\ 109 - 66 - 0 \\ 109 - 73 - 9 \\ 109 - 74 - 0 \\ 109 - 77 - 3 \\ 109 - 79 - 5 \\ 109 - 86 - 4 \end{array}$
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0166 0493 0050 0357 0532 0486 0079 0086 0378 0083 0401 0396 0209 0278 0602	108-94-1 108-95-2 108-98-5 109-59-1 109-66-0 109-73-9 109-74-0 109-77-3 109-79-5 109-86-4 109-87-7 109-89-7
0166 0493 0050 0357 0532 0486 0079 0086 0378 0083 0401 0396 0209 0278 0602 0421	108-94-1 108-95-2 108-98-5 109-59-1 109-66-0 109-73-9 109-77-3 109-79-5 109-86-4 109-87-5 109-89-7 109-94-9
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0647	11107-01-0
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<u>0287</u>	<u> 12604-58-9</u>
0172	<u> 13121-70-</u>
0308	13397-24-5
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0183	10202-10-3
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0407	25639-42-3
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0241	34590-94-8
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0393 0330 0443 0145 0521	10294-33-4 10361-37-2 11097-69-1 1107-01-6 12001-26-2 12179-65-1 12108-13-1 12125-02-9 12179-04-1 12604-58-9 13121-70-9 13463-40-6 13463-67-1 13494-80-9 13838-16-9 14484-64-1 14807-96-6 14977-61-8 15096-52-1 16219-75-1 16842-03-8 17702-41-9 17804-35-2 18282-10-9 19287-45-1 19624-22-1 20816-12-6 21087-64-9 21351-79-2 21651-19-4 22224-92-6 25013-15-6 25376-45-8 25639-42-1 25376-45-8 25639-15-1 268956-68-5 93763-70-1
0443 0145	62765-93-9
0145	65996-93-2
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NIOSH Pocket Guide to Chemical Hazards

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GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0001	Acetaldehyde	75-07-0	AB1925000
0002	Acetic acid	64-19-7	AF1225000
0003	Acetic anhydride	108-24-7	AK1925000
0004	Acetone	67-64-1	AL3150000
0005	Acetone cyanohydrin	75-86-5	OD9275000
<u>0006</u>	Acetonitrile	75-05-8	AL7700000
0007	2-Acetylaminofluorene	53-96-3	AB9450000
8000	Acetylene	74-86-2	A09600000
0009	Acetylene tetrabromide	79-27-6	KI8225000
0010	Acetylsalicyclic acid	50-78-2	<u>VO0700000</u>
0011	Acrolein	107-02-8 79-06-1	AS1050000 AS3325000
0012 0013	Acrylamide Acrylic acid	79-06-1 79-10-7	AS3325000 AS4375000
0013		107-10-7	
0014	Acrylonitrile Adiponitrile	111-69-3	AT5250000 AV2625000
0015	Aldrin	309-00-2	IO2100000
0017	Allyl alcohol	107-18-6	BA5075000
0017	Allyl chloride	107-18-0	UC7350000
0018	Allyl glycidyl ether	106-92-3	RR0875000
0020	Allyl propyl disulfide	2179-59-1	J00350000
0021	alpha-Alumina	1344-28-1	BD1200000
0022	Aluminum	7429-90-5	BD0330000
0023	Aluminum (pyro powders and welding fumes	7120 00 5	<u>DD0330000</u>
0024	Aluminum (soluble salts and alkyls, as A		
0025	4-Aminodiphenyl	92-67-1	DU8925000
0026	2-Aminopyridine	504-29-0	US1575000
0027	Amitrole	61-82-5	XZ3850000
0028	Ammonia	7664-41-7	B00875000
0029	Ammonium chloride fume	12125-02-9	BP4550000
0030	Ammonium sulfamate	7773-06-0	WO6125000
0031	n-Amyl acetate	628-63-7	AJ1925000
0032	sec-Amyl acetate	626-38-0	AJ2100000
0033	Aniline (and homologs)	62-53-3	BW6650000
0034	o-Anisidine	90-04-0	BZ5410000
0035	<u>p-Anisidine</u>	104-94-9	BZ5450000
0036	Antimony	7440-36-0	CC4025000
0037	ANTU	86-88-4	YT9275000
0038	Arsenic (inorganic compounds, as As)	7440-38-2	CG0525000
0039	Arsenic, organic compounds (as As)		
0040	Arsine	7784-42-1	CG6475000
0041	Asbestos	1332-21-4	CI6475000
0042	Asphalt fumes	8052-42-4	CI9900000
0043	Atrazine	1912-24-9	XY5600000
0044	Azinphos-methyl	86-50-0	TE1925000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0045	Barium chloride (as Ba)	10361-37-2	CO8750000
0046	Barium nitrate (as Ba)	10022-31-8	CQ9625000
0047	Barium sulfate	7727-43-7	CR0600000
0048	Benomyl	17804-35-2	DD6475000

0049	Benzene	71-43-2	CY1400000
0050	Benzenethiol	108-98-5	DC0525000
0051	Benzidine	92-87-5	DC9625000
0052	Benzoyl peroxide	94-36-0	DM8575000
0053	Benzyl chloride	100-44-7	XS8925000
0054	Beryllium & beryllium compounds (as Be)	7440-41-7	DS1750000
0 <u>055</u> 0056	Bismuth telluride, doped with Selenium s Bismuth telluride, undoped	1304-82-1	EB3110000
0056 0057		1330-43-4	ED4588000
0057		1303-96-4	VZ2275000
0050	Borates, tetra, sodium salts (Pentahydra	12179-04-3	V <u>ZZZ</u> /3000
0060	Boron oxide	1303-86-2	ED7900000
0061	Boron tribromide	10294-33-4	ED7400000
0062	Boron trifluoride	7637-07-2	ED2275000
0063	Bromacil	314-40-9	Y09100000
0064	Bromine	7726-95-6	EF9100000
0065	Bromine pentafluoride	7789-30-2	EF9350000
0066	Bromoform	75-25-2	PB5600000
0067	1,3-Butadiene	106-99-0	EI9275000
0068	n-Butane	106-97-8	EJ4200000
0069	2-Butanone	78-93-3	EL6475000
0070	2-Butoxyethanol	111-76-2	KJ8575000
0071	2-Butoxyethanol acetate	112-07-2	KJ8925000
0072	n-Butyl acetate	123-86-4	AF7350000
0073	sec-Butyl_acetate	105-46-4	AF7380000
0074	tert-Butyl acetate	540-88-5	AF7400000
0075	Butyl acrylate	141-32-2	UD3150000
0076	n-Butyl alcohol	71-36-3	E01400000
0077	sec-Butyl alcohol tert-Butyl alcohol	78-92-2 75-65-0	E01750000
0 <u>078</u> 0079	n-Butvlamine	75-65-0 109-73-9	E01925000 E02975000
00 <i>79</i> 0080	tert-Butyl chromate	1189-73-9 1189-85-1	GB2900000
0080	n-Butvl glycidyl ether	2426-08-6	TX4200000
0082	n-Butyl lactate	138-22-7	OD4025000
0083	n-Butyl mercaptan	109-79-5	EK630000
0084	o-sec-Butylphenol	89-72-5	SJ8920000
0085	p-tert-Butyltoluene	98-51-1	XS8400000
	p ccrc bacyrcoraciic		ET8750000
0086 GUIDE	n-Butyronitrile CHEMICAL NAME	109-74-0 CAS NO	RTECS N
0086 GUIDE 0087	CHEMICAL NAME Cadmium dust (as Cd)	CAS NO 7440-43-9	RTECS N
0086 GUIDE 0087 0088	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd)	CAS NO 7440-43-9 1306-19-0	RTECS N EU9800000 EV1930000
0086 GUIDE 0087 0088 0089	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As)	7440-43-9 1306-19-0 7778-44-1	RTECS N EU9800000 EV1930000 CG0830000
0086 GUIDE 0087 0088 0089 0090	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate	7440-43-9 1306-19-0 7778-44-1 1317-65-3	RTECS N EU9800000 EV1930000 CG0830000 EV9580000
0086 GUIDE 0087 0088 0089 0090 0091	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000
0086 GUIDE 0087 0088 0089 0090 0091 0092	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000
0086 GUIDE 0087 0088 0089 0090 0091	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000
0086 0087 0088 0089 0090 0091 0092 0093	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium oxide Calcium silicate Calcium sulfate	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium dyaroxide Calcium oxide Calcium silicate Calcium sulfate Canphor (synthetic)	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium oxide Calcium silicate Calcium sulfate Camphor (synthetic) Caprolactam	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS60000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium oxide Calcium silicate Calcium sulfate Calcium sulfate Camphor (synthetic) Caprolactam Captafol	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1	EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium oxide Calcium silicate Calcium silicate Calcium sulfate Canphor (synthetic) Caprolactam Captafol Captan	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2	RTECS N EU9800000 EV1930000 CG0830000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GW50750000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium oxide Calcium silicate Calcium sulfate Calcium sulfate Camphor (synthetic) Caprolactam Captafol Captan Carbaryl	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GW50750000 FC5950000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium oxide Calcium silicate Calcium silicate Calcium sulfate Camphor (synthetic) Caprolactam Captafol Captan Carbaryl Carbofuran	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GG5950000 FC5950000 FB9450000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium bydroxide Calcium silicate Calcium silicate Calcium sulfate Canphor (synthetic) Caprolactam Captafol Captan Carbaryl Carbofuran Carbon black	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4	EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GW50750000 FC5950000 FF5800000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102 0103	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium oxide Calcium silicate Calcium silicate Calcium sulfate Canphor (synthetic) Caprolactam Captafol Captan Carbaryl Carbofuran Carbon black Carbon dioxide	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9	EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GW50750000 FC5950000 FF5800000 FF5800000
0086 0087 0088 0089 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102 0103 0104	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium oxide Calcium silicate Calcium sulfate Calcium sulfate Caprolactam Captafol Captan Carboryl Carbofuran Carbon black Carbon dioxide Carbon dioxide Carbon dioxide Carbon dioxide Carbon dioxide	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GW5075000 FF5800000 FF5800000 FF6400000 FF66500000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102 0103 0104	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium oxide Calcium silicate Calcium sulfate Calcium sulfate Caprolactam Captafol Captan Carboryl Carbofuran Carbon black Carbon dioxide Carbon monoxide	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GW5075000 FC5950000 FF5800000 FF6600000 FF66500000 FG3500000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102 0103 0104 0105	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium silicate Calcium silicate Calcium sulfate Calcium sulfate Caprolactam Captafol Captan Carbaryl Carbofuran Carbon dioxide Carbon dioxide Carbon monoxide Carbon tetrabromide	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GS4900000 FC5950000 FF5800000 FF66650000 FG66500000 FG4725000
0086 O087 0087 0088 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102 0103 0104 0105 0106 0107	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium oxide Calcium silicate Calcium sulfate Calcium sulfate Caprolactam Captafol Captan Carbaryl Carbofuran Carbon black Carbon dioxide Carbon monoxide	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GS4900000 FC5950000 FF5800000 FF6650000 FF6650000 FG63500000 FG4725000 FG4725000
0086 GUIDE 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102 0103 0104 0105 0106 0107 0108	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium silicate Calcium silicate Calcium sulfate Calcium sulfate Caprolactam Captafol Captan Carbon dioxide Carbon dioxide Carbon dioxide Carbon tetrabromide Carbon tetrachloride	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM36750000 GS4900000 FC5950000 FF5800000 FF6400000 FF6650000 FG4725000 FG4725000 FG4900000 FG6125000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0100 0101 0102 0103 0104 0105 0106 0107 0108 0109	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium oxide Calcium silicate Calcium silicate Calcium sulfate Caprolactam Captan Captan Carbaryl Carbofuran Carbon black Carbon dioxide Carbon monoxide Carbon tetrabromide Carbonyl fluoride Carbonyl fluoride Carbonyl fluoride Carbonyl fluoride Catechol Cellulose	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5 353-50-4 120-80-9 9004-34-6	EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GW50750000 FF5800000 FF5800000 FF6400000 FF6400000 FG650000 FG4725000 FG4900000 FG61250000 FJ5691460
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102 0103 0104 0105 0106 0107 0108 0109 0110	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium silicate Calcium silicate Calcium sulfate Canphor (synthetic) Caprolactam Captanl Carbaryl Carbofuran Carbon black Carbon dioxide Carbon disulfide Carbon tetrabromide Carbonyl fluoride Carbonyl fluoride Carbonlose Carbonlose Carbonlose Carbonlose Carbonlose Carbonlose Carbonlose Carbonlose Cesium hydroxide	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5 353-50-4 120-80-9 9004-34-6 21351-79-1	EU9800000 EV1930000 CG0830000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GW50750000 FF5800000 FF6400000 FF6650000 FG4725000 FG4725000 FG4900000 FG61250000 FF66125000 UX1050000 FJ5691460 FK9800000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0105 0106 0107 0108 0109 0110 0111	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium silicate Calcium silicate Calcium sulfate Canphor (synthetic) Caprolactam Captafol Captan Carbaryl Carbofuran Carbon black Carbon dioxide Carbon disulfide Carbon tetrabromide Carbonyl fluoride Catechol Cellulose Cesium hydroxide Chlordane	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5 353-50-4 120-80-9 9004-34-6 21351-79-1 57-74-9	EU9800000 EV1930000 CG0830000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GW5075000 FF5800000 FF6400000 FF6650000 FG4725000 FG4725000 FG4900000 FG4725000 FG4900000 FG4900000 FG61250000 UX1050000 FK9800000 PB98000000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0096 0097 0098 0099 0100 0101 0102 0103 0104 0105 0106 0107 0108 0109 0110 0111	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium silicate Calcium silicate Calcium sulfate Calcium sulfate Caprolactam Captafol Captan Carbaryl Carbofuran Carbon black Carbon dioxide Carbon dioxide Carbon tetrabromide Carbon tetrachloride Carbonlose Chlordane Chlordane	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5 353-50-4 120-80-9 9004-34-6 21351-79-1	EU9800000 EV1930000 CG0830000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GW50750000 FF5800000 FF5800000 FF6400000 FF6650000 FG4725000 FG4725000 FG4900000 FG61250000 UX1050000 FJ5691460 FK9800000
0086 OUTDE 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102 0103 0104 0105 0106 0107 0108 0109 0101 0110 0111 0112 0113 0114	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium silicate Calcium silicate Calcium sulfate Calcium sulfate Caprolactam Captafol Captan Carbon black Carbon dioxide Carbon dioxide Carbon tetrabromide Carbon tetrachloride Carbonane Catelulose Cesium hydroxide Chlorinated camphene Chlorinated diphenyl oxide	CAS NO 7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5 353-50-4 120-80-9 9004-34-6 21351-79-1 57-74-9 8001-35-2	EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 FC5950000 FF5800000 FF6650000 FF6650000 FG4725000 FG4725000 FG4725000 FG4900000 FG4725000 FG4900000 FG4725000 FG4900000 FG4900000 FG4725000 FG4900000 FG4900000 FG4900000 FG4900000 FG61250000 UX1050000 FJ5691460 FK98000000 PB98000000 NW52500000
0086 OUTDE 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102 0103 0104 0105 0106 0107 0108 0109 0110 0111 0112 0113 0114 0115	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium silicate Calcium silicate Calcium sulfate Calcium sulfate Caprolactam Captafol Captan Carbaryl Carbofuran Carbon black Carbon dioxide Carbon dioxide Carbon tetrabromide Carbon tetrachloride Carbonly fluoride Carbonly fluoride Catechol Cellulose Cesium hydroxide Chlorinated camphene Chlorinated diphenyl oxide Chlorine	CAS NO 7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5 353-50-4 120-80-9 9004-34-6 21351-79-1 57-74-9 8001-35-2	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 FC5950000 FF5800000 FF6400000 FF6650000 FG4725000 FG4725000 FG4900000 FG4900000 FG6125000 UX1050000 FJ5691460 FK9800000 PB98000000 PB98000000 FF021000000
0086 GUIDE 0087 0088 0089 0090 0091 0092 0093 0094 0095 0097 0098 0099 0100 0101 0102 0103 0104 0105 0106 0107 0108 0109 0110 0111 01112 0113 0114 0115 0116	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium sxide Calcium sxide Calcium sxide Calcium sulfate Calcium sulfate Canphor (synthetic) Caprolactam Captafol Captan Carboryl Carbofuran Carbon black Carbon dioxide Carbon disulfide Carbon tetrabromide Carbon tetrachloride Carbonyl fluoride Carbonyl fluoride Catechol Cellulose Cesium hydroxide Chlorinated camphene Chlorinated diphenyl oxide Chlorine Chlorine Chlorine Chlorine Chlorine Chlorine Chlorine	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5 353-50-4 120-80-9 9004-34-6 21351-79-1 57-74-9 8001-35-2	EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 WS6920000 EX1225000 CM3675000 GS4900000 FC5950000 FF5800000 FF6400000 FF6650000 FG4725000 FG4725000 FG4725000 FG4900000 FG6125000 UX1050000 FJ5691460 FK9800000 PB9800000 PB9800000 FF021000000 FO21000000 FO21000000 FO21000000 FO21000000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102 0103 0104 0105 0106 0107 0108 0109 0110 0111 0112 0113 0114 0115 0116	Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium bydroxide Calcium oxide Calcium silicate Calcium silicate Calcium sulfate Calcium sulfate Capphor (synthetic) Caprolactam Captafol Captan Carbaryl Carbon black Carbon dioxide Carbon dioxide Carbon dioxide Carbon tetrabromide Carbon tetrachloride Carbonyl fluoride Carbonyl fluoride Catechol Cellulose Cesium hydroxide Chlorinated diphenyl oxide Chlorine Chlorine dioxide Chlorine trifluoride	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5 353-50-4 120-80-9 9004-34-6 21351-79-1 57-74-9 8001-35-2 7782-50-5 10049-04-4 7790-91-2	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 EV9580000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM36750000 GS4900000 FC5950000 FF5800000 FF6400000 FF6650000 FG4725000 FG47250000 FG61250000 FG61250000 FG612500000 FJ5691460 FK9800000 FO28000000 FO28000000
0086 GUIDE 0087 0088 0099 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102 0103 0104 0105 0106 0107 0108 0109 0111 0112 0113 0114 0115 0116 0117 0118	Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium oxide Calcium silicate Calcium silicate Calcium sulfate Canphor (synthetic) Caprolactam Captafol Captan Carbaryl Carbon black Carbon dioxide Carbon dioxide Carbon tetrabromide Carbon tetrachloride Carbonyl fluoride Catechol Cellulose Cesium hydroxide Chlorinated diphenyl oxide Chlorine Chlorine dioxide Chlorine trifluoride	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5 353-50-4 120-80-9 9004-34-6 21351-79-1 57-74-9 8001-35-2 7782-50-5 10049-04-4 7790-91-2 107-20-0	EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 WS6920000 EX1225000 CM3675000 GS4900000 FC5950000 FF5800000 FF6400000 FF6400000 FF6400000 FF6400000 FF6400000 FG650000 FG4725000 FG4900000 FG4900000 FG4900000 FG5950000 FG5950000 FG4900000 FG60250000 FG5950000 FG4900000 FG60250000 FG9900000 FG9900000 FO2800000 FO2800000 AB2450000
0086 OUNTE 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097 0098 0099 0100 0101 0102 0103 0104 0105 0106 0107 0108 0107 0108 0111 0112 0113 0114 0115 0116 0117 0118	Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium silicate Calcium silicate Calcium silicate Calcium sulfate Canphor (synthetic) Caprolactam Captafol Captan Carbaryl Carbofuran Carbon black Carbon dioxide Carbon disulfide Carbon tetrabromide Carbon tetrabromide Carbon tetrachloride Carbonly fluoride Catechol Cellulose Cesium hydroxide Chlorinated diphenyl oxide Chlorine Chlorine trifluoride Chloroacetaldehyde alpha-Chloroacetophenone	7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5 353-50-4 120-80-9 9004-34-6 21351-79-1 57-74-9 8001-35-2 7782-50-5 10049-04-4 7790-91-2 107-20-0 532-27-4	EU9800000 EV1930000 CG0830000 CG0830000 EV9580000 GS60000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GW5075000 FF5800000 FF5800000 FF6400000 FF6400000 FF64725000 FG4725000 FG4725000 FG4900000 FG4725000 FG4900000 FG4900000 FG4900000 FG6125000 FG4900000 FG6125000 FG4900000 FG61250000 FG2800000 FO2800000 AM63000000 AM63000000
0086 OUTDE 0087 0088 0089 0090 0091 0092 0093 0094 0099 0100 0101 0102 0103 0104 0105 0106 0107 0108 0109 0110 0111 0112 0113 0114 0115 0116 0117 0118 0119 0120	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium silicate Calcium silicate Calcium sulfate Canphor (synthetic) Caprolactam Captafol Captan Carbaryl Carbofuran Carbon dioxide Carbon dioxide Carbon disulfide Carbon tetrabromide Carbon tetrachloride Carbonyl fluoride Carbonyl fluoride Catesium hydroxide Chlorinated camphene Chlorinated diphenyl oxide Chlorine Chlorine trifluoride Chloroacetaldehyde alpha-Chloroacetophenone Chloroacetyl chloride	CAS NO 7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5 353-50-4 120-80-9 9004-34-6 21351-79-1 57-74-9 8001-35-2 7782-50-5 10049-04-4 7790-91-2 107-20-0 532-27-4 79-04-9	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GW5075000 FC5950000 FF5800000 FF6400000 FF6400000 FG4725000 FG4725000 FG4725000 FG4900000 FG4725000 FG4900000 FG6125000 UX1050000 FJ5691460 FK9800000 PB9800000 XW5250000 FO2100000 FO2100000 FO28000000 AB2450000 AM6300000 AM6300000 AM6300000 AM6300000
0086 OUTDE 0087 0088 0089 0090 0091 0092 0093 0094 0099 0100 0101 0102 0103 0104 0105 0106 0107 0108 0109 0110 0111 0112 0113 0114 0115 0116 0117 0118 0119 01117 0118 0119 0120 0121	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium suitcate Calcium silicate Calcium sulfate Canphor (synthetic) Caprolactam Captafol Captan Carborfuran Carbon black Carbon dioxide Carbon dioxide Carbon tetrabromide Carbon tetrabromide Carbon tetrabromide Carbonl fluoride Carbonl fluoride Catechol Cellulose Cesium hydroxide Chlorinated diphenyl oxide Chlorine trifluoride Chlorine trifluoride Chloroacetaldehyde alpha-Chloroacetophenone Chlorobenzene	CAS NO 7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5 353-50-4 120-80-9 9004-34-6 21351-79-1 57-74-9 8001-35-2 7782-50-5 10049-04-4 7790-91-2 107-20-0 532-27-4 79-04-9 108-90-7	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 FC5950000 FF5800000 FF6400000 FF6650000 FG4725000 FG4725000 FG4900000 FG4725000 CZ0175000 CZ0175000
0086 0087 0088 0089 0090 0091 0092 0093 0094 0095 0096 0097	CHEMICAL NAME Cadmium dust (as Cd) Cadmium fume (as Cd) Calcium arsenate (as As) Calcium carbonate Calcium cyanamide Calcium hydroxide Calcium silicate Calcium silicate Calcium sulfate Canphor (synthetic) Caprolactam Captafol Captan Carbaryl Carbofuran Carbon dioxide Carbon dioxide Carbon disulfide Carbon tetrabromide Carbon tetrachloride Carbonyl fluoride Carbonyl fluoride Catesium hydroxide Chlorinated camphene Chlorinated diphenyl oxide Chlorine Chlorine trifluoride Chloroacetaldehyde alpha-Chloroacetophenone Chloroacetyl chloride	CAS NO 7440-43-9 1306-19-0 7778-44-1 1317-65-3 156-62-7 1305-62-0 1305-78-8 1344-95-2 7778-18-9 76-22-2 105-60-2 2425-06-1 133-06-2 63-25-2 1563-66-2 1333-86-4 124-38-9 75-15-0 630-08-0 558-13-4 56-23-5 353-50-4 120-80-9 9004-34-6 21351-79-1 57-74-9 8001-35-2 7782-50-5 10049-04-4 7790-91-2 107-20-0 532-27-4 79-04-9	RTECS N EU9800000 EV1930000 CG0830000 EV9580000 GS6000000 EW2800000 EW3100000 VV9150000 WS6920000 EX1225000 CM3675000 GS4900000 GW5075000 FC5950000 FF5800000 FF6400000 FF6400000 FG4725000 FG4725000 FG4725000 FG4900000 FG4725000 FG4900000 FG6125000 UX1050000 FJ5691460 FK9800000 PB9800000 XW5250000 FO2100000 FO2100000 FO28000000 AB2450000 AM6300000 AM6300000 AM6300000 AM6300000

0125	Chlorodiphenyl (42% chlorine)	53469-21-9	TO1356000
0125	Chlorodiphenyl (54% chlorine)	11097-69-1	TO1360000
$\frac{0120}{0127}$	Chloroform	67-66-3	FS9100000
0127	bis-Chloromethyl ether	542-88-1	KN1575000
		107-30-2	
0129	Chloromethyl methyl ether		KN6650000
0130	1-Chloro-1-nitropropane	600-25-9	TX5075000
0131	Chloropentafluoroethane	76-15-3	KH7877500
0132	Chloropicrin	76-06-2	PB6300000
0133	beta-Chloroprene	126-99-8	EI9625000
0134	o-Chlorostyrene	2039-87-4	WL4160000
0135	o-Chlorotoluene	95-49-8	XS9000000
0136	2-Chloro-6-trichloromethyl pyridine	1929-82-4	US7525000
0137	Chlorpyrifos	2921-88-2	TF6300000
0138	Chromic acid and chromates	1333-82-0	GB6650000
0139	Chromium(II) compounds (as Cr)		
0140	Chromium(III) compounds (as Cr)		
0141	Chromium metal	7440-47-3	GB4200000
0142	Chromyl chloride	14977-61-8	GB5775000
0143	Clopidol	2971-90-6	UU7711500
0144	Coal dust		GF8281000
0145	Coal tar pitch volatiles	65996-93-2	GF8655000
0146	Cobalt metal dust and fume (as Co)	7440-48-4	GF8750000
0147	Cobalt carbonyl (as Co)	10210-68-1	GG030000
0148	Cobalt hydrocarbonyl (as Co)	16842-03-8	GG090000
0149	Coke oven emissions		GH0346000
0150	Copper (dusts and mists, as Cu)	7440-50-8	GL5325000
0151	Copper fume (as Cu)	1317-38-0	GL7900000
0151	Cotton dust (raw)	<u> </u>	GN2275000
0152	Crag® herbicide	136-78-7	KK4900000
0153	o-Cresol	95-48-7	G06300000
0154 0155	m-Cresol	108-39-4	G06300000 G06125000
0156	p-Cresol	106-44-5	G06475000
0157	Crotonaldehyde	4170-30-3	GP9499000
0158	Crufomate	299-86-5	TB3850000
0159	Cumene	98-82-8	GR8575000
0160	Cyanamide	420-04-2	GS5950000
0161	Cyanogen	460-19-5	GT1925000
0162	Cyanogen chloride	506-77-4	GT2275000
0163	Cyclohexane	110-82-7	GU6300000
0164	Cyclohexanethiol	1569-69-3	GV7525000
0165	Cyclohexanol	108-93-0	GV7875000
0166	Cyclohexanone	108-94-1	GW1050000
	Cyclohexanone Cyclohexene	108-94-1 110-83-8	GW2500000
0166 0167	Cyclohexene		
0166 0167 0168	Cyclohexene Cyclohexylamine	110-83-8 108-91-8	GW2500000 GX0700000
0166 0167 0168 0169	Cyclohexene Cyclohexylamine Cyclonite	110-83-8 108-91-8 121-82-4	GW2500000 GX0700000 XY9450000
0166 0167 0168 0169 0170	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene	110-83-8 108-91-8 121-82-4 542-92-7	GW2500000 GX0700000 XY9450000 GY1000000
0166 0167 0168 0169 0170	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane	110-83-8 108-91-8 121-82-4	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000
0166 0167 0168 0169 0170	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3	GW2500000 GX0700000 XY9450000 GY1000000
0166 0167 0168 0169 0170	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000
0166 0167 0168 0169 0170 0171 0172	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000
0166 0167 0168 0169 0170 0171 0172 GUIDE	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO
0166 0167 0168 0169 0170 0171 0172 GUIDE	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyclopentane Cyhexatin CHEMICAL NAME	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2.4-D DDT Decaborane	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2,4-D DDT Decaborane 1-Decanethiol	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2,4-D DDT Decaborane 1-Decanethiol Demeton	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2,4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2,4-D DDT Decaborane 1-Decanethiol Demeton	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2,4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179	Cyclohexene Cyclonite Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2,4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2,4-Diaminoanisole (and its salts) o-Dianisidine Diazinon®	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181	Cyclohexene Cyclonite Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2,4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2,4-Diaminoanisole (and its salts) o-Dianisidine Diazinon®	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2.4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2.4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183	Cyclohexene Cyclonite Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2.4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2.4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8	GW2500000 GX0700000 XY9450000 GY1000000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 HO9275000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2.4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2.4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185	Cyclohexene Cyclonite Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2.4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2.4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1,2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8	GW2500000 GX0700000 XY9450000 GY1000000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 HO9275000 TX8750000 KK3850000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186	Cyclohexene Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyclopentane Cyhexatin CHEMICAL NAME 2,4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2,4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1,2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol Dibutyl phosphate	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8 107-66-4	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 HO9275000 TX8750000 KK3850000 TB9605000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187	Cyclohexene Cyclonite Cyclopentadiene Cyclopentane Cyclopentane Cyhexatin CHEMICAL NAME 2,4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2,4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1,2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol Dibutyl phosphate Dibutyl phosphate Dibutyl phthalate	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 107-66-4 84-74-2	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 H09275000 TX8750000 TX8750000 TB9605000 T10875000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0185 0187	Cyclohexene Cyclonite Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2,4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2,4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1,2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol Dibutyl phosphate Dibutyl phthalate Dichloroacetylene	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8 107-66-4 84-74-2 7572-29-4	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 HO9275000 TX8750000 TX8750000 TB9605000 T10875000 AP1080000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187 0188	Cyclohexene Cyclonite Cyclonite Cyclopentadiene Cyclopentane Cyclopentane Cyhexatin CHEMICAL NAME 2.4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2.4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1.2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol Dibutyl phosphate Dibutyl phosphate Dibutyl phthalate Dichloroacetylene o-Dichlorobenzene	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8 107-66-4 84-74-2 7572-29-4 95-50-1	GW2500000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 HO9275000 TX8750000 KX3850000 TB9605000 T10875000 AP1080000 CZ4500000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187 0188	Cyclohexene Cyclonite Cyclopentadiene Cyclopentane Cyclopentane Cyhexatin CHEMICAL NAME 2.4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2.4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1.2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol Dibutyl phosphate Dibutyl phosphate Dibutyl phosphate Dibloroacetylene o-Dichlorobenzene p-Dichlorobenzene p-Dichlorobenzene	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 107-66-4 84-74-2 7572-29-4 95-50-1 106-46-7	GW2500000 GX0700000 XY9450000 GY1000000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 HO9275000 TX8750000 KK3850000 TB9605000 T10875000 AP1080000 CZ4550000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187 0188 0189 0190	Cyclohexene Cyclonite Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2.4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2.4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1,2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol Dibutyl phosphate Dibutyl phosphate Dibutyl phthalate Dichloroacetylene o-Dichlorobenzene p-Dichlorobenzene 3,3'-Dichlorobenzidine (and its salts)	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8 107-66-4 84-74-2 7572-29-4 95-50-1 106-46-7 91-94-1	GW2500000 GX0700000 XY9450000 GY1000000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 HO9275000 TX8750000 KK3850000 TB9605000 T10875000 AP1080000 CZ4550000 DD0525000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187 0188 0189 0190 0191 0192	Cyclohexene Cyclonite Cyclopentadiene Cyclopentane Cyclopentane Cyhexatin CHEMICAL NAME 2,4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2,4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1,2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol Dibutyl phosphate Dibutyl phthalate Dichloroacetylene o-Dichlorobenzene p-Dichlorobenzene p-Dichlorobenzene p-Dichlorobenzene p-Dichlorobenzeneinical candits salts) Dichlorodifluoromethane	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8 107-66-4 84-74-2 7572-29-4 95-50-1 106-46-7 91-94-1 75-71-8	GW2500000 GX0700000 XY9450000 GY1000000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 HO9275000 TX8750000 TX8750000 TX8750000 TX8750000 AP1080000 CZ4550000 DD0525000 PA8200000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187 0188 0189 0190 0191 0192 0193	Cyclohexene Cyclonite Cyclopentadiene Cyclopentane Cyclopentane Cyhexatin CHEMICAL NAME CHEMICAL NAME CHEMICAL NAME CHEMICAL NAME CHEMICAL NAME CHEMICAL NAME CHEMICAL NAME CHE	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8 107-66-4 84-74-2 7572-29-4 95-50-1 106-46-7 91-94-1 75-71-8 118-52-5	GW2500000 GX0700000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 H09275000 TX8750000 TX8750000 TX8750000 TX8750000 AP1080000 CZ4500000 CZ4550000 DD0525000 PA8200000 MU0700000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187 0188 0189 0190 0191 0192 0193 0194	Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME CHEMICAL NAME CHEMICAL NAME CHEMICAL NAME CHEMICAL N	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8 107-66-4 84-74-2 7572-29-4 95-50-1 106-46-7 91-94-1 75-71-8 118-52-5 75-34-3	GW2500000 GX0700000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 H09275000 TX8750000 TX8750000 TX8750000 TX8750000 TX8750000 TX8750000 CZ4500000 CZ4550000 DD0525000 PA8200000 MU07000000 KI0175000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187 0188 0189 0190 0191 0192 0193 0194 0195	Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2,4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2,4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1,2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol Dibutyl phosphate Dichloroacetylene o-Dichlorobenzene p-Dichlorobenzene p-Dichlorobenzene 1,3-Dichloro-5,5-dimethylhydantoin 1,1-Dichloroethane 1,2-Dichloroethylene	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8 107-66-4 84-74-2 7572-29-4 95-50-1 106-46-7 91-94-1 75-71-8 118-52-5 75-34-3 540-59-0	GW2500000 GX0700000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 H09275000 TX8750000 TX8750000 TX8750000 TX8750000 CZ4500000 CZ4500000 CZ4550000 DD05255000 PA8200000 MU0700000 KV9360000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187 0188 0189 0190 0191 0192 0193 0195 0196	Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2.4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2.4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1.2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol Dibutyl phosphate Dibutyl phosphate Dibutyl phosphate Dibutyl phosphate Dibutyl phosphate Dibloroacetylene o-Dichlorobenzene p-Dichlorobenzene 3.3'-Dichlorobenzidine (and its salts) Dichlorodifluoromethane 1.3-Dichloro-5,5-dimethylhydantoin 1.1-Dichloroethylene Dichloroethyl ether	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8 107-66-4 84-74-2 7572-29-4 95-50-1 106-46-7 91-94-1 75-71-8 118-52-5 75-34-3 540-59-0 111-44-4	GW2500000 GX0700000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 HO9275000 TX8750000 TX8750000 TX8750000 TX8750000 T10875000 T10875000 AP1080000 CZ4500000 CZ4550000 DD0525000 PA8200000 MU0700000 KV9360000 KV9360000 KV9360000 KV9360000 KV9360000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187 0188 0189 0190 0191 0192 0193 0194 0195 0197	Cyclohexylamine Cyclonite Cyclopentadiene Cyclopentane Cyclopentane Cyhexatin CHEMICAL NAME 2.4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2.4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1.2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol Dibutyl phosphate Dibutyl phosphate Dibutyl phthalate Dichloroacetylene o-Dichlorobenzene p-Dichlorobenzene p-Dichlorobenzene 3.3'-Dichloro-5.5-dimethylhydantoin 1.1-Dichloroethylene Dichloroethyl ether Dichloroethyl ether Dichloroethyl ether Dichloromonofluoromethane	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8 107-66-4 84-74-2 7572-29-4 95-50-1 106-46-7 91-94-1 75-71-8 118-52-5 75-34-3 540-59-0 111-44-4 75-43-4	GW2500000 GX0700000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 H09275000 TX875000 TX8750000 TX875000 T10875000 T10875000 AP1080000 CZ4500000 CZ4550000 DD0525000 PA8200000 MU0700000 KV9360000 KV9360000 KN0875000 PA8400000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187 0188 0189 0190 0191 0192 0193 0194 0195 0196 0197	Cyclohexylamine Cyclopentadiene Cyclopentane Cyclopentane Cyclopentane Cyhexatin CHEMICAL NAME 2.4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2.4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1.2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol Dibutyl phosphate Dibutyl phthalate Dichloroacetylene o-Dichlorobenzene p-Dichlorobenzene 3.3'-Dichloro-5.5-dimethylhydantoin 1.1-Dichloroethylene Dichloroethyl ether Dichloroethyl ether Dichloromonofluoromethane 1,2-Dichloroethyl ether Dichloromonofluoromethane 1,1-Dichloro-1-nitroethane	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8 107-66-4 84-74-2 7572-29-4 95-50-1 106-46-7 91-94-1 75-71-8 118-52-5 75-34-3 540-59-0 111-44-4 75-43-4 594-72-9	GW2500000 GX0700000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 TX8750000 TX8750000 TX8750000 TX8750000 TX8750000 CZ4500000 CZ4500000 CZ4500000 CZ4500000 CZ4500000 CZ4500000 CX4500000 CX4500000 CX4500000 CX450000 CX4500000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187 0188 0189 0190 0191 0192 0193 0194 0195 0198 0199	Cyclohexene Cyclonite Cyclopentadiene Cyclopentane Cyhexatin CHEMICAL NAME 2.4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2.4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1.2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol Dibutyl phosphate Dibutyl phosphate Dibutyl phosphate Dibutyl phosphate Dibloroacetylene o-Dichlorobenzene p-Dichlorobenzene p-Dichlorobenzidine (and its salts) Dichlorodifluoromethane 1.3-Dichloro-5.5-dimethylhydantoin 1.1-Dichloroethylene Dichloroethyl ether Dichloromonofluoromethane 1.2-Dichloro-1-nitroethane 1.1-Dichloro-1-nitroethane 1.3-Dichloro-1-nitroethane 1.3-Dichloro-1-nitroethane	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8 107-66-4 84-74-2 7572-29-4 95-50-1 106-46-7 91-94-1 75-71-8 118-52-5 75-34-3 540-59-0 111-44-4 75-43-4 594-72-9 542-75-6	GW2500000 GX0700000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 TX8750000 TX8750000 TX8750000 TX8750000 TX8750000 CZ4500000 CZ4500000 CZ4500000 CZ4500000 CZ4500000 CZ4500000 CZ4500000 CX4500000
0166 0167 0168 0169 0170 0171 0172 GUIDE 0173 0174 0175 0176 0177 0178 0179 0180 0181 0182 0183 0184 0185 0186 0187 0188 0189 0190 0191 0192 0193 0194 0195 0196 0197	Cyclohexylamine Cyclopentadiene Cyclopentane Cyclopentane Cyclopentane Cyhexatin CHEMICAL NAME 2.4-D DDT Decaborane 1-Decanethiol Demeton Diacetone alcohol 2.4-Diaminoanisole (and its salts) o-Dianisidine Diazinon® Diazomethane Diborane 1.2-Dibromo-3-chloropropane 2-N-Dibutylaminoethanol Dibutyl phosphate Dibutyl phthalate Dichloroacetylene o-Dichlorobenzene p-Dichlorobenzene 3.3'-Dichloro-5.5-dimethylhydantoin 1.1-Dichloroethylene Dichloroethyl ether Dichloromonofluoromethane 1.2-Dichloroethyl ether Dichloromonofluoromethane 1.1-Dichloroethylene Dichloromonofluoromethane 1.1-Dichloroethylene Dichloroethyl ether Dichloromonofluoromethane 1.1-Dichloroethylene	110-83-8 108-91-8 121-82-4 542-92-7 287-92-3 13121-70-5 CAS NO 94-75-7 50-29-3 17702-41-9 143-10-2 8065-48-3 123-42-2 615-05-4 119-90-4 333-41-5 334-88-3 19287-45-7 96-12-8 102-81-8 107-66-4 84-74-2 7572-29-4 95-50-1 106-46-7 91-94-1 75-71-8 118-52-5 75-34-3 540-59-0 111-44-4 75-43-4 594-72-9	GW2500000 GX0700000 GX0700000 XY9450000 GY1000000 GY2390000 WH8750000 RTECS NO AG6825000 KJ3325000 HD1400000 TF3150000 SA9100000 BZ8580500 DD0875000 TF3325000 PA7000000 TX8750000 TX8750000 TX8750000 TX8750000 TX8750000 CZ4500000 CZ4500000 CZ4500000 CZ4500000 CZ4500000 CZ4500000 CX4500000 CX4500000 CX4500000 CX450000 CX4500000

0202	Dichlorotetrafluoroethane	76-14-2	KI1101000
	Dichloryos	62-73-7	TC0350000
0203	Dicrotophos	141-66-2	TC3850000
0204 0205	Dicyclopentadiene Dicyclopentadiene	77-73-6 102-54-5	PC1050000
0 <u>205</u> 0206	Dicyclopentadienyl iron Dieldrin	60-57-1	LK0700000 IO1750000
0206	Diesel exhaust	00-57-1	101/50000
0208	Diethanolamine	111-42-2	KL2975000
0209	Diethylamine	109-89-7	HZ8750000
0210	2-Diethylaminoethanol	100-37-8	KK5075000
0211	Diethylenetriamine	111-40-0	IE1225000
0212	Diethyl ketone	96-22-0	SA8050000
0213	Diethyl phthalate	84-66-2	TI1050000
0214	Difluorodibromomethane	75-61-6	PA7525000
0215	Diglycidyl ether	2238-07-5	KN2350000
0216	Diisobutyl ketone	108-83-8	MJ5775000
)217	Diisopropylamine	108-18-9	IM4025000
)218	Dimethyl acetamide	127-19-5	AB7700000
)219	Dimethylamine	124-40-3	IP8750000
)220	4-Dimethylaminoazobenzene	60-11-7	BX7350000
)221	bis(2-(Dimethylamino)ethyl)ether	3033-62-3	KR9460000
)222	Dimethylaminopropionitrile	1738-25-6	UG1575000
)223	N,N-Dimethylaniline	121-69-7	BX4725000
)224	Dimethyl carbamoyl chloride	79-44-7	FD4200000
)225		300-76-5	TB9450000
)226	Dimethylformamide	68-12-2	LO2100000
)227	1,1-Dimethylhydrazine	57-14-7	MV2450000
)228	Dimethylphthalate	131-11-3	TI1575000
)229	Dimethyl sulfate	77-78-1	WS8225000
)230	<u>Dinitolmide</u>	148-01-6	XS4200000
)231	o-Dinitrobenzene	<u>528-29-0</u> 99-65-0	CZ7450000
)232	m-Dinitrobenzene p-Dinitrobenzene	100-25-4	CZ7350000
) <u>233</u>)234		534-52-1	CZ7525000 GO9625000
)234	<u>Dinitro-o-cresol</u> Dinitrotoluene	25321-14-6	XT1300000
)236	Di-sec octyl phthalate	117-81-7	TI0350000
)237	Dioxane	123-91-1	JG8225000
0238	Dioxathion	78-34-2	TE3350000
0239	Diphenyl	92-52-4	DU8050000
0240	Diphenylamine	122-39-4	JJ7800000
0241	Dipropylene glycol methyl ether	34590-94-8	JM1575000
0242	Dipropyl ketone	123-19-3	MJ5600000
	Diquat (Diquat dibromide)	85-00-7	JM5690000
1243			
	Disulfiram	97-77-8	J01225000
0244	Disulfoton	97-77-8 298-04-4	J01225000 TD9275000
0243 0244 0245 0246		298-04-4 128-37-0	J01225000 TD9275000 G07875000
)244)245	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron	298-04-4 128-37-0 330-54-1	J01225000 TD9275000 G07875000 YS8925000
)244)245)246)247)248	Disulfoton 2,6-Di-tert-butyl-p-cresol	298-04-4 128-37-0 330-54-1 1321-74-0	J01225000 TD9275000 G07875000 YS8925000 CZ9370000
)244)245)246)247)248	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron	298-04-4 128-37-0 330-54-1	J01225000 TD9275000 G07875000 YS8925000
)244)245)246)247)248)249	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000
)244)245)246)247)248)249	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol	298-04-4 128-37-0 330-54-1 1321-74-0	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000
0244 0245 0246 0247 0248 0249	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N
0244 0245 0246 0247 0248 0249 SUIDE	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N
0244 0245 0246 0247 0248 0249 SUIDE	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N
244 245 246 247 248 2249 SUIDE	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000
0244 0245 0246 0247 0248 0249 SUIDE 0250 0251 0252	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 101575000
0244 0245 0246 0247 0248 0249 SUIDE 0250 0251 0252 0253	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 101575000 KN6800000
0244 0245 0246 0247 0248 0249 SUIDE 0250 0251 0252 0253 0254	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 101575000 KN6800000 TX4900000
0244 0245 0246 0247 0248 0249 0250 0251 0252 0253 0254 0255	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 101575000 TX4900000 TX4900000 TB1925000
2244 2245 2246 2247 2248 2249 GUIDE 2250 2251 2252 2253 2254 2256 2257 2258	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 I01575000 KN6800000 TX490000 TB1925000 KJ5775000 KK8050000 KK8050000
244 245 246 247 248 2249 SUIDE 250 251 252 253 254 255 256 257 258 2258	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 I01575000 KN6800000 TX4900000 TB1925000 KJ5775000 KJ5775000 KK8050000 KK8050000
244 245 246 247 248 2249 GUIDE 250 251 252 253 2254 2255 2256 2257 2258 2259 2260	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acetate	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 I01575000 KN6800000 TX4900000 TB1925000 KJ5775000 KK8050000 KK8050000 AH54250000
244 245 246 247 248 2249 SUIDE 250 251 252 253 254 255 256 257 258 2259 260 261	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acetate Ethyl acrylate	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 L01575000 KN6800000 TX4900000 TX4900000 TB1925000 KJ5775000 KK8050000 KK8225000 AH54250000 AT07000000
244 245 246 247 248 249 SUIDE 250 251 252 253 254 255 256 256 257 258 200 201 201 201 201 201 201 201	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acrylate Ethyl alcohol	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5 64-17-5	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 L01575000 KN6800000 TX4900000 TE4550000 KK8050000 KK8050000 KK8225000 AT0700000 KQ6300000
0244 0245 0246 0247 0248 0249 0250 0251 0252 0253 0253 0255 0256 0257 0258 0259 0260 0261	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acetate Ethyl acrylate Ethyl alcohol Ethylamine	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5 64-17-5 75-04-7	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 L01575000 KN6800000 TX4900000 TX490000 TX4900000 KJ5775000 KK8050000 KK8225000 AH54250000 AT07000000 KO63000000 KH21000000
0244 0245 0246 0247 0248 0249 0250 0251 0252 0253 0254 0255 0256 0257 0258 0259 0260 0261 0262	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acetate Ethyl acrylate Ethyl alcohol Ethylamine Ethylamine Ethylamine Ethyl benzene	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5 64-17-5 75-04-7 100-41-4	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 101575000 KN6800000 TX4900000 TB1925000 KJ5775000 KK8050000 KK8225000 AH5425000 AT0700000 KO6300000 CK12100000 DA0700000
0244 0245 0246 0247 0248 0249 SUIDE 0250 0251 0252 0253 0255 0256 0257 0258 0259 0260 0261 0262 0263 0264 0265	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acetate Ethyl acrylate Ethyl alcohol Ethylamine Ethyl benzene Ethyl bromide	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5 64-17-5 75-04-7 100-41-4 74-96-4	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 101575000 KN6800000 TX4900000 TX4900000 KK8050000 KK8225000 AH5425000 AH5425000 KK8050000
0244 0245 0246 0247 0248 0249 GUIDE 0250 0251 0252 0253 0255 0255 0255 0256 0257 0258 0259 0260 0261 0262 0263 0264 0265 0266	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acetate Ethyl acrylate Ethyl alcohol Ethylamine Ethyl benzene Ethyl bromide Ethyl boutyl ketone	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5 64-17-5 75-04-7 100-41-4 74-96-4 106-35-4	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 I01575000 KN6800000 TX4900000 TX4900000 TS19250000 KK8050000 KK8225000 AH5425000 AT0700000 KM6300000 KH2100000 DA07700000 MJ5250000
0244 0245 0246 0247 0248 0249 GUIDE 0250 0251 0252 0253 0254 0255 0256 0257 0258 0260 0261 0262 0263 0264 0265 0265 0265 0265	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acrylate Ethyl acrylate Ethyl alcohol Ethylamine Ethyl benzene Ethyl bormide Ethyl butyl ketone Ethyl chloride	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5 64-17-5 75-04-7 100-41-4 74-96-4 106-35-4 75-00-3	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 I01575000 KN6800000 TX4900000 TX4900000 TX4900000 KJ5775000 KK8050000 KK8050000 KK8225000 AT0700000 KK8225000 AT0700000 KH6475000 MJ5250000 KH75250000 KH75250000
0244 0245 0246 0247 0248 0249 GUIDE 0250 0251 0252 0253 0254 0255 0256 0257 0258 0259 0260 0261 0262 0263 0264 0265 0265 0265	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acetate Ethyl acrylate Ethyl alcohol Ethylamine Ethyl benzene Ethyl bromide Ethyl butyl ketone Ethyl chloride Ethylene chlorohydrin	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5 64-17-5 75-04-7 100-41-4 74-96-4 106-35-4 75-00-3 107-07-3	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 I01575000 KN6800000 TX4900000 TX4900000 TE4550000 KK8250000 AH5425000 AT0700000 KO6300000 KM64750000 KH64750000 KH64750000 KK08750000 KK08750000
0244 0245 0246 0247 0248 0249 GUIDE 0250 0251 0252 0253 0254 0255 0257 0258 0257 0258 0260 0261 0262 0263 0264 0265 0265 0265 0265 0265 0265 0265 0265 0265 0265 0265 0265 0266 0267 0268 0269	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acrylate Ethyl acrylate Ethyl alcohol Ethylamine Ethyl benzene Ethyl butyl ketone Ethyl chloride Ethylene chlorohydrin Ethylenediamine	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5 64-17-5 75-04-7 100-41-4 74-96-4 106-35-4 75-00-3 107-07-3 107-15-3	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 L01575000 KN6800000 TX4900000 TE4550000 KK8050000 KK8050000 KK8225000 AH5425000 AT0700000 KQ6300000 KH2100000 DA0700000 KH6475000 KK9875000 KK0875000 KK0875000
0244 0245 0246 0247 0248 0249 GUIDE 0250 0251 0252 0253 0254 0255 0256 0257 0258 0259 0260 0261 0262 0263 0264 0265 0265 0267 0268 0269 0270	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acetate Ethyl acrylate Ethyl alcohol Ethylamine Ethyl benzene Ethyl bromide Ethyl chloride Ethylene dibromide	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5 64-17-5 75-04-7 100-41-4 74-96-4 106-35-4 75-00-3 107-07-3 107-15-3 106-93-4	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 L01575000 XK6800000 XK4900000 TX4900000 TE4550000 KK8050000 KK8225000 AH5425000 AH5425000 AT0700000 KO6300000 KH2100000 DA0700000 KH6475000 KK6875000 KK8875000 KK8875000 KK8875000 KK8875000 KK8875000
0244 0245 0246 0247 0248 0249 GUIDE 0250 0251 0252 0253 0254 0255 0256 0257 0258 0259 0260 0262 0263 0262 0263 0264 0265 0267 0268 0269 0270	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acetate Ethyl acrylate Ethyl alcohol Ethylamine Ethyl benzene Ethyl bomide Ethyl butyl ketone Ethyl chloride Ethylene chlorohydrin Ethylene dibromide Ethylene dibromide Ethylene dibromide Ethylene dichloride	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5 64-17-5 75-04-7 100-41-4 74-96-4 106-35-4 75-00-3 107-07-3 107-15-3 106-93-4 107-06-2	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 L01575000 KN6800000 TX4900000 TX4900000 TE4550000 KK8050000 KK8050000 KK8225000 AH5425000 AH5425000 AH700000 CM6475000 KM6475000 KM6475000 KM6875000 KM7525000 KM875000
244 2245 2246 2247 2248 2249 SUIDE 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2267 2268 2270 2271 2272	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EpN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acrylate Ethyl acrylate Ethyl alcohol Ethylamine Ethyl benzene Ethyl butyl ketone Ethyl chloride Ethylene chlorohydrin Ethylene dichloride Ethylene dichloride Ethylene glycol	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5 64-17-5 75-04-7 100-41-4 74-96-4 106-35-4 75-00-3 107-07-3 107-07-3 107-07-3 107-06-2 107-06-2	J01225000 TD9275000 G07875000 S07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 101575000 KN6800000 TX4900000 TX4900000 KJ5775000 KK8050000 KK8050000 KK8225000 AH54250000 AH54250000 KM64750000 KM64750000 KM64750000 KM68750000 KM875250000 KM875250000 KM875250000 KM8750000 KM8750000 KM8750000 KM8750000 KM8750000 KM892750000 KM92750000 KM92750000 KM29750000
0244 0245 0246 0247 0248 0249 SUIDE 0250 0251 0252 0253 0255 0255 0256 0257 0258 0259 0260 0261 0262 0263 0264 0265 0262 0263 0264 0265 0267 0268 0270 0271 0272 0273	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EPN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acrylate Ethyl acrylate Ethyl acrylate Ethyl alcohol Ethylamine Ethyl benzene Ethyl bomide Ethyl butyl ketone Ethyl chloride Ethylene chlorohydrin Ethylene dibromide Ethylene dichloride Ethylene glycol Ethylene glycol Ethylene glycol dinitrate	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5 64-17-5 75-04-7 100-41-4 74-96-4 106-35-4 75-00-3 107-07-3 107-07-3 107-07-3 107-06-2 107-21-1 628-96-6	J01225000 TD9275000 G07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 L01575000 KN6800000 TX4900000 TX4900000 TX4900000 KN5775000 KK8050000 KK8050000 KK8250000 KK8275000 KK9275000 KK9275000 KW2975000 KW2975000
244 2245 2246 2247 2248 2249 SUIDE 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2267 2268 2270 2271 2272	Disulfoton 2,6-Di-tert-butyl-p-cresol Diuron Divinyl benzene 1-Dodecanethiol CHEMICAL NAME Emery Endosulfan Endrin Enflurane Epichlorohydrin EpN Ethanolamine Ethion 2-Ethoxyethanol 2-Ethoxyethyl acetate Ethyl acrylate Ethyl acrylate Ethyl alcohol Ethylamine Ethyl benzene Ethyl butyl ketone Ethyl chloride Ethylene chlorohydrin Ethylene dichloride Ethylene dichloride Ethylene glycol	298-04-4 128-37-0 330-54-1 1321-74-0 112-55-0 CAS NO 1302-74-5 115-29-7 72-20-8 13838-16-9 106-89-8 2104-64-5 141-43-5 563-12-2 110-80-5 111-15-9 141-78-6 140-88-5 64-17-5 75-04-7 100-41-4 74-96-4 106-35-4 75-00-3 107-07-3 107-07-3 107-07-3 107-06-2 107-06-2	J01225000 TD9275000 G07875000 S07875000 YS8925000 CZ9370000 JR3155000 RTECS N GN0231000 RB9275000 101575000 KN6800000 TX4900000 TX4900000 KJ5775000 KK8050000 KK8050000 KK8225000 AH54250000 AH54250000 KM64750000 KM64750000 KM64750000 KM68750000 KM875250000 KM875250000 KM875250000 KM8750000 KM8750000 KM8750000 KM8750000 KM8750000 KM892750000 KM92750000 KM92750000 KM29750000

0330 0331 0332 0333 0334 0335 0336 0337 0338 0339	12-Hexanone 2-Hexanone Hexone sec-Hexyl acetate Hexylene glycol Hydrazine Hydrogenated terphenyls Hydrogen bromide Hydrogen chloride Hydrogen cyanide Hydrogen fluoride Hydrogen peroxide Hydrogen selenide Hydrogen sulfide Hydrogen sulfide Hydroguinone 2-Hydroxypropyl acrylate	$\begin{array}{c} 591-78-6 \\ 108-10-1 \\ 108-84-9 \\ 107-41-5 \\ 302-01-2 \\ 61788-32-7 \\ 10035-10-6 \\ 7647-01-0 \\ 74-90-8 \\ 7664-39-3 \\ 7722-84-1 \\ 7783-07-5 \\ 7783-06-4 \\ 123-31-9 \\ 999-61-1 \end{array}$	MO455000 MP140000 SA927500 SA752500 SA081000 MU717500 WZ6535000 MW3850000 MW4025000 MW7875000 MX0900000 MX1050000 MX1225000 AT1925000
0330 0331 0332 0333 0334 0335 0336 0337	2-Hexanone Hexone sec-Hexyl acetate Hexylene glycol Hydrazine Hydrogenated terphenyls Hydrogen bromide Hydrogen chloride Hydrogen fluoride Hydrogen peroxide Hydrogen selenide Hydrogen selenide Hydrogen sulfide Hydrogen sulfide Hydroguinone	$\begin{array}{c} 108-10-1 \\ 108-84-9 \\ 107-41-5 \\ 302-01-2 \\ 61788-32-7 \\ 10035-10-6 \\ 7647-01-0 \\ 74-90-8 \\ 7664-39-3 \\ 7722-84-1 \\ 7783-07-5 \\ 7783-06-4 \\ 123-31-9 \end{array}$	MP140000 SA927500 SA927500 SA752500 SA0810000 MU717500 WZ6535000 MW3850000 MW4025000 MW6825000 MW7875000 MX0900000 MX1050000 MX1225000 MX3500000
0330 0331 0332 0333 0334 0335	2-Hexanone Hexone sec-Hexyl acetate Hexylene glycol Hydrazine Hydrogenated terphenyls Hydrogen bromide Hydrogen cyanide Hydrogen fluoride Hydrogen peroxide Hydrogen selenide	$\begin{array}{c} 108-10-1 \\ 108-84-9 \\ 107-41-5 \\ 302-01-2 \\ 61788-32-7 \\ 10035-10-6 \\ 7647-01-0 \\ 74-90-8 \\ 7664-39-3 \\ 7722-84-1 \\ 7783-07-5 \end{array}$	MP140000 SA927500 SA927500 SA081000 MU717500 WZ6535000 MW3850000 MW4025000 MW6825000 MW7875000 MX0900000 MX1050000
)330)331)332)333)334)335	2-Hexanone Hexone sec-Hexyl acetate Hexylene glycol Hydrazine Hydrogenated terphenyls Hydrogen bromide Hydrogen chloride Hydrogen cyanide Hydrogen fluoride Hydrogen peroxide	$\begin{array}{c} 108-10-1 \\ 108-84-9 \\ 107-41-5 \\ 302-01-2 \\ 61788-32-7 \\ 10035-10-6 \\ 7647-01-0 \\ 74-90-8 \\ 7664-39-3 \\ 7722-84-1 \end{array}$	MP140000 SA927500 SA752500 SA0810000 MU717500 WZ6535000 MW3850000 MW4025000 MW6825000 MW7875000 MX0900000
0330 0331 0332 0333	2-Hexanone Hexone sec-Hexyl acetate Hexylene glycol Hydrazine Hydrogenated terphenyls Hydrogen bromide Hydrogen chloride Hydrogen cyanide	108-10-1 108-84-9 107-41-5 302-01-2 61788-32-7 10035-10-6 7647-01-0 74-90-8	MP140000 SA927500 SA752500 SA0810000 MU717500 WZ6535000 MW3850000 MW4025000 MW6825000
0330 0331 0332	2-Hexanone Hexone sec-Hexyl acetate Hexylene glycol Hydrazine Hydrogenated terphenyls Hydrogen bromide Hydrogen chloride	$ \begin{array}{r} 108-10-1\\ 108-84-9\\ 107-41-5\\ 302-01-2\\ 61788-32-7\\ 10035-10-6\\ 7647-01-0 \end{array} $	MP140000 SA927500 SA752500 SA0810000 MU717500 WZ6535000 MW3850000 MW4025000
0330 0331	2-Hexanone Hexone sec-Hexyl acetate Hexylene glycol Hydrazine Hydrogenated terphenyls Hydrogen bromide	108-10-1 108-84-9 107-41-5 302-01-2 61788-32-7 10035-10-6	MP140000 SA927500 SA752500 SA0810000 MU717500 WZ6535000 MW3850000
	2-Hexanone Hexone sec-Hexyl acetate Hexylene glycol Hydrazine	108-10-1 108-84-9 107-41-5 302-01-2	MP140000 SA927500 SA752500 SA081000 MU717500
	2-Hexanone Hexone sec-Hexyl acetate Hexylene glycol	108-10-1 108-84-9 107-41-5	MP140000 SA927500 SA752500 SA0810000
)328)329	2-Hexanone Hexone sec-Hexyl acetate	108-10-1 108-84-9	MP140000 SA927500 SA752500
)327	2-Hexanone	108-10-1	MP140000 SA927500
326		591-78-6	
)325			MOALLOOO
)323)324	Hexane isomers (excluding n-Hexane) n-Hexanethiol	111-31-9	
322	n-Hexane	110-54-3	MN927500
321	Hexamethyl phosphoramide	680-31-9	TD0875000
0319	Hexafluoroacetone Hexamethylene diisocyanate	822-06-0	UC2450000 MO1740000
) <u>318</u>)319	1-Hexadecanethiol	<u>2917-26-2</u> 684-16-2	TIC24E000
)317	Hexachloronaphthalene	1335-87-1	QJ7350000
)316	Hexachloroethane	67-72-1	KI4025000
)314	Hexachlorocyclopentadiene	77-47-4	GY1225000
)313)314	1-Heptanethiol Hexachlorobutadiene	1639-09-4 87-68-3	MJ140000 EJ070000
)312	n-Heptane	142-82-5	MI770000
)311	Heptachlor	76-44-8	PC070000
)310	Halothane	151-67-7	KH655000
309	Hafnium	7440-58-6	MG460000
GUIDE	CHEMICAL NAME	CAS NO	RTECS
0308	Gypsum	13397-24-5	MG236000
0307	Graphite (synthetic)	7440-44-0	FF5250100
) <u>305</u>)306	Grain dust (oat, wheat, barley) Graphite (natural)	7782-42-5	MD790000 MD965960
304	Glycolonitrile Crain dust (eat wheat barlow)	107-16-4	AM035000
303	Glycidol	556-52-5	UB437500
302	Glycerin (mist)	56-81-5	MA805000
)300)301	Glutaraldehyde	111-30-8	MA245000
) <u>299</u>)300	Gasoline Germanium tetrahydride	8006-61-9 7782-65-2	LX330000 LY490000
2000		0006 61 0	
GUIDE	CHEMICAL NAME	CAS NO	RTECS
0 <u>297</u> 0298	Furfuryl alcohol	98-01-1 98-00-0	LU910000
<u>)296</u>	Formic acid	64-18-6	LO490000
)295	Formamide	75-12-7	LO052500
)294	Formalin (as formaldehyde)		
)292)293	Fonofos Formaldehyde	944-22-9 50-00-0	TA595000 LP8925000
)291	Fluoroxene	406-90-6	KO425000
)290	Fluorotrichloromethane	75-69-4	PB6125000
0289	Fluorine	7782-41-4	LM647500
)288	Fibrous glass dust	12004-56-9	LK365100
) <u>286</u>)287	Ferrovanadium dust	14484-64-1 12604-58-9	NO875000 LK290000
0285	Fenthion	55-38-9	TF962500
)284	Fensulfothion	115-90-2	TF385000
283	Fenamiphos	22224-92-6	TB367500
GUIDE	CHEMICAL NAME	CAS NO	RTECS
)282	Ethyl silicate	78-10-4	VV945000
281	N-Ethylmorpholine	100-74-3	OE4025000
280	Ethyl mercaptan	75-08-1	K1962500
)279	Ethylidene norbornene	16219-75-3	RB9450000
) <u>277</u>)278	Ethyl ether Ethyl formate	<u>60-29-7</u> 109-94-4	KI577500 LO840000

0341	Indium	7440-74-6	NL1050000
0342	Iodine	7553-56-2	NN1575000
0343	Iodoform	75-47-8	PB7000000
0344	Iron oxide dust and fume (as Fe)	1309-37-1	NO7400000
<u>0345</u> 0346	Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe)	13463-40-6	NO4900000
0340 0347	Isoamyl acetate	123-92-2	NS9800000
0348	Isoamyl alcohol (primary)	123-51-3	EL5425000
0349	Isoamyl alcohol (secondary)	6032-29-7	
0350	Isobutane	75-28-5	TZ4300000
0351	<u>Isobutyl</u> acetate	110-19-0	AI4025000
0352	Isobutyl alcohol	78-83-1	NP9625000
0353 0354	Isobutyronitrile Isooctyl alcohol	78-82-0 26952-21-6	TZ4900000 NS7700000
0355	Isophorone	78-59-1	GW7700000
0356	Isophorone diisocyanate	4098-71-9	NO9370000
0357	2-Isopropoxyethanol	109-59-1	KL5075000
0358	<u>Isopropyl acetate</u>	108-21-4	AI4930000
0359	Isopropyl alcohol	67-63-0 75-31-0	NT8050000
<u>0360</u> 0361	Isopropylamine N-Isopropylaniline	768-52-5	NT8400000 BY4190000
0362	Isopropyl ether	108-20-3	TZ5425000
0363	Isopropyl glycidyl ether	4016-14-2	TZ350000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NC
0364	Kaolin	1332-58-7	GF1670500
0365	Kepone	143-50-0	PC8575000
<u>0366</u>	Kerosene	8008-20-6	OA5500000
0367	Ketene	463-51-4	OA7700000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0368 0369	Lead	7439-92-1 1317-65-3	OF7525000 EV9580000
0369	Limestone Lindane	58-89-9	GV4900000
0371	Lithium hydride	7580-67-8	OJ6300000
0372	L.P.G.	68476-85-7	SE7545000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
GUIDE	Magnesite	546-93-0	OM2470000
0373 0374	Magnesite Magnesium oxide fume	546-93-0 1309-48-4	OM2470000 OM3850000
0373 0374 0375	Magnesite Magnesium oxide fume Malathion	546-93-0 1309-48-4 121-75-5	OM2470000 OM3850000 WM8400000
0373 0374 0375 0376	Magnesite Magnesium oxide fume Malathion Maleic anhydride	546-93-0 1309-48-4 121-75-5 108-31-6	OM2470000 OM3850000 WM8400000 ON3675000
0373 0374 0375 0376 0377	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile	546-93-0 1309-48-4 121-75-5	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000
0373 0374 0375 0376 0377 0378	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn)	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000
0373 0374 0375 0376 0377 0378 0379	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000 OO9720000
0373 0374 0375 0376 0377 0378 0379 0380 0381	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn)	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO9275000 OO9275000 OP0895000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese tetroxide (as Mn) Marble	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO9275000 OO9275000 OP0895000 EV9580000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO9275000 OO9275000 OP0895000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese tetroxide (as Mn) Marble	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO9275000 OO9275000 OP0895000 EV9580000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000 OO9720000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO9275000 OO9275000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KJ3675000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386 0387	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxyflurane	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO9150000 OO9275000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KJ3675000 KN7820000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386 0387 0388	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KJ3675000
0373 0374 0375 0376 0377 0378 0380 0381 0382 0383 0384 0385 0386 0387 0388 0389 0390	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxyflurane 4-Methoxyphenol Methyl acetate Methyl acetylene	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000 OP0895000 EV9580000 OV4550000 OZ2975000 AK2975000 KJ3675000 KN7820000 SL7700000 AI9100000 UK4250000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386 0387 0388 0389 0390 0391	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxychlor Methoxychlor Methoxyphenol Methyl acetate Methyl acetylene Methyl acetylene Methyl acetylene Methyl acetylene Methyl acetylene Methyl acetylene	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7 59355-75-8	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000 OO9720000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KJ3675000 KJ3675000 KJ3675000 KJ7700000 A19100000 UK4250000 UK4920000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386 0387 0388 0389 0390 0391	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxyflurane 4-Methoxyphenol Methyl acetate Methyl acetylene Methyl acetylene Methyl acetylene Methyl acrylate	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7 59355-75-8 96-33-3	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000 OO9275000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KJ3675000 KN7820000 SL7700000 AI9100000 UK4250000 UK4250000 AT2800000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0385 0386 0387 0389 0390 0391 0392	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxychlor Methoxyflurane 4-Methoxyphenol Methyl acetate Methyl acetylene Methyl acetylene Methyl acrylate Methylacrylonitrile	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7 59355-75-8 96-33-3 126-98-7	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000 OO9275000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KJ3675000 KN7820000 SL7700000 AI9100000 UK4920000 AT2800000 UD1400000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386 0387 0388 0390 0391 0392 0393	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxychlor Methoxyflurane 4-Methoxyphenol Methyl acetylene Methyl acetylene Methyl acrylate Methylal	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7 59355-75-8 96-33-3 126-98-7 109-87-5	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000 OO9720000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KJ3675000 KN7820000 SL7700000 AI9100000 UK4250000 UK4920000 AT2800000 UK4920000 PA8750000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386 0387 0390 0391 0392 0393 0394 0395 0396	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxychlor Methoxyflurane 4-Methoxyphenol Methyl acetylene Methyl acetylene Methyl acrylate Methylal Methylal Methylal Methylal Methylal	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7 59355-75-8 96-33-3 126-98-7	OM2470000 OM3850000 WM8400000 OM3675000 TX6475000 OO3150000 OO9275000 OO9720000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KJ3675000 KN7820000 SL7700000 AI9100000 UK4250000 UK4920000 AT2800000 UD1400000 PA8750000 PC1400000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386 0387 0390 0391 0392 0393 0394 0395 0396 0397	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxychlor Methoxyflurane 4-Methoxyphenol Methyl acetylene Methyl acetylene Methyl acrylate Methylal	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7 59355-75-8 96-33-3 126-98-7 109-87-5 67-56-1 74-89-5 110-43-0	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO9150000 OO9275000 OO9720000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KJ3675000 KN7820000 SL7700000 AI9100000 UK4250000 UK4920000 AT2800000 UD1400000 PA8750000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386 0387 0388 0389 0390 0391 0392 0393 0394 0395 0396 0397	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxyflurane 4-Methoxyphenol Methyl acetate Methyl acetylene Methyl acetylene Methyl acrylate Methylal Methylal Methylal Methyl alcohol Methylamine Methyl methyl methyl methyl methylamine Methyl methylamine Methyl bromide	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7 59355-75-8 96-33-3 126-98-7 109-87-5 67-56-1 74-89-5 110-43-0 74-83-9	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OX3150000 OX9275000 OX9275000 OX9275000 OX9580000 OX4550000 OX4550000 OX22975000 AK2975000 KJ3675000 KN7820000 SL7700000 AI9100000 UK4920000 AT2800000 UK4920000 PA8750000 PA8750000 PF6300000 PA4900000 PA4900000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386 0387 0388 0399 0391 0392 0393 0394 0395 0396 0397 0398 0399 0400 0401	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxyflurane 4-Methoxyphenol Methyl acetate Methyl acetylene Methyl acetylene Methyl acrylate Methylal Methylal Methylal Methyl alcohol Methylamine Methyl (n-amyl) ketone Methyl bromide Methyl bromide Methyl Cellosolve®	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7 59355-75-8 96-33-3 126-98-7 109-87-5 67-56-1 74-89-5 110-43-0 74-83-9 109-86-4	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000 OO9275000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KN7820000 KN7820000 SL7700000 AI9100000 UK4920000 AT2800000 UK4920000 PA8750000 PA8750000 PA6300000 PF6300000 PA4900000 PA4900000 KL5775000 PA4900000 KL5775000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0385 0386 0387 0389 0390 0391 0392 0393 0394 0395 0396 0397 0398 0399 0400 0401 0402	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxychlor Methoxyflurane 4-Methoxyphenol Methyl acetylene Methyl acetylene Methyl acetylene Methyl acrylate Methyl alcohol Methylal Methyl alcohol Methylamine Methyl bromide Methyl Cellosolve® Methyl Cellosolve® Methyl Cellosolve®	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7 59355-75-8 96-33-3 126-98-7 109-87-5 67-56-1 74-89-5 110-43-0 74-83-9 109-86-4 110-49-6	OM2470000 OM3850000 WM8400000 OM3675000 TX6475000 OO3150000 OO9275000 OO9275000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KJ3675000 KN7820000 SL7700000 AI9100000 UK4920000 OX4920000 OX4920000 OX4920000 OX4920000 OX50000 OX50000 OX500000 OX50000 OX500000 OX50000 OX50000 OX500000 OX500000 OX500000 OX500000 OX500000 OX500000 OX500000 OX5000000 OX5000000 OX50000000 OX50000000 OX500
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386 0387 0388 0390 0391 0392 0393 0394 0395 0396 0397 0398 0397 0398 0399 0400 0401 0402 0403	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxyflurane 4-Methoxyphenol Methyl acetylene Methyl acetylene Methyl acrylate Methyl acrylate Methylal Methylal Methylal Methylal Methylal Methylal Methyl alcohol Methylamine Methyl (n-amyl) ketone Methyl Cellosolve® Methyl Cellosolve® Methyl chloride	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7 59355-75-8 96-33-3 126-98-7 109-87-5 67-56-1 74-89-5 110-43-0 74-83-9 109-86-4 110-49-6 74-87-3	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000 OO9275000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KJ3675000 KN7820000 SL7700000 AI9100000 UK4920000 JK4250000 UK4920000 DF6300000 PA8750000 PA8750000 PA8750000 PA6300000 PA6300000 PA6300000 PA6300000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386 0386 0387 0388 0390 0391 0392 0393 0394 0395 0396 0397 0398 0399 0401 0402 0403 0404	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxychlor Methoxyflurane 4-Methoxyphenol Methyl acetylene Methyl acetylene Methyl acetylene Methyl acrylate Methylacrylonitrile Methylal Methylal Methylal Methylal Methylamine Methyl (n-amyl) ketone Methyl Cellosolve® Methyl chloride Methyl chloroform	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7 59355-75-8 96-33-3 126-98-7 109-87-5 67-56-1 74-89-5 110-43-0 74-83-9 109-86-4 110-49-6 74-87-3 71-55-6	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000 OO9720000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KJ3675000 KN7820000 SL7700000 AI9100000 UK4250000 UK4920000 AT2800000 UK4920000 PA8750000 PA8750000 PA6300000 PA6300000 KL5975000 PA6300000 KL5950000 PA6300000 KL5975000 PA6300000 KL5975000 PA6300000 KL5975000 PA6300000 KJ2975000
0373 0374 0375 0376 0377 0378 0379 0380 0381 0382 0383 0384 0385 0386 0387 0388 0389 0390 0391 0392 0393 0394 0395 0396 0397 0398 0399 0400 0401 0402 0403 0404 0405 0406	Magnesite Magnesium oxide fume Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxyflurane 4-Methoxyphenol Methyl acetylene Methyl acetylene Methyl acrylate Methyl acrylate Methylal Methylal Methylal Methylal Methylal Methylal Methyl alcohol Methylamine Methyl (n-amyl) ketone Methyl Cellosolve® Methyl Cellosolve® Methyl chloride	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7 59355-75-8 96-33-3 126-98-7 109-87-5 67-56-1 74-89-5 110-43-0 74-87-3 71-55-6 137-05-3 108-87-2	OM2470000 OM3850000 WM8400000 ON3675000 TX6475000 OO3150000 OO9275000 OO9275000 OP0895000 EV9580000 OV4550000 SB4200000 OZ2975000 AK2975000 KJ3675000 KN7820000 SL7700000 AI9100000 UK4920000 JK4250000 UK4920000 DF6300000 PA8750000 PA8750000 PA8750000 PA6300000 PA6300000 PA6300000 PA6300000
	Magnesite Malathion Maleic anhydride Malonaldehyde Malononitrile Manganese compounds and fume (as Mn) Manganese cyclopentadienyl tricarbonyl Manganese tetroxide (as Mn) Marble Mercury compounds [except (organo) alkyl Mercury (organo) alkyl compounds (as Hg) Mesityl oxide Methacrylic acid Methomyl Methoxychlor Methoxyflurane 4-Methoxyphenol Methyl acetate Methyl acetylene Methyl acrylate Methyl alcohol Methylal Methyl alcohol Methyl alcohol Methyl bromide Methyl Cellosolve® Methyl chloride Methyl chloroform Methyl-2-cyanoacrylate	546-93-0 1309-48-4 121-75-5 108-31-6 542-78-9 109-77-3 7439-96-5 12079-65-1 1317-35-7 1317-65-3 7439-97-6 141-79-7 79-41-4 16752-77-5 72-43-5 76-38-0 150-76-5 79-20-9 74-99-7 59355-75-8 96-33-3 126-98-7 109-87-5 67-56-1 74-89-5 110-43-0 74-83-9 109-86-4 110-49-6 74-87-3 71-55-6 137-05-3	OM2470000 OM3850000 WM8400000 OM3675000 TX6475000 OO3150000 OO9275000 OO9720000 OP0895000 EV9580000 OV4550000 SB4200000 AK2975000 KJ3675000 KN7820000 SL7700000 AI9100000 UK4250000 UK4920000 AT2800000 UD1400000 PA8750000 PC1400000 PF6300000 MJ5075000 PA6300000 KL5950000 AS7000000 AS7000000

) <u>409</u>)410	Methyl cyclopentadienyl manganese tricar Methyl demeton	8022-00-2	OP1450000 TG1760000
415				
418 S-Methyl hydrazine				
MethV1 iodide				
Mathy Isoamy Retone				
Mathyl				
Mathyl mercaptan				
Mathyl parathion 298-00-0 TG0175000				
Match Methyl styrene 98-83-9 Misor Misor 12001-26-2 Wy8000000 Metribuzin 21087-64-9 XZ2990001 X2990001 X2990		-		
Algorithms				
Main				
Mineral wool fiber				
433 Molybdenum				
May			TZ00T-70-7	
March Marc			7420 00 7	
435 Monomethyl aniline 100-61-8 BY4550000 437 Morpholine 110-91-8 OD6475000 437 Morpholine 110-91-8 OD6475000 438 Maphtha (coal tar) 8030-30-6 DE3030000 439 Naphthalene 91-20-3 OJ0525000 440 Naphthalene 61-20-3 OJ0525000 441 alpha-Naphthylamine 134-32-7 OM400000 442 beta-Naphthylamine 134-32-7 OM400000 442 beta-Naphthylamine 134-32-7 OM260000 444 alpha-Naphthylamine 134-32-7 OM260000 444 alpha-Naphthylamine 134-32-7 OM2500000 444 Alpha-Naphthylamine 134-32-7 OM2500000 445 Nickel carbonyl 13463-39-3 OR6300000 445 Nickel carbonyl 13463-39-3 OR6300000 446 Nictel carbonyl 13463-39-3 OR6300000 447 Nitric acid 7697-37-2 OU5775000 448 Nitric oxide 10102-43-9 OX5255000 449 P-Nitroaniline 100-01-6 BY7000000 449 P-Nitroaniline 100-01-6 BY7000000 449 P-Nitrobiphenyl 92-93-3 DV5600000 451 A-Nitrobiphenyl 92-93-3 DV5600000 452 P-Nitrochlorobenzene 100-00-5 CZ10500000 453 Nitrogen trifluoride T783-54-2 OX19250000 455 Nitrogen trifluoride T783-54-2 OX19250000 456 Nitrogen trifluoride T783-54-2 OX19250000 456 Nitrogen trifluoride T783-54-2 OX19250000 457 Nitromethane T5-52-5 PA9800000 458 P-Nitronaphthalene T783-54-2 OX19250000 466 Nonane T11-84-2 RA6115000 466 Nonane T11-84-2 RA6115000 466 Nonane T11-84-2 RA6115000 466 Nonane T11-84-2 RA6115000 467 P-Nonanethiol T11-88-6 RA6115000 478 P-Octadecanethiol 2885-00-9 RA6115000 478 P-Octadecanethiol T11-88-6 RA6115000 478 P-Octadecanethiol T11-88-6 RA6115000 478 P-Octadecanethiol T11-88-6 P-Octadecanethiol T11-88-6 P-Octadecanethiol T11-88-6 P-Octadecanethiol T11-88-6 P-Octadecanethiol T11-88-6 P-Octade			1439-98-1	<u> </u>
### Wildling ### ### ### ### ### ### ### ### ### #			6000 00 4	ma/275000
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	UIDE	CHEMICAL NAME	CAS NO	RTECS N
440 Naphthalene diisocyanate 3173-72-6 N09600000 441 alpha-Naphthylamine 134-32-7 OM1400000 442 beta-Naphthylamine 91-59-8 OM2100000 443 Niax® Catalyst ESN 62765-93-9 OR3900001 445 Nickel carbonyl 13463-39-3 OR630000 445 Nickel metal and other compounds (as Ni) 7440-02-0 OR5950000 446 Nicroine 54-11-5 OS525000 447 Nitric acid 7697-37-2 OU5775000 448 Nitric oxide 10102-43-9 OX0525004 449 p-Nitroaniline 100-01-6 BY700000 450 Nitrobenzene 98-95-3 DA647500 451 4-Nitroblorbenzene 100-00-5 CZ105000 452 p-Nitrochlorobenzene 100-00-5 CZ105000 453 Nitrogen dioxide 10102-44-0 OW980000 454 Nitrogen dioxide 10102-44-0 OW980000 455 Nitrogen dioxide 783-54-2 OX1925000 <t< td=""><td></td><td></td><td></td><td>DE3030000</td></t<>				DE3030000
441 alpha-Naphthylamine 134-32-7 OM1400000 442 beta-Naphthylamine 91-59-8 OM2100000 443 Niax® Catalyst ESN 62765-93-9 OR390000 444 Nickel carbonyl 13463-39-3 OR6300000 445 Nickel metal and other compounds (as Ni) 7440-02-0 OR5950000 446 Nicotine 54-11-5 OS525000 447 Nitric acid 7697-37-2 OU5775000 448 Nitric oxide 10102-43-9 OX525000 449 p-Nitrochlorobergen 100-01-6 BY7000000 449 p-Nitrochlorobenzene 100-01-6 BY7000000 450 Nitrochlorobenzene 100-00-5 CZ105000 451 4-Nitropen dioxide 1010-0-5 CZ105000 452 p-Nitrochlorobenzene 100-00-5 CZ105000 453 Nitrogen dioxide 10102-43-0 OW980000 454 Nitrogen dioxide 10102-43-0 OW980000 455 Nitrogen trifluoride 7783-54-2 OX1925000				ОЈ0525000
442 beta-Naphthylamine				
444 Niax@ Catalyst ESN			134-32-7	OM1400000
444 Nickel carbonyl			91-59-8	
445 Nickel metal and other compounds (as Ni) 7440-02-0 OR5950000 446 Nicotine 54-11-5 OS5250000 447 Nitric acid 7697-37-2 OU5775000 448 Nitric oxide 10102-43-9 OX5525000 449 p-Nitroaniline 100-01-6 By7000000 450 Nitrobenzene 98-95-3 DA6475000 451 4-Nitrobiphenyl 92-93-3 DV5600000 452 p-Nitrochlorobenzene 100-00-5 CZ1050000 453 Nitroethane 79-24-3 K15600000 454 Nitrogen dioxide 10102-44-0 OW9800000 455 Nitrogen trifluoride 7783-54-2 OX1925000 456 Nitroglycerine 55-63-0 OX210000 457 Nitromaphthalene 581-89-5 D976000 459 1-Nitropropane 108-03-2 T25075000 461 N-Nitrotoluene 88-72-2 XT315000 462 o-Nitrotoluene 99-98-1 XT2975000 463		-		OR3900000
447 Nitric acid 7697-37-2 0U5775000 448 Nitric oxide 10102-43-9 0X0525000 449 p-Nitroaniline 100-01-6 BY7000000 450 Nitrobenzene 98-95-3 DA6475000 451 4-Nitrobiphenyl 92-93-3 DV5600000 452 p-Nitrochlorobenzene 100-00-5 CZ1050000 453 Nitroethane 79-24-3 K15600000 454 Nitrogen dioxide 10102-44-0 0W980000 455 Nitrogen trifluoride 7783-54-2 0X1925000 456 Nitrogen trifluoride 7783-54-2 0X1925000 457 Nitromethane 75-52-5 PA9800000 457 Nitromethane 75-52-5 PA9800000 459 1-Nitropropane 108-03-2 TZ5075000 450 2-Nitropropane 79-46-9 TZ5250000 461 N-Nitrotoluene 88-72-2 XT315000 462 o-Nitrotoluene 99-90-8 XT2975000 463 <t< td=""><td></td><td></td><td></td><td>OR5950000</td></t<>				OR5950000
448 Nitric oxide 10102-43-9 OX0525000 449				<u> </u>
449 p-Nitroaniline 100-01-6 BY7000000 450 Nitrobenzene 98-95-3 DA6475000 451 4-Nitrobiphenyl 92-93-3 DV5600000 452 p-Nitrochlorobenzene 100-00-5 CZ1050000 453 Nitroethane 79-24-3 K15600000 454 Nitrogen dioxide 10102-44-0 0W980000 455 Nitrogen trifluoride 7783-54-2 0X1925000 456 Nitrogen trifluoride 7783-54-2 0X1925000 457 Nitromethane 75-52-5 PA980000 458 2-Nitronaphthalene 581-89-5 OJ9760000 459 1-Nitropropane 108-03-2 TZ5075000 460 2-Nitropropane 79-46-9 TZ5250000 461 N-Nitrotoluene 88-72-2 XT315000 462 o-Nitrotoluene 99-08-1 XT2975000 463 m-Nitrotoluene 99-08-1 XT2975000 464 Nonane 111-84-2 RA6115000 465 <td< td=""><td></td><td></td><td></td><td><u> </u></td></td<>				<u> </u>
450 Nitrobenzene 98-95-3 DA6475000				
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455 Nitrogen trifluoride 7783-54-2 OX1925000 456 Nitroglycerine 55-63-0 OX210000 457 Nitromethane 75-52-5 PA980000 458 2-Nitronaphthalene 581-89-5 OJ9760000 459 1-Nitropropane 108-03-2 T25075000 460 2-Nitropropane 79-46-9 T2525000 461 N-Nitrosodimethylamine 62-75-9 100525000 462 o-Nitrotoluene 88-72-2 XT315000 463 m-Nitrotoluene 99-99-0 XT3325000 464 p-Nitrotoluene 99-99-0 XT3325000 465 Nitrous oxide 10024-97-2 OX1350000 466 Nonane 111-84-2 RA6115000 467 1-Nonanethiol 1455-21-6 WUIDE CHEMICAL NAME CAS NO RTECS 468 Octachloronaphthalene 2234-13-1 OK0250000 470 Octane 111-65-9 RG8400000 471 1-Octanethiol 111-			,, ,, ,,	K15600000
455 Nitrogen trifluoride 7783-54-2 OX1925000 456 Nitroglycerine 55-63-0 OX210000 457 Nitromethane 75-52-5 PA980000 458 2-Nitronaphthalene 581-89-5 OJ9760000 459 1-Nitropropane 108-03-2 T25075000 460 2-Nitropropane 79-46-9 T2525000 461 N-Nitrosodimethylamine 62-75-9 100525000 462 o-Nitrotoluene 88-72-2 XT315000 463 m-Nitrotoluene 99-99-0 XT3325000 464 p-Nitrotoluene 99-99-0 XT3325000 465 Nitrous oxide 10024-97-2 OX1350000 466 Nonane 111-84-2 RA6115000 467 1-Nonanethiol 1455-21-6 WUIDE CHEMICAL NAME CAS NO RTECS 468 Octachloronaphthalene 2234-13-1 OK0250000 470 Octane 111-65-9 RG8400000 471 1-Octanethiol 111-		Nitrogen dioxide		<u>QW9800000</u>
457 Nitromethane 75-52-5 PA9800000 458 2-Nitronaphthalene 581-89-5 OJ9760000 459 1-Nitropropane 108-03-2 TZ5075000 460 2-Nitropropane 79-46-9 TZ5250000 461 N-Nitrosodimethylamine 62-75-9 IO0525000 462 o-Nitrotoluene 88-72-2 XT3150000 463 m-Nitrotoluene 99-08-1 XT2975000 464 p-Nitrotoluene 99-99-0 XT3325000 465 Nitrous oxide 10024-97-2 OX1350000 466 Nonane 111-84-2 RA6115000 467 1-Nonanethiol 1455-21-6 CHEMICAL NAME CAS NO RTECS I 468 Octachloronaphthalene 2234-13-1 OK0250000 470 Octane 111-65-9 RG8400000 471 1-Octanethiol 111-88-6 472 Oil mist (mineral) 8012-95-1 PY8030000 473 Osmium tetroxide 20816-12-0 RN1140000 474 Oxalic acid 144-62-7		Nitrogen trifluoride		OX1925000
458 2-Nitronaphthalene 581-89-5 OJ9760000 459 1-Nitropropane 108-03-2 TZ5075000 460 2-Nitropropane 79-46-9 TZ5250000 461 N-Nitrosodimethylamine 62-75-9 IO0525000 462 o-Nitrotoluene 88-72-2 XT3150000 463 m-Nitrotoluene 99-08-1 XT2975000 464 p-Nitrotoluene 99-99-0 XT3325000 465 Nitrous oxide 10024-97-2 OX1350000 467 1-Nonanethiol 1455-21-6 CHEMICAL NAME CAS NO RTECS WIDE				OX2100000
458 2-Nitronaphthalene 581-89-5 OJ9760000 459 1-Nitropropane 108-03-2 TZ5075000 460 2-Nitropropane 79-46-9 TZ5250000 461 N-Nitrosodimethylamine 62-75-9 IO0525000 462 o-Nitrotoluene 88-72-2 XT3150000 463 m-Nitrotoluene 99-08-1 XT2975000 464 p-Nitrotoluene 99-99-0 XT3325000 465 Nitrous oxide 10024-97-2 OX1350000 467 1-Nonanethiol 1455-21-6 CHEMICAL NAME CAS NO RTECS INTERCAL 468 Octachloronaphthalene 2234-13-1 OK0250000 469 1-Octadecanethiol 2885-00-9 470 Octane 111-65-9 RG8400000 471 1-Octanethiol 111-88-6 472 Oil mist (mineral) 8012-95-1 PY8030000 473 Osmium tetroxide 20816-12-0 RN114000 474 Oxalic acid 144-62-7 RO2450000 475 Oxygen difluoride 7783-41-7 RS2100000				PA9800000
460 2-Nitropropane 79-46-9 TZ5250000 461 N-Nitrosodimethylamine 62-75-9 IO0525000 462 o-Nitrotoluene 88-72-2 XT3150000 463 m-Nitrotoluene 99-08-1 XT2975000 464 p-Nitrotoluene 99-99-0 XT3325000 465 Nitrous oxide 10024-97-2 OX1350000 466 Nonane 111-84-2 RA6115000 467 1-Nonanethiol 1455-21-6 CHEMICAL NAME CAS NO RTECS 409 1-Octadecanethiol 2885-00-9 470 Octane 111-65-9 RG8400000 471 1-Octanethiol 111-88-6 472 Oil mist (mineral) 8012-95-1 PY8030000 473 Osmium tetroxide 20816-12-0 RN1140000 474 Oxalic acid 144-62-7 RO2450000 475 Oxygen difluoride 7783-41-7 RS2100000 476 Ozone 10028-15-6 RS8225000		2-Nitronaphthalene		ОЈ9760000
461 N-Nitrosodimethylamine 62-75-9 IQ0525000 462 o-Nitrotoluene 88-72-2 XT3150000 463 m-Nitrotoluene 99-08-1 XT2975000 464 p-Nitrotoluene 99-99-0 XT3325000 465 Nitrous oxide 10024-97-2 QX1350000 466 Nonane 111-84-2 RA6115000 467 1-Nonanethiol 1455-21-6 WIDE CHEMICAL NAME CAS NO RTECS 468 Octachloronaphthalene 2234-13-1 OK0250000 469 1-Octadecanethiol 2885-00-9 470 Octane 111-65-9 RG8400000 471 1-Octanethiol 111-88-6 472 Oil mist (mineral) 8012-95-1 PY8030000 473 Osmium tetroxide 20816-12-0 RN114000 474 Oxalic acid 144-62-7 RO2450000 475 Oxygen difluoride 7783-41-7 RS2100000 476 Ozone 10028-15-6 RS8225000		1-Nitropropane		TZ5075000
461 N-Nitrosodimethylamine 62-75-9 IQ0525000 462 o-Nitrotoluene 88-72-2 XT3150000 463 m-Nitrotoluene 99-08-1 XT2975000 464 p-Nitrotoluene 99-99-0 XT3325000 465 Nitrous oxide 10024-97-2 QX1350000 466 Nonane 111-84-2 RA6115000 467 1-Nonanethiol 1455-21-6 WIDE CHEMICAL NAME CAS NO RTECS 468 Octachloronaphthalene 2234-13-1 OK0250000 469 1-Octadecanethiol 2885-00-9 470 Octane 111-65-9 RG8400000 471 1-Octanethiol 111-88-6 472 Oil mist (mineral) 8012-95-1 PY8030000 473 Osmium tetroxide 20816-12-0 RN114000 474 Oxalic acid 144-62-7 RO2450000 475 Oxygen difluoride 7783-41-7 RS2100000 476 Ozone 10028-15-6 RS8225000	100		TO 46 0	mprocooo
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464 p-Nitrotoluene 99-99-0 XT3325000 465 Nitrous oxide 10024-97-2 QX1350000 466 Nonane 111-84-2 RA6115000 467 1-Nonanethiol 1455-21-6 CHEMICAL NAME CAS NO RTECS I 468 Octachloronaphthalene 2234-13-1 QK0250000 469 1-Octadecanethiol 2885-00-9 470 Octane 111-65-9 RG8400000 471 1-Octanethiol 111-88-6 472 Oil mist (mineral) 8012-95-1 PY8030000 473 Osmium tetroxide 20816-12-0 RN1140000 474 Oxalic acid 144-62-7 RO2450000 475 Oxygen difluoride 7783-41-7 RS2100000 476 Ozone 10028-15-6 RS8225000	461 462	N-Nitrosodimethylamine o-Nitrotoluene	62-75-9 88-72-2	IQ0525000 XT3150000
466 Nonane 111-84-2 RA6115000 467 1-Nonanethiol 1455-21-6 FUIDE CHEMICAL NAME CAS NO RTECS 468 Octachloronaphthalene 2234-13-1 OK0250000 469 1-Octadecanethiol 2885-00-9 470 Octane 111-65-9 RG8400000 471 1-Octanethiol 111-88-6 472 Oil mist (mineral) 8012-95-1 PY8030000 473 Osmium tetroxide 20816-12-0 RN1140000 474 Oxalic acid 144-62-7 RO2450000 475 Oxygen difluoride 7783-41-7 RS2100000 476 Ozone 10028-15-6 RS8225000	461 462 463	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene	62-75-9 88-72-2 99-08-1	IQ0525000 XT3150000 XT2975000
### Tenson	461 462 463 464	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene	62-75-9 88-72-2 99-08-1 99-99-0	IQ0525000 XT3150000 XT2975000 XT3325000
### CAS NO RTECS 1 ### CAS NO RECS 1 ### CAS	461 462 463 464 465	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene Nitrous oxide	62-75-9 88-72-2 99-08-1 99-99-0 10024-97-2	IQ0525000 XT3150000 XT2975000 XT3325000 QX1350000
468 Octachloronaphthalene 2234-13-1 OK0250000 469 1-Octadecanethiol 2885-00-9 470 Octane 111-65-9 RG8400000 471 1-Octanethiol 111-88-6 472 Oil mist (mineral) 8012-95-1 PY8030000 473 Osmium tetroxide 20816-12-0 RN1140000 474 Oxalic acid 144-62-7 RO2450000 475 Oxygen difluoride 7783-41-7 RS2100000 476 Ozone 10028-15-6 RS8225000	461 462 463 464 465 466	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene Nitrous oxide Nonane	62-75-9 88-72-2 99-08-1 99-99-0 10024-97-2 111-84-2	IQ0525000 XT3150000 XT2975000 XT3325000 QX1350000
469 1-Octadecanethiol 2885-00-9 470 Octane 111-65-9 RG8400000 471 1-Octanethiol 111-88-6 472 Oil mist (mineral) 8012-95-1 PY8030000 473 Osmium tetroxide 20816-12-0 RN1140000 474 Oxalic acid 144-62-7 RO2450000 475 Oxygen difluoride 7783-41-7 RS2100000 476 Ozone 10028-15-6 RS8225000	461 462 463 464 465 466	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene Nitrous oxide Nonane	62-75-9 88-72-2 99-08-1 99-99-0 10024-97-2 111-84-2	IQ0525000 XT3150000 XT2975000 XT3325000 QX1350000
469 1-Octadecanethiol 2885-00-9 470 Octane 111-65-9 RG8400000 471 1-Octanethiol 111-88-6 472 Oil mist (mineral) 8012-95-1 PY8030000 473 Osmium tetroxide 20816-12-0 RN1140000 474 Oxalic acid 144-62-7 RO2450000 475 Oxygen difluoride 7783-41-7 RS2100000 476 Ozone 10028-15-6 RS8225000	461 462 463 464 465 466 467	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene Nitrous oxide Nonane 1-Nonanethiol	62-75-9 88-72-2 99-08-1 99-99-0 10024-97-2 111-84-2 1455-21-6	IQ0525000 XT3150000 XT2975000 XT3325000 QX1350000 RA6115000
470 Octane 111-65-9 RG8400000 471 1-Octanethiol 111-88-6 472 Oil mist (mineral) 8012-95-1 PY8030000 473 Osmium tetroxide 20816-12-0 RN1140000 474 Oxalic acid 144-62-7 RO2450000 475 Oxygen difluoride 7783-41-7 RS2100000 476 Ozone 10028-15-6 RS8225000	461 462 463 464 465 466 467	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene Nitrous oxide Nonane 1-Nonanethiol CHEMICAL NAME	62-75-9 88-72-2 99-08-1 99-99-0 10024-97-2 111-84-2 1455-21-6 CAS NO	TQ0525000 XT3150000 XT2975000 XT3325000 QX1350000 RA6115000
471 1-Octanethiol 111-88-6 472 Oil mist (mineral) 8012-95-1 PY8030000 473 Osmium tetroxide 20816-12-0 RN1140000 474 Oxalic acid 144-62-7 RO2450000 475 Oxygen difluoride 7783-41-7 RS2100000 476 Ozone 10028-15-6 RS8225000	461 462 463 464 465 466 467 SUIDE	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene Nitrous oxide Nonane 1-Nonanethiol CHEMICAL NAME	62-75-9 88-72-2 99-08-1 99-99-0 10024-97-2 111-84-2 1455-21-6 CAS NO 2234-13-1 2885-00-9	TQ0525000 XT3150000 XT2975000 XT3325000 QX1350000 RA6115000
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473 Osmium tetroxide 20816-12-0 RN1140000 474 Oxalic acid 144-62-7 R02450000 475 Oxygen difluoride 7783-41-7 RS2100000 476 Ozone 10028-15-6 RS8225000	9460 9461 9462 9463 9464 9465 9466 9467 SUIDE	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene Nitrous oxide Nonane 1-Nonanethiol CHEMICAL NAME Octachloronaphthalene 1-Octadecanethiol Octane	62-75-9 88-72-2 99-08-1 99-99-0 10024-97-2 111-84-2 1455-21-6 CAS NO 2234-13-1 2885-00-9 111-65-9	T25250000 T005250000 XT3150000 XT2975000 XT33250000 QX1350000 RA6115000 RTECS N OK0250000 RG8400000
474 Oxalic acid 144-62-7 RO2450000 1475 Oxygen difluoride 7783-41-7 RS2100000 1476 Ozone 10028-15-6 RS8225000	461 462 463 464 465 466 467 SUIDE 468 469 470 471	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene Nitrous oxide Nonane 1-Nonanethiol CHEMICAL NAME Octachloronaphthalene 1-Octadecanethiol Octane 1-Octanethiol	62-75-9 88-72-2 99-08-1 99-99-0 10024-97-2 111-84-2 1455-21-6 CAS NO 2234-13-1 2885-00-9 111-65-9 111-88-6 8012-95-1	TQ0525000 XT3150000 XT2975000 XT3325000 QX1350000 RA6115000 RTECS N QK0250000 RG8400000
475 Oxygen difluoride 7783-41-7 RS2100000 476 Ozone 10028-15-6 RS8225000	461 462 463 464 465 466 467 FUIDE 468 469 470 471 472	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene Nitrous oxide Nonane 1-Nonanethiol CHEMICAL NAME Octachloronaphthalene 1-Octadecanethiol Octane 1-Octanethiol Oil mist (mineral)	62-75-9 88-72-2 99-08-1 99-99-0 10024-97-2 111-84-2 1455-21-6 CAS NO 2234-13-1 2885-00-9 111-65-9 111-88-6 8012-95-1	T00525000 XT3150000 XT2975000 XT3325000 QX1350000 RA6115000 RTECS N
476 Ozone 10028-15-6 RS8225000	461 462 463 464 465 466 467 FUIDE 468 469 470 471 472 473	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene Nitrous oxide Nonane 1-Nonanethiol CHEMICAL NAME Octachloronaphthalene 1-Octadecanethiol Octane 1-Octanethiol Oil mist (mineral) Osmium tetroxide	62-75-9 88-72-2 99-08-1 99-99-0 10024-97-2 111-84-2 1455-21-6 CAS NO 2234-13-1 2885-00-9 111-65-9 111-88-6 8012-95-1 20816-12-0	TQ0525000 XT3150000 XT2975000 XT3325000 QX1350000 RA6115000 RTECS N OK0250000 RG8400000 PY8030000 RN1140000
	461 462 463 464 465 466 467 FUIDE 468 469 470 471 472 473 474	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene Nitrous oxide Nonane 1-Nonanethiol CHEMICAL NAME Octachloronaphthalene 1-Octadecanethiol Octane 1-Octanethiol 0il mist (mineral) Osmium tetroxide Oxygen difluoride	62-75-9 88-72-2 99-08-1 99-99-0 10024-97-2 111-84-2 1455-21-6 CAS NO 2234-13-1 2885-00-9 111-65-9 111-88-6 8012-95-1 20816-12-0 144-62-7	TQ0525000 XT3150000 XT2975000 XT3325000 QX1350000 RA6115000 RTECS N QK0250000 RG8400000
UIDE CHEMICAL NAME CAS NO RTECS	461 462 463 464 465 466 467 EUIDE 468 469 470 471 472 473 474 475	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene Nitrous oxide Nonane 1-Nonanethiol CHEMICAL NAME Octachloronaphthalene 1-Octadecanethiol Octane 1-Octanethiol 0il mist (mineral) Osmium tetroxide Oxygen difluoride	62-75-9 88-72-2 99-08-1 99-99-0 10024-97-2 111-84-2 1455-21-6 CAS NO 2234-13-1 2885-00-9 111-65-9 111-88-6 8012-95-1 20816-12-0 144-62-7 7783-41-7	TQ0525000 XT3150000 XT2975000 XT33250000 QX1350000 RA6115000 RTECS N QK0250000 RG8400000 PY8030000 RN1140000 RO2450000
	461 462 463 464 465 466 467 EUIDE 468 469 470 471 472 473 474 475	N-Nitrosodimethylamine o-Nitrotoluene m-Nitrotoluene p-Nitrotoluene Nitrous oxide Nonane 1-Nonanethiol CHEMICAL NAME Octachloronaphthalene 1-Octadecanethiol Octane 1-Octanethiol 0il mist (mineral) Osmium tetroxide Oxygen difluoride	62-75-9 88-72-2 99-08-1 99-99-0 10024-97-2 111-84-2 1455-21-6 CAS NO 2234-13-1 2885-00-9 111-65-9 111-88-6 8012-95-1 20816-12-0 144-62-7 7783-41-7	TQ0525000 XT3150000 XT2975000 XT3325000 QX1350000 RA6115000 RTECS N OK0250000 RG8400000 PY8030000 RN1140000 RO2450000 RS2100000

1 <i>17</i> 0	Paraffin wax fume Paraguat (Paraguat dichloride)	8002-74-2 1910-42-5	RV0350000
0 <u>478</u> 0479	Paraquat (Paraquat dichioride) Parathion	1910-42-5 56-38-2	DW2275000 TF4550000
)4 <i>19</i>)480	Particulates not otherwise regulated	JU JU-4	II 400000
)481	Pentaborane	19624-22-7	RY8925000
1482	Pentachloroethane	76-01-7	KI6300000
483	<u>Pentachloronaphthalene</u>	1321-64-8	OK0300000
484	Pentachlorophenol	87-86-5	SM6300000
1485	Pentaerythritol	115-77-5	RZ2490000
)486	n-Pentane	109-66-0	RZ9450000
)487	1-Pentanethiol	110-66-7	SA3150000
0488	2-Pentanone	107-87-9	SA7875000
)489	Perchloromethyl mercaptan	<u>594-42-3</u> 7616-94-6	PB0370000
)490)401	Perchloryl fluoride Perlite	93763-70-3	SD1925000
)491)492	Petroleum distillates (naphtha)	8002-05-9	SO5254000 SE7449000
)493	Phenol	108-95-2	SJ3325000
)494	Phenothiazine	92-84-2	SN5075000
)495	p-Phenylene diamine	106-50-3	SS8050000
)496	Phenyl ether (vapor)	101-84-8	KN8970000
0497	Phenyl ether-biphenyl mixture (vapor)	8004-13-5	DV1500000
)498	Phenyl glycidyl ether	122-60-1	TZ3675000
)499	Phenylhydrazine	100-63-0	MW8925000
)500	N-Phenyl-beta-naphthylamine	135-88-6	OM4550000
)501	Phenylphosphine	638-21-1	SZ2100000
)502	Phorate	298-02-2	TD9450000
)503	Phosdrin	7786-34-7	GO5250000
504	Phosgene	75-44-5	SY5600000
)505	Phosphine	7803-51-2	SY7525000
<u>)506</u>	Phosphoric acid	7664-38-2	TB6300000
)507)500	Phosphorus (yellow)	7723-14-0	TH3500000
)508)500	Phosphorus oxychloride	10025-87-3	TH4897000
)509)510	Phosphorus pentachloride	10026-13-8	TB6125000
) <u>510</u>)511	Phosphorus pentasulfide	1314-80-3 7719-12-2	TH4375000
)511)512	Phosphorus trichloride Phthalic anhydride	85-44-9	TH3675000 TI3150000
)513	m-Phthalodinitrile	626-17-5	CZ1900000
)514	Picloram	1918-02-1	TJ7525000
)515	Picric acid	88-89-1	TJ7875000
0516	Pindone	83-26-1	NK630000
0517	Piperazine dihydrochloride	142-64-3	TL4025000
0518	Plaster of Paris	26499-65-0	TP0700000
)519	Platinum	7440-06-4	TP2160000
)520	Platinum (soluble salts, as Pt)		
)521	Portland cement	65997-15-1	VV8770000
)522	Potassium cyanide (as CN)	151-50-8	TS8750000
)523	Potassium hydroxide	1310-58-3	TT2100000
)524	Propane	74-98-6	TX2275000
)525	Propane sultone	1120-71-4	RP5425000
) <u>526</u>	1-Propanethiol	107-03-9	TZ7300000
)527)520	Propargyl alcohol	107-19-7	UK5075000
)528)520	beta-Propiolactone	<u>57-57-8</u>	RO7350000
)529)520	Propionic acid	79-09-4	UE5950000
)530)531	Propionitrile Propoxur	107-12-0 114-26-1	UF9625000 FC3150000
)531)532	n-Propyl acetate	109-60-4	AJ3675000
533	n-Propyl acetate n-Propyl alcohol	71-23-8	UH8225000
534	Propylene dichloride	78-87-5	TX9625000
535	Propylene glycol dinitrate	6423-43-4	TY630000
		107-98-2	UB7700000
	Propylene glydoi monomethyl ether	エロノーラロース	
1536	Propylene glycol monomethyl ether Propylene imine		
) <u>536</u>) <u>537</u>	Propylene glycol monomethyl ether Propylene imine Propylene oxide	75-55-8 75-56-9	CM8050000
)536)537)538	Propylene imine	75-55-8	CM8050000 TZ2975000
)536)537)538)539	Propylene imine Propylene oxide	75-55-8 75-56-9	CM8050000 TZ2975000 UK0350000
0536 0537 0538 0539 0540	Propylene imine Propylene oxide n-Propyl nitrate	75-55-8 75-56-9 627-13-4	CM8050000 TZ2975000 UK0350000 UR4200000
0536 0537 0538 0539 0540 0541	Propylene imine Propylene oxide n-Propyl nitrate Pyrethrum Pyridine	75-55-8 75-56-9 627-13-4 8003-34-7 110-86-1	CM8050000 TZ2975000 UK0350000 UR4200000 UR8400000
0536 0537 0538 0539 0540 0541	Propylene imine Propylene oxide n-Propyl nitrate Pyrethrum Pyridine	75-55-8 75-56-9 627-13-4 8003-34-7	CM8050000 TZ2975000 UK0350000 UR4200000 UR8400000
0536 0537 0538 0539 0540 0541	Propylene imine Propylene oxide n-Propyl nitrate Pyrethrum Pyridine	75-55-8 75-56-9 627-13-4 8003-34-7 110-86-1	CM8050000 TZ2975000 UK0350000 UR4200000 UR8400000 RTECS 1
0536 0537 0538 0539 0540 0541	Propylene imine Propylene oxide n-Propyl nitrate Pyrethrum Pyridine CHEMICAL NAME	75-55-8 75-56-9 627-13-4 8003-34-7 110-86-1 CAS NO	CM8050000 TZ2975000 UK0350000 UR4200000 UR8400000 RTECS 1
0536 0537 0538 0539 0540 0541 GUIDE	Propylene imine Propylene oxide n-Propyl nitrate Pyrethrum Pyridine CHEMICAL NAME Quinone CHEMICAL NAME	75-55-8 75-56-9 627-13-4 8003-34-7 110-86-1 CAS NO 106-51-4 CAS NO	CM8050000 TZ2975000 UK0350000 UR4200000 UR8400000 RTECS 1 DK2625000 RTECS 1
0536 0537 0538 0539 0540 0541 0542 0542	Propylene imine Propylene oxide n-Propyl nitrate Pyrethrum Pyridine CHEMICAL NAME Quinone CHEMICAL NAME	75-55-8 75-56-9 627-13-4 8003-34-7 110-86-1 CAS NO 106-51-4 CAS NO	CM8050000 TZ2975000 UK0350000 UR4200000 UR8400000 RTECS I DK2625000 RTECS I
9536 9537 9538 9539 9540 9541 SUIDE 9542	Propylene imine Propylene oxide n-Propyl nitrate Pyrethrum Pyridine CHEMICAL NAME Ouinone CHEMICAL NAME Resorcinol Rhodium (metal fume and insoluble compou	75-55-8 75-56-9 627-13-4 8003-34-7 110-86-1 CAS NO 106-51-4 CAS NO	CM8050000 TZ2975000 UK0350000 UR4200000 UR8400000 RTECS I DK2625000 RTECS I
0536 0537 0538 0539 0540 0541 0542 0542 0542	Propylene imine Propylene oxide n-Propyl nitrate Pyrethrum Pyridine CHEMICAL NAME Ouinone CHEMICAL NAME Resorcinol Rhodium (metal fume and insoluble compour Rhodium (soluble compounds, as Rh)	75-55-8 75-56-9 627-13-4 8003-34-7 110-86-1 CAS NO 106-51-4 CAS NO 108-46-3 7440-16-6	CM8050000 TZ2975000 UK0350000 UR4200000 UR4200000 RTECS 1 DK2625000 RTECS 1 VG9625000 VI9069000
536 537 538 539 540 541 SUIDE 542 542 543 544 545	Propylene imine Propylene oxide n-Propyl nitrate Pyrethrum Pyridine CHEMICAL NAME Ouinone CHEMICAL NAME Resorcinol Rhodium (metal fume and insoluble compour Rhodium (soluble compounds, as Rh) Ronnel	75-55-8 75-56-9 627-13-4 8003-34-7 110-86-1 CAS NO 106-51-4 CAS NO	CM8050000 TZ2975000 UK0350000 UR4200000 UR8400000 RTECS
536 537 538 539 540 541 SUIDE 542 SUIDE	Propylene imine Propylene oxide n-Propyl nitrate Pyrethrum Pyridine CHEMICAL NAME Ouinone CHEMICAL NAME Resorcinol Rhodium (metal fume and insoluble compour Rhodium (soluble compounds, as Rh)	75-55-8 75-56-9 627-13-4 8003-34-7 110-86-1 CAS NO 106-51-4 CAS NO 108-46-3 7440-16-6	CM8050000 TZ2975000 UK0350000 UR4200000 UR8400000 RTECS I DK2625000 RTECS I

1309-37-1 Rouge NO7400000 **GUIDE** CHEMICAL NAME CAS NO RTECS NO 0550 7782-49-2 VS7700000 <u>Selenium</u> 7783-79-1 0551 Selenium hexafluoride VS9450000 0552 Silica, amorphous 7631-86-9 VV7310000 0553 Silica, crystalline (as respirable dust) 14808-60-7 VV7330000 0554 Silicon 7440-21-3 VW0400000 0555 409-21-2 VW0450000 Silicon carbide 0556 7<u>803-62-5</u> VV1400000 <u>Silicon tetrahydride</u> 0557 Silver (metal dust and soluble compounds 7440-22-4 VW3500000 0558 Soapstone (containing less than 1% quart VV8780000 15096-52-3 0559 Sodium aluminum fluoride (as F) WA9625000 0560 Sodium azide VY8050000 0561 Sodium bisulfite 7631-90-5 VZ2000000 0562 Sodium cyanide (as CN) 143-33-9 VZ7530000 Sodium fluoride (as F) Sodium fluoroacetate 0563 7681-49-4 WB0350000 62-74-8 0564 AH9100000 0565 Sodium hydroxide 1310-73-2 WB4900000 0566 Sodium metabisulfite UX8225000 <u>7681-57-4</u> 0567 9005-25-8 GM5090000 Starch 0568 Stibine 7803-52-3 WJ0700000 8052-41-3 <u>0569</u> Stoddard solvent WJ8925000 0570 57-24-9 WL2275000 <u>Strychnine</u> 0571 100-42-5 WL3675000 Styrene 0572 Subtilisins 1395-21-7 CO9450000 0573 110-61-2 WN3850000 <u>Succinonitrile</u> 0574 Sucrose 57 - 50 - 1WN6500000 0575 Sulfur dioxide 7446-09-5 WS4550000 WS4900000 0576 <u> 2551-62-4</u> <u>Sulfur hexafluoride</u> 0577 7664-93-9 WS5600000 <u>Sulfuric acid</u> 0578 10025-67-9 WS4300000 Sulfur monochloride 0579 Sulfur pentafluoride 5714-22-7 WS4480000 Sulfur tetrafluoride 7783-60-0 2699-79-8 0580 WT4800000 Sulfuryl fluoride 0581 WT5075000 0582 Sulprofos 35400-43-2 TE4165000 GUIDE CHEMICAL NAME CAS NO RTECS NO 0583 93-76-5 AJ8400000 0584 Talc (containing no asbestos and less th 14807-96-6 WW2710000 0585 7440-25-7 WW5505000 Tantalum (metal and oxide dust, as Ta) 0586 3689-24-5 XN4375000 0587 WY2625000 13494-80-9 <u>Tellurium</u> 0588 Tellurium hexafluoride 7783-80-4 WY2800000 TF6890000 0589 Temephos 3383-96-8 0590 TEPP 107-49-3 UX6825000 0591 o-Terphenvl 84 - 15 - 1WZ6472000 0592 92-06-8 WZ6470000 <u>m-Terphenyl</u> 0593 p-Terphenyl 92-94-4 WZ6475000 0594 3,7,8-Tetrachloro-dibenzo-p-dioxin HP3500000 <u> 1746-01-6</u> 0595 1,1,1,2-Tetrachloro-2,2-difluoroethane 76-11-9 KI1425000 1,1,2,2-Tetrachloro-1,2-difluoroethane 0596 76-12-0 KI1420000 0597 1,1,1,2-Tetrachloroethane KI8450000 <u>630-20-6</u> 0598 1,2,2-Tetrachloroethane 79-34-5 KI8575000 0599 Tetrachloroethylene 127-18-4 KX3850000 0600 <u>Tetrachloronaphthalene</u> 1335-88-2 OK3700000 0601 78-00-2 TP4550000 Tetraethyl lead (as Pb) 109-99-9 LU5950000 0602 <u>Tetrahydrofuran</u> 0603 Tetramethyl lead (as Pb) 75-74-1 TP4725000 0604 Tetramethyl succinonitrile 3333-52-6 WN4025000 0605 509-14-8 PB4025000 <u>Tetranitromethane</u> 0606 7722-88-5 UX7350000 Tetrasodium pyrophosphate <u>0607</u> 479-45-8 BY6300000 Thallium (soluble compounds, 0608 as Tl) 4,4'-Thiobis(6-tert-butyl-m-cresol) GP3150000 0609 96-69-5 AI5950000 0610 Thioglycolic acid 68-11-1 7719-09-7 XM5150000 0611 Thionyl chloride 0612 Thiram 137-26-8 J01400000 0613 7440-31-5 XP7320000 Tin 0614 Tin (organic compounds, as Sn) Tin(II) oxide (as Tin(IV) oxide (as 0615 21651-19-4 0616 18282-10-5 XO400000 0617 Titanium dioxide 13463-67-7 XR2275000 119<u>-93-7</u> DD1225000 XS5250000 o-Tolidine 0618 0619 108-88-3 <u>Toluene</u> 0620 25376-45-8 XS9445000 Toluenediamine

0621	Toluene-2,4-diisocyanate	584-84-9	CZ6300000
0622	o-Toluidine	95-53-4	XU2975000
0623	m-Toluidine	108-44-1	XU2800000
0624	p-Toluidine	106-49-0	XU3150000
0625	Tributyl phosphate	126-73-8	TC7700000
0626	Trichloroacetic acid	76-03-9	AJ7875000
<u>0627</u>	1,2,4-Trichlorobenzene	120-82-1	DC2100000
0628	1,1,2-Trichloroethane	79-00-5	KJ3150000
0629	Trichloroethylene	79-01-6	KX4550000
0630	Trichloronaphthalene	1321-65-9	OK4025000
0631	1,2,3-Trichloropropane	96-18-4	TZ9275000
0632	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	KJ4000000
0633	Triethylamine	121-44-8	YEO175000
0634	Trifluorobromomethane	75-63-8	PA5425000
0635	Trimellitic anhydride	552-30-7	DC2050000
0636	Trimethylamine	75-50-3	PA0350000
0637	1,2,3-Trimethylbenzene	526-73-8	DC330000
0638	1,2,4-Trimethylbenzene	95-63-6	DC3325000
0639	1,3,5-Trimethylbenzene	108-67-8	OX6825000
0640	Trimethyl phosphite	121-45-9	TH1400000
<u>0641</u>	2,4,6-Trinitrotoluene	118-96-7	<u>XU0175000</u>
0642	Triorthocresyl phosphate	78-30-8	TD0350000
0643	Triphenylamine	603-34-9	YK2680000
0644	Triphenyl phosphate	115-86-6	TC8400000
0645	Tungsten	7440-33-7	Y07175000
0646	Tungsten (soluble compounds, as W)	7110 33 7	107173000
0647	Tungsten (soluble compounds, as w) Tungsten carbide (cemented)	11107-01-0	Y07350000
0648	Turpentine	8006-64-2	Y08400000
0648	Turpentine	8006-64-2	<u> 108400000</u>
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0649	1-Undecanethiol	5332-52-5	
0650	Uranium (insoluble compounds, as U)	7440-61-1	YR3490000
0651	Uranium (soluble compounds, as U)	7 2 2 0 0 2 2	11019000
	<u> </u>		
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0652	n-Valeraldehyde	110-62-3	YV3600000
0653	Vanadium dust	1314-62-1	YW2450000
0654	Vanadium fume	1314-02-1	
			77747 A C O O O O
		1314-62-1	YW2460000
0655	Vegetable oil mist	68956-68-3	YX1850000
0655 0656	Vegetable oil mist Vinyl acetate	68956-68-3 108-05-4	YX1850000 AK0875000
0655 0656 0657	Vegetable oil mist Vinyl acetate Vinyl bromide	68956-68-3 108-05-4 593-60-2	YX1850000 AK0875000 KU8400000
0655 0656 0657 0658	Vegetable oil mist Vinyl acetate Vinyl bromide Vinyl chloride	68956-68-3 108-05-4 593-60-2 75-01-4	YX1850000 AK0875000 KU8400000 KU9625000
0655 0656 0657	Vegetable oil mist Vinyl acetate Vinyl bromide	68956-68-3 108-05-4 593-60-2	YX1850000 AK0875000 KU8400000
0655 0656 0657 0658	Vegetable oil mist Vinyl acetate Vinyl bromide Vinyl chloride Vinyl cyclohexene dioxide	68956-68-3 108-05-4 593-60-2 75-01-4	YX1850000 AK0875000 KU8400000 KU9625000
0655 0656 0657 0658 0659 0660	Vegetable oil mist Vinyl acetate Vinyl bromide Vinyl chloride Vinyl cyclohexene dioxide Vinyl fluoride	68956-68-3 108-05-4 593-60-2 75-01-4 106-87-6 75-02-5	YX1850000 AK0875000 KU8400000 KU9625000 RN8640000 YZ7351000
0655 0656 0657 0658 0659 0660 0661	Vegetable oil mist Vinyl acetate Vinyl bromide Vinyl chloride Vinyl cyclohexene dioxide Vinyl fluoride Vinylidene chloride	68956-68-3 108-05-4 593-60-2 75-01-4 106-87-6 75-02-5 75-35-4	YX1850000 AK0875000 KU8400000 KU9625000 RN8640000 YZ7351000 KV9275000
0655 0656 0657 0658 0659 0660 0661	Vegetable oil mist Vinyl acetate Vinyl bromide Vinyl chloride Vinyl cyclohexene dioxide Vinyl fluoride Vinylidene chloride Vinylidene fluoride	68956-68-3 108-05-4 593-60-2 75-01-4 106-87-6 75-02-5 75-35-4 75-38-7	YX1850000 AK0875000 KU8400000 KU9625000 RN8640000 YZ7351000 KV9275000 KW0560000
0655 0656 0657 0658 0659 0660 0661 0662	Vegetable oil mist Vinyl acetate Vinyl bromide Vinyl chloride Vinyl cyclohexene dioxide Vinyl fluoride Vinylidene chloride Vinylidene fluoride Vinyl toluene	68956-68-3 108-05-4 593-60-2 75-01-4 106-87-6 75-02-5 75-35-4 75-38-7 25013-15-4	YX1850000 AK0875000 KU8400000 KU9625000 RN8640000 YZ7351000 KV9275000 KW0560000 WL5075000
0655 0656 0657 0658 0659 0660 0661	Vegetable oil mist Vinyl acetate Vinyl bromide Vinyl chloride Vinyl cyclohexene dioxide Vinyl fluoride Vinylidene chloride Vinylidene fluoride	68956-68-3 108-05-4 593-60-2 75-01-4 106-87-6 75-02-5 75-35-4 75-38-7	YX1850000 AK0875000 KU8400000 KU9625000 RN8640000 YZ7351000 KV9275000 KW0560000 WL5075000
0655 0656 0657 0658 0659 0660 0661 0662	Vegetable oil mist Vinyl acetate Vinyl bromide Vinyl chloride Vinyl cyclohexene dioxide Vinyl fluoride Vinylidene chloride Vinylidene fluoride Vinyl toluene	68956-68-3 108-05-4 593-60-2 75-01-4 106-87-6 75-02-5 75-35-4 75-38-7 25013-15-4	YX1850000 AK0875000 KU8400000 KU9625000 RN8640000 YZ7351000 KV9275000 KW0560000 WL5075000 OI6180000
0655 0656 0657 0658 0659 0660 0661 0662 0663 0664 GUIDE	Vegetable oil mist Vinyl acetate Vinyl bromide Vinyl chloride Vinyl cyclohexene dioxide Vinyl fluoride Vinylidene chloride Vinylidene fluoride Vinyl toluene VM & P Naphtha CHEMICAL NAME	68956-68-3 108-05-4 593-60-2 75-01-4 106-87-6 75-02-5 75-35-4 75-38-7 25013-15-4 8032-32-4 CAS NO	YX1850000 AK0875000 KU8400000 KU9625000 RN8640000 YZ7351000 KV9275000 KW0560000 WL5075000 OI6180000
0655 0656 0657 0658 0659 0660 0661 0662 0663 0664 GUIDE	Vegetable oil mist Vinyl acetate Vinyl bromide Vinyl chloride Vinyl cyclohexene dioxide Vinyl fluoride Vinylidene chloride Vinylidene fluoride Vinyl toluene VM & P Naphtha CHEMICAL NAME Warfarin	68956-68-3 108-05-4 593-60-2 75-01-4 106-87-6 75-02-5 75-35-4 75-38-7 25013-15-4 8032-32-4	YX1850000 AK0875000 KU8400000 KU9625000 RN8640000 YZ7351000 KV9275000 KW0560000 WL5075000 OI6180000 RTECS NO
0655 0656 0657 0658 0659 0660 0661 0662 0663 0664 GUIDE	Vegetable oil mist Vinyl acetate Vinyl bromide Vinyl chloride Vinyl cyclohexene dioxide Vinyl fluoride Vinylidene chloride Vinylidene fluoride Vinyl toluene VM & P Naphtha CHEMICAL NAME Warfarin Welding fumes	68956-68-3 108-05-4 593-60-2 75-01-4 106-87-6 75-02-5 75-35-4 75-38-7 25013-15-4 8032-32-4 CAS NO	YX1850000 AK0875000 KU8400000 KU9625000 RN8640000 YZ7351000 KV9275000 KW0560000 WL5075000 OI6180000 RTECS NO GN4550000 ZC2550000
0655 0656 0657 0658 0659 0660 0661 0662 0663 0664 GUIDE	Vegetable oil mist Vinyl acetate Vinyl bromide Vinyl chloride Vinyl cyclohexene dioxide Vinyl fluoride Vinylidene chloride Vinylidene fluoride Vinyl toluene VM & P Naphtha CHEMICAL NAME Warfarin	68956-68-3 108-05-4 593-60-2 75-01-4 106-87-6 75-02-5 75-35-4 75-38-7 25013-15-4 8032-32-4 CAS NO	YX1850000 AK0875000 KU8400000 KU9625000 RN8640000 YZ7351000 KV9275000 KW0560000 WL5075000 OI6180000 RTECS NO
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0676	Zinc stearate	557-05-1	ZH5200000
0677	Zirconium compounds (as Zr)	7440-67-7	ZH7070000

NIOSH Pocket Guide to Chemical Hazards

INTRODUCTION

INDEX with CHEMICAL NAMES and SYNONYMS Note: Large File

INDEX with CHEMICAL NAMES Note: Medium File

INDEX with CAS NUMBERS Note: Small File

APPENDICES

The Pocket Guide includes the following:

- Chemical Names, synonyms, trade names, conversion factors, CAS, RTECS, and DOT Numbers
- NIOSH Recommended Expoure Limits (NIOSH RELs)
- Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs)
- NIOSH Immediate Dangerous to Life and Health values (NIOSH IDLHs)
- · A physical description of the agent with chemical and physical properties
- Measurement methods
- Personal Protection and Sanitation Recommendations
- Respirator Recommendations
- Information on Health Hazards including route, symptoms, first aid and target organ information.

INTRODUCTION
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NIOSH Pocket Guide to Chemical Hazards

INTRODUCTION

The NIOSH Pocket Guide to Chemical Hazards is intended as a source of general industrial hygiene information for workers, employers, and occupational health professionals. The Pocket Guide presents key information and data in abbreviated tabular form for 677 chemicals or substance groupings (e.g., manganese compounds, tellurium compounds, inorganic tin compounds, etc.) that are found in the work environment. The industrial hygiene information found in the Pocket Guide should help users recognize and control occupational chemical hazards. The chemicals or substances contained in this revision include all substances for which the National Institute for Occupational Safety and Health (NIOSH) has recommended exposure limits (RELs) and those with permissible exposure limits (PELs) as found in the Occupational Safety and Health Administration (OSHA) General Industry Air Contaminants Standard (29 CFR 1910.1000).

Background

In 1974, NIOSH (which is responsible for recommending health and safety standards) joined OSHA (whose jurisdictions include promulgation and enforcement activities) in developing a series of occupational health standards for substances with existing PELs. This joint effort was labeled the Standards Completion Program and involved the cooperative efforts of several contractors and personnel from various divisions within NIOSH and OSHA. The Standards Completion Program developed 380 substance-specific draft standards with supporting documentation that contained technical information and recommendations needed for the promulgation of new occupational health regulations. The *Pocket Guide* was developed to make the technical information in those draft standards more conveniently available to workers, employers, and occupational health professionals. The *Pocket Guide* is updated periodically to reflect new data regarding the toxicity of various substances and any changes in exposure standards or recommendations.

Data Collection and Application

The data were collected from a variety of sources, including NIOSH policy documents such as criteria documents and Current Intelligence Bulletins (CIBs), and recognized references in the fields of industrial hygiene, occupational medicine, toxicology, and analytical chemistry.

NIOSH RECOMMENDATIONS

Acting under the authority of the Occupational Safety and Health Act of 1970 (29 USC Chapter 15) and the Federal Mine Safety and Health Act of 1977 (30 USC Chapter 22), NIOSH develops and periodically revises recommended exposure limits (RELs) for hazardous substances or conditions in the workplace. NIOSH also recommends appropriate preventive measures to reduce or eliminate the adverse health and safety effects of these hazards. To formulate these recommendations, NIOSH evaluates all known and available medical, biological, engineering, chemical, trade, and other information relevant to the hazard. These recommendations are then published and transmitted to OSHA and the Mine Safety and Health Administration (MSHA) for use in promulgating legal standards.

NIOSH recommendations are published in a variety of documents. Criteria documents recommend workplace exposure

limits and appropriate preventive measures to reduce or eliminate adverse health effects and accidental injuries.

Current Intelligence Bulletins (CIBs) are issued to disseminate new scientific information about occupational hazards. A CIB may draw attention to a formerly unrecognized hazard, report new data on a known hazard, or present information on hazard control.

Alerts, Special Hazard Reviews, Occupational Hazard Assessments, and Technical Guidelines support and complement the other standards development activities of the Institute. Their purpose is to assess the safety and health problems associated with a given agent or hazard (e.g., the potential for injury or for carcinogenic, mutagenic, or teratogenic effects) and to recommend appropriate control and surveillance methods. Although these documents are not intended to supplant the more comprehensive criteria documents, they are prepared to assist OSHA and MSHA in the formulation of regulations.

In addition to these publications, NIOSH periodically presents testimony before various Congressional committees and at OSHA and MSHA rulemaking hearings.

A complete list of occupational safety and health issues for which NIOSH has formal policies (e.g., recommendations for occupational exposure to chemical and physical hazards, engineering controls, work practices, safety considerations, etc.) can be found in *NIOSH Recommendations for Occupational Safety and Health: Compendium of Policy Documents and Statements* [DHHS (NIOSH) Publication No. 92-100].

HOW TO USE THIS POCKET GUIDE

The Pocket Guide has been designed to provide chemical-specific data to supplement general industrial hygiene knowledge. To maximize the amount of data provided in this limited space, abbreviations and codes have been used extensively. These abbreviations and codes, which have been designed to permit rapid comprehension by the regular user, are discussed for each column in the following subsections.

Chemical Name and Structure/Formula, CAS and RTECS Numbers, and DOT ID and Guide Numbers

Chemical Name and Structure/Formula - The chemical name found in the OSHA General Industry Air Contaminants Standard (29 CFR 1910.1000) is listed first. The chemical formula is also provided under the chemical name.

CAS and RTECS Numbers - The Chemical Abstracts Service (CAS) number, in the format xxx-xx-x, is unique for each chemical and allows efficient searching on computerized data bases. The *NIOSH Registry of Toxic Effects of Chemical Substances* (RTECS) number, in the format ABxxxxxxx, may be useful for obtaining additional toxicologic information on a specific substance.

DOT ID and GUIDE Number - The U.S. Department of Transportation (DOT) identification number and the corresponding guide number. Their format is xxxx xxx. The Identification number (xxxx) indicates that the chemical is regulated by DOT. The Guide number (xxx) refers to actions to be taken to stabilize an emergency situation; this information can be found in the 2000 Emergency Response Guidebook (Office of Hazardous Materials Training and Initiatives [DHM-50], Research and Special Programs Administration, U.S. Department of Transportation, Washington, D.C. 20590-0001; for sale by the U.S. Government Printing Office, Superintendent of Documents, Mail Stop: SSOP, Washington, D.C. 20402-9328). A page index for all DOT ID numbers listed is included at the back of the *Pocket Guide* to help the user locate a specific substance; please note however, that many DOT numbers are NOT unique for specific substances.

Synonyms, Trade Names, and Conversion Factors

Common synonyms and trade names are listed alphabetically for each chemical. Factors for the conversion of ppm

(parts of vapor or gas per million parts of contaminated air by volume) to mg/m³ (milligrams of vapor or gas per cubic meter of contaminated air) at 25 °C and 1 atmosphere are listed for chemicals with exposure limits expressed in ppm.

Exposure Limits

The NIOSH recommended exposure limits (RELs) are listed first in this column. Unless noted otherwise, RELs are time-weighted average (TWA) concentrations for up to a 10-hour workday during a 40-hour workweek. A short-term exposure limit (STEL) is designated by "ST" preceding the value; unless noted otherwise, the STEL is a 15-minute TWA exposure that should not be exceeded at any time during a workday. A ceiling REL is designated by "C" preceding the value; unless noted otherwise, the ceiling value should not be exceeded at any time. Any substance that NIOSH considers to be a potential occupational carcinogen is designated by the notation "Ca" see (Appendix A, which contains a brief discussion of potential occupational carcinogens).

The OSHA permissible exposure limits (PELs), as found in Tables Z-1, Z-2, and Z-3 of the OSHA General Industry Air Contaminants Standard (29 CFR 1910.1000), that were effective on July 1, 1993* and which are currently enforced by OSHA are listed next. [*Note: In July 1992, the 11th Circuit Court of Appeals in its decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992) vacated more protective PELs set by OSHA in 1989 for 212 substances, moving them back to PELs established in 1971. The appeals court also vacated new PELs for 164 substances that were not previously regulated. The substances for which OSHA PELs were vacated on June 30, 1993 are indicated by the symbol "†" following OSHA PEL in this column. A number of RELs are based on NIOSH concurrence with the data presented and the airborne exposure limits proposed in this rulemaking.] Unless noted otherwise, PELs are TWA concentrations that must not be exceeded during any 8-hour workshift of a 40-hour workweek. A STEL is designated by "ST" preceding the value and is measured over a 15-minute period unless noted otherwise. OSHA ceiling concentrations (designated by "C" preceding the value) must not be exceeded during any part of the workday; if instantaneous monitoring is not feasible, the ceiling must be assessed as a 15-minute TWA exposure. In addition, there are a number of substances from Table Z-2 (e.g., beryllium, ethylene dibromide, etc.) that have PEL ceiling values that must not be exceeded except for specified excursions. For example, a "5-minute maximum peak in any 2 hours" means that a 5-minute exposure above the ceiling value, but never above the maximum peak, is allowed in any 2 hours during an 8-hour workday. Appendix B contains a brief discussion of substances regulated as carcinogens by OSHA.

Concentrations are given in ppm, mg/m³, mppcf (millions of particles per cubic foot of air as determined from counting an impinger sample), or fibers/cm³ (fibers per cubic centimeter). The "[skin]" designation indicates the potential for dermal absorption; skin exposure should be prevented as necessary through the use of good work practices and gloves, coveralls, goggles, and other appropriate equipment. The "(total)" designation indicates that the REL or PEL listed is for "total particulate" versus the "(resp)" designation which refers to the "respirable fraction" of the airborne particulate. Appendix C contains more detailed discussions of the specific exposure limits for certain low-molecular-weight aldehydes, asbestos, various dyes (benzidine-, o-tolidine-, and o-dianisidine-based), carbon black, the various chromium compounds (chromic acid and chromates, chromium(II) and chromium(III) compounds, and chromium metal), coal tar pitch volatiles, coke oven emissions, cotton dust, lead, NIAX Catalyst ESN, trichloroethylene, and tungsten carbide (cemented). Appendix D contains a brief discussion of substances included in the *Pocket Guide* with no established RELs at this time and Appendix F contains miscellaneous notes regarding the OSHA PELs. Appendix G lists the OSHA PELs that were vacated on June 30, 1993.]

IDLH

For the June 1994 Edition of the *Pocket Guide*, immediately dangerous to life or health concentrations (IDLHs) were reviewed and, in many cases, were revised and made more protective. As a consequence of the IDLH changes, many of the respirator recommendations for these substances were also revised. The criteria utilized to determine the adequacy of existing IDLH values were a combination of those used during the Standards Completion Program and a newer methodology developed by NIOSH. These "interim" criteria form a tiered approach with acute human toxicity data being used preferentially, followed next by acute animal inhalation toxicity data, and then finally by acute animal oral toxicity data to determine an updated IDLH value. When relevant acute toxicity data were insufficient or

unavailable, the use of chronic toxicity data or an analogy to a chemically similar substance was considered. The criteria and information sources for both the original and revised IDLH values are given in *Documentation for Immediately Dangerous to Life and Health Concentrations (IDLHs)* (NTIS Publication No. PB-94-195047). NIOSH is currently assessing the various uses of IDLHs and whether the original criteria used to derive the IDLH values are valid or if other information or criteria should be utilized. Based on this assessment, NIOSH will develop a new strategy for revising the IDLH values currently listed, as well as for developing new IDLH values for the more than 300 substances listed in the *Pocket Guide* without IDLHs.

The definition of IDLH that was derived during the Standards Completion Program was based on the Mine Safety and Health Administration (MSHA) definition stipulated in 30 CFR 11.3(t). The purpose for establishing an IDLH value in the Standards Completion Program was to ensure that a worker could escape without injury or irreversible health effects from an IDLH exposure in the event of the failure of respiratory protection equipment. The IDLH was considered a maximum concentration above which only a highly reliable breathing apparatus providing maximum worker protection was permitted. In determining IDLH values, the ability of a worker to escape without loss of life or irreversible health effects was considered along with severe eye or respiratory irritation and other deleterious effects (e.g., disorientation or incoordination) that could prevent escape. As a safety margin, the Standards Completion Program IDLH values were based on the effects that might occur as a consequence of a 30-minute exposure. However, the 30-minute period was NOT meant to imply that workers should stay in the work environment any longer than necessary, in fact, EVERY EFFORT SHOULD BE MADE TO EXIT IMMEDIATELY!

The current NIOSH definition for an IDLH exposure condition, as stipulated in the *NIOSH Respirator Decision Logic* (DHHS [NIOSH] Publication No. 87-108, NTIS Publication No. PB-91-151183), is a condition "that poses a threat of exposure to airborne contaminants when that exposure is likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment." The purpose of establishing an IDLH exposure concentration is to "ensure that the worker can escape from a given contaminated environment in the event of failure of the respiratory protection equipment." The *NIOSH Respirator Decision Logic* uses these IDLH values as one of several respirator selection criteria. Under the *NIOSH Respirator Decision Logic*, the most protective respirators (e.g., a self-contained breathing apparatus equipped with a full facepiece and operated in a pressure-demand or other positive-pressure mode) would be selected for firefighting, exposure to carcinogens, entry into oxygen-deficient atmospheres, in emergency situations, during entry into an atmosphere that contains a substance at a concentration greater than 2,000 times the NIOSH REL or OSHA PEL, and for entry into IDLH atmospheres.

IDLH values are listed for over 380 substances. The notation "Ca" appears in this column for all substances that NIOSH considers to be potential occupational carcinogens. However, IDLH values that were originally determined in the Standards Completion Program or were recently revised are shown in brackets following the "Ca" designations. "10%LEL" indicates that the IDLH was based on 10% of the lower explosive limit for safety considerations even though the relevant toxicological data indicated that irreversible health effects or impairment of escape existed only at higher concentrations. "N.D." indicates that an IDLH has not as yet been determined.

Physical Description

This entry provides a brief description of the appearance and odor of each substance. Notations are made as to whether a substance can be shipped as a liquefied compressed gas or whether it has major use as a pesticide.

Chemical and Physical Properties

The following abbreviations are used for the chemical and physical properties given for each substance. "NA" indicates that a property is not applicable, and a question mark (?) indicates that it is unknown.

MW Molecular weight

BP Boiling point at 1 atmosphere, °F

Sol Solubility in water at 68 °F (unless a different temperature is noted), % by weight (i.e., g/100 ml)

Fl.P Flash point (i.e., the temperature at which the liquid phase gives off enough vapor to flash when exposed to

- an external ignition source), closed cup (unless annotated "(oc)" for open cup), °F
- IP Ionization potential, eV (electron volts) [Ionization potentials are given as a guideline for the selection of photoionization detector lamps used in some direct-reading instruments.]
- VP Vapor pressure at 68 °F (unless a different temperature is noted), mm Hg; "approx" indicates approximately
- MLT Melting point for solids, °F
- FRZ Freezing point for liquids and gases, °F
- UEL Upper explosive (flammable) limit in air, % by volume (at room temperature unless otherwise noted)
- LEL Lower explosive (flammable) limit in air, % by volume (at room temperature unless otherwise noted)
- MEC Minimum explosive concentration, g/m³ (when available)
- Sp.Gr Specific gravity at 68 °F (unless a different temperature is noted) referenced to water at 39.2 °F (4 °C)
- RGasD Relative density of gases referenced to air = 1 (indicates how many times a gas is heavier than air at the same temperature)

When possible, the flammability/combustibility of a substance was determined and listed after the specific gravity. The following OSHA criteria (29 CFR 1910.106) were used to classify flammable or combustible liquids:

Class IA flammable liquid

Fl.P. below 73 °F and BP below 100 °F.

Class IB flammable liquid

Fl.P. below 73 °F and BP at or above 100 °F.

Class IC flammable liquid

Fl.P. at or above 73 °F and below 100 °F.

Class II combustible liquid

Fl.P. at or above 100 °F and below 140 °F.

Class IIIA combustible liquid

Fl.P. at or above 140 °F and below 200 °F.

Class IIIB combustible liquid Fl.P. at or above 200 °F.

Incompatibilities and Reactivities

This entry lists important hazardous incompatibilities or reactivities of each substance.

Measurement Methods

This entry provides a source (NIOSH or OSHA) and the method number for which a measurement method can be used to determine the exposure. Unless otherwise noted, the NIOSH methods are from the 4th edition of the *NIOSH Manual of Analytical Methods* (DHHS [NIOSH] Publication No. 94-113). If a different edition of the *NIOSH Manual of Analytical Methods* is cited, the appropriate edition and, where applicable, the volume number would be noted [e.g., II-4 (2nd edition, volume 4)]. The OSHA methods are from the OSHA web site, http://www.osha-slc.gov/dts/sltc/methods/. "None available" means that no method is available from the NIOSH or OSHA source.

Personal Protection and Sanitation

This column presents a summary of recommended practices for each toxic substance. These recommendations supplement general work practices (e.g., no eating, drinking, or smoking where chemicals are used). Table 3 explains the codes used. Each category is described as follows:

SKIN: Recommends the need for personal protective clothing.

EYES: Recommends the need for eye protection.

WASH Recommends when workers should wash the spilled chemical from the body in addition to normal

SKIN: washing (e.g., before eating).

REMOVE: Advises workers when to remove clothing that has accidentally become wet or significantly

contaminated.

CHANGE: Recommends whether the routine changing of clothing is needed.

PROVIDE: Recommends the need for eyewash fountains and/or quick drench facilities.

First Aid

This entry lists <u>emergency procedures</u> for eye and skin contact, inhalation, and ingestion of the toxic substance.

Respirator Recommendations

This entry provides a condensed table of allowable respirator use for those substances for which IDLH values have been determined. NIOSH is currently reevaluating the IDLH values, and as new or revised IDLH values are developed, respirator selection recommendations will be incorporated into subsequent editions of the *Pocket Guide*. In the interim no respirator recommendations will be made for substances without IDLH values (these will be noted by "To be added later").

NIOSH has developed a new set of regulations in 42 CFR 84 (also referred to as "Part 84") for testing and certifying nonpowered, air-purifying, particulate-filter respirators. The new Part 84 respirators have passed a more demanding certification test than the old respirators (e.g.; dust; dust and mist; dust, mist, and fume; spray paint; pesticide; etc.) certified under 30 CFR 11 (also referred to as "Part 11"). Under Part 84, NIOSH is allowing manufacturers to continue selling and shipping Part 11 particulate filters as NIOSH-certified until July 10, 1998. It is important to see the *NIOSH Guide to the Selection and Use of Particulate Respirators* (DHHS [NIOSH] Publication No. 96-101) for substitution of Part 84 respirators for Part 11 respirators.

The first line in the entry indicates whether the "NIOSH" or the "OSHA" exposure limit is used on which to base the respirator recommendations. The more protective limit between the NIOSH REL or the OSHA PEL is always used. "NIOSH/OSHA" indicates that the limits are equivalent.

Each subsequent line lists a maximum use concentration (MUC) followed by the classes of respirators, with their assigned protection factors (APFs), that are acceptable for use up to the MUC. Individual respirator classes are separated by diagonal lines (/). More protective respirators may be worn. Emergency or planned entry into unknown concentrations or entry into IDLH conditions are followed by the classes of respirators acceptable for these conditions. "Escape" indicates that the respirators are to be used only for escape purposes. For each MUC or condition this entry lists only those respirators with the required APF and other use restrictions based on the NIOSH Respirator Decision Logic.

In certain cases, the recommended respirators are annotated with the following symbols as additional information:

- * Substance reported to cause eye irritation or damage; may require eye protection
- £ Substance causes eye irritation or damage; eye protection needed
- ^ If not present as a fume
- ¿ Only nonoxidizable sorbents allowed (not charcoal)
- † End of service life indicator (ESLI) required

All respirators selected must be approved by NIOSH and MSHA under the provisions of 30 CFR 11 or by NIOSH under 42 CFR 84. The current listing of NIOSH/MSHA certified respirators can be found in the *NIOSH Certified Equipment List* (DHHS [NIOSH] Publication No. 2001-139). A list of Part 84 respirators can be found on the NIOSH Home Page (http://www.cdc.gov/niosh/) or obtained by calling 1-800-35-NIOSH.

A complete respiratory protection program must be implemented and must fulfill all requirements of 29 CFR 1910.134. A respiratory protection program must include a written standard operating procedure covering regular training, fit-testing, fit-checking, periodic environmental monitoring, maintenance, medical monitoring, inspection, cleaning, storage and periodic program evaluation. Selection of a specific respirator within a given class of

recommended respirators depends on the particular situation; this choice should be made only by a knowledgeable person. *REMEMBER*: Air-purifying respirators will not protect users against oxygen-deficient atmospheres, and they are not to be used in IDLH conditions. The only respirators recommended for fire fighting are self-contained breathing apparatuses that have full facepieces and are operated in a pressure-demand or other positive-pressure modes. Additional information on the selection and use of respirators can be found in the *NIOSH Respirator Decision Logic* and the *NIOSH Guide to Industrial Respiratory Protection* (DHHS [NIOSH] Publication No. 87-116).

Route of Health Hazard

This entry lists the toxicologically important routes of entry for each substance and whether contact with the skin or eyes is potentially hazardous.

Symptoms

This entry lists the potential symptoms of exposure.

Target Organs

This entry lists the organs that are affected by exposure to each substance.

EPA's Environmentally Preferable Purchasing Program Web Site

http://www.epa.gov/oppt/epp

Includes EPA's guidance on EPP, descriptions of federal pilot projects, and tools and resources – including the EPP database, collections of case studies, and electronic copies of the EPP Update.

EPP Update

http://www.epa.gov/oppt/epp/documents/docupdates.htm

EPA's semi-annual newsletter on EPP program activities. Issues of this publication are available online.

EPP Database

http://yosemite1.epa.gov/oppt/eppstand2.nsf

Contains information on more than 600 products and services. It provides links to contract language and specifications created and used by federal and state governments and others to buy environmentally preferable products and services.

EPPNET

http://www.nerc.org/eppnet.html

The Northeast Recycling Council (NERC) established the EPPNET list server to link federal, state, local, and private procurement and environmental officials. Potential participants must first register for approval.

Hospitals for a Healthy Environment (H2E) Environmentally Preferable Purchasing Guide http://www.geocities.com/EPP_how_to_guide

While aimed at hospitals, the principles and steps in this EPP guide are applicable to any type organization. This Web site is a cooperative project of the U.S. EPA and the American Hospital Association.

National Pollution Prevention Roundtable (NPPR) EPP Discussion Group

http://www.p2.org/workgroup/epp

The EPP Discussion Group was formed in 1999 to promote networking and communication among people practicing EPP and people interested in learning about EPP; minimize duplication of effort on EPP issues through increased communication; and serve as a resource to NPPR members interested in EPP.

The Environmentally Preferable Purchasing Guide

http://www.swmcb.org/EPPG/1 1.htm

Published by the Solid Waste Management Coordinating Board, a group consisting of six metropolitan counties in Minnesota, this online EPP guide is aimed at government and school purchasers. The guide reviews more than 30 product areas, providing information on cost, performance, specifications, and availability.

King County, Washington Environmental Purchasing Program

http://www.metrokc.gov/procure/green

King County's Web site provides a history of the county's EPP policies, descriptions of its experience with various environmentally preferable products, bid and contract specifications, and local vendor information.

Massachusetts Environmentally Preferable Products Procurement

http://www.state.ma.us/osd/enviro/enviro.htm

The Commonwealth of Massachusetts is one of the first states in the country to initiate an EPP program. Its Web site includes state EPP policies and regulations, bid and contract specifications, and product information and experience.

Minnesota Materials Management Division Environmentally Responsible Purchasing

http://www.mmd.admin.state.mn.us/envir.htm

Provides new updates on various products available to state agencies, lists environmentally responsible

products and services available, highlights state legislative and executive order requirements, and includes an electronic version of the state's biennial report on EPP.

City of Santa Monica's Purchasing Policy

http://www.ci.santa-monica.ca.us/environment/policy/purchasing

Provides criteria for procuring products and services, negotiating contracts and bid specifications, and complying with city ordinances through environmental preferable purchasing.

Office of the Federal Environmental Executive

http://www.ofee.gov

The Office of the Federal Environmental Executive serves to implement E. O. 13101, which is designed to further expand and strengthen the federal government's commitment to recycling and buying recycled-content and environmentally preferable products. The Web site contains various reports and resources.

U.S. Department of Energy's Federal Energy Management Program (FEMP)

hhttp://www.eere.energy.gov/femp

FEMP seeks to help government agencies reduce energy and water use, manage utility costs, and promote renewable energy. The Web site provides information about the program's mission, technical assistance resources, and documents highlighting program success stories.

Medical Academic and Scientific Community Organization, Inc. (MASCO)

http://www1.netcasters.com/mercury/

MASCO has developed a mercury database for 1,147 different compounds. Users can select one of the compounds listed from the database and then calculate the quantity of mercury in the compound based upon the total amount used.

Cleaner Technologies Substitute Assessment (CTSA)

http://www.epa.gov/opptintr/dfe/tools/ctsa.htm

CTSA is a methodology for evaluating the comparative risk, performance, cost, and resource conservation of alternatives to chemicals currently used by specific industry sectors. It was developed by the EPA Design for the Environment (DfE) Program, the University of Tennessee Center for Clean Products and Clean Technologies, and other partners in voluntary, cooperative, industry-specific pilot projects.

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NIOSH Pocket Guide to Chemical Hazards

INDEX of Chemical Names and Synonyms

GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0017	AA	107-18-6	BA5075000
0007	AAF	53-96-3	AB9450000
0007	2-AAF	53-96-3	AB9450000
0019	AGE	106-92-3	RR0875000
0030	AMS	7773-06-0	WO6125000
0429	AMS	98-83-9	WL5075300
0014	AN	107-13-1	AT5250000
	ANTU	86-88-4	YT9275000
<u>0514</u>	ATCP	<u> 1918-02-1</u>	TJ7525000
<u>0589</u>	Abate®	3383-96-8	TF6890000
0010	Acetal	<u>50-78-2</u>	<u> VO0700000</u>
0001*		<u>75-07-0</u>	AB1925000
0007	2-Acetaminofluorene	53-96-3	AB9450000
0002*	Acetic acid	64-19-7	AF1225000
0002	Acetic acid (agueous)	64-19-7	AF1225000
0003	Acetic acid anhydride	108-24-7	AK1925000
0001	Acetic aldehyde	75-07-0	AB1925000
	Acetic anhydride	108-24-7	AK1925000
0260	Acetic ester	141-78-6	AH5425000
0260	Acetic ether	141-78-6	AH5425000
0003	Acetic oxide	108-24-7	AK1925000
0004*	Acetone	67-64-1	AL3150000
	Acetone cyanohydrin	75-86-5	OD9275000
0006*	Acetonitrile	75-05-8	AL7700000
<u>0665</u> 0010	3-(alpha-Acetonyl)-benzyl-4-hydroxycouma	81-81-2 50-78-2	GN4550000 VO0700000
0010	2-Acetoxybenzoic acid o-Acetoxybenzoic acid	50-78-2	
0656	-	108-05-4	<u>VO0700000</u> AK0875000
0610	1-Acetoxyethylene Acetyl mercaptan	68-11-1	AI5950000
0003	Acetyl mercaptan Acetyl oxide	108-24-7	AK1925000
0424	2-Acetyl propane	563-80-4	EL9100000
	2-Acetylaminofluorene	53-96-3	AB9450000
	Acetylene	74-86-2	A09600000
0102	Acetylene black	1333-86-4	FF5800000
0195	Acetylene dichloride	540-59-0	KV9360000
0195	cis-Acetylene dichloride	540-59-0	KV9360000
0195	trans-Acetylene dichloride	540-59-0	KV9360000
0009*	Acetylene tetrabromide	79-27-6	KI8225000
0598	Acetylene tetrachloride	79-34-5	KI8575000
	Acetylsalicyclic acid	50-78-2	V00700000
0011	Acraldehyde	107-02-8	AS1050000
0013	Acroleic acid	79-10-7	AS4375000
0011*	Acrolein	107-02-8	AS1050000
0011	Acrylaldehyde	107-02-8	AS1050000
0012*	Acrylamide	79-06-1	AS3325000
0012	Acrylamide monomer	79-06-1	AS3325000
0013*	Acrylic acid	79-10-7	AS4375000
0011	Acrylic aldehyde	107-02-8	AS1050000
0012	Acrylic amide	79-06-1	AS3325000
0014*	Acrylonitrile	107-13-1	AT5250000
0014	Acrylonitrile monomer	107-13-1	AT5250000
0041	Actinolite	1332-21-4	CI6475000

O317 Activated carbon 7440-44-0 FF52501	trivated carbon	0041 7	Actinolite asbestos	1332-21-4	CI6475000
0262 Alcohol 64-17-5 KO63000 0916* Aldrin 309-02 1021000 0492 Aliphatic petroleum naphtha 8002-05-9 SE774900 0011* Alivi alcohol 107-18-6 BA50750 0011* Alivi chloride 107-02-8 ASI0500 0018* Alivi chloride 107-05-1 UC73500 0019* Alivi chloride 106-92-3 RR08750 0392 Aliviene 74-99-7 UK2500 0017 Alivic alcohol 107-18-6 BA50750 0019 1-Aliviene 106-92-3 RR08750 0021 Alumina 1344-28-1 BD12000 0021* Alumina 1344-28-1 BD12000 0022* Aluminum (pyro powders and welding fumes 0022* 0022* Aluminum metal 7429-90-5 BD03300 0022* Aluminum metal 1302-74-5 GR02310 0021 Aluminum cycle 1344-28-1 BD12000 0022 Aluminum powder 729-90-5 BD03300 0250 Aluminum cycle 1344-28-1 BD12000 021 Aluminum trioxide 1344-28-1 BD12000 022	cohol 64-17-5 K06300000 iphatic petroleum naphtha 309-00-2 102100000 iphatic petroleum naphtha 8002-05-9 887449000 lyl aldehyde 107-02-8 AS1050000 lyl propyl disulfide 107-05-1 UC735000 lyl propyl disulfide 2179-55-1 J0035000 lyl trichloride 96-18-4 T72255000 lyl trichloride 96-18-4 T72755000 lylene 74-99-7 UK425000 lylea 107-18-6 BA5075000 lylica alcohol 107-18-6 BA5075000 lylica alcohol 107-18-6 BA5075000 lylica alcohol 107-18-6 BA5075000 uminum 1344-28-1 BD1200000 uminum 1344-28-1 BD1200000 uminum (solution alcoholous	<u>0307</u> <i>I</i>	Activated carbon		
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Olicia Aliminum trioxide 1344-28-1 BD120000	Imminum trioxide				
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0027	Amino-1, 2, 4-triazole				
0027 2-Amino-1.3.4-triazole 61-82-5 X2385001 0623 3-Amino-1-methylbenzene 108-44-1 XU28000 0514 4-Amino-3.5.6-trichloro-2-picolinic acid 1918-02-1 TJ752500 0430 4-Amino-6-(1,1-dimethylethyl)-3-(methylt 21087-64-9 XZ299000 0495 4-Aminoaniline 106-50-3 SS80500 0035 para-Aminoanisole 104-94-9 BZ545000 0034 ortho-Aminoanisole 90-04-0 BZ541000 0033 Aminobenzene 62-53-3 BW665000 0025 p-Aminobiphenyl 92-67-1 DU892500 0079 1-Aminobiphenyl 92-67-1 DU892500 0097 Aminocaproic lactam 105-60-2 CM367500 0168 Aminocaproic lactam 108-91-8 GX070000 0672 Aminodimethylbenzene 1300-73-8 ZE857500 0025 p-Aminodiphenyl 92-67-1 DU892500 0025*/4-Aminodiphenyl 92-67-1 DU892500 0256 Deta-Aminoethyla 92-67-1	Amino-1,3,4-triazole				
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	minoxylene 1300-73-8 ZE8575000 mitrole 61-82-5 XZ3850000 mate herbicide 7773-06-0 W06125000 monia 7664-41-7 B00875000 monium amidosulfonate 7773-06-0 W06125000 monium chloride 12125-02-9 BP4550000		Aminotriazole	61-82-5	XZ3850000
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0029 Ammonium chloride 12125-02-9 BP455000	monium ablasida fuma	<u>0029</u> <i>I</i>	Ammonium chloride	12125-02-9	BP4550000
	monium chioride rume 12125-02-9 BP4550000			12125-02-9	BP4550000
0029 Ammonium muriate fume 12125-02-9 BP455000					
0030* Ammonium sulfamate 7773-06-0 W0612500 0041 Amosite (cummingtonite-grunerite) 1332-21-4 CI647500					WU0125000 CT6475000
0031* n-Amyl acetate 628-63-7 AJ192500	Amvl acetate				AJ1925000
	ARREST MANUALISM			626-38-0	AJ2100000
<u> </u>		<u>0031</u>	Amyl acetic ester	628-63-7	AJ1925000
0031 Amyl acetic ester 628-63-7 AJ19250	cc-Amyl acetate 626-38-0 AJ2100000 ayl acetic ester 628-63-7 AJ1925000	0031 2	Amyl acetic ether	628-63-7	AJ1925000
0022* 404 7041 040+0+0					
	ec-Amyl acetate 626-38-0 AJ2100000				
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_0652	Amyl aldehyde	110-62-3	YV3600000
0418	Amyl ethyl ketone	541-85-5	MJ7350000
0487	Amyl hydrosulfide	110-66-7	SA3150000
0487	Amyl mercaptan	110-66-7	SA3150000
0399	Amyl methyl ketone	110-43-0	MJ5075000
0399	n-Amyl methyl ketone	110-43-0	MJ5075000
0487	Amyl sulfhydrate	110-66-7	SA3150000
0028	Anhydrous ammonia	7664-41-7	B00875000
0057	Anhydrous borax	1330-43-4	ED4588000
0095	Anhydrous calcium sulfate	7778-18-9 7778-18-9	WS6920000
0095 0331	Anhydrous gypsum Anhydrous hydrogen bromide	10035-10-6	WS6920000 MW3850000
0331	Anhydrous hydrogen chloride	7647-01-0	MW4025000
0334	Anhydrous hydrogen fluoride	7664-39-3	MW7875000
0095	Anhydrous sulfate of lime	7778-18-9	WS6920000
0033*		62-53-3	BW6650000
0033	Aniline oil	62-53-3	BW6650000
0240	Anilinobenzene	122-39-4	JJ7800000
0500	2-Anilinonaphthalene	135-88-6	OM4550000
0035	4-Anisidine	104-94-9	BZ5450000
	p-Anisidine	104-94-9	BZ5450000
	o-Anisidine	90-04-0	BZ5410000
0034 0165	2-Anisidine	90-04-0 108-93-0	BZ5410000 GV7875000
0166	Anol Anone	108-93-0	GW1050000
0244	Antabuse®	97-77-8	J01225000
0041	Anthophyllite	1332-21-4	CI6475000
0041	Anthophyllite asbestos	1332-21-4	CI6475000
0144	Anthracite coal dust		GF8281000
	Antimony	7440-36-0	CC4025000
<u> 0568</u>	Antimony hydride	7803-52-3	<u> WJ0700000</u>
0036	Antimony metal	7440-36-0	CC4025000
0036	Antimony powder	7440-36-0	CC4025000
<u>0568</u>	Antimony trihydride	7803-52-3	WJ0700000
0531 0028	Aprocarb® Aqua ammonia	114-26-1 7664-41-7	FC3150000 B00875000
0447	Aqua fortis	7697-37-2	OU5775000
0013	Aqueous acrylic acid (technical grade is		AS4375000
0028	Aqueous ammonia	7664-41-7	B00875000
0331	Aqueous hydrogen bromide (i.e.	10035-10-6	MW3850000
0332	Aqueous hydrogen chloride (i.e.	7647-01-0	MW4025000
	7	ECC4 22 2	
0334	Aqueous hydrogen fluoride (i.e.	7664-39-3	MW7875000
0557	Argentum	7440-22-4	VW3500000
0557 0125	Argentum Aroclor® 1242	7440-22-4 53469-21-9	VW3500000 TQ1356000
0557 0125 0126	Argentum Aroclor® 1242 Aroclor® 1254	7440-22-4 53469-21-9 11097-69-1	VW3500000 T01356000 T01360000
0557 0125 0126 0038*	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As)	7440-22-4 53469-21-9 11097-69-1 7440-38-2	VW3500000 TQ1356000 TQ1360000 CG0525000
0557 0125 0126 0038* 0040	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1	VW3500000 T01356000 T01360000 CG0525000 CG6475000
0557 0125 0126 0038* 0040	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride	7440-22-4 53469-21-9 11097-69-1 7440-38-2	VW3500000 TQ1356000 TQ1360000 CG0525000
0557 0125 0126 0038* 0040 0040 0039*	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As)	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1	VW3500000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000
0557 0125 0126 0038* 0040 0040 0039*	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1	VW3500000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000
0557 0125 0126 0038* 0040 0040 0039* 0040 0040	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1	VW3500000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000
0557 0125 0126 0038* 0040 0040 0039* 0040 0040*	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1	VW3500000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000
0557 0125 0126 0038* 0040 0040 0039* 0040 0040* 0047	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1	VW3500000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000
0557 0125 0126 0038* 0040 0040 0039* 0040 0040* 0040* 0041* 0042*	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4	VW3500000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CI6475000 CI9900000
0557 0125 0126 0038* 0040 0040 0039* 0040 0040* 0047 0041* 0042*	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4	VW3500000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CT6600000 CI6475000 C19900000 C19900000
0557 0125 0126 0038* 0040 0040 0040 0040 0040 0040* 0041* 0042* 0042	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 50-78-2	VW3500000 TQ1356000 TQ1356000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG9900000 CI9900000 V00700000
0557 0125 0126 0038* 0040 0040 0040 0040* 0041* 0041* 0042* 0010 0638	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6	VW3500000 TQ1356000 TQ1356000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CI9900000 CI9900000 V00700000 DC3325000
0557 0125 0126 0038* 0040 0040 0039* 0040 0040* 0041* 0042* 0042* 0042 0010 0638 0194	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6 75-34-3	VW3500000 TQ1356000 TQ1356000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CT9900000 C19900000 C19900000 DC3325000 KI0175000
0557 0125 0126 0038* 0040 0049 0039* 0040 0040* 0047 0041* 0042* 0010 0638 0194 0043*	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CR0600000 CI6475000 CI9900000 CI9900000 CJ9900000 V00700000 DC3325000 KI0175000 XY5600000
0557 0125 0126 0038* 0040 0049 0039* 0040 0040* 0047 0041* 0042* 0010 0638 0194 0043* 0587	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CR0600000 CI9900000 CI9900000 CI9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000
0557 0125 0126 0038* 0040 0049 0040* 0040* 0047 0041* 0042* 0010 0638 0194 0043* 0587 0541	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9 110-86-1	VW3500000 T01356000 T01360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CR0600000 CI9900000 CI9900000 CI9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000
0557 0125 0126 0038* 0040 0049 0039* 0040 0040* 0047 0041* 0042* 0010 0638 0194 0043* 0587	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azide	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9	VW3500000 T01356000 T01356000 T01360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CR0600000 CI9900000 CI9900000 CI9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000 VY8050000
0557 0125 0126 0038* 0040 0040 0040* 0040* 0041* 0042* 0010 0638 0194 0043* 0587 0541 0560 0182	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azide Azimethylene Azine	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9 110-86-1 26628-22-8	VW3500000 T01356000 T01360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CR0600000 CI9900000 CI9900000 CI9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000
0557 0125 0126 0038* 0040 0040 0040* 0040* 0041* 0042* 0042 0010 0638 0194 0043* 0587 0541 0560 0182 0541	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azine	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9 110-86-1 26628-22-8 334-88-3 110-86-1 86-50-0	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CT9900000 CT9900000 CT9900000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000 VX8050000 PA7000000 UR8400000 TE1925000
0557 0125 0126 0038* 0040 0040 0040* 0040* 0041* 0042* 0042 0010 0638 0194 0043* 0587 0541 0560 0182 0541 0044*	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azide Azimethylene Azine Azine Azine Azine Azine Azine Azine Azine Azinehylene Azinehylene Azinehylene Azinehylene Azinehylene Azinehylene Azinehylene Azinehylene Azinehylene	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9 110-86-1 26628-22-8 334-88-3 110-86-1 86-50-0 151-56-4	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CT9900000 CT9900000 CT9900000 CT9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000 VX8050000 PA7000000 UR8400000 TE1925000 KX5075000
0557 0125 0126 0038* 0040 0049 0049 0040* 0047 0041* 0042* 0042 0010 0638 0194 0043* 0587 0541 0560 0182 0541 0044* 0274	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azine Azinehylene Azinehylene Azinphos-methyl Azirane Aziridine	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9 110-86-1 26628-22-8 334-88-3 110-86-1 86-50-0 151-56-4 151-56-4	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CT9900000 CT9900000 CT9900000 CT9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000 VX8500000 PA7000000 UR8400000 TE1925000 KX5075000 KX5075000
0557 0125 0126 0038* 0040 0040 0039* 0040 0040* 0047 0041* 0042* 0010 0638 0194 0043* 0587 0541 0560 0182 0541 0044* 0274 0274 0560	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azide Azimethylene Azine Azinphos-methyl Azirane Aziridine Aziridine Azium	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9 110-86-1 26628-22-8 334-88-3 110-86-1 86-50-0 151-56-4 26628-22-8	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CT9900000 CT9900000 CT9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000 VY8050000 TE1925000 KX5075000 KX5075000 VY8050000
0557 0125 0126 0038* 0040 0040 0039* 0040 0040* 0047 0041* 0042* 0010 0638 0194 0043* 0587 0541 0560 0182 0574 0044*	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azide Azimethylene Azine Azinphos-methyl Azirane Aziridine Azium Azomethylene Azium Azomethylene	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9 110-86-1 26628-22-8 334-88-3 110-56-4 151-56-4 26628-22-8 334-88-3	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CT9900000 CT9900000 CT9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000 VY8050000 PA7000000 CX5075000 KX5075000 VY8050000 PA7000000
0557 0125 0126 0038* 0040 0040 0039* 0040 0040* 0047 0041* 0042* 0010 0638 0194 0043* 0587 0541 0560 0182 0541 0044* 0274 0274 0560	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azide Azimethylene Azine Azinphos-methyl Azirane Aziridine Aziridine Azium	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9 110-86-1 26628-22-8 334-88-3 110-86-1 86-50-0 151-56-4 26628-22-8	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CT9900000 CT9900000 CT9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000 VY8050000 TE1925000 KX5075000 KX5075000 VY8050000
0557 0125 0126 0038* 0040 0040 0039* 0040 0040* 0047 0041* 0042* 0010 0638 0194 0043* 0587 0541 0560 0182 0574 0044*	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azide Azimethylene Azine Azinphos-methyl Azirane Aziridine Azium Azomethylene Azium Azomethylene	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9 110-86-1 26628-22-8 334-88-3 110-56-4 151-56-4 26628-22-8 334-88-3	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CT9900000 CT9900000 CT9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000 VY8050000 PA7000000 CX5075000 KX5075000 VY8050000 PA7000000
0557 0125 0126 0038* 0040 0040 0040 0040* 0041* 0042* 0042* 0010 0638 0194 0043* 0541 0560 0182 0541 0044* 0274 0274 0274 0560 0182 0427	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azide Azimethylene Azine Azirade Azirane Azirane Azirane Azirum Azomethylene Azophos®	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 784-42-1 7784-42-1 784-42-1 784-42-1 784-42-1 784-42-1 784-42-1 784-42-1 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9 110-86-1 26628-22-8 334-88-3 110-86-1 86-50-0 151-56-4 151-56-4 26628-22-8 334-88-3 298-00-0 CAS NO	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CI9900000 CI9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000 VY8050000 PA7000000 TE1925000 KX5075000 KX5075000 VX8050000 PA7000000 TG0175000 TG0175000
0557 0125 0126 0038* 0040 0040 0040* 0040* 0041* 0042* 0042* 0042 0010 0638 0194 0043* 0587 0541 0560 0182 0541 0044* 0274 0274 0274 0274 0274 0427 0427	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azide Azimethylene Azine Azirane Aziridine Azirane Aziridine Azium Azomethylene Azophos® CHEMICAL NAME	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 784-48-1 784-48-1 784-48-1 784-48-1 784-48-1 784-48-1 784-48-1 784-48-1 784-48-1 784-48-1 784-48-1 784-48-1 784-48-1 784-48-1 784-48-1 784-48-1 784-48	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CI9900000 CI9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000 VY8050000 PA7000000 TE1925000 KX5075000 VY8050000 PA7000000 TG0175000 RTECS NO
0557 0125 0126 0038* 0040 0040 0040* 0040* 0041* 0042* 0042* 0042 0010 0638 0194 0043* 0587 0541 0560 0182 0274 0274 0274 0274 0274 0560 0182 0427 0427 0427 0438	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azide Azimethylene Azine Azinphos-methyl Azirane Aziridine Azium Azomethylene Azomethylene Azomothylene	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9 110-86-1 26628-22-8 334-88-3 110-86-1 86-50-0 151-56-4 151-56-4 26628-22-8 334-88-3 298-00-0 CAS NO	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CT9900000 CT9900000 CT9900000 CT9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000 VY8050000 PA7000000 TE1925000 KX5075000 VX8050000 PA7000000 TG0175000 TG0175000 TX4200000 TX4200000
0557 0125 0126 0038* 0040 0040 0040* 0040* 0041* 0042* 0042* 0010 0638 0194 0043* 0587 0541 0560 0182 0541 0274 0274 0274 0274 0560 0182 0427 GUIDE	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azide Azimethylene Azine Azirane Aziridine Azirane Aziridine Azirane Aziridine Azophos® CHEMICAL NAME BCME BGE BHC	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9 110-86-1 26628-22-8 334-88-3 110-86-1 86-50-0 151-56-4 151-56-4 26628-22-8 334-88-3 298-00-0 CAS NO 542-88-1 2426-08-6 58-89-9	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CT9900000 CT9900000 CT9900000 CT9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000 PA7000000 UR8400000 TE1925000 KX5075000 KX5075000 KX5075000 VY8050000 PA7000000 TG0175000 RTECS NO KN1575000 TX4200000 GV4900000
0557 0125 0126 0038* 0040 0040 0040* 0040* 0041* 0042* 0042* 0042 0010 0638 0194 0043* 0587 0541 0560 0182 0274 0274 0274 0274 0274 0560 0182 0427 0427 0427 0438	Argentum Aroclor® 1242 Aroclor® 1254 Arsenic (inorganic compounds, as As) Arsenic hydride Arsenic trihydride Arsenic, organic compounds (as As) Arseniuretted hydrogen Arsenous hydride Arsine Artificial barite Asbestos Asphalt fumes Asphalt: Asphaltum Aspirin Assymetrical trimethylbenzene Asymmetrical dichloroethane Atrazine Aurum paradoxum Azabenzene Azide Azimethylene Azine Azinphos-methyl Azirane Aziridine Azium Azomethylene Azomethylene Azomothylene	7440-22-4 53469-21-9 11097-69-1 7440-38-2 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7784-42-1 7727-43-7 1332-21-4 8052-42-4 8052-42-4 50-78-2 95-63-6 75-34-3 1912-24-9 13494-80-9 110-86-1 26628-22-8 334-88-3 110-86-1 86-50-0 151-56-4 151-56-4 26628-22-8 334-88-3 298-00-0 CAS NO	VW3500000 TQ1356000 TQ1356000 TQ1360000 CG0525000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CG6475000 CT9900000 CT9900000 CT9900000 CT9900000 V00700000 DC3325000 KI0175000 XY5600000 WY2625000 UR8400000 VY8050000 PA7000000 TE1925000 KX5075000 VX8050000 PA7000000 TG0175000 TG0175000 TX4200000 TX4200000

0415	para	101-77-9	BY5425000
0572	Bacillus subtilis	1395-21-7	CO9450000
0572	Bacillus subtilis BPN	1395-21-7	CO9450000
0572	Bacillus subtilis Carlsburg	1395-21-7	CO9450000
0347	Banana oil	123-92-2	NS9800000
0047	Barite	7727-43-7	CR0600000
0045*	Barium chloride (as Ba)	10361-37-2	CO8750000
0045	Barium dichloride	10361-37-2	CO8750000
0046	Barium dinitrate	10022-31-8	CO9625000
0046*	Barium nitrate (as Ba)	10022-31-8	CO9625000
0046	Barium salt of nitric acid	10022-31-8	CO9625000
0047	Barium salt of sulfuric acid	7727-43-7	CR0600000
	Barium sulfate	7727-43-7	CR0600000
0046	Barium(II) nitrate (1:2)	10022-31-8	CQ9625000
0047	Barytes (natural)	7727-43-7	CR0600000
0181	Basudin®	333-41-5	TF3325000
0577	Battery acid	7664-93-9	WS5600000
0285	Baytex	55-38-9	TF9625000
0574	Beet sugar	57-50-1	WN6500000
	Benomyl	<u>17804-35-2</u>	DD6475000
0033	Benzenamine	62-53-3	BW6650000
0121	Benzene chloride	71-43-2 108-90-7	CY1400000 CZ0175000
<u>0163</u> 0167	Benzene hexahydride Benzene tetrahydride	110-82-7 110-83-8	GU6300000 GW2500000
0495	1.4-Benzenediamine	106-50-3	SS8050000
0513	1,3-Benzenedicarbonitrile	626-17-5	CZ1900000
0513	1.2-Benzenedicarbonitrile 1.2-Benzenedicarboxvlic anhvdride	85-44-9	TI3150000
0671	1,3-Benzenedicarboxylic annydride 1,3-Benzenedimethanamine	1477-55-0	PF8970000
0543	m-Benzenediol	108-46-3	VG9625000
0109	o-Benzenediol	120-80-9	UX1050000
0338	p-Benzenediol	123-31-9	MX3500000
0543	1,3-Benzenediol	108-46-3	VG9625000
0109	1,2-Benzenediol	120-80-9	UX1050000
0338	1,4-Benzenediol	123-31-9	MX3500000
0050*		108-98-5	DC0525000
0635	1,2,4-Benzenetricarboxylic anhydride	552-30-7	DC2050000
0051*		92-87-5	DC9625000
0051	Benzidine-based dyes	92-87-5	DC9625000
0251	Benzoepin	115-29-7	RB9275000
0049	Benzol	71-43-2	CY1400000
0052	Benzoperoxide	94-36-0	DM8575000
0542	p-Benzoquinone	106-51-4	DK2625000
0542	1,4-Benzoguinone	106-51-4	DK2625000
	Benzoyl peroxide	94-36-0	DM8575000
	Benzyl chloride	100-44-7 7440-41-7	XS8925000 DS1750000
0054	Beryllium & beryllium compounds (as Be) 4.4'-Bianiline	92-87-5	DC9625000
0204	Bicyclopentadiene	77-73-6	PC1050000
0203	Bidrin®	141-66-2	TC3850000
0067	Biethylene	106-99-0	EI9275000
0431	Biotite	12001-26-2	VV8760000
0239	Biphenyl	92-52-4	DU8050000
0051	1.1'-Biphenvl-4.4'-diamine	92-87-5	DC9625000
0051	4,4'-Biphenyldiamine	92-87-5	DC9625000
0056	Bismuth sesquitelluride	1304-82-1	EB3110000
0056	Bismuth telluride	1304-82-1	EB3110000
0055*			
0056*		1304-82-1	EB3110000
0056	Bismuth tritelluride	1304-82-1	EB3110000
0042	Bitumen (European term)	8052-42-4	CI9900000
0144	Bituminous coal dust	100 00 -	GF8281000
0067	Bivinyl	106-99-0	EI9275000
0151	Black copper oxide fume	1317-38-0	GL7900000
0306	Black lead	7782-42-5	MD9659600
0586	Bladafum®	3689-24-5 35400-43-2	XN4375000
0582	Bolstar® Poratog totra godium galtg (Anhydroug)	35400-43-2 1330-43-4	TE4165000
0057*	Borates, tetra, sodium salts (Anhydrous) Borates, tetra, sodium salts (Decahydrat	1303-96-4	ED4588000 VZ2275000
	Borates, tetra, sodium salts (Pentahydra	12179-04-3	V 44 44 1 3 0 0 0 0
0058	Borax Sociali Saits (Pentanyara	1303-96-4	VZ2275000
0058	Borax decahydrate	1303-96-4	VZ2275000
0057	Borax dehydrated	1330-43-4	ED4588000
0057	Borax pentahydrate	12179-04-3	
0060	Boric anhydride	1303-86-2	ED7900000
0060	Boric oxide	1303-86-2	ED7900000
0183	Boroethane	19287-45-7	Н09275000
0061	Boron bromide	10294-33-4	ED7400000
0062	Boron fluoride	7637-07-2	ED2275000
0183	Boron hydride	19287-45-7	Н09275000
0060*	Boron oxide	1303-86-2	ED7900000

0061*	Boron tribromide	10294-33-4	ED7400000
0062*	Boron trifluoride	7637-07-2	ED2275000
0060	Boron trioxide	1303-86-2	ED7900000
0372	Bottled gas	68476-85-7	SE7545000
0524	Bottled gas	74-98-6	TX2275000
0063*	Bromacil	314-40-9	YQ9100000
0064*	Bromine	7726-95-6	EF9100000
0065	Bromine fluoride	7789-30-2	EF9350000
0065*	Bromine pentafluoride	7789-30-2	EF9350000
0310	1-Bromo-1-chloro-2,2,2-trifluoroethane	151-67-7	KH6550000
0310	2-Bromo-2-chloro-1,1,1-trifluoroethane	151-67-7	KH6550000
0063	5-Bromo-3-sec-butyl-6-methyluracil	314-40-9	<u>Y09100000</u>
0063	5-Bromo-6-methyl-3-(1-methylpropyl)uraci	314-40-9	<u>Y09100000</u>
0123 0265	<u>Bromochloromethane</u>	74-97-5 74-96-4	PA5250000 KH6475000
0657	Bromoethane Bromoethene	593-60-2	KU8400000
0657	Bromoethylene	593-60-2	KU8400000
0066*	Bromoform	75-25-2	PB5600000
0400	Bromomethane	74-83-9	PA4900000
0634	Bromotrifluoromethane	75-63-8	PA5425000
0093	Burned lime	1305-78-8	EW3100000
0093	Burnt lime	1305-78-8	EW3100000
0067	Butadiene	106-99-0	EI9275000
0067*	1,3-Butadiene	106-99-0	EI9275000
_0068*	n-Butane	106-97-8	EJ4200000
0068	normal-Butane	106-97-8	EJ4200000
0573	Butanedinitrile	110-61-2	WN3850000
0086	Butanenitrile	109-74-0	ET8750000
0083	Butanethiol	109-79-5	EK6300000
0083	1-Butanethiol	109-79-5	EK6300000
0083	n-Butanethiol	109-79-5	EK6300000 EO1400000
<u>0076</u> 0076	1-Butanol n-Butanol	71-36-3 71-36-3	E01400000 E01400000
0077	2-Butanol	78-92-2	EO1750000
0069*	2-Butanone	78-93-3	EL6475000
0416	2-Butanone peroxide	1338-23-4	EL9450000
0157	2-Butenal	4170-30-3	GP9499000
0376	cis-Butenedioic anhydride	108-31-6	ON3675000
0070*	2-Butoxyethanol	111-76-2	KJ8575000
0071*	2-Butoxyethanol acetate	112-07-2	KJ8925000
0071	2-Butoxyethyl acetate	112-07-2	KJ8925000
0220	Butter yellow	60-11-7	BX7350000
0075	Butyl 2-propenoate	141-32-2	UD3150000
0070	Butyl Cellosolve®	111-76-2	KJ8575000
0071	Butyl Cellosolve® acetate	112-07-2	KJ8925000
0072	Butyl acetate	123-86-4	AF7350000
0072*	n-Butyl acetate	123-86-4	AF7350000
0073* 0074*	sec-Butyl acetate tert-Butyl acetate	105-46-4 540-88-5	AF7380000 AF7400000
0.005		1.41 0.0 0	01 5 0 0 0 0
0075	n-Butyl acrylate n-Butyl acrylate	141-32-2 141-32-2	UD3150000 UD3150000
0075	Butyl alcohol	71-36-3	EO1400000
0076*		71-36-3	E01400000
0077*	sec-Butyl alcohol	78-92-2	E01750000
0078*	tert-Butyl alcohol	75-65-0	EO1925000
0080*		1189-85-1	GB2900000
0082	Butyl ester of 2-hydroxypropanoic acid	138-22-7	OD4025000
0072	n-Butyl ester of acetic acid	123-86-4	AF7350000
0073	sec-Butyl ester of acetic acid	105-46-4	AF7380000
0074	tert-Butyl ester of acetic acid	540-88-5	AF7400000
0075	Butyl ester of acrylic acid	141-32-2	UD3150000
0080	di-tert-Butyl ester of chromic acid	1189-85-1	GB2900000
0082	Butyl ester of lactic acid	138-22-7	OD4025000
0072	Butyl ethanoate	123-86-4	AF7350000
<u>0266</u> 0081*	Butyl ethyl ketone n-Butyl glycidyl ether	106-35-4 2426-08-6	MJ5250000 TX4200000
0071	Butyl glycol acetate	112-07-2	KJ8925000
0068	Butyl hydride	106-97-8	EJ4200000
0082	Butyl lactate	138-22-7	OD4025000
0082*	n-Butyl lactate	138-22-7	OD4025000
0083*	n-Butyl mercaptan	109-79-5	EK6300000
0325	Butyl methyl ketone	591-78-6	MP1400000
0070	Butyl oxitol	111-76-2	KJ8575000
0625	Butyl phosphate	126-73-8	TC7700000
0516	tert-Butyl valone	83-26-1	NK6300000
0158	4-t-Butyl-2-chlorophenylmethyl methylpho	299-86-5	TB3850000
0079	Butylamine	109-73-9	EO2975000
0079*	n-Butylamine	109-73-9	E02975000
0246	Butylated hydroxytoluene	128-37-0	G07875000
0077	Butylene hydrate	78-92-2	E01750000
0084*	o-sec-Butylphenol	89-72-5	SJ8920000

0084 2-sec-Butylphenol	89-72-5	SJ8920000
0085 4-tert-Butyltoluene	98-51-1	XS8400000
0085* p-tert-Butyltoluene	98-51-1	XS8400000
0242 Butyrone	123-19-3	MJ5600000
0086 Butyronitrile	109-74-0	ET8750000
0086* n-Butyronitrile	109-74-0	ET8750000

123 CB	_0086^	n-Butyronitrile	109-74-0	ET8/50000
1032 CBM	GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
1032 CBM				
1032 CBM	0123	CB	74-07-5	DX5250000
1049 CI - 2				
0128 bis - CMF			76-13-1	
0122 CS 2698-41 003675000 0087* Cadmium fume (as Cd)				
0087	0128			
0088				
0088* Cadmium fume (as Cd) 1306-19-0 EV1930000 0089* Calcium arsenate (as As) 7778-44-1 CG0830000 0090* Calcium carbinide 156-62-7 GS600000 0090* Calcium carbonate 1317-65-3 EV9580000 0369 Calcium carbonate 1317-65-3 EV9580000 0381* Calcium carbonate 1317-65-3 EV9580000 0091* Calcium carbonate 1317-65-3 EV9580000 0092 Calcium hydrosilicate 1305-62-0 EW2800000 0094 Calcium hydroxide 1305-62-0 EW2800000 0094 Calcium mydroxide 1305-62-0 EW2800000 0094 Calcium monosilicate 1344-95-2 VV9150000 0094 Calcium salt (2:3) of arsenic acid 7778-44-1 CG0830000 0095 Calcium salt of carbonic acid 1317-65-3 EV9580000 0099 Calcium salt of sulfric acid 778-44-1 CG0830000 0099 Calcium salt of carbonic acid 1317-65-3 EV958000 0099 Calcium salt of sulfric acid 778-44-1 CG0830000 0090 Calcium salt of sulfric acid 778-44-1 CG0830000 0091 Capium				
0088 Cadmium monoxide 1306-19-0 EVIJ930000 00891 Calcium carbimide 156-62-7 G85000000 0090 Calcium carbonate 1317-65-3 EV958000 0382 Calcium carbonate 1317-65-3 EV9580000 0382 Calcium carbonate 1317-65-3 EV9580000 0091* Calcium branche 136-62-7 G86000000 0092 Calcium hvdrate 1305-62-0 EW2800000 0094 Calcium hvdroxide 1305-62-0 EW2800000 0094 Calcium metasilicate 1344-95-2 VV9150000 0094 Calcium mosilicate 1344-95-2 VV9150000 0094 Calcium salt (2:3) of arsenic acid 1347-95-2 VV9150000 0093 Calcium salt (2:3) of arsenic acid 1347-95-2 VV9150000 0094 Calcium salt of silicic acid 1347-95-3 EV9580000 0095 Calcium sili (2:3) of arsenic acid 1347-95-2 VV9150000 0096 Calcium sili of silicic acid 1347-95-3 EV9580000 0097 Calcium sili of silicic acid 1347-95-3 EV9580000 0098 Calcium sili of silicic acid 174-22-2 EV15000 0095 Calciu				
O0901 Calcium carbinide			1306-19-0	
0090				
0.382 Calcium carbonate 1317-65-3 EV9580000				
0382 Calcium carbonate				
0091* Calcium hydrate 1356-52-0 G8200000 0094 Calcium hydrosilicate 1344-95-2 VV9150000 0094* Calcium hydroxide 1365-52-0 EW2800000 0094 Calcium metasilicate 1344-95-2 VV9150000 0094 Calcium monosilicate 1344-95-2 VV9150000 0093* Calcium salt (2:3) of arsenic acid 1778-44-1 C60830000 0090 Calcium salt of carbonic acid 1317-65-3 EW3100000 0091 Calcium salt of silicic acid 1344-95-2 VV9150000 0094 Calcium salt of sulfuric acid 1344-95-2 VV9150000 0095 Calcium salt of sulfuric acid 1778-18-9 M56920000 0094 Calcium salt of sulfuric acid 1778-18-9 M56920000 0094 Calcium sulfate 1778-18-9 W56920000 0095 Calcium sulfate 1778-18-9 W56920000 0514 Calcium sulfate				
0.094 Calcium hydrosilicate				
0.094 Calcium hydroxide				
O094 Calcium metasilicate				
0094 Calcium monosilicate				
0093* Calcium salt (2:3) of arsenic acid 7778-44-1 CG0830000 0090 Calcium salt of carbonic acid 1317-65-3 EV9580000 0094 Calcium salt of silicic acid 1347-95-2 VV9150000 0095 Calcium salt of sulfuric acid 7778-18-9 WS6920000 0094* Calcium silicate 1344-95-2 VV9150000 0095* Calcium sulfate 7778-18-9 WS6920000 0518 Calcium sulfate hemihydrate 26499-65-0 TD0700000 0308 Calcium (II) sulfate dihydrate 13397-24-5 MC2360000 0308 Calcium (II) sulfate dihydrate 13397-24-5 MC2360000 0096 2-Camphonone 76-22-2 EX1225000 0097 2-Camphonor 76-22-2 EX1225000 0098 2-Camphor (synthetic) 76-22-2 EX1225000 0097 2-Caprolactam 105-60-2 CM3675000 0098 2-Carbano 105-60-2 CM3675000 0099 2-Captan 105-60-2 CM3675000 0099 3-Captane 133-06-2 GW5075000 0099 3-Captane 133-06-2 GW5075000 0098 3-Captane 133-06-2 GW507500				
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0105 Carbon oxide 630-08-0 FG3500000 0504 Carbon oxychloride 75-44-5 SY5600000 0108 Carbon oxyfluoride 353-50-4 FG6125000 0555 Carbon silicide 409-21-2 VW0450000 0107 Carbon tet 56-23-5 FG4900000 0106* Carbon tetrabromide 558-13-4 FG4725000 0107* Carbon tetrachloride 56-23-5 FG4900000 0373 Carbonate magnesium 546-93-0 OM2470000 0103 Carbonic acid gas 124-38-9 FF6400000				
0504 Carbon oxychloride 75-44-5 SY5600000 0108 Carbon oxyfluoride 353-50-4 FG6125000 0555 Carbon silicide 409-21-2 VW0450000 0107 Carbon tet 56-23-5 FG4900000 0106* Carbon tetrabromide 558-13-4 FG4725000 0107* Carbon tetrachloride 56-23-5 FG4900000 0373 Carbonate magnesium 546-93-0 OM2470000 0103 Carbonic acid gas 124-38-9 FF6400000				
0108 Carbon oxyfluoride 353-50-4 FG6125000 0555 Carbon silicide 409-21-2 VW0450000 0107 Carbon tet 56-23-5 FG4900000 0106* Carbon tetrabromide 558-13-4 FG4725000 0107* Carbon tetrachloride 56-23-5 FG4900000 0373 Carbonate magnesium 546-93-0 OM2470000 0103 Carbonic acid gas 124-38-9 FF6400000				
0555 Carbon silicide 409-21-2 VW0450000 0107 Carbon tet 56-23-5 FG4900000 0106* Carbon tetrabromide 558-13-4 FG4725000 0107* Carbon tetrachloride 56-23-5 FG4900000 0373 Carbonate magnesium 546-93-0 OM2470000 0103 Carbonic acid gas 124-38-9 FF6400000				
0107 Carbon tet 56-23-5 FG4900000 0106* Carbon tetrabromide 558-13-4 FG4725000 0107* Carbon tetrachloride 56-23-5 FG4900000 0373 Carbonate magnesium 546-93-0 OM2470000 0103 Carbonic acid gas 124-38-9 FF6400000				
0106* Carbon tetrabromide 558-13-4 FG4725000 0107* Carbon tetrachloride 56-23-5 FG4900000 0373 Carbonate magnesium 546-93-0 OM2470000 0103 Carbonic acid gas 124-38-9 FF6400000		Carbon tet	56-23-5	FG4900000
0373 Carbonate magnesium 546-93-0 OM2470000 0103 Carbonic acid gas 124-38-9 FF6400000			558-13-4	FG4725000
0103 Carbonic acid gas 124-38-9 FF6400000				
			546-93-0 124 20 0	
	<u> </u>	Carbony 1 Childrad	, 5 17 5	51500000

0504	Combonyl dighlomide	7E 44 E	CVECOOOO
0504 0108	Carbonyl dichloride Carbonyl difluoride	75-44-5 353-50-4	SY5600000 FG6125000
		353-50-4	FG6125000 FG6125000
	Carbonyl fluoride		
0147	di-mu-Carbonylhexacarbonyldicobalt	10210-68-1 409-21-2	GG0300000
0555	Carborundum®		VW0450000
0529	Carboxyethane	79-09-4	UE5950000
0635	4-Carboxyphthalic anhydride	552-30-7	DC2050000
0109*		120-80-9	UX1050000
0092	Caustic lime	1305-62-0	EW2800000
0523	Caustic potash	1310-58-3	TT2100000
0565	Caustic soda	1310-73-2	WB4900000
0258	Cellosolve®	110-80-5	KK8050000
0259	Cellosolve® acetate	111-15-9	KK8225000
0110*		9004-34-6	FJ5691460
0309	Celtium	7440-58-6	MG4600000
0521	Cement	65997-15-1	VV8770000
0647	Cemented WC	11107-01-0	Y07350000
0647	Cemented tungsten carbide	11107-01-0	Y07350000
0111	Cesium hydrate	21351-79-1	FK9800000
	Cesium hydroxide	21351-79-1	FK9800000
0111	Cesium hydroxide dimer	21351-79-1	FK9800000
0318	Cetvl mercaptan	2917-26-2	FR900000
		1333-86-4	PPE O O O O O
0102	Channel black	1333-86-4	FF5800000
0364	China clay		GF1670500
0162	Chlordan	506-77-4	GT2275000
0112	Chlordan	57-74-9	PB9800000
0112*		57-74-9	PB9800000
0112	Chlordano	57-74-9	PB9800000
0365	Chlordecone	143-50-0	PC8575000
0113*		8001-35-2	XW5250000
0114*			
0115*		7782-50-5	FO2100000
0162	Chlorine cyanide	506-77-4	GT2275000
0116*		10049-04-4	F03000000
0117	Chlorine fluoride	7790-91-2	FO2800000
0490	Chlorine fluoride oxide	7616-94-6	SD1925000
0116	Chlorine oxide	10049-04-4	FO3000000
0490	Chlorine oxyfluoride	7616-94-6	SD1925000
0116	Chlorine peroxide	10049-04-4	F03000000
0117*	Chlorine trifluoride	7790-91-2	FO2800000
0253	2-Chloro-1,1,2-trifluoroethyl difluorome	13838-16-9	KN6800000
0133	2-Chloro-1,3-butadiene	126-99-8	EI9625000
0253		13838-16-9	KN6800000
0135	2-Chloro-1-methylbenzene	95-49-8	XS9000000
	1-Chloro-1-nitropropane	600-25-9	TX5075000
0184	1-Chloro-2,3-dibromopropane	96-12-8	TX8750000
0254	1-Chloro-2,3-epoxypropane	106-89-8	TX4900000
0134	1-Chloro-2-ethenylbenzene	2039-87-4	WL4160000
0135	1-Chloro-2-methylbenzene	95-49-8	XS9000000
0018	1-Chloro-2-propene 2-Chloro-4-ethylamino-6-isopropylamino-s	107-05-1	<u>UC7350000</u>
0043		100-00-5	XY5600000
0452	1-Chloro-4-nitrobenzene		CZ1050000
0136	2-Chloro-6-(trichloro-methyl)pyridine	1929-82-4	US7525000
	2-Chloro-6-trichloromethyl pyridine	1929-82-4	<u>US7525000</u>
0043	6-Chloro-N-ethyl-N'- (1-methylethyl)-1,3	1912-24-9	XY5600000
0118*		107-20-0	AB2450000
0118	2-Chloroacetaldehyde	107-20-0	AB2450000
0118	Chloroacetaldehyde (40% aqueous solution	107-20-0	AB2450000
0120	Chloroacetic acid chloride	79-04-9	A06475000
0120	Chloroacetic chloride	79-04-9	A06475000
0119	2-Chloroacetophenone	532-27-4	AM6300000
0119*	alpha-Chloroacetophenone	532-27-4	AM6300000
0120*	Chloroacetyl chloride	79-04-9	A06475000
0199	3-Chloroallyl chloride	542-75-6	UC8310000
0122	2-Chlorobenzalmalonitrile	2698-41-1	003675000
0121*	Chlorobenzene	108-90-7	CZ0175000
0121	Chlorobenzol	108-90-7	CZ0175000
0122*		2698-41-1	003675000
0123*		74-97-5	PA5250000
0133	Chlorobutadiene	126-99-8	EI9625000
0113	Chlorocamphene	8001-35-2	XW5250000
0142	Chlorochromic anhydride	14977-61-8	GB5775000
0162	Chlorocyanide Chlorocyanide	506-77-4	GT2275000
0162	Chlorocyanogen	506-77-4	GT2275000
0102		75-45-6	PA6390000
		107-30-2	KN6650000
0129	Chlorodimethyl ether		
0125*		53469-21-9	TO1356000
0126*		11097-69-1	TO1360000
0118	2-Chloroethanal	107-20-0	AB2450000
0267	Chloroethane	75-00-3	KH7525000
0268	2-Chloroethanol	107-07-3	KK0875000

0658	Chloroethene	75-01-4	KU9625000
0268	2-Chloroethyl alcohol	107-07-3	KK0875000
0196	bis(2-Chloroethyl)ether	111-44-4	KN0875000
0658	Chloroethylene	75-01-4	KU9625000
0632	Chlorofluorocarbon-113	76-13-1	KJ400000
0127*	Chloroform	67-66-3	FS9100000
0224	Chloroformic acid dimethylamide	79-44-7	FD4200000
0504	Chloroformyl chloride	75-44-5	SY5600000
0403	Chloromethane	74-87-3	PA6300000
0129	Chloromethoxymethane	107-30-2	KN6650000
0128	Chloromethyl ether	542-88-1	KN1575000
0128*	bis-Chloromethyl ether	542-88-1	KN1575000
0129*	Chloromethyl methyl ether	107-30-2	KN6650000
0119	Chloromethyl phenyl ketone	532-27-4	AM6300000
0053	Chloromethylbenzene	100-44-7	XS8925000
0452	4-Chloronitrobenzene	100-00-5	CZ1050000
0452	p-Chloronitrobenzene	100-00-5	CZ1050000
0131*	Chloropentafluoroethane	76-15-3	KH7877500
0132*	Chloropicrin	76-06-2	PB6300000
0133	Chloroprene	126-99-8	EI9625000
_0133*		126-99-8	EI9625000
_0018	3-Chloropropene	107-05-1	<u>UC7350000</u>
0018	3-Chloropropylene	107-05-1	<u>UC7350000</u>
0254	2-Chloropropylene oxide	106-89-8	TX4900000
0254	gamma-Chloropropylene oxide	106-89-8	TX4900000
0134*	<u>o-Chlorostyrene</u>	2039-87-4	WL4160000
0134	2-Chlorostyrene	2039-87-4	WL4160000
0134	ortho-Chlorostyrene	2039-87-4	WL4160000
0404	Chlorothene	71-55-6	KJ2975000
0135*	o-Chlorotoluene	95-49-8	XS9000000
0135	2-Chlorotoluene	95-49-8	XS900000
0053	alpha-Chlorotoluene	100-44-7	XS8925000
0117	Chlorotrifluoride	7790-91-2	F02800000
0137*	Chlorpyrifos	2921-88-2	TF6300000
0137	Chlorpyrifos-ethyl	<u>2921-88-2</u>	TF6300000
0141	Chrome	7440-47-3	GB4200000
0138	Chromic acid (Cro3): Chromic anhydride	1333-82-0	GB6650000
0138*	Chromic acid and chromates	1333-82-0	GB6650000
0138	Chromic oxide	1333-82-0	GB6650000
$\frac{0142}{0141}$	Chromic oxychloride	14977-61-8 7440-47-3	GB5775000 GB4200000
$\frac{0141}{0142}$	Chromium Chromium chloride oxide	14977-61-8	GB4200000 GB5775000
$\frac{0142}{0142}$	Chromium dichloride dioxide	14977-61-8	GB5775000 GB5775000
$\frac{0142}{0142}$	Chromium dioxide dioxide Chromium dioxide dichloride	14977-61-8	GB5775000 GB5775000
0142	Chromium dioxychloride	14977-61-8	GB5775000 GB5775000
0141*		7440-47-3	GB4200000
0142	Chromium oxychloride	14977-61-8	GB5775000
0139*		11377 01 0	<u>CD3113000</u>
0140*			
0138	Chromium(VI) oxide (1:3)	1333-82-0	GB6650000
0142*		14977-61-8	GB5775000
0041	Chrysotile	1332-21-4	CI6475000
0540	Cinerin I or II	8003-34-7	UR4200000
0364	Clay	1332-58-7	GF1670500
0143*	Clopidol	2971-90-6	UU7711500
0144*	Coal dust		GF8281000
0145*		65996-93-2	GF8655000
0147*	Cobalt carbonyl (as Co)	10210-68-1	GG0300000
0148*	Cobalt hydrocarbonyl (as Co)	16842-03-8	GG0900000
0146	Cobalt metal dust	7440-48-4	GF8750000
0146*		7440-48-4	GF8750000
0146	Cobalt metal fume	7440-48-4	GF8750000
0147	Cobalt octacarbonyl	10210-68-1	GG030000
0147	Cobalt tetracarbonyl dimer	10210-68-1	GG030000
0149*		C4 18 5	GH0346000
0262	Cologne spirit	64-17-5	K06300000
0397	Columbian spirits	67-56-1	PC1400000
0409	Combustion Improver-2	12108-13-3	OP1450000
0372	Compressed petroleum gas	68476-85-7	SE7545000
0574	Confectioner's sugar	<u>57-50-1</u>	WN6500000
0150*		7440-50-8	GL5325000
0151*		1317-38-0	GL7900000
0150 0150	Copper metal dusts	7440-50-8 7440-50-8	GL5325000
0150	Copper metal fumes	1317-38-0	GL5325000 GL7900000
0151	Copper monoxide fume Copper(II) oxide fume	1317-38-0	GL7900000 GL7900000
0567	Corn starch	9005-25-8	GM5090000
0250	Corundum	1302-74-5	GN0231000
0152*		1304-14-3	GN2275000
0143	Covden®	2971-90-6	UU7711500
<u> </u>		<u> </u>	00111100
0153*		136-78-7	KK4900000

0153	Crag® herbicide No. 1	136-78-7	KK4900000
	p-Cresol	106-44-5	G06475000
0156	4-Cresol	106-44-5	G06475000
0155	3-Cresol	108-39-4	G06125000
	m-Cresol	108-39-4	G06125000 G06300000
0154	2-Cresol o-Cresol	95-48-7 95-48-7	
			G06300000
0156	para-Cresol	106-44-5	G06475000
0155	meta-Cresol	108-39-4 95-48-7	G06125000
0154 0156	ortho-Cresol	106-44-5	G06300000
0155	p-Cresylic acid	108-39-4	G06475000
0154	m-Cresylic acid o-Cresylic acid	95-48-7	G06125000 G06300000
0553	Cristobalite	14808-60-7	VV7330000
0041	Crocidolite (Riebeckite)	1332-21-4	CI6475000
	Crotonaldehyde	4170-30-3	GP9499000
0438	Crude solvent coal tar naphtha	8030-30-6	DE3030000
	Crufomate	299-86-5	TB3850000
0559	Cryocide	15096-52-3	WA9625000
0559	Cryodust	15096-52-3	WA9625000
0559	Cryolite	15096-52-3	WA9625000
0089	Cucumber dust	7778-44-1	CG0830000
	Cumene	98-82-8	GR8575000
0638	psi-Cumene	95-63-6	DC3325000
0159	Cumol	98-82-8	GR8575000
0091	Cyanamide	156-62-7	GS6000000
	Cyanamide	420-04-2	GS5950000
	2-Cyano-1-propene	126-98-7	UD1400000
0005	2-Cyano-2-propanol	75-86-5	OD9275000
0378	Cyanoacetonitrile	109-77-3	003150000
0530	Cyanoethane	107-12-0	UF9625000
0014	Cyanoethylene	107-13-1	AT5250000
0161*	Cyanogen	460-19-5	GT1925000
	Cyanogen chloride	506-77-4	GT2275000
0160	Cyanogen nitride	420-04-2	GS5950000
0005	Cyanohydrin-2-propanone	75-86-5	OD9275000
0006	Cyanomethane	75-05-8	AL7700000
0304	Cyanomethanol	107-16-4	AM0350000
0086	1-Cyanopropane	109-74-0	ET8750000
0395	2-Cyanopropene-1	126-98-7	UD1400000
0542	1,4-Cyclohexadiene dioxide	106-51-4	DK2625000
0163*	Cyclohexane	110-82-7	GU6300000
0164*	Cyclohexanethiol	1569-69-3	GV7525000
0164* 0165*	Cyclohexanethiol Cyclohexanol	1569-69-3 108-93-0	GV7525000 GV7875000
0164* 0165* 0166*	Cyclohexanethiol Cyclohexanol Cyclohexanone	1569-69-3 108-93-0 108-94-1	GV7525000 GV7875000 GW1050000
0164* 0165* 0166* 0167*	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene	1569-69-3 108-93-0 108-94-1 110-83-8	GV7525000 GV7875000 GW1050000 GW2500000
0164* 0165* 0166* 0167* 0165	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0	GV7525000 GV7875000 GW1050000 GW2500000 GV7875000
0164* 0165* 0166* 0167* 0165 0166	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1	GV7525000 GV7875000 GW1050000 GW2500000 GV7875000 GW1050000
0164* 0165* 0166* 0167* 0165 0166 0168*	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8	GV7525000 GV7875000 GW1050000 GW2500000 GV7875000 GW1050000 GX0700000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3	GV7525000 GV7875000 GW1050000 GW2500000 GV7875000 GW1050000 GX0700000 GV7525000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2	GV7525000 GV7875000 GW1050000 GW2500000 GV7875000 GW1050000 GX0700000 GV7525000 GV6125000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3	GV7525000 GV7875000 GW1050000 GW2500000 GV7875000 GW1050000 GX0700000 GV7525000 GV6125000 GV7525000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169*	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4	GV7525000 GV7875000 GW1050000 GW2500000 GV7875000 GW1050000 GX0700000 GV7525000 GV6125000 GV7525000 XY9450000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169*	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7	GV7525000 GV7875000 GW1050000 GW2500000 GV7875000 GW1050000 GX0700000 GV7525000 GV6125000 GV7525000 XY9450000 GY1000000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170*	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 542-92-7	GV7525000 GV7875000 GW1050000 GW2500000 GV7875000 GW1050000 GX0700000 GV7525000 GV6125000 GV7525000 XY9450000 GY1000000 GY1000000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0170	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 542-92-7 12079-65-1	GV7525000 GV7875000 GW1050000 GW2500000 GV7875000 GW1050000 GW7700000 GV7525000 GV7525000 GV7525000 GV7525000 GV7525000 GV7525000 GV7525000 GV7525000 GV7525000 GV7525000 GV7525000 GV7525000 GV7525000 GV7525000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0170 0380 0205	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 542-92-7 12079-65-1 102-54-5	GV7525000 GV7875000 GW1050000 GW2500000 GW2500000 GW1050000 GX0700000 GV7525000 GV6125000 GV7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0170 0380 0205 0380	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 542-92-7 12079-65-1 102-54-5 12079-65-1	GV7525000 GV7875000 GW1050000 GW2500000 GW2500000 GW1050000 GX0700000 GV7525000 GV7525000 GV7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000 GY7525000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0170 0380 0205 0380 0171*	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmercaptan Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentane	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3	GV7525000 GV7875000 GW1050000 GW2500000 GW2500000 GW1050000 GX0700000 GV7525000 GV6125000 GV7525000 GY7525000 GY7525000 GY7525000 GY1000000 GY1000000 GY1000000 OO9720000 LK0700000 GY2390000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0170* 0170 0380 0205 0380 0171* 0169	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene 1.3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclopentane Cyclotrimethylenetrinitramine	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3 121-82-4	GV7525000 GV7875000 GW1050000 GW2500000 GW2500000 GW1050000 GW77525000 GW6125000 GV7525000 GY7525000 GY7525000 GY7525000 GY1000000 GY1000000 GY1000000 OO9720000 LK0700000 GY2390000 XY9450000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0170 0380 0205 0380 0171*	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmercaptan Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentane	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3	GV7525000 GV7875000 GW1050000 GW2500000 GW2500000 GW1050000 GW1050000 GX0700000 GV7525000 GV7525000 GY7525000 GY1000000 GY1000000 GY1000000 GY1000000 OO9720000 LK0700000 GY2390000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0170* 0170 0380 0205 0380 0171* 0169 0172*	Cyclohexanot Cyclohexanone Cyclohexanone Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmercaptan Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentadie Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3 121-82-4 13121-70-5	GV7525000 GV7875000 GW1050000 GW2500000 GW2500000 GW1050000 GW1050000 GW1050000 GW7525000 GV6125000 GV7525000 GY1000000 GY1000000 GY1000000 DY1000000 O09720000 LK0700000 GY2390000 XY9450000 WH8750000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0170* 0170 0380 0205 0380 0171* 0169	Cyclohexanethiol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene 1.3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclopentane Cyclotrimethylenetrinitramine	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3 121-82-4	GV7525000 GV7875000 GW1050000 GW2500000 GW2500000 GW1050000 GW77525000 GW6125000 GV7525000 GY7525000 GY7525000 GY7525000 GY1000000 GY1000000 GY1000000 OO9720000 LK0700000 GY2390000 XY9450000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0170* 0170 0380 0205 0380 0171* 0169 0172*	Cyclohexanot Cyclohexanone Cyclohexanone Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmercaptan Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentadie Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3 121-82-4 13121-70-5	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GW1050000 GW1050000 GX0700000 GV7525000 GV6125000 GY7525000 GY1000000 GY1000000 GY1000000 O09720000 LK0700000 O09720000 XY9450000 XY9450000 WH8750000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0380 0205 0380 0171* 0169 0172* GUIDE	Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylmine Cyclohexylmercaptan Cyclohexylmertanan Cyclohexylthiol Cyclonite Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GW1050000 GW1050000 GW7525000 GV6125000 GV7525000 GY7525000 GY1000000 GY1000000 GY1000000 CY1000000 CY2390000 GY2390000 WH8750000 WH8750000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0170* 0170 0380 0205 0380 0171* 0169 0172*	Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylmine Cyclohexylmercaptan Cyclohexylmertanan Cyclohexylthiol Cyclonite Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3 121-82-4 13121-70-5	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GW1050000 GW1050000 GX0700000 GV7525000 GV6125000 GY7525000 GY1000000 GY1000000 GY1000000 O09720000 LK0700000 O09720000 XY9450000 XY9450000 WH8750000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0380 0205 0380 0171* 0169 0172* GUIDE	Cyclohexanol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylwercaptan Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GV7875000 GW1050000 GX0700000 GX0700000 GV7525000 GV6125000 GY7525000 GY1000000 GY1000000 GY1000000 OO9720000 LK0700000 GY2390000 XY9450000 WH8750000 RTECS NO
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0170* 0170 0380 0205 0380 0171* 0169 0172* GUIDE 0173* 0220 0411 0184	Cyclohexanol Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 542-92-7 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GV7875000 GW1050000 GX0700000 GX0700000 GV7525000 GV6125000 GY7525000 GY1000000 GY1000000 GY1000000 GY1000000 GY2390000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0170* 0170* 0170* 0170* 0170* 0171* 0169 0172* GUIDE 0173* 0220 0411	Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME 2,4-D DAB DACPM	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 542-92-7 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GV7875000 GW1050000 GX0700000 GY7525000 GV6125000 GY7525000 GY1000000 GY1000000 GY1000000 GY1000000 GY2390000 LK0700000 GY2390000 XY9450000 WH8750000 WH8750000 AG6825000 BX7350000 CY1050000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0170* 0170 0380 0205 0380 0171* 0169 0172* GUIDE 0173* 0220 0411 0184	Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME 2,4-D DAB DACPM DBCP	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO 94-75-7 60-11-7 101-14-4 96-12-8 84-74-2 7572-29-4	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GV7875000 GW1050000 GX0700000 GV7525000 GV6125000 GY7525000 GY75250000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0170 0380 0205 0380 0171* 0169 0172* GUIDE 0173* 0220 0411 0184 0187	Cyclohexanol Cyclohexanone Cyclohexanone Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmercaptan Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME 2,4-D DAB DACPM DBCP DBP	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO 94-75-7 60-11-7 101-14-4 96-12-8 84-74-2	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GW1050000 GW1050000 GW7525000 GV6125000 GY7525000 GY1000000 GY1000000 GY1000000 GY1000000 GY2390000 LK0700000 GY2390000 KY9450000 GY2390000 AY9450000 GY2390000 TX8750000 TX8750000 TX8750000 TX8750000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0170 0380 0205 0380 0171* 0169 0172* GUIDE 0173* 0220 0411 0184 0187 0188	Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME 2,4-D DAB DACPM DBCP DBP DCA	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO 94-75-7 60-11-7 101-14-4 96-12-8 84-74-2 7572-29-4	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GW2500000 GW1050000 GW07525000 GV6125000 GY7525000 GY7525000 GY1000000 GY1000000 GY1000000 GY1000000 GY20000 LK0700000 GY2390000 XY9450000 GY2390000 AY9450000 GY2390000 TTECS NO AG6825000 BX7350000 CY1050000 TX8750000 T10875000 AP1080000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0380 0205 0380 0171* 0169 0172* GUIDE 0173* 0220 0411 0184 0187 0188 0190 0189 0661	Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylmercaptan Cyclohexylmercaptan Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME 2.4-D DAB DACPM DBCP DBP DCA p-DCB	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 542-92-7 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO 94-75-7 60-11-7 101-14-4 96-12-8 84-74-2 7572-29-4 106-46-7 95-50-1 75-35-4	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GV7875000 GW1050000 GX0700000 GX0700000 GY7525000 GY6125000 GY7525000 GY7525000 GY1000000 GY1000000 GY1000000 GY1000000 GY2390000 GY2390000 GY2390000 GY2390000 GY2390000 GY2390000 TX8750000 TX8750000 TX8750000 TX8750000 TX8750000 AP1080000 CZ4550000 KV9275000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0170* 0170* 0170* 0189 0189 0661 0199	Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexyl ketone Cyclohexylmercaptan Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME 2,4-D DAB DACPM DBCP DBP DCA p-DCB o-DCB	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO 94-75-7 60-11-7 101-14-4 96-12-8 84-74-2 7572-29-4 106-46-7 95-50-1	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GV7875000 GW1050000 GX0700000 GX0700000 GV7525000 GV6125000 GY7525000 GY75250000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0380 0205 0380 0171* 0169 0172* GUIDE 0173* 0220 0411 0184 0187 0188 0190 0189 0661	Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylamine Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclonite Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME 2,4-D DAB DACPM DBCP DBP DCA p-DCB o-DCB 1,1-DCE	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 542-92-7 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO 94-75-7 60-11-7 101-14-4 96-12-8 84-74-2 7572-29-4 106-46-7 95-50-1 75-35-4 542-75-6 77-73-6	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GV7875000 GW1050000 GX0700000 GX0700000 GY7525000 GY6125000 GY7525000 GY7525000 GY1000000 GY1000000 GY1000000 GY1000000 GY2390000 GY2390000 GY2390000 GY2390000 GY2390000 GY2390000 TX8750000 TX8750000 TX8750000 TX8750000 TX8750000 AP1080000 CZ4550000 KV9275000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0170 0380 0205 0380 0171* 0169 0172* GUIDE 0173* 0220 0411 0184 0187 0188 0190 0189 0661 0199 0204 0193	Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexyl ketone Cyclohexylmercaptan Cyclohexylmercaptan Cyclohexylthiol Cyclohexylthiol Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese tricarbonyl Cyclopentadienylmanganese Cyclotrimethylenetrinitramine Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME 2,4-D DAB DACPM DBCP DBP DCA p-DCB 0-DCB 1,1-DCE DCP DCPD DDH	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO 94-75-7 60-11-7 101-14-4 96-12-8 84-74-2 7572-29-4 106-46-7 95-50-1 75-35-4 542-75-6 77-73-6 118-52-5	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GW2500000 GW1050000 GW1050000 GW7525000 GW6125000 GY7525000 GY7525000 GY7525000 GY1000000 GY1000000 GY1000000 GY2390000 LK0700000 GY2390000 KY9450000 GY2390000 TX8750000 TX8750000 TX8750000 TX8750000 TX8750000 CZ4550000 CZ4500000 CZ4550000 CZ4550000 CZ4500000 CZ4550000 CZ4500000 CZ45500000 CZ4500000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0170 0380 0205 0380 0171* 0169 0172* GUIDE 0173* 0220 0411 0184 0187 0188 0190 0189 0661 0199 0204 0193 0174*	Cyclohexanol Cyclohexanone Cyclohexanone Cyclohexyl alcohol Cyclohexyl ketone Cyclohexyl ketone Cyclohexylmercaptan Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME 2,4-D DAB DACPM DBCP DBP DCA p-DCB 0-DCB 1,1-DCE DCP DCPD DDH DDT	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO 94-75-7 60-11-7 101-14-4 96-12-8 84-74-2 7572-29-4 106-46-7 95-50-1 75-35-4 542-75-6 77-73-6 118-52-5 50-29-3	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GW2500000 GW1050000 GW1050000 GW7525000 GV6125000 GV7525000 GY7525000 GY7525000 GY1000000 GY1000000 GY1000000 GY2390000 LK0700000 GY2390000 KY9450000 GY2390000 TX8750000 TX8750000 TX8750000 TX8750000 TX8750000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4500000 KV9275000 UC8310000 PC1050000 MU0700000 KJ3325000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0170 0380 0205 0380 0171* 0169 0172* GUIDE 0173* 0220 0411 0184 0187 0188 0190 0189 0661 0199 0204 0193 0174* 0174	Cyclohexanol Cyclohexanone Cyclohexene Cyclohexyl alcohol Cyclohexyl ketone Cyclohexylketone Cyclohexylmercaptan Cyclohexylmercaptan Cyclohexylthiol Cyclohexylthiol Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME 2,4-D DAB DACPM DBCP DBP DCA p-DCB o-DCB 1,1-DCE DCP DCPD DDH DDT p,p'-DDT	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 12079-65-1 102-54-5 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO 94-75-7 60-11-7 101-14-4 96-12-8 84-74-2 7572-29-4 106-46-7 95-50-1 75-35-4 542-75-6 77-73-6 118-52-5 50-29-3 50-29-3	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GW2500000 GW1050000 GW1050000 GW7525000 GV6125000 GY7525000 GY7525000 GY7525000 GY1000000 GY1000000 GY1000000 GY2390000 LK0700000 GY2390000 KY9450000 GY2390000 TX8750000 TX8750000 TX8750000 TX8750000 TX8750000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4500000 KV9275000 UC8310000 PC1050000 MU0700000 KJ3325000 KJ3325000 KJ3325000
0164* 0165* 0166* 0167* 0165 0166 0168* 0164 0406 0164 0169* 0170* 0170 0380 0205 0380 0171* 0169 0172* GUIDE 0173* 0220 0411 0184 0187 0188 0190 0189 0661 0199 0204 0193 0174*	Cyclohexanol Cyclohexanone Cyclohexanone Cyclohexyl alcohol Cyclohexyl ketone Cyclohexyl ketone Cyclohexylmercaptan Cyclohexylmercaptan Cyclohexylmethane Cyclohexylthiol Cyclopentadiene 1,3-Cyclopentadiene Cyclopentadienyl tricarbonyl manganese bis(Cyclopentadienyl)iron Cyclopentadienylmanganese tricarbonyl Cyclopentane Cyclotrimethylenetrinitramine Cyhexatin CHEMICAL NAME 2,4-D DAB DACPM DBCP DBP DCA p-DCB 0-DCB 1,1-DCE DCP DCPD DDH DDT	1569-69-3 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 110-83-8 108-93-0 108-94-1 108-91-8 1569-69-3 108-87-2 1569-69-3 121-82-4 542-92-7 12079-65-1 287-92-3 121-82-4 13121-70-5 CAS NO 94-75-7 60-11-7 101-14-4 96-12-8 84-74-2 7572-29-4 106-46-7 95-50-1 75-35-4 542-75-6 77-73-6 118-52-5 50-29-3	GV7525000 GV7875000 GV7875000 GW1050000 GW2500000 GW2500000 GW2500000 GW1050000 GW1050000 GW7525000 GV6125000 GV7525000 GY7525000 GY7525000 GY1000000 GY1000000 GY1000000 GY2390000 LK0700000 GY2390000 KY9450000 GY2390000 TX8750000 TX8750000 TX8750000 TX8750000 TX8750000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4550000 CZ4500000 KV9275000 UC8310000 PC1050000 MU0700000 KJ3325000

0208	DEA	111-42-2	KL2975000
0236	DEHP	117-81-7	TI0350000
0212	DEK	96-22-0	SA8050000
0213	DEP	84-66-2	TI1050000
0211	DETA	111-40-0	IE1225000
0215	DGE	2238-07-5	KN2350000
0216	DIBK	108-83-8	MJ5775000
0217	DIPA	108-18-9	IM4025000
0218	DMAC	127-19-5	AB7700000
0224	DMCC	79-44-7	FD4200000
0412	DMDI	5124-30-1	NO9250000
0388	DMDT	72-43-5	<u>KJ3675000</u>
0226	DMF	68-12-2	LO2100000
0227	DMH	<u>57-14-7</u> 62-75-9	MV2450000
0461 0228	DMNA	131-11-3	<u>IQ0525000</u> TI1575000
0234	DMP DNC	534-52-1	GO9625000
0234	DNOC	534-52-1	G09625000 G09625000
0235	DNT	25321-14-6	XT1300000
0236	DOP	117-81-7	TI0350000
0240	DPA	122-39-4	JJ7800000
0242	DPK	123-19-3	MJ5600000
0248	DVB	1321-74-0	CZ9370000
0193	Dactin	118-52-5	MU0700000
0200	Dalapon	75-99-0	UF0690000
0284	Dasanit®	115-90-2	TF3850000
0175*	Decaborane	17702-41-9	HD1400000
0175	Decaboron tetradecahydride	17702-41-9	HD1400000
0365	Decachlorooctahydro-1,3,4-metheno-2H-cyc	143-50-0	PC8575000
0365	Decachlorooctahydro-kepone-2-one	143-50-0	PC8575000
0365	Decachlorotetrahydro-4,7-methanoindeneon	143-50-0	PC8575000
0176*	1-Decanethiol	143-10-2	
0176	Decylmercaptan	143-10-2	
0176	n-Decylmercaptan	143-10-2	
0238	Delnav®	78-34-2	TE3350000
0177* 0410	Demeton Demeton methyl	8065-48-3	TF3150000
0215	Di(2,3-epoxypropyl) ether	8022-00-2 2238-07-5	TG1760000 KN2350000
0215	Di(2-ethylhexyl)phthalate	117-81-7	TI0350000
0208	Di(2-bydroxyethyl)amine	111-42-2	KL2975000
0185	2-Di-N-butylaminoethanol	102-81-8	KK3850000
0185	2-Di-N-butylaminoethyl alcohol	102-81-8	KK3850000
0245	Di-Syston®	298-04-4	TD9275000
0186	Di-n-butyl hydrogen phosphate	107-66-4	TB9605000
0187	Di-n-butyl phthalate	84-74-2	TI0875000
0236*	Di-sec octyl phthalate	117-81-7	TI0350000
0246*	2,6-Di-tert-butyl-p-cresol	128-37-0	G07875000
0178	Diacetone	123-42-2	SA9100000
0178*	Diacetone alcohol	123-42-2	SA9100000
0215	Diallyl ether dioxide	2238-07-5	KN2350000
0329	Diamine	302-01-2	<u>MU7175000</u>
0191	4,4'-Diamino-3,3'-dichlorobiphenyl	91-94-1	DD0525000
0618	4,4'-Diamino-3,3'-dimethylbiphenyl	119-93-7	DD1225000
0179	1,3-Diamino-4-methoxybenzene	615-05-4	BZ8580500
0179*	2,4-Diaminoanisole (and its salts)	615-05-4	BZ8580500
0495	p-Diaminobenzene	106-50-3	SS8050000
0495 0051	1,4-Diaminobenzene 4,4'-Diaminobiphenyl	106-50-3 92-87-5	SS8050000 DC9625000
0211	2,2'-Diaminodiethylamine	<u>92-87-5</u> 111-40-0	IE1225000
0051	p-Diaminodiphenyl	92-87-5	DC9625000
0415	para'-Diaminodiphenyl-methane	101-77-9	BY5425000
0415	4,4'-Diaminodiphenylmethane	101-77-9	BY5425000
0618	Diaminoditolyl	119-93-7	DD1225000
0269	1,2-Diaminoethane	107-15-3	KH8575000
0620	Diaminotoluene	25376-45-8<	XS9445000
0415	Dianilinomethane	101-77-9	BY5425000
0180	Dianisidine	119-90-4	DD0875000
0180*	o-Dianisidine	119-90-4	DD0875000
0180	3,3'-Dianisidine	119-90-4	DD0875000
0552	Diatomaceous earth	7631-86-9	VV7310000
0552	Diatomaceous silica	7631-86-9	VV7310000
0552	Diatomite	7631-86-9	VV7310000
0181	<u>Diazide®</u>	333-41-5	TF3325000
	Diazinon®	333-41-5	TF3325000
0182	Diazirine	334-88-3	PA700000
	<u>Diazomethane</u>	334-88-3	PA700000
0676	Dibasic zinc stearate	557-05-1	ZH5200000
0494	Dibenzothiazine Dibenzoul paravida	92-84-2	SN5075000
0052	Dibenzoyl peroxide	94-36-0 10207 45 7	DM8575000
0183	Diborane Diboron hexahydride	<u>19287-45-7</u> 19287-45-7	HO9275000 HO9275000
<u> </u>	DIDOTOH HEVGHANTINE	<u> </u>	1102213000

	<u>1,2-Dibromo-2,2-dichloroethyl dimethyl p</u>	200-76-5	TB9450000
<u>0225</u> 0184*	1,2-Dibromo-3-chloropropane	96-12-8	TX8750000
0184	Dibromochloropropane	96-12-8	TX8750000
0214	Dibromodifluoromethane	75-61-6	PA7525000
0270	1,2-Dibromoethane	106-93-4	KH9275000
0225	<u>Dibrom®</u>	<u> 300-76-5</u>	TB9450000
0187	Dibutyl 1,2-benzene-dicarboxylate	84-74-2	TI0875000
0186	Dibutyl acid o-phosphate	107-66-4	TB9605000
0186*	Dibutyl phosphate	107-66-4	TB9605000
0186	Dibutyl phosphoric acid	107-66-4	TB9605000
0187*		84-74-2	TI0875000
0185	Dibutylaminoethanol	102-81-8	KK3850000
0185	2-Dibutylaminoethanol	102-81-8	KK3850000
0246	Dibutylated hydroxytoluene	128-37-0	G07875000
0389	2,2-Dichloro-1,1-difluoro-1-methoxyethan		KN7820000
0389	2,2-Dichloro-1,1-difluoroethyl methyl et	76-38-0	KN7820000
0534	Dichloro-1,2-propane	78-87-5	TX9625000
0198*	1,1-Dichloro-1-nitroethane	594-72-9	KI1050000
0199	1,3-Dichloro-1-propene	<u>542-75-6</u>	UC8310000
0143	3,5-Dichloro-2,6-dimethyl-4-pyridinol	2971-90-6	<u>UU7711500</u>
0191	3,3'-Dichloro-4,4'-biphenyldiamine	91-94-1	DD0525000
0191	3,3'-Dichloro-4,4'-diaminobiphenyl	91-94-1	DD0525000
0411	3,3'-Dichloro-4,4'-diaminodiphenylmethan	101-14-4	CY1050000
0193*	1,3-Dichloro-5,5-dimethylhydantoin	118-52-5	MU0700000
0188*		7572-29-4	AP1080000
0190*	p-Dichlorobenzene	106-46-7	CZ4550000
0189*		95-50-1	CZ4500000
0190	1,4-Dichlorobenzene	106-46-7	CZ4500000 CZ4550000
0189	1,2-Dichlorobenzene	95-50-1 106 46 7	CZ4500000
0190	para-Dichlorobenzene	106-46-7	CZ4550000
0189	ortho-Dichlorobenzene	95-50-1	CZ4500000
0191	o,o'-Dichlorobenzidine	91-94-1	DD0525000
0191*	3,3'-Dichlorobenzidine (and its salts)	91-94-1	DD0525000
0191	<u>Dichlorobenzidine base</u>	91-94-1	DD0525000
0189	o-Dichlorobenzol	95-50-1	CZ4500000
0191	3,3'-Dichlorobiphenyl-4,4'-diamine	91-94-1	DD0525000
0190	Dichlorocide	106-46-7	CZ4550000
0196	2,2'-Dichlorodiethyl ether	111-44-4	KN0875000
0192*		75-71-8	PA8200000
0128	Dichlorodimethyl ether	542-88-1	KN1575000
0142	Dichlorodioxochromium	14977-61-8	GB5775000
	DICITO OCTOXOCIT OIII CIII		
	Dichlorodiphenyltrichloroethane		
0174	Dichlorodiphenyltrichloroethane	50-29-3	KJ3325000
$\begin{array}{r} 0174 \\ \hline 0271 \end{array}$	1,2-Dichloroethane	50-29-3 107-06-2	KJ3325000 KI0525000
0174 0271 0194*	1,2-Dichloroethane 1,1-Dichloroethane	50-29-3 107-06-2 75-34-3	KJ3325000 KI0525000 KI0175000
0174 0271 0194* 0661	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene	50-29-3 107-06-2 75-34-3 75-35-4	KJ3325000 KI0525000 KI0175000 KV9275000
0174 0271 0194* 0661 0196*	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000
0174 0271 0194* 0661 0196* 0196	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000
0174 0271 0194* 0661 0196* 0196	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000
0174 0271 0194* 0661 0196* 0195 0195	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000 KV9360000
0174 0271 0194* 0661 0196* 0195* 0195 0661	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000 KV9360000 KV9360000
0174 0271 0194* 0661 0196* 0195* 0195 0661 0188	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 141-44-4 540-59-0 540-59-0 75-35-4 7572-29-4	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000 KV9360000 KV9275000 AP1080000
0174 0271 0194* 0661 0196* 0195* 0195 0661	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000 KV9360000 KV9360000
0174 0271 0194* 0661 0196* 0195* 0195 0661 0188	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 141-44-4 540-59-0 540-59-0 75-35-4 7572-29-4	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000 KV9360000 KV9275000 AP1080000
0174 0271 0194* 0661 0196* 0195* 0195* 0661 0188 0197 0414 0128	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne Dichloroethyne Dichlorofluoromethane	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 75-35-4 7572-29-4 75-43-4	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KV9360000 KV9360000 KV9275000 AP1080000 PA8400000
0174 0271 0194* 0661 0196* 0195* 0195* 0661 0188 0197 0414 0128	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne Dichlorofluoromethane Dichloromethane	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4 7572-29-4 75-43-4 75-09-2	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KV9360000 KV9360000 KV9275000 AP1080000 PA8400000 PA8050000 KN1575000
0174 0271 0194* 0661 0196* 0195* 0195 0661 0188 0197 0414 0128 0197*	1,2-Dichloroethane 1,1-Dichloroethene 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne Dichloroethyne Dichlorofluoromethane Dichloromethyl ether Dichloromethyl ether Dichloromonofluoromethane Dichloromonofluoromethane Dichloromitroethane	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4 7572-29-4 75-09-2 542-88-1	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000 KV9360000 KV9275000 AP1080000 PA8400000 PA8400000 PA8400000
0174 0271 0194* 0661 0196* 0195* 0195 0661 0188 0197 0414 0128 0197* 0198	1,2-Dichloroethane 1,1-Dichloroethene 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne Dichloroethyne Dichlorofluoromethane Dichloromethyl ether Dichloromethyl ether Dichloromonofluoromethane Dichloromonofluoromethane Dichloromitroethane	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4 7572-29-4 75-43-4 75-09-2 542-88-1 75-43-4	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KV9360000 KV9360000 KV9360000 AP1080000 PA8400000 PA8400000 PA8400000 KX1575000 PA8400000 KX11050000 KK4900000
0174 0271 0194* 0661 0196* 0195* 0195 0661 0188 0197 0414 0128 0197*	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne Dichloroethyne Dichloromethane Dichloromethane Dichloromethyl ether Dichloromethyl ether Dichloromethyl ether Dichloromethyl ether Dichloromonofluoromethane Dichloronitroethane Dichloronitroethane 2-(2,4-Dichlorophenoxy)ethyl sodium sulf	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 75-35-4 7572-29-4 75-43-4 75-09-2 542-88-1 75-43-4 594-72-9 136-78-7	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KV9360000 KV9360000 KV9360000 AP1080000 PA8400000 PA8400000 PA8400000 KX1575000 PA8400000 KX11050000 KK4900000
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0174 0271 0194* 0661 0196* 0195* 0195 0661 0188 0197 0414 0128 0197* 0198 0197* 0193	1.2-Dichloroethane 1.1-Dichloroethane 1.1-Dichloroethene Dichloroethyl ether 2.2'-Dichloroethyl ether 1.2-Dichloroethylene sym-Dichloroethylene 1.1-Dichloroethylene Dichloroethylene Dichloroethyne Dichloroethyne Dichlorofluoromethane Dichloromethane Dichloromothyl ether Dichloromonofluoromethane Dichloromonofluoromethane Dichlorophenoxylethyl sodium sulf Dichlorophenoxyacetic acid 2.4-Dichlorophenoxyacetic acid 3-(3.4-Dichlorophenyl)-1.1-dimethylurea	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 540-59-0 540-59-0 75-35-4 7572-29-4 75-43-4 75-09-2 542-88-1 75-43-4 594-72-9 136-78-7 94-75-7 94-75-7 330-54-1	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000 KV9360000 KV9275000 AP1080000 PA8400000 PA8400000 PA8400000 PA8400000 KX4900000 KX4900000 AG6825000 AG6825000 YS8925000
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0174 0271 0194* 0661 0196 0195* 0195 0661 0188 0197 0414 0128 0197* 0198 0153 0173 0247 0534 0200 0199* 0200* 0200*	1.2-Dichloroethane 1.1-Dichloroethene Dichloroethyl ether 2.2'-Dichloroethyl ether 1.2-Dichloroethylene sym-Dichloroethylene 1.1-Dichloroethylene 1.1-Dichloroethylene Dichloroethylene Dichloroethyne Dichloroethyne Dichloroethyne Dichloromethane Dichloromethane Dichloromethyl ether Dichloromonofluoromethane Dichloromonofluoromethane Dichloronitroethane 2-(2.4-Dichlorophenoxy)ethyl sodium sulf Dichlorophenoxyacetic acid 2.4-Dichlorophenoxyacetic acid 3-(3.4-Dichlorophenoxyl)-1.1-dimethylurea 1.2-Dichloropropane 2.2-Dichloropropanoic acid 1.3-Dichloropropionic acid alpha.alpha-Dichloropropionic acid 1.3-Dichloropropylene Dichlorotetrafluoroethane	50-29-3 $107-06-2$ $75-34-3$ $75-35-4$ $111-44-4$ $111-44-4$ $540-59-0$ $75-35-4$ $75-2-29-4$ $75-43-4$ $75-09-2$ $542-88-1$ $75-43-4$ $594-72-9$ $136-78-7$ $94-75-7$ $330-54-1$ $78-87-5$ $75-99-0$ $542-75-6$ $75-99-0$ $542-75-6$ $76-14-2$	KJ3325000 KI0525000 KI0525000 KI0175000 KV9275000 KN0875000 KV9360000 KV9360000 KV9360000 PA8400000 PA8400000 PA8400000 PA8400000 PA8400000 PA8400000 PA8400000 PA8400000 CKI1050000 CKI4900000
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0174 0271 0194* 0661 0196* 0195* 0195 0661 0188 0197* 0414 0128 0197* 0198 0153 0173 0247 0247 0534 0200 0199* 0200* 02001* 0201	1.2-Dichloroethane 1.1-Dichloroethene Dichloroethyl ether 2.2'-Dichloroethyl ether 1.2-Dichloroethylene sym-Dichloroethylene 1.1-Dichloroethylene 1.1-Dichloroethylene 1.1-Dichloroethylene Dichloroethylene Dichloroethyne Dichloroethyne Dichloromethane Dichloromethane Dichloromethane Dichloromonofluoromethane Dichloronitroethane 2-(2.4-Dichlorophenoxy)ethyl sodium sulf Dichlorophenoxyacetic acid 2.4-Dichlorophenoxyacetic acid 3-(3.4-Dichlorophenoxyacetic acid 3-(3.4-Dichlorophenoxyacetic acid 1.2-Dichloropropane 2.2-Dichloropropane 2.2-Dichloropropionic acid alpha,alpha-Dichloropropionic acid 1.3-Dichloropropylene Dichlorotetrafluoroethane 1.2-Dichlorotetrafluoroethane 2.2-Dichlorotetrafluoroethane 2.2-Dichlorotetrafluoroethane	50-29-3 $107-06-2$ $75-34-3$ $75-35-4$ $111-44-4$ $111-44-4$ $540-59-0$ $75-35-4$ $75-2-29-4$ $75-43-4$ $75-09-2$ $542-88-1$ $75-43-4$ $594-72-9$ $136-78-7$ $94-75-7$ $94-75-7$ $330-54-1$ $78-87-5$ $75-99-0$ $542-75-6$ $75-99-0$ $542-75-6$ $76-14-2$ $76-14-2$ $62-73-7$	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000 KV9360000 KV9360000 PA8400000 PA84000000 PA8400000
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0174 0271 0194* 0661 0196* 0195* 0195 0661 0188 0197* 0414 0128 0197* 0198 0153 0173 0173 0247 0534 0200 0199* 0200* 0201* 0201 0202 0202* 0147	1.2-Dichloroethane 1.1-Dichloroethene Dichloroethyl ether 2.2'-Dichloroethyl ether 1.2-Dichloroethylene sym-Dichloroethylene 1.1-Dichloroethylene 1.1-Dichloroethylene 1.1-Dichloroethylene Dichloroethylene Dichloroethyne Dichlorofluoromethane Dichloromethyl ether Dichloromethyl ether Dichloromonofluoromethane Dichloromitroethane 2-(2,4-Dichlorophenoxy)ethyl sodium sulf Dichlorophenoxyacetic acid 2.4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 1.2-Dichloropropane 2.2-Dichloropropane 2.2-Dichloropropionic acid 1.3-Dichloropropionic acid 1.3-Dichloropropylene Dichlorotetrafluoroethane 1.2-Dichlorotetrafluoroethane 2.2-Dichlorotetrafluoroethane 2.2-Dichlorovinyl dimethyl phosphate Dichlorvos Dicobalt Octacarbonyl	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4 7572-29-4 75-43-4 75-09-2 542-88-1 75-43-4 594-72-9 136-78-7 94-75-7 330-54-1 78-87-5 75-99-0 542-75-6 75-99-0 542-75-6 76-14-2 76-14-2 76-14-2 76-14-2 76-14-2 76-73-7 10210-68-1	KJ3325000 KI0525000 KI0525000 KI0175000 KV9275000 KN0875000 KV9360000 KV9360000 KV9360000 AP1080000 PA8400000 PA850000 KN1575000 PA8400000 KX1050000 KX490000 AG6825000 AG6825000 TX9625000 UF0690000 UF0690000 UF0690000 UF0690000 UF0690000 TC0350000 TC0350000 GG0300000
0174 0271 0194* 0661 0196* 0195* 0195 0661 0188 0197* 0414 0128 0197* 0198 0153 0173 0247 0534 0200 0199* 0200* 02001* 0201 0202 0202*	1.2-Dichloroethane 1.1-Dichloroethene Dichloroethyl ether 2.2'-Dichloroethyl ether 1.2-Dichloroethylene sym-Dichloroethylene 1.1-Dichloroethylene 1.1-Dichloroethylene 1.1-Dichloroethylene Dichloroethylene Dichloroethyne Dichlorofluoromethane Dichloromethyl ether Dichloromethyl ether Dichloromonofluoromethane Dichloromitroethane 2-(2,4-Dichlorophenoxy)ethyl sodium sulf Dichlorophenoxyacetic acid 2.4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 1.2-Dichloropropane 2.2-Dichloropropane 2.2-Dichloropropionic acid alpha,alpha-Dichloropropionic acid 1.3-Dichloropropylene Dichlorotetrafluoroethane 1.2-Dichlorotetrafluoroethane 2.2-Dichlorotetrafluoroethane 2.2-Dichlorovinyl dimethyl phosphate	50-29-3 $107-06-2$ $75-34-3$ $75-35-4$ $111-44-4$ $111-44-4$ $540-59-0$ $540-59-0$ $75-35-4$ $75-43-4$ $75-43-4$ $75-43-4$ $75-43-4$ $75-7$ $94-75-7$ $94-75-7$ $94-75-7$ $94-75-7$ $94-75-6$ $75-99-0$ $542-75-6$ $75-99-0$ $542-75-6$ $75-99-0$ $542-75-6$ $76-14-2$ $76-14-2$ $62-73-7$	KJ3325000 KI0525000 KI0525000 KI0175000 KV9275000 KN0875000 KV9360000 KV9360000 KV9360000 AP1080000 PA8400000 PA8050000 KN1575000 PA8400000 KX490000 AG6825000 AG6825000 AG6825000 TY9625000 UF0690000 UF0690000 UF0690000 UF0690000 UF0690000 UF0690000 TC0350000 TC0350000 GG03000000 GG03000000
0174 0271 0194* 0661 0196 0195* 0195 0661 0188 0197 0414 0128 0197* 0198 0153 0173 0247 0534 0200 0199* 0200* 0201* 0202 0202* 0147 0203*	1.2-Dichloroethane 1.1-Dichloroethene Dichloroethyl ether 2.2'-Dichloroethyl ether 1.2-Dichloroethylene sym-Dichloroethylene 1.1-Dichloroethylene 1.1-Dichloroethylene 1.1-Dichloroethylene Dichloroethylene Dichloroethyne Dichlorofluoromethane Dichloromethyl ether Dichloromethyl ether Dichloromonofluoromethane Dichloromitroethane 2-(2,4-Dichlorophenoxy)ethyl sodium sulf Dichlorophenoxyacetic acid 2.4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 1.2-Dichloropropane 2.2-Dichloropropane 2.2-Dichloropropionic acid 1.3-Dichloropropionic acid 1.3-Dichloropropylene Dichlorotetrafluoroethane 1.2-Dichlorotetrafluoroethane 2.2-Dichlorotetrafluoroethane 2.2-Dichlorovinyl dimethyl phosphate Dichlorvos Dicobalt Octacarbonyl	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4 7572-29-4 75-43-4 75-09-2 542-88-1 75-43-4 594-72-9 136-78-7 94-75-7 330-54-1 78-87-5 75-99-0 542-75-6 75-99-0 542-75-6 76-14-2 76-14-2 76-14-2 76-14-2 76-14-2 76-73-7 10210-68-1	KJ3325000 KI0525000 KI0525000 KI0175000 KV9275000 KN0875000 KV9360000 KV9360000 KV9360000 AP1080000 PA8400000 PA8050000 KN1575000 PA8400000 KX490000 AG6825000 AG6825000 AG6825000 TY9625000 UF0690000 UF0690000 UF0690000 UF0690000 UF0690000 UF0690000 TC0350000 TC0350000 GG03000000 GG03000000
0174 0271 0194* 0661 0196 0195* 0195 0661 0188 0197 0414 0128 0197* 0198 0153 0173 0247 0534 0200 0199* 0200* 0201* 0202 0202* 0147 0203*	1,2-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne Dichloroethyne Dichloromethane Dichloromethane Dichloromethyl ether Dichloromethyl ether Dichloromethyl ether Dichloromonofluoromethane Dichloronitroethane 2-(2,4-Dichlorophenoxy)ethyl sodium sulf Dichlorophenoxyacetic acid 2,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 3-(2-Dichloropropanoic acid 1,3-Dichloropropanoic acid 1,3-Dichloropropionic acid alpha,alpha-Dichloropropionic acid 1,3-Dichloropropylene Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 2,2-Dichlorovinyl dimethyl phosphate Dichlorvos Dicobalt Octacarbonyl Dicrotophos	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4 7572-29-4 75-43-4 75-09-2 542-88-1 75-43-4 594-72-9 136-78-7 94-75-7 330-54-1 78-87-5 75-99-0 542-75-6 75-99-0 542-75-6 76-14-2 62-73-7 10210-68-1 10210-68-1 141-66-2	KJ3325000 KI0525000 KI0525000 KI0175000 KV9275000 KN0875000 KV9360000 KV9360000 KV9360000 PA8400000 PA8400000 PA8400000 PA8400000 KN1575000 PA8400000 KX4900000 KX4900000 CX1050000 CX350000 CX350000 CX350000 CX350000 CX350000 CX350000 CX3500000 CX3500000 CX3500000 CX3500000 CX3500000 CX3500000 CX3500000 CX3500000 CX35000000 CX35000000 CX35000000 CX35000000 CX350000000 CX350000000
0174 0271 0194* 0661 0196 0195* 0195 0661 0188 0197 0414 0128 0197* 0198 0153 0173 0247 0534 0200 0199* 0200* 0201* 0202* 0147 0203* 0161	1,2-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene 1,1-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne Dichloroethyne Dichloromethane Dichloromethane Dichloromethyl ether Dichloromonofluoromethane Dichloromonofluoromethane Dichloronitroethane 2-(2,4-Dichlorophenoxy)ethyl sodium sulf Dichlorophenoxyacetic acid 2,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenyl)-1,1-dimethylurea 1,2-Dichloropropane 2,2-Dichloropropanoic acid 1,3-Dichloropropionic acid alpha,alpha-Dichloropropionic acid 1,3-Dichloropropylene Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 2,2-Dichlorotetrafluoroethane 2,2-Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane Dichlorvos Dicobalt Octacarbonyl Dicobalt carbonyl Dicrotophos Dicyan	50-29-3 $107-06-2$ $75-34-3$ $75-35-4$ $111-44-4$ $111-44-4$ $111-44-4$ $540-59-0$ $75-35-4$ $7572-29-4$ $75-43-4$ $75-43-4$ $75-43-4$ $75-43-4$ $75-43-4$ $75-43-4$ $75-43-4$ $75-67$ $75-7$	KJ3325000 KI0525000 KI0525000 KI0175000 KV9275000 KN0875000 KV9360000 KV9360000 KV9360000 PA8400000 PA8400000 PA8400000 KI1050000 KX4900000 AG6825000 AG6825000 TX9625000 UF0690000 UF0690000 UF0690000 UF0690000 UF0690000 TC0350000 TC0350000 GG0300000 GG0300000 GT1925000 GT1925000
0174 0271 0194* 0661 0196 0195* 0195 0661 0188 0197 0414 0128 0197* 0198 0153 0173 0247 0534 0200 0199* 0201* 0202 0202* 0161 0513	1,2-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene 1,1-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne Dichloroethyne Dichloromethane Dichloromethane Dichloromethyl ether Dichloromonofluoromethane Dichloromonofluoromethane Dichloronitroethane 2-(2,4-Dichlorophenoxy)ethyl sodium sulf Dichlorophenoxyacetic acid 2,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenyl)-1,1-dimethylurea 1,2-Dichloropropane 2,2-Dichloropropane 2,2-Dichloropropionic acid alpha,alpha-Dichloropropionic acid 1,3-Dichloropropylene Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 2,2-Dichlorotetrafluoroethane 2,2-Dichlorovinyl dimethyl phosphate Dichlorvos Dicobalt Octacarbonyl Dicobalt carbonyl Dicrotophos Dicyan m-Dicyanobenzene	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4 7572-29-4 75-43-4 75-09-2 542-88-1 75-43-4 594-72-9 136-78-7 94-75-7 330-54-1 78-87-5 75-99-0 542-75-6 75-99-0 542-75-6 76-14-2 76-14-2 62-73-7 10210-68-1 10210-68-1 141-66-2 460-19-5 626-17-5	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000 KV9360000 KV9360000 PA8400000 PA8400000 PA8400000 FA8400000 FA84000000 FA84000000 FA84000000 FA84000000 FA84000000 FA84000000 FA84000000 FA84000000 FA84000000 FA840000000 FA84000000 FA840000000 FA8400000000 FA84000000000000000000000000000000000000
0174 0271 0194* 0661 0196 0195* 0195* 0661 0188 0197 0414 0128 0197* 0198 0197* 0198 0197* 0198 0197* 02947 0534 0200 0199* 0200* 0201* 0201 0202 0202* 0147 0147 0203* 0161 0513 0513	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne Dichloroethyne Dichloromethane Dichloromethane Dichloromethane Dichloromethane Dichloromonofluoromethane Dichloronitroethane 2-(2,4-Dichlorophenoxy)ethyl sodium sulf Dichlorophenoxyacetic acid 2,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxy) -1,1-dimethylurea 1,2-Dichloropropane 2,2-Dichloropropane 2,2-Dichloropropionic acid 1,3-Dichloropropionic acid alpha,alpha-Dichloropropionic acid 1,3-Dichloropropylene Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 2,2-Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane Dichlorvos Dicobalt Octacarbonyl Dicobalt carbonyl Dicrotophos Dicyan m-Dicyanobenzene 1,3-Dicyanobenzene	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4 7572-29-4 75-43-4 75-09-2 542-88-1 75-43-4 594-72-9 136-78-7 94-75-7 330-54-1 78-87-5 75-99-0 542-75-6 75-99-0 542-75-6 75-99-0 542-75-6 76-14-2 62-73-7 10210-68-1 10210-68-1 141-66-2 460-19-5 626-17-5 626-17-5	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000 KV9360000 KV9360000 AP1080000 PA8050000 FA8050000 KN1575000 PA8400000 FA8050000 KX4900000 AG6825000 AG6825000 AG6825000 UF0690000 UF0690000 UF0690000 UF0690000 UF0690000 UF0690000 UF0690000 UF0690000 UF0690000 CT0350000 TC0350000 TC0350000 GG0300000 CZ1900000 CZ1900000 CZ1900000
0174 0271 0194* 0661 0196* 0195* 0195 0661 0188 0197* 0414 0128 0197* 0198 0153 0173 0247 0534 0200 0199* 0200* 0200* 0201 0202 0202* 0147 0147 0203* 0161 0513 0015	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne Dichlorofluoromethane Dichloromethane Dichloromethyl ether Dichloromonofluoromethane Dichloromitroethane 2-(2,4-Dichlorophenoxy)ethyl sodium sulf Dichlorophenoxyacetic acid 2,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 1,2-Dichloropropane 2,2-Dichloropropane 2,2-Dichloropropanoic acid 1,3-Dichloropropionic acid alpha,alpha-Dichloropropionic acid 1,3-Dichloropropylene Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 2,2-Dichlorotetrafluoroethane 2,2-Dichlorovinyl dimethyl phosphate Dichlorvos Dicobalt Octacarbonyl Dicobalt carbonyl Dicrotophos Dicyan m-Dicyanobenzene 1,3-Dicyanobenzene 1,4-Dicyanobutane	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4 7572-29-4 75-43-4 75-09-2 542-88-1 75-43-4 594-72-9 136-78-7 94-75-7 94-75-7 330-54-1 78-87-5 75-99-0 542-75-6 75-99-0 542-75-6 75-99-0 542-75-6 75-99-0 542-75-6 75-99-0 542-75-6 76-14-2 62-73-7 10210-68-1 10210-68-1 141-66-2 460-19-5 626-17-5 611-69-3	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000 KV9360000 KV9360000 AP1080000 PA8400000 PA8050000 KN1575000 PA8400000 KX4900000 AG6825000 AG6825000 AG6825000 UF0690000 UC8310000 UF0690000 UC8310000 UF0690000 UC8310000 TC0350000 TC0350000 GG0300000 GG0300000 GG1925000 CZ1900000 CZ1900000 AV2625000
0174 0271 0194* 0661 0196* 0195* 0195 0661 0188 0197* 0414 0128 0197* 0198 0153 0173 0247 0534 0200 0199* 0200* 0201* 0202 0202* 0147 0203* 0161 0513 0015 0573	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne Dichloroethyne Dichlorofluoromethane Dichloromethane Dichloromethane Dichloromitroethane Dichloronitroethane 2-(2,4-Dichlorophenoxy)ethyl sodium sulf Dichlorophenoxyacetic acid 2,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 3-(2-Dichloropropane) 2,2-Dichloropropane 2,2-Dichloropropanoic acid 1,3-Dichloropropionic acid alpha,alpha-Dichloropropionic acid 1,3-Dichloropropylene Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 2,2-Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 1,2-Dicyanobenzene 1,3-Dicyanobenzene 1,4-Dicyanobenzene 1,4-Dicyanobenzene 1,4-Dicyanobethane	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4 7572-29-4 75-43-4 75-09-2 542-88-1 75-43-4 594-72-9 136-78-7 94-75-7 330-54-1 78-87-5 75-99-0 542-75-6 75-99-0 542-75-6 76-14-2 62-73-7 10210-68-1 141-66-2 460-19-5 626-17-5 626-17-5 611-69-3 110-61-2	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000 KV9360000 KV9360000 PA8050000 PA8050000 FA8050000 KN1575000 PA8400000 FA8050000 KX4900000 FA8050000 FC0350000
0174 0271 0194* 0661 0196* 0195* 0195* 0661 0188 0197* 0198 0153 0173 0173 0247* 0534 0200 0199* 0200* 0200* 0202 0202* 0147 0203* 0161 0513 0015 0573 0015	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne Dichloroethyne Dichloromethane Dichloromethane Dichloromethane Dichloromethyl ether Dichloromonofluoromethane Dichloronitroethane 2-(2,4-Dichlorophenoxy)ethyl sodium sulf Dichlorophenoxyacetic acid 3,4-Dichlorophenoxyacetic acid 3,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 3-(3,4-Dichloropropane 2,2-Dichloropropane 2,2-Dichloropropanoic acid 1,3-Dichloropropopionic acid alpha.alpha-Dichloropropionic acid 1,3-Dichloropropylene Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 2,2-Dichlorovinyl dimethyl phosphate Dichlorvos Dicobalt Octacarbonyl Dicobalt Carbonyl Dicobalt carbonyl Dicrotophos Dicyan m-Dicyanobenzene 1,3-Dicyanobenzene 1,4-Dicyanobenzene 1,2-Dicyanoethane Dicyanogen	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4 7572-29-4 75-43-4 75-09-2 542-88-1 75-43-4 594-72-9 136-78-7 94-75-7 330-54-1 78-87-5 75-99-0 542-75-6 75-99-0 542-75-6 76-14-2 76-14-2 62-73-7 10210-68-1 141-66-2 460-19-5 626-17-5 611-69-3 110-61-2 460-19-5	KJ3325000 KI0525000 KI0525000 KI0175000 KV9275000 KN0875000 KV9360000 KV9360000 KV9360000 AP1080000 PA8400000 PA8400000 PA850000 KN1575000 PA8400000 KX4900000 AG6825000 AG6825000 AG6825000 TY9625000 UF0690000 UF0690000 UF0690000 UF0690000 UF0690000 TC0350000 TC0350000 TC0350000 TC0350000 GG0300000 GG0300000 GG1925000 CZ1900000 CZ19000000
0174 0271 0194* 0661 0196* 0195* 0195 0661 0188 0197* 0414 0128 0197* 0198 0153 0173 0247 0534 0200 0199* 0200* 0201* 0202 0202* 0147 0203* 0161 0513 0015 0573	1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethene Dichloroethyl ether 2,2'-Dichloroethyl ether 1,2-Dichloroethylene sym-Dichloroethylene sym-Dichloroethylene 1,1-Dichloroethylene Dichloroethyne Dichloroethyne Dichlorofluoromethane Dichloromethane Dichloromethane Dichloromitroethane Dichloronitroethane 2-(2,4-Dichlorophenoxy)ethyl sodium sulf Dichlorophenoxyacetic acid 2,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 3-(3,4-Dichlorophenoxyacetic acid 3-(2-Dichloropropane) 2,2-Dichloropropane 2,2-Dichloropropanoic acid 1,3-Dichloropropionic acid alpha,alpha-Dichloropropionic acid 1,3-Dichloropropylene Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 2,2-Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 1,2-Dichlorotetrafluoroethane 1,2-Dicyanobenzene 1,3-Dicyanobenzene 1,4-Dicyanobenzene 1,4-Dicyanobenzene 1,4-Dicyanobethane	50-29-3 107-06-2 75-34-3 75-35-4 111-44-4 111-44-4 540-59-0 540-59-0 75-35-4 7572-29-4 75-43-4 75-09-2 542-88-1 75-43-4 594-72-9 136-78-7 94-75-7 330-54-1 78-87-5 75-99-0 542-75-6 75-99-0 542-75-6 76-14-2 62-73-7 10210-68-1 141-66-2 460-19-5 626-17-5 626-17-5 611-69-3 110-61-2	KJ3325000 KI0525000 KI0175000 KV9275000 KN0875000 KN0875000 KV9360000 KV9360000 KV9360000 PA8050000 PA8050000 FA8050000 KN1575000 PA8400000 FA8050000 KX4900000 FA8050000 FC0350000

0204*	Digralomentadione	77 72 6	DG1 0 E 0 0 0 0
0204	Dicyclopentadiene 1,3-Dicyclopentadiene dimer	77-73-6 77-73-6	PC1050000 PC1050000
	Dicyclopentadienyl iron	102-54-5	LK0700000
	Dieldrin	60-57-1	IO1750000
	Diesel exhaust	00 57 1	101730000
0209	Diethamine	109-89-7	HZ8750000
	Diethanolamine	111-42-2	KL2975000
0068	Diethyl	106-97-8	EJ4200000
0375	Diethyl (dimethoxyphosphinothioylthio) s	121-75-5	WM8400000
0248	Diethyl benzene	1321-74-0	CZ9370000
0213	Diethyl ester of phthalic acid	84-66-2	TI1050000
_0277	<u>Diethyl ether</u>	60-29-7	KI5775000
	Diethyl ketone	96-22-0	SA8050000
0277	Diethyl oxide	60-29-7	KI5775000
0479	Diethyl parathion	56-38-2	TF4550000
	Diethyl phthalate	84-66-2	TI1050000
0210	Diethyl-(2-hydroxyethyl)amine	100-37-8	KK5075000
	<u>Diethylamine</u>	109-89-7	HZ8750000
0210	Diethylaminoethanol	100-37-8	KK5075000
0210	2-Diethylaminoethanol 2-Diethylaminoethyl alcohol	100-37-8 100-37-8	KK5075000 KK5075000
0210	Diethylene dioxide	123-91-1	JG8225000
0237	Diethylene ether	123-91-1	JG8225000
0437	Diethylene imidoxide	110-91-8	OD6475000
0602	Diethylene oxide	109-99-9	LU5950000
0437	Diethylene oximide	110-91-8	OD6475000
0211*	Diethylenetriamine	111-40-0	IE1225000
0323	Diethylmethylmethane		
0244	bis(Diethylthiocarbamovl) disulfide	97-77-8	J01225000
0475	Difluorine monoxide	7783-41-7	RS2100000
0595	2,2-Difluoro-1,1,1,2-tetrachloroethane	76-11-9	KI1425000
0596	1,2-Difluoro-1,1,2,2-tetrachloroethane	76-12-0	KI1420000
0662	Difluoro-1,1-ethylene	75-38-7	KW0560000
0124	Difluorochloromethane	75-45-6	PA6390000
0214*	Difluorodibromomethane	75-61-6	PA7525000
0192	Difluorodichloromethane	75-71-8	PA8200000
0662	1,1-Difluoroethene	75-38-7	KW0560000
0662	1,1-Difluoroethylene	75-38-7	<u>KW0560000</u>
0098	Difolatan®	2425-06-1	<u>GS4900000</u>
0215*	Diglycidyl ether	2238-07-5	KN2350000
0101 0328	2,3-Dihydro-2,2-dimethyl-7-benzofuranyl 2,4-Dihydroxy-2-methylpentane	1563-66-2 107-41-5	FB9450000 SA0810000
0338	Dihydroxybenzene	123-31-9	MX3500000
0543	m-Dihydroxybenzene	108-46-3	VG9625000
0109	o-Dihydroxybenzene	120-80-9	UX1050000
0543	1,3-Dihydroxybenzene	108-46-3	VG9625000
0109	1,2-Dihydroxybenzene	120-80-9	UX1050000
0338	1,4-Dihydroxybenzene	123-31-9	MX3500000
0208	2,2'-Dihydroxydiethyamine	111-42-2	KL2975000
0272	1,2-Dihydroxyethane	107-21-1	KW2975000
0216*	Diisobutyl ketone	108-83-8	MJ5775000
0320	1,6-Diisocyanatohexane	822-06-0	MO1740000
0440	1,5-Diisocyanatonaphthalene	3173-72-6	NO9600000
0323	Diisopropyl		
0216	sym-Diisopropyl acetone	108-83-8	MJ5775000
0362	Diisopropyl ether	108-20-3	TZ5425000
0362	<u>Diisopropyl oxide</u>	108-20-3	TZ5425000
0217*	Diisopropylamine	108-18-9	IM4025000
0227	Dimazine	57-14-7	MV2450000
0180	3,3'-Dimethoxybenzidine	119-90-4	DD0875000
0388	p,p'-Dimethoxydiphenylftrichloroethane	72-43-5	KJ3675000
0396 0218*	Dimethoxymethane Dimethyl agetamide	109-87-5	PA8750000
	Dimethyl acetamide Dimethyl carbamoyl chloride	127-19-5 79-44-7	AB7700000
0224* 0359	Dimethyl carbanoyl chloride Dimethyl carbinol	67-63-0	FD4200000 NT8050000
0359	2-Dimethyl cis-2-dimethylcarbamovl-1-met		TC3850000
0203	Dimethyl ester of 1,2-benzenedicarboxyli	131-11-3	TI1575000
0229	Dimethyl ester of sulfuric acid	77-78-1	WS8225000
0226	Dimethyl formamide	68-12-2	LO2100000
0004	Dimethyl ketone	67-64-1	AL3150000
0524	Dimethyl methane	74-98-6	TX2275000
0229*	Dimethyl sulfate	77-78-1	WS8225000
0225*		300-76-5	TB9450000
0478		1910-42-5	DW2275000
0618	3,3'-Dimethyl-4,4'-diphenyldiamine	119-93-7	DD1225000
0216	2,6-Dimethyl-4-heptanone	108-83-8	MJ5775000
0212	Dimethylacetone	96-22-0	SA8050000
	Dimethylamine	124-40-3	IP8750000
0219	Dimethylamine (anhydrous)	124-40-3	IP8750000
	<pre>bis(2-(Dimethylamino)ethyl)ether</pre>	3033-62-3	KR9460000
0222	3-(Dimethylamino)propionitrile	1738-25-6	UG1575000

0220	p-Dimethylaminoazobenzene	60-11-7	BX7350000
	4-Dimethylaminoazobenzene	60-11-7	BX7350000
0672	Dimethylaminobenzene	1300-73-8	ZE8575000
0222*		1738-25-6	UG1575000
0672 0672	Dimethylaniline 2.4-Dimethylaniline)	1300-73-8 1300-73-8	ZE8575000 ZE8575000
0670	1,4-Dimethylbenzene	106-42-3	ZE2625000
0669	1,3-Dimethylbenzene	108-38-3	ZE2275000
0668	1,2-Dimethylbenzene	95-47-6	ZE2450000
0618	3,3'-Dimethylbenzidine	119-93-7	DD1225000
0323	2,2-Dimethylbutane		
0323 0327	2,3-Dimethylbutane 1,3-Dimethylbutyl acetate	108-84-9	SA7525000
0224	Dimethylcarbamic chloride	79-44-7	FD4200000
0129	Dimethylchloroether	107-30-2	KN6650000
0286	tris(Dimethyldithiocarbamato)iron	14484-64-1	NO8750000
0275	Dimethylene oxide	75-21-8	KX2450000
0274	<u>Dimethyleneimine</u>	151-56-4	KX5075000
0274 0226*	Dimethylenimine Dimethylformamide	151-56-4 68-12-2	KX5075000 LO2100000
0227*	1,1-Dimethylhydrazine	57-14-7	MV2450000
0460	Dimethylnitromethane	79-46-9	TZ5250000
0461	Dimethylnitrosamine	62-75-9	IO0525000
0228*		131-11-3	TI1575000
0229	<u>Dimethylsulfate</u>	77-78-1	WS8225000
0612 0573	bis(Dimethylthiocarbamoyl) disulfide Dinile	137-26-8 110-61-2	<u>J01400000</u> WN3850000
0230*		148-01-6	XS4200000
0234	3,5-Dinitro-2-hydroxytoluene	534-52-1	G09625000
0234	4,6-Dinitro-2-methyl phenol	534-52-1	GO9625000
	Dinitro-o-cresol	534-52-1	G09625000
0234	4,6-Dinitro-o-cresol	534-52-1	G09625000
0230 0233*	3,5-Dinitro-o-toluamide p-Dinitrobenzene	148-01-6 100-25-4	XS4200000 CZ7525000
0231*	o-Dinitrobenzene	528-29-0	CZ7450000
0232*		99-65-0	CZ7350000
0233	1,4-Dinitrobenzene	100-25-4	CZ7525000
0231	1,2-Dinitrobenzene	528-29-0	CZ7450000
0232	1,3-Dinitrobenzene	99-65-0	CZ7350000
0233 0232	<pre>para-Dinitrobenzene meta-Dinitrobenzene</pre>	100-25-4 99-65-0	CZ7525000 CZ7350000
0232	ortho-Dinitrobenzene	528-29-0	CZ7450000
0465	Dinitrogen monoxide	10024-97-2	OX1350000
0454	Dinitrogen tetroxide (N2O4)	10102-44-0	OW9800000
0235*	Dinitrotoluene	25321-14-6	XT1300000
0235	Dinitrotoluol	25321-14-6	XT1300000 KL2975000
<u>0208</u> <u>0237</u>	<u>Diolamine</u> Dioxan	111-42-2 123-91-1	JG8225000
0237*	Dioxane	123-91-1	JG8225000
0237	p-Dioxane	123-91-1	JG8225000
0237	1,4-Dioxane	123-91-1	JG8225000
0238	Dioxane phosphate	78-34-2	TE3350000
0238	p-Dioxane-2,3-diyl ethyl phosphorodithio	78-34-2	TE3350000
0238 0238*	2,3-p-Dioxanethiol S,S-bis(0,0-diethyl p Dioxathion	78-34-2 78-34-2	TE3350000 TE3350000
0594	Dioxin	1746-01-6	HP3500000
0594	Dioxine	1746-01-6	HP3500000
0516	1,3-Dioxo-2-pivaloy-lindane	83-26-1	NK6300000
0239*	Diphenyl	92-52-4	DU8050000
<u>0496</u> 0496	Diphenyl ether Diphenyl oxide	101-84-8 101-84-8	KN8970000 KN8970000
0496	Diphenyl oxide-diphenyl mixture	8004-13-5	DV1500000
0240*	Diphenylamine	122-39-4	JJ7800000
0591	o-Diphenylbenzene	84-15-1	WZ6472000
0592	m-Diphenylbenzene	92-06-8	WZ6470000
0593	p-Diphenylbenzene	92-94-4	WZ6475000
<u>0591</u> _0592	1,2-Diphenylbenzene 1,3-Diphenylbenzene	84-15-1 92-06-8	WZ6472000 WZ6470000
0592	1,4-Diphenylbenzene	92-94-4	WZ6470000 WZ6475000
0413	4,4'-Diphenylmethane diisocyanate	101-68-8	NO9350000
0415	4,4'-Diphenylmethanediamine	101-77-9	BY5425000
0242*	Dipropyl ketone	123-19-3	MJ5600000
0241*	Dipropylene glycol methyl ether	34590-94-8	JM1575000
0241 0243*	Dipropylene glycol monomethyl ether Diquat (Diquat dibromide)	34590-94-8 85-00-7	JM1575000 JM5690000
0243	Diquat (Diquat dibromide) Diquat dibromide	85-00-7	JM5690000 JM5690000
0247	Direx®	330-54-1	YS8925000
0566	Disodium pyrosulfite	7681-57-4	UX8225000
0057	Disodium salt of boric acid	1330-43-4	ED4588000
0057	Disodium tetrabromate	1330-43-4	ED4588000
<u>UZ44*</u>	Disulfiram	97-77-8	J01225000

0579			
	Disulfoton	298-04-4	TD9275000
ひひつひ	Disulfur decafluoride	5714-22-7	WS4480000
	4,5-Dithia-1-octene	2179-59-1	J00350000
	Dithion®	3689-24-5	<u>XN4375000</u>
	Diuron	330-54-1	YS8925000
0653	Divanadium pentoxide dust	1314-62-1	YW2450000
0654	Divanadium pentoxide fume	1314-62-1	YW2460000
0067	Divinyl	106-99-0	EI9275000
	Divinyl benzene	1321-74-0	CZ9370000
	1-Dodecanethiol	112-55-0	JR3155000
0249	Dodecyl mercaptan	112-55-0	JR3155000
		112-55-0	JR3155000 JR3155000
0249	1-Dodecyl mercaptan		
0249	n-Dodecyl mercaptan	112-55-0	JR3155000
0055	Doped bismuth sesquitelluride		
0055	Doped bismuth telluride		
0055	Doped bismuth tritelluride		
0055	Doped tellurobismuthite		
0241	Dowanol® 50B	34590-94-8	JM1575000
0070	Dowanol® EB	111-76-2	KJ8575000
0158	Dowco® 132	299-86-5	TB3850000
0536	Dowtherm® 209	107-98-2	UB7700000
	Dowtherm® A	8004-13-5	DV1500000
		26499-65-0	
0518	Dried calcium sulfate		TP0700000
0569	Dry cleaning safety solvent	8052-41-3	WJ8925000
0103	Dry ice	124-38-9	FF6400000
	Dursban®	2921-88-2	TF6300000
0292	<u>Dyfonate®</u>	944-22-9	TA5950000
	Dyphonate	944-22-9	TA5950000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
			
0070	EGBE	111-76-2	кЈ8575000
		112-07-2	
0071	EGBEA		KJ8925000
0273	EGDN	628-96-6	KW5600000
0258	EGEE	110-80-5	KK8050000
0259	EGEEA	111-15-9	KK8225000
0.401	EGME	109-86-4	KL5775000
0401	ECMEA		
0401	EGMEA	110-49-6	KL5950000
	ENB		KL5950000 RB9450000
0402 0279	ENB	16219-75-3	RB9450000
0402 0279 0255*	ENB EPN	16219-75-3 2104-64-5	RB9450000 TB1925000
0402 0279 0255* 0276	ENB EPN ETU	16219-75-3 2104-64-5 96-45-7	RB9450000 TB1925000 NI9625000
0402 0279 0255* 0276 0070	ENB EPN ETU Ektasolve EB®	16219-75-3 2104-64-5 96-45-7 111-76-2	RB9450000 TB1925000 NI9625000 KJ8575000
0402 0279 0255* 0276 0070 0071	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000
0402 0279 0255* 0276 0070 0071 0022	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2 7429-90-5	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000
0402 0279 0255* 0276 0070 0071 0022 0309	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2 7429-90-5 7440-58-6	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000
0402 0279 0255* 0276 0070 0071 0022 0309 0507	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2 7429-90-5 7440-58-6 7723-14-0	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2 7429-90-5 7440-58-6 7723-14-0 7782-49-2	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0554	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ \end{array}$	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0554 0250*	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ 1302-74-5\\ \end{array}$	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD03330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0554	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ 1302-74-5\\ 115-29-7\\ \end{array}$	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0554 0250*	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ 1302-74-5\\ 115-29-7\\ 115-29-7\\ \end{array}$	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD03330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0554 0250* 0251*	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulphan	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ 1302-74-5\\ 115-29-7\\ 115-29-7\\ \end{array}$	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0554 0250* 0251* 0252*	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulphan Endrin	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ 1302-74-5\\ 115-29-7\\ 72-20-8\\ \end{array}$	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 I01575000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0554 0250* 0251* 0252* 0253*	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulphan Endrin Enflurane	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ 1302-74-5\\ 115-29-7\\ 115-29-7\\ \end{array}$	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 T01575000 KN6800000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0554 0250* 0251* 0252* 0253* 0447	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulphan Endrin Enflurane Engravers acid	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ 1302-74-5\\ 115-29-7\\ 715-29-7\\ 72-20-8\\ 13838-16-9\\ 7697-37-2\\ \end{array}$	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 KN6800000 QU5775000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0251* 0251* 0252* 0253* 0447 0285	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulphan Endrin Enflurane Engravers acid Entex	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ 1302-74-5\\ 115-29-7\\ 115-29-7\\ 72-20-8\\ 13838-16-9\\ 7697-37-2\\ 55-38-9\\ \end{array}$	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 I01575000 KN6800000 OU5775000 TF9625000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0251* 0251* 0252* 0252* 0253* 0447 0285 0254*	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulphan Endrin Enflurane Engravers acid Entex Epichlorohydrin	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2 7429-90-5 7440-58-6 7723-14-0 7782-49-2 7440-21-3 1302-74-5 115-29-7 115-29-7 72-20-8 13838-16-9 7697-37-2 55-38-9 106-89-8	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 I01575000 KN6800000 OU5775000 TF9625000 TX4900000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0251* 0251* 0252* 0247 0285 0254* 0275	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulphan Endrin Enflurane Engravers acid Entex Epichlorohydrin 1,2-Epoxy ethane	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ 1302-74-5\\ 115-29-7\\ 715-29-7\\ 72-20-8\\ 13838-16-9\\ 7697-37-2\\ 55-38-9\\ 106-89-8\\ 75-21-8\\ \end{array}$	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 I01575000 KN6800000 QU5775000 TT9625000 TX4900000 KX2450000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0251* 0251* 0252* 0253* 0447 0285 0254* 0275 0538	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulphan Endrin Enflurane Engravers acid Entex Epichlorohydrin 1,2-Epoxy ethane 1,2-Epoxy propane	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ 1302-74-5\\ 115-29-7\\ 72-20-8\\ 13838-16-9\\ 7697-37-2\\ 55-38-9\\ 106-89-8\\ 75-21-8\\ 75-56-9\\ \end{array}$	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 T01575000 KN6800000 QU5775000 TX4900000 KX2450000 TZ2975000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0251* 0252* 0253* 0447 0285 0254* 0275 0538 0303	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulfan Endrin Enflurane Engravers acid Entex Epichlorohydrin 1,2-Epoxy ethane 1,2-Epoxy propane 2,3-Epoxy-1-propanol	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ 1302-74-5\\ 115-29-7\\ 72-20-8\\ 13838-16-9\\ 7697-37-2\\ 55-38-9\\ 106-89-8\\ 75-21-8\\ 75-56-9\\ 556-52-5\\ \end{array}$	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD03330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 T01575000 KN6800000 QU5775000 TF9625000 TX4900000 KX2450000 TZ2975000 UB4375000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0251* 0252* 0253* 0447 0285 0254* 0275 0253* 0447 0285 0253*	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulfan Endrin Enflurane Engravers acid Entex Epichlorohydrin 1,2-Epoxy ethane 1,2-Epoxy-1-propanol 1,2-Epoxy-3-butoxypropane	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2 7429-90-5 7440-58-6 7723-14-0 7782-49-2 7440-21-3 1302-74-5 115-29-7 715-29-7 72-20-8 13838-16-9 7697-37-2 55-38-9 106-89-8 75-21-8 75-56-9 556-52-5 2426-08-6	RB9450000 TB1925000 NT9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 T01575000 KN6800000 QU5775000 TF9625000 TX4900000 KX2450000 TZ2975000 UB4375000 TX4200000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0251* 0251* 0252* 0253* 0447 0285 0254* 0275 0253* 0447 0285 0253*	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulfan Endosulphan Endrin Enflurane Engravers acid Entex Epichlorohydrin 1.2-Epoxy ethane 1,2-Epoxy -1-propanol 1.2-Epoxy-3-butoxypropane 1,2-Epoxy-3-isopropoxypropane	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2 7429-90-5 7440-58-6 7723-14-0 7782-49-2 7440-21-3 1302-74-5 115-29-7 72-20-8 13838-16-9 7697-37-2 55-38-9 106-89-8 75-21-8 75-56-9 556-52-5 2426-08-6 4016-14-2	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 KN6800000 OU5775000 TF9625000 TX4900000 KX2450000 TZ2975000 TX4200000 TX4200000 TX4200000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0554 0251* 0251* 0252* 0253* 0447 0285 0254* 0275 0538 0303 0081 0363 0498	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulfan Endrin Enflurane Engravers acid Entex Epichlorohydrin 1.2-Epoxy ethane 1.2-Epoxy propane 2.3-Epoxy-1-propanol 1.2-Epoxy-3-butoxypropane 1.2-Epoxy-3-isopropoxypropane 1.2-Epoxy-3-phenoxy propane	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2 7429-90-5 7440-58-6 7723-14-0 7782-49-2 7440-21-3 1302-74-5 115-29-7 715-29-7 72-20-8 13838-16-9 7697-37-2 55-38-9 106-89-8 75-21-8 75-56-9 556-52-5 2426-08-6 4016-14-2 122-60-1	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 KN6800000 OU5775000 TF9625000 TX4900000 KX2450000 TZ2975000 UB4375000 TX4200000 TZ3500000 TZ3500000 TZ3500000
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0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0251* 0252* 0253* 0447 0285 0254* 0275 0538 0303 0498 0602 0659 0303 0215 0215	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulphan Endrin Enflurane Engravers acid Entex Epichlorohydrin 1.2-Epoxy ethane 1.2-Epoxy ethane 1.2-Epoxy-1-propanol 1.2-Epoxy-3-butoxypropane 1.2-Epoxy-3-butoxypropane 1.2-Epoxy-3-penoxy propane 1.4-Epoxybutane 1-Epoxyethyl-3,4-epoxy-cyclohexane Epoxypropyl alcohol 2-Epoxypropyl ether bis(2,3-Epoxypropyl) ether	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2 7429-90-5 7440-58-6 7723-14-0 7782-49-2 7440-21-3 1302-74-5 115-29-7 715-29-7 72-20-8 13838-16-9 7697-37-2 55-38-9 106-89-8 75-21-8 75-56-9 556-52-5 2426-08-6 4016-14-2 122-60-1 109-99-9 106-87-6 556-52-5 2238-07-5	RB9450000 TB1925000 NT9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 T01575000 KN6800000 QU5775000 TF9625000 TX4900000 KX2450000 TX2975000 UB4375000 TX4200000 TZ3500000 TZ3675000 LU5950000 RN8640000 UB4375000 KN2350000 KN2350000 KN2350000
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0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0554 0251* 0252* 0253* 0447 0285 0254* 0275 0538 0303 0081 0363 0498 0602 0602 0659 0303 0215 0262 0262 0262 0262 0262 0262 0262 0263 0263 0263 0263 0263 0263 0264 0263 0	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulphan Endrin Enflurane Engravers acid Entex Epichlorohydrin 1,2-Epoxy ethane 1,2-Epoxy propane 2,3-Epoxy-1-propanol 1,2-Epoxy-3-butoxypropane 1,2-Epoxy-3-butoxypropane 1,2-Epoxy-3-phenoxy propane 1,4-Epoxybutane 1-Epoxybutane 1-Epoxybutane 1-Epoxypropyl alcohol 2-Epoxypropyl ether bis(2,3-Epoxypropyl) ether Erythrene Essence of mirbane EtOH Ethanal Ethane hexachloride Ethane pentachloride	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2 7429-90-5 7440-58-6 7723-14-0 7782-49-2 7440-21-3 1302-74-5 115-29-7 115-29-7 72-20-8 13838-16-9 7697-37-2 55-38-9 106-89-8 75-21-8 75-56-9 556-52-5 2426-08-6 4016-14-2 122-60-1 109-99-9 106-87-6 556-52-5 2238-07-5 2238-07-5 106-99-0 98-95-3 64-17-5 75-07-0 67-72-1 76-01-7	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 TB9275000 TS75000 TF9625000 TX4900000 TX4900000 TX2975000 TX4900000 TX2975000 TX4900000 TX2975000 TX4900000 TX4900000 TX4900000 TX490000 TX4900000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0251* 0252* 0253* 0447 0285 0254* 0254* 0275 0538 0303 0498 0602 0659 0303 0215 0262 0262 0262 0262	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulfan Endrin Enflurane Engravers acid Entex Epichlorohydrin 1,2-Epoxy ethane 1,2-Epoxy propane 2,3-Epoxy-1-propanol 1,2-Epoxy-3-butoxypropane 1,2-Epoxy-3-butoxypropane 1,2-Epoxy-3-phenoxy propane 1,2-Epoxy-3-phenoxy propane 1,4-Epoxybutane 1-Epoxyethyl-3,4-epoxy-cyclohexane Epoxypropyl alcohol 2-Epoxypropyl ether bis(2,3-Epoxypropyl) ether Erythrene Essence of mirbane EtOH Ethanal Ethane hexachloride Ethane pentachloride Ethane pentachloride Ethane trichloride	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2 7429-90-5 7440-58-6 7723-14-0 7782-49-2 7440-21-3 1302-74-5 115-29-7 115-29-7 72-20-8 13838-16-9 7697-37-2 55-38-9 106-89-8 75-21-8 75-56-9 556-52-5 2426-08-6 4016-14-2 122-60-1 109-99-9 106-87-6 556-52-5 2238-07-5 2238-07-5 106-99-0 98-95-3 64-17-5 75-07-0 67-72-1 76-01-7 79-00-5	RB9450000 TB1925000 NT9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 T1575000 KN6800000 QU5775000 TF9625000 TX4900000 KX2450000 TX4900000 TX4200000 TZ2975000 UB4375000 TX4200000 TZ3500000 TX4200000 TZ3500000 TX4200000 TZ3500000 TX4200000 TZ3500000 TZ3500000 TZ3500000 KN2350000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0251* 0252* 0253* 0447 0285 0254* 0275 0538 0303 0081 0363 0498 0602 0659 0303 0215 0262 0001 0316 0482 0628 0529	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulfan Endrin Enflurane Engravers acid Entex Epichlorohydrin 1.2-Epoxy ethane 1.2-Epoxy propane 2.3-Epoxy-1-propanol 1.2-Epoxy-3-butoxypropane 1.2-Epoxy-3-butoxypropane 1.2-Epoxy-3-phenoxy propane 1.4-Epoxybutane 1-Epoxyethyl-3,4-epoxy-cyclohexane Epoxypropyl alcohol 2-Epoxypropyl ether bis(2,3-Epoxypropyl) ether Erythrene Essence of mirbane EtOH Ethanal Ethane hexachloride Ethane trichloride Ethanecarboxylic acid	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ 1302-74-5\\ 115-29-7\\ 115-29-7\\ 72-20-8\\ 13838-16-9\\ 7697-37-2\\ 55-38-9\\ 106-89-8\\ 75-21-8\\ 75-56-9\\ 556-52-5\\ 2426-08-6\\ 4016-14-2\\ 122-60-1\\ 109-99-9\\ 106-87-6\\ 556-52-5\\ 2238-07-5\\ 2238-07-5\\ 2238-07-5\\ 2238-07-5\\ 106-99-0\\ 98-95-3\\ 64-17-5\\ 75-07-0\\ 67-72-1\\ 76-01-7\\ 79-00-5\\ 79-09-4\\ \end{array}$	RB9450000 TB1925000 NT9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 TF9625000 TX4900000 TX4900000 TZ2975000 TZ2975000 TZ2975000 TX4200000 TZ3500000 TZ3675000 LU5950000 CNN2350000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0251* 0251* 0252* 0253* 0447 0285 0254* 0275 0538 0303 0498 0602 0659 0303 0215 0262 0001 0316 0482 0482 0628 0529 0269	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulfan Endrin Enflurane Engravers acid Entex Epichlorohydrin 1,2-Epoxy ethane 1,2-Epoxy propane 2,3-Epoxy-1-propanol 1,2-Epoxy-3-butoxypropane 1,2-Epoxy-3-butoxypropane 1,2-Epoxy-3-phenoxy propane 1,2-Epoxy-3-phenoxy propane 1,4-Epoxybutane 1-Epoxyethyl-3,4-epoxy-cyclohexane Epoxypropyl alcohol 2-Epoxypropyl ether bis(2,3-Epoxypropyl) ether Erythrene Essence of mirbane EtOH Ethanal Ethane hexachloride Ethane pentachloride Ethane pentachloride Ethane trichloride	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2 7429-90-5 7440-58-6 7723-14-0 7782-49-2 7440-21-3 1302-74-5 115-29-7 115-29-7 72-20-8 13838-16-9 7697-37-2 55-38-9 106-89-8 75-21-8 75-56-9 556-52-5 2426-08-6 4016-14-2 122-60-1 109-99-9 106-87-6 556-52-5 2238-07-5 2238-07-5 106-99-0 98-95-3 64-17-5 75-07-0 67-72-1 76-01-7 79-00-5 79-09-4 107-15-3	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 TF9625000 TX4900000 TX4900000 TX4900000 TZ2975000 TZ2975000 TZ2975000 TZ2975000 TX4900000 TZ3500000 TZ3500000 TZ3500000 TZ3500000 TZ3500000 TZ3500000 TZ3500000 TZ3500000 TZ3500000 KN2350000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0251* 0252* 0253* 0447 0285 0254* 0275 0538 0303 0081 0363 0498 0602 0659 0303 0215 0262 0001 0316 0482 0628 0529	ENB EPN ETU Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulphan Endrin Enflurane Engravers acid Entex Epichlorohydrin 1,2-Epoxy ethane 1,2-Epoxy propane 2,3-Epoxy-1-propanol 1,2-Epoxy-3-butoxypropane 1,2-Epoxy-3-butoxypropane 1,2-Epoxy-3-phenoxy propane 1,4-Epoxybutane 1-Epoxyethyl-3,4-epoxy-cyclohexane Epoxypropyl alcohol 2-Epoxypropyl ether bis(2,3-Epoxypropyl) ether Erythrene Essence of mirbane EtOH Ethanal Ethane hexachloride Ethane carboxylic acid 1,2-Ethanediamine Ethanedimitrile	$\begin{array}{c} 16219-75-3\\ 2104-64-5\\ 96-45-7\\ 111-76-2\\ 112-07-2\\ 7429-90-5\\ 7440-58-6\\ 7723-14-0\\ 7782-49-2\\ 7440-21-3\\ 1302-74-5\\ 115-29-7\\ 115-29-7\\ 72-20-8\\ 13838-16-9\\ 7697-37-2\\ 55-38-9\\ 106-89-8\\ 75-21-8\\ 75-56-9\\ 556-52-5\\ 2426-08-6\\ 4016-14-2\\ 122-60-1\\ 109-99-9\\ 106-87-6\\ 556-52-5\\ 2238-07-5\\ 2238-07-5\\ 2238-07-5\\ 2238-07-5\\ 106-99-0\\ 98-95-3\\ 64-17-5\\ 75-07-0\\ 67-72-1\\ 76-01-7\\ 79-00-5\\ 79-09-4\\ \end{array}$	RB9450000 TB1925000 NT9625000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 TF9625000 TX4900000 TX4900000 TZ2975000 TZ2975000 TZ2975000 TX4200000 TZ3500000 TZ3675000 LU5950000 CNN2350000
0402 0279 0255* 0276 0070 0071 0022 0309 0507 0550 0251* 0251* 0252* 0253* 0447 0285 0254* 0275 0538 0303 0498 0602 0659 0303 0215 0262 0001 0316 0482 0482 0628 0529 0269	ENB EPN ETU Ektasolve EB® Ektasolve EB® acetate Elemental aluminum Elemental hafnium Elemental phosphorus Elemental selenium Elemental silicon Emery Endosulfan Endosulphan Endrin Enflurane Engravers acid Entex Epichlorohydrin 1,2-Epoxy ethane 1,2-Epoxy propane 2,3-Epoxy-1-propanol 1,2-Epoxy-3-butoxypropane 1,2-Epoxy-3-butoxypropane 1,2-Epoxy-3-phenoxy propane 1,4-Epoxybutane 1-Epoxyethyl-3,4-epoxy-cyclohexane Epoxypropyl alcohol 2-Epoxypropyl ether bis(2,3-Epoxypropyl) ether Erythrene Essence of mirbane EtOH Ethanal Ethane hexachloride Ethane pentachloride Ethane carboxylic acid 1,2-Ethanediamine	16219-75-3 2104-64-5 96-45-7 111-76-2 112-07-2 7429-90-5 7440-58-6 7723-14-0 7782-49-2 7440-21-3 1302-74-5 115-29-7 115-29-7 72-20-8 13838-16-9 7697-37-2 55-38-9 106-89-8 75-21-8 75-56-9 556-52-5 2426-08-6 4016-14-2 122-60-1 109-99-9 106-87-6 556-52-5 2238-07-5 2238-07-5 106-99-0 98-95-3 64-17-5 75-07-0 67-72-1 76-01-7 79-00-5 79-09-4 107-15-3	RB9450000 TB1925000 NI9625000 KJ8575000 KJ8575000 KJ8925000 BD0330000 MG4600000 TH3500000 VS7700000 VW0400000 GN0231000 RB9275000 RB9275000 TJ575000 TF9625000 TX4900000 TX4900000 TZ2975000 TX4900000 TZ2975000 TZ2975000 TX4900000 TZ3500000 TZ3500000 TZ3500000 TZ3500000 TZ3500000 TZ3500000 TZ3500000 TZ3500000 KN2350000

0273	1.2-Ethanediol dinitrate	628-96-6	KW5600000
0273	Ethanethiol	75-08-1	K19625000
0002	Ethanoic acid	64-19-7	AF1225000
0003	Ethanoic anhydride	108-24-7	AK1925000
0262	Ethanol	64-17-5	K06300000
0256*	Ethanolamine	141-43-5	KJ5775000
0367	Ethenone	463-51-4	OA7700000
0656	Ethenyl acetate	108-05-4	AK0875000
<u>0571</u>	Ethenyl benzene	100-42-5	WL3675000
<u>0656</u>	Ethenyl ethanoate	108-05-4	AK0875000
0663	Ethenylmethylbenzene	25013-15-4	WL5075000
0277	Ether	60-29-7	KI5775000
0008	Ethine	74-86-2	A09600000
	Ethion	563-12-2 110-80-5	TE4550000
	2-Ethoxyethanol 2-Ethoxyethyl acetate	111-80-5	KK8050000
0253	<u>z-Ethoxyethyi acetate</u> Ethrane®	13838-16-9	KK8225000 KN6800000
0283	Ethyl 3-methyl-4-(methylthio)phenyl-(1-m		TB3675000
	Ethyl acetate	141-78-6	AH5425000
0488	Ethyl acetone	107-87-9	SA7875000
	Ethyl acrylate	140-88-5	AT0700000
0261	Ethyl acrylate (inhibited)	140-88-5	AT0700000
0262*		64-17-5	K06300000
0001		75-07-0	AB1925000
0418	Ethyl amyl ketone	541-85-5	MJ7350000
	Ethyl benzene	100-41-4	DA0700000
0265*		74-96-4	KH6475000
	Ethyl butyl ketone	106-35-4	MJ5250000
0533	Ethyl carbinol	71-23-8	UH8225000
0267*	-	75-00-3	KH7525000
0530	Ethyl cyanide	107-12-0	UF9625000
0260	Ethyl ester of acetic acid	141-78-6	AH5425000
0261	Ethyl ester of acrylic acid	140-88-5	AT0700000
0278	Ethyl ester of formic acid	109-94-4	L08400000
0260	Ethyl ethanoate	141-78-6	AH5425000
	Ethyl ether Ethyl formate	60-29-7 109-94-4	KI5775000
0278	Ethyl ketone	96-22-0	LQ8400000 SA8050000
0212		75-08-1	K19625000
0278	Ethyl methanoate	109-94-4	L08400000
0069	Ethyl methyl ketone	78-93-3	EL6475000
0416	Ethyl methyl ketone peroxide	1338-23-4	EL9450000
0006	Ethyl nitrile	75-05-8	AL7700000
0282	Ethyl orthosilicate	78-10-4	VV9450000
0277	Ethyl oxide	60-29-7	KI5775000
0255	Ethyl p-nitrophenyl benzenethionophospho	2104-64-5	TB1925000
0479	Ethyl parathion	56-38-2	TF4550000
0213	Ethyl phthalate	84-66-2	TI1050000
0261	Ethyl propenoate	140-88-5	AT0700000
0590	Ethyl pyrophosphate	107-49-3	UX6825000
	Ethyl silicate	78-10-4	VV9450000
0282	Ethyl silicate (condensed)	78-10-4	VV9450000
0280	Ethyl sulfhydrate	75-08-1	K19625000
	Ethylamine (aphydroug)	75-04-7 75-04-7	KH2100000
0263	Ethylamine (anhydrous)	 	KH2100000
<u>0264</u> 0270	Ethylbenzol Ethylene bromide	100-41-4 106-93-4	DA0700000 KH9275000
0270	Ethylene chlorhydrin	107-07-3	KK0875000
0200	Ethylene chloride	107-07-3	KI0525000
	Ethylene chlorohydrin	107-00-2	KK0875000
	Ethylene cyanide	110-61-2	WN3850000
	Ethylene dibromide	106-93-4	KH9275000
	Ethylene dichloride	107-06-2	KI0525000
0573	Ethylene dicyanide	110-61-2	WN3850000
	Ethylene dinitrate	628-96-6	KW5600000
0272*	Ethylene glycol	107-21-1	KW2975000
0273*	Ethylene glycol dinitrate	628-96-6	KW5600000
0357	Ethylene glycol isopropyl ether	109-59-1	KL5075000
0070	Ethylene glycol monobutyl ether	111-76-2	KJ8575000
0071	Ethylene glycol monobutyl ether acetate	112-07-2	KJ8925000
0258	Ethylene glycol monoethyl ether	110-80-5	KK8050000
0259	Ethylene glycol monoethyl ether acetate	111-15-9	KK8225000
0401	Ethylene glycol monomethyl ether	109-86-4	KL5775000
0402	Ethylene glycol monomethyl ether acetate		KL5950000
0658	Ethylene monochloride	75-01-4	KU9625000
0273	Ethylene nitrate	628-96-6 75-21-8	KW5600000
	Ethylene oxide Ethylene thiourea	<u>75-21-8</u> 96-45-7	XX2450000
0629	Ethylene trichloride	79-45-7 79-01-6	NI9625000 KX4550000
0243	1,1'-Ethylene-2,2'-bipyridyllium dibromi	85-00-7	JM5690000
	1,3-Ethylene-2-thiourea	96-45-7	NI9625000
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0013		79-10-7	AS4375000
0269*	Ethylenediamine (anhydrous)	107-15-3 107-15-3	KH8575000
0269	Ethyleneimine (annydrous)	151-56-4	KH8575000 KX5075000
	Ethylenimine	151-56-4	KX5075000
0529	Ethylformic acid	79-09-4	UE5950000
0236	bis-(2-Ethylhexyl)phthalate	117-81-7	TI0350000
0194		75-34-3	KI0175000
0194	1,1-Ethylidene dichloride	75-34-3	KI0175000
	Ethylidene norbornene	16219-75-3	RB9450000
0279	5-Ethylidene-2-norbornene	16219-75-3	RB9450000
0279	5-Ethylidenebicyclo(2.2.1)-hept-2-ene	16219-75-3	RB9450000
0274	Ethylimine	151-56-4	<u>KX5075000</u>
	4-Ethylmorpholine	100-74-3	OE4025000
<u>0256</u> 0008		141-43-5 74-86-2	
0491	Expanded perlite	93763-70-3	
0471	<u> </u>	<u> </u>	503231000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
_0007	בא א	52-06-2	AB9450000
0007	FAA 2-FAA	53-96-3 53-96-3	AB9450000 AB9450000
0346	FeSO4: Ferrous sulfate	<u> </u>	ADJ130000
	Fenamiphos	22224-92-6	TB3675000
0546	Fenchlorophos	299-84-3	TG0525000
0494	Fenothiazine	92-84-2	SN5075000
0284*	Fensulfothion	115-90-2	TF3850000
	Fenthion	55-38-9	TF9625000
0501	Fenylfosfin	638-21-1	SZ2100000
	Ferbam	14484-64-1	NO8750000
0348	Fermentation amyl alcohol	123-51-3	EL5425000
0286	Ferric dimethyl dithiocarbamate	14484-64-1	NO8750000
0344 0205	Ferric oxide Ferrocene	1309-37-1 102-54-5	NO7400000 LK0700000
0203	Ferrovanadium	12604-58-9	LK2900000
	Ferrovanadium dust	12604-58-9	LK2900000
0288	Fiber glas®	12001 50 5	LK3651000
0288	Fiberglass		LK3651000
0288*			LK3651000
0563	Floridine	7681-49-4	WB0350000
0105	Flue gas	630-08-0	FG3500000
0007	2-Fluorenylacetamide	53-96-3	AB9450000
0289*	Fluorine	7782-41-4	LM6475000
0475	Fluorine monoxide	7783-41-7	RS2100000
0289 0123	Fluorine-19 Fluorocarbon 1011	7782-41-4 74-97-5	LM6475000 PA5250000
0123	Fluorocarbon 12	75-71-8	
0634	Fluorocarbon 1301	75-63-8	PA8200000 PA5425000
0131	Fluorocarbon-115	76-15-3	KH7877500
0124	Fluorocarbon-22	75-45-6	PA6390000
0197	Fluorodichloromethane	75-43-4	PA8400000
0660	Fluoroethene	75-02-5	YZ7351000
0660	Fluoroethylene	75-02-5	YZ7351000
0108	Fluoroformyl fluoride	353-50-4	FG6125000
0108	Fluorophosgene	353-50-4	FG6125000
0290*	Fluorotrichloromethane	75-69-4	PB6125000
0291* 0292*	Fluoroxene	<u>406-90-6</u> 944-22-9	KO4250000 TA5950000
0292	Fonofos Fonophos	944-22-9	TA5950000 TA5950000
0396	Formal	109-87-5	PA8750000
0393*	Formaldehyde	50-00-0	LP8925000
0304	Formaldehyde cyanohydrin	107-16-4	AM0350000
0396	Formaldehyde dimethylacetal	109-87-5	PA8750000
0294	Formaldehyde solution		
0294*			
0295*	Formamide	75-12-7	L00525000
0296*	Formic acid	64-18-6	LO4900000
0296	Formic acid (85-95% in aqueous solution)	64-18-6	LO4900000
0333	Formonitrile	74-90-8	MW6825000
0107 0290	Freon® 10 Freon® 11	56-23-5 75-69-4	FG4900000 PB6125000
<u>0290</u> <u>0596</u>	Freon® 11 Freon® 112	76-12-0	KI1420000
0595	Freon® 112a	76-12-0	KI1425000 KI1425000
0632	Freon® 113	76-13-1	KJ4000000
0201	Freon® 114	76-14-2	KI1101000
0131	Freon® 115	76-15-3	КН7877500
0192	Freon® 12	75-71-8	PA8200000
0214	Freon® 12B2	75-61-6	PA7525000
0634	Freon® 13B1	75-63-8	PA5425000

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0197	Freon® 21	75-43-4	PA8400000
0124	Freon® 22	75-45-6	PA6390000
0366	Fuel Oil No. 1	8008-20-6	OA5500000
0101	Furacarb®	1563-66-2	FB9450000
0101	Furadan®	1563-66-2	FB9450000
<u> </u>			
0297	Fural	98-01-1	LT700000
0297	2-Furancarboxaldehyde	98-01-1	LT7000000
0376	2,5-Furanedione	108-31-6	ON3675000
0297*	Furfural	98-01-1	LT7000000
0297	<u>Furfuraldehyde</u>	98-01-1	LT7000000
0297	2-Furfuraldehyde	98-01-1	LT7000000
0298*	Furfuryl alcohol	98-00-0	LU9100000
0102	Furnace black	1333-86-4	FF5800000
0298	2-Furylmethanol	98-00-0	LU9100000
0057	Fused borax	1330-43-4	ED4588000
0348	Fusel oil	123-51-3	EL5425000
0340			
UIDE	CHEMICAL NAME	CAS NO	RTECS N
	acridine	65996-93-2	GF8655000
0145	chrysene	65996-93-2	GF8655000
	anthracene & benzo(a)pyrene).	65996-93-2	GF8655000
0145	pyrene	65996-93-2	GF8655000
0145	phenanthrene	65996-93-2	GF8655000
	Gasoline	8006-61-9	LX3300000
0632	Genetron® 113	76-13-1	KJ400000
	Genetron® 114	76-14-2	KI1101000
	Genetron® 115	76-15-3	KH7877500
0192	Genetron® 12	75-71-8	PA8200000
	Genetron® 21	75-43-4	PA8400000
	Genetron® 22	75-45-6	PA6390000
	Germane	7782-65-2	LY4900000
	Germanium hydride	7782-65-2	LY4900000
	Germanium tetrahydride	7782-65-2	LY4900000
	Germanomethane	<u>7782-65-2</u>	<u>LY4900000</u>
0002	Glacial acetic acid (pure compound)	64-19-7	AF1225000
	Glacial acrylic acid (98% in aqueous sol	79-10-7	AS4375000
0288	Glass fibers		LK3651000
	Glass wool		LK3651000
	Glutaraldehyde	111-30-8	MA2450000
	Glutaric dialdehyde	111-30-8	MA2450000
	Glycerin (anhydrous)	56-81-5	MA8050000
	Glycerin (mist)	56-81-5	MA8050000
	GIVCELIII (MISC)	30-01-3	
		E C 01 E	
0302	Glycerol	56-81-5	
0631	Glycerol Glycerol trichlorohydrin	96-18-4	TZ9275000
0631 0631	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin	96-18-4 96-18-4	TZ9275000 TZ9275000
0631 0631 0456	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate	96-18-4 96-18-4 55-63-0	TZ9275000 TZ9275000 OX2100000
0631 0631 0456 0303	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide	96-18-4 96-18-4 55-63-0 556-52-5	TZ9275000 TZ9275000 OX2100000 UB4375000
0631 0631 0456 0303 0303*	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5	TZ9275000 TZ9275000 QX2100000 UB4375000 UB4375000
0631 0631 0456 0303 0303* 0019	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol Glycidyl allyl ether	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3	TZ9275000 TZ9275000 0X2100000 UB4375000 UB4375000 RR0875000
0631 0631 0456 0303 0303*	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5	TZ9275000 TZ9275000 0X2100000 UB4375000 UB4375000 RR0875000
0631 0631 0456 0303 0303* 0019	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol Glycidyl allyl ether	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3 122-60-1 107-21-1	TZ9275000 TZ9275000 0X2100000 UB4375000 UB4375000 RR0875000 TZ3675000
0631 0631 0456 0303 0303* 0019 0498	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol Glycidyl allyl ether Glycidyl phenyl ether	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3 122-60-1	TZ9275000 TZ9275000 0X2100000 UB4375000 UB4375000 RR0875000 TZ3675000 KW2975000
0631 0631 0456 0303 0303* 0019 0498 0272	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycidol Glycidyl allyl ether Glycidyl phenyl ether Glycol	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3 122-60-1 107-21-1	TZ9275000 TZ9275000 OX2100000 UB4375000 UB4375000 RR0875000 TZ3675000 KW2975000
0631 0631 0456 0303 0303* 0019 0498 0272 0272	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol Glycidyl allyl ether Glycidyl phenyl ether Glycol Glycol alcohol Glycol dibromide	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3 122-60-1 107-21-1 106-93-4	TZ9275000 TZ9275000 OX2100000 UB4375000 RR0875000 TZ3675000 KW2975000 KW2975000
0631 0631 0456 0303 0303* 0019 0498 0272 0272 0270 0271	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol Glycidyl allyl ether Glycidyl phenyl ether Glycol Glycol dibromide Glycol dichloride	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3 122-60-1 107-21-1 106-93-4 107-06-2	TZ9275000 TZ9275000 OX2100000 UB4375000 RR0875000 TZ3675000 KW2975000 KW2975000 KH9275000 KI0525000
0631 0631 0456 0303 0303* 0019 0498 0272 0272 0272 0271	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol Glycidyl allyl ether Glycidyl phenyl ether Glycol Glycol alcohol Glycol dibromide Glycol dichloride Glycol dinitrate	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3 122-60-1 107-21-1 106-93-4 107-06-2 628-96-6	TZ9275000 TZ9275000 OX2100000 UB4375000 RR0875000 TZ3675000 KW2975000 KW2975000 KH9275000 KH9275000 KW5600000
0631 0631 0456 0303 0303* 0019 0498 0272 0272 0272 0271 0273	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol Glycidyl allyl ether Glycidyl phenyl ether Glycol Glycol dibromide Glycol dibromide Glycol dinitrate Glycol monoethyl ether acetate	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3 122-60-1 107-21-1 106-93-4 107-06-2 628-96-6 111-15-9	TZ9275000 TZ9275000 OX2100000 UB4375000 RR0875000 TZ3675000 KW2975000 KW2975000 KH9275000 KH9275000 KI0525000 KW5600000
0631 0631 0456 0303 0303* 0019 0498 0272 0272 0272 0270 0271 0273 0259 0401	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycidol Glycidyl allyl ether Glycidyl phenyl ether Glycol Glycol dibromide Glycol dichloride Glycol dinitrate Glycol monoethyl ether acetate Glycol monomethyl ether	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3 122-60-1 107-21-1 106-93-4 107-06-2 628-96-6 111-15-9 109-86-4	TZ9275000 TZ9275000 OX2100000 UB4375000 RR0875000 TZ3675000 KW2975000 KW2975000 KH9275000 KI0525000 KW5600000 KK8225000 KL5775000
0631 0631 0456 0303 0303* 0019 0498 0272 0272 0272 0271 0273 0259 0401	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol Glycidyl allyl ether Glycidyl phenyl ether Glycol Glycol dichloride Glycol dichloride Glycol dinitrate Glycol monomethyl ether Glycol monomethyl ether	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3 122-60-1 107-21-1 106-93-4 107-06-2 628-96-6 111-15-9 109-86-4 110-49-6	TZ9275000 TZ9275000 OX2100000 UB4375000 RR0875000 TZ3675000 KW2975000 KW2975000 KH9275000 KH9275000 KK8225000 KK8225000 KL5775000 KL5775000
0631 0631 0456 0303 0303* 0019 0498 0272 0272 0272 0271 0271 0273 0259 0401 0402	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol Glycidyl allyl ether Glycidyl phenyl ether Glycol Glycol alcohol Glycol dibromide Glycol dichloride Glycol dinitrate Glycol monoethyl ether acetate Glycol monomethyl ether Glycol monomethyl ether	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3 122-60-1 107-21-1 106-93-4 107-06-2 628-96-6 111-15-9 109-86-4 110-49-6 107-16-4	TZ9275000 TZ9275000 OX2100000 UB4375000 RR0875000 KR2975000 KW2975000 KH9275000 KH9275000 KK550000 KK8225000 KK8225000 KK8225000 KL5950000 AM0350000
0631 0631 0456 0303 0303* 0019 0498 0272 0272 0270 0271 0273 0259 0401 0402 0304*	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol Glycidyl allyl ether Glycidyl phenyl ether Glycol Glycol dibromide Glycol dibromide Glycol dichloride Glycol dinitrate Glycol monomethyl ether acetate Glycol monomethyl ether Glycol monomethyl ether Glycol itrile Glycolonitrile	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3 122-60-1 107-21-1 106-93-4 107-06-2 628-96-6 111-15-9 109-86-4 110-49-6 107-16-4 107-16-4	TZ9275000 TZ9275000 OX2100000 UB4375000 RR0875000 KW2975000 KW2975000 KH9275000 KH9275000 KK5600000 KK8225000 KK5775000 KL5950000 AM0350000 AM0350000
0631 0631 0456 0303 0303* 0019 0498 0272 0272 0270 0271 0273 0259 0401 0402 0304* 0304*	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol Glycidyl allyl ether Glycidyl phenyl ether Glycol Glycol dibromide Glycol dibromide Glycol dichloride Glycol dinitrate Glycol monomethyl ether acetate Glycol monomethyl ether Glycol monomethyl ether Glycol intrile Glycolonitrile Glycolonitrile	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3 122-60-1 107-21-1 106-93-4 107-06-2 628-96-6 111-15-9 109-86-4 110-49-6 107-16-4 107-16-4 107-16-4	TZ9275000 TZ9275000 OX2100000 UB4375000 RR0875000 KW2975000 KW2975000 KW2975000 KM2975000 AM0350000 AM0350000 AM0350000
0631 0631 0456 0303 0303* 0019 0498 0272 0272 0270 0271 0273 0259 0401 0402 0304*	Glycerol Glycerol trichlorohydrin Glyceryl trichlorohydrin Glyceryl trinitrate Glycide Glycide Glycidol Glycidyl allyl ether Glycidyl phenyl ether Glycol Glycol dibromide Glycol dibromide Glycol dichloride Glycol dinitrate Glycol monomethyl ether acetate Glycol monomethyl ether Glycol monomethyl ether Glycol itrile Glycolonitrile	96-18-4 96-18-4 55-63-0 556-52-5 556-52-5 106-92-3 122-60-1 107-21-1 106-93-4 107-06-2 628-96-6 111-15-9 109-86-4 110-49-6 107-16-4 107-16-4	TZ9275000 QX2100000 UB4375000 RR0875000 TZ3675000 KW2975000 KW2975000 KH9275000 K10525000 KW5600000 KK8225000 KL5775000

GUIDE CHEMICAL NAME CAS NO RTECS NO

MD7900000

WN6500000

MD9659600

FF5250100

EX1225000 Y08400000

Y08400000

TE1925000

MG2360000

TP0700000

MG2360000

57-50-1

7782-42-5

76-22-2 8006-64-2

8006-64-2

13397-24-5

26499-65-0

13397-24-5

86-50-0

7440-44-0 (

0305* Grain dust (oat, wheat, barley)

0574 Granulated sugar

0096 Gum camphor 0648 Gum turpentine

Guthion®

0648 Gumspirits

0308* Gypsum

0044

0518

0308

0306* Graphite (natural)

0307* Graphite (synthetic) 0096 Gum camphor

Gypsum stone

Gypsum hemihydrate

0314	HCBD	87-68-3	ЕЈ0700000
0315	HCCPD	77-47-4	GY1225000
0370	HCH	58-89-9	GV4900000
0320	HDI	822-06-0	MO1740000
0206	HEOD	60-57-1	IO1750000
0334	HF-A	7664-39-3	MW7875000
0319	HFA	684-16-2	UC2450000
0016	HHDN	309-00-2	IO2100000
0412	HMDI	5124-30-1	NO9250000
0320	HMDI	822-06-0	MO1740000
0321	HMPA	680-31-9	TD0875000
0339	НРА	999-61-1	AT1925000
0309*	Hafnium	7440-58-6	MG4600000
0309	Hafnium metal	7440-58-6	MG4600000
0193	Halane	118-52-5	MU0700000
0596	Halocarbon 112	76-12-0	KI1420000
0595	<u>Halocarbon 112a</u>	76-11-9	KI1425000
0632	<u>Halocarbon 113</u>	76-13-1	KJ4000000
0662	Halocarbon 1132A	75-38-7	KW0560000
0131	Halocarbon 115	76-15-3	<u>KH7877500</u>
0634	Halocarbon 13B1	75-63-8	PA5425000
0123	<u>Halon® 1011</u>	74-97-5	PA5250000
0107	Halon® 104	56-23-5	FG4900000
0197	Halon® 112	75-43-4	PA8400000
0214	Halon® 1202	75-61-6	PA7525000
0192	Halon® 122	75-71-8	PA8200000
0634	Halon® 1301	75-63-8	PA5425000
0201	Halon® 242	76-14-2	KI1101000
0310*	Halothane	151-67-7	KH6550000
0630	Halowax®	1321-65-9	OK4025000
0600	Halowax®	1335-88-2	OK3700000
0483	Halowax® 1013	1321-64-8	OK030000
0317	Halowax® 1014	1335-87-1	OJ7350000
0468	Halowax® 1051	2234-13-1	OK0250000
0647	Hard metal	11107-01-0	<u>Y07350000</u>
0667	Hard wood dust	0010 05 1	ZC9850000
0472	Heavy mineral oil mist	8012-95-1	PY8030000
0637	Hemellitol	526-73-8	DC330000
0518 0311*	Hemihydrate gypsum	26499-65-0 76-44-8	TP0700000 PC0700000
0311	Heptachlor 1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetr	76-44-8	PC0700000 PC0700000
0242	Heptan-4-one	123-19-3	MJ5600000
0312	Heptane	142-82-5	MI7700000
0312*	n-Heptane	142-82-5	MI7700000 MI7700000
0312	normal-Heptane	142-82-5	MI7700000 MI7700000
0313*	1-Heptanethiol	1639-09-4	MJ1400000
0266	3-Heptanone	106-35-4	MJ5250000
0399	2-Heptanone	110-43-0	MJ5075000
0242	4-Heptanone	123-19-3	MJ5600000
0313	Heptyl mercaptan	1639-09-4	MJ1400000
0313	n-Heptyl mercaptan	1639-09-4	MJ1400000
0314	Hexachloro-1,3-butadiene	87-68-3	EJ070000
0315	Hexachloro-1,3-cyclopentadiene	77-47-4	GY1225000
0315	1,2,3,4,5,5-Hexachloro-1,3-cyclopentadie	77-47-4	GY1225000
0016	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-h	309-00-2	IO2100000
0251	6,7,8,9,10-Hexachloro-1,5,5a,6,9,9a-hexa	115-29-7	RB9275000
0206	1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4	60-57-1	IO1750000
0252	1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4	72-20-8	I01575000
0314*	Hexachlorobutadiene	87-68-3	EJ0700000
0314	1,3-Hexachlorobutadiene	87-68-3	EJ0700000
0370	gamma-Hexachlorocyclohexane	58-89-9	GV4900000
0315*	<u>Hexachlorocyclopentadiene</u>	77-47-4	GY1225000
0370	gamma isomer of 1,2,3,4,5,6-Hexachlorocy	58-89-9	GV4900000
0316*	Hexachloroethane	67-72-1	KI4025000
0317*	<u>Hexachloronaphthalene</u>	1335-87-1	QJ7350000
0318	n-Hexadecanethiol	2917-26-2	
0318*	1-Hexadecanethiol	2917-26-2	
0318	Hexadecanethiol-1	2917-26-2	
0318	Hexadecyl mercaptan	2917-26-2	T01575000
0252	Hexadrin®	72-20-8	<u>I01575000</u>
0319	Hexafluoro-2-propanone	684-16-2 684-16-2	UC2450000
0319	1,1,1,3,3,3-Hexafluoro-2-propanone		UC2450000
0319*	Hexafluoroacetone Hexahydro-1,3,5-trinitro-s-triazine	684-16-2	UC2450000
<u>0169</u> 0097		121-82-4 105-60-2	XY9450000 CM3675000
0168	Hexahydro-2H-azepin-2-one Hexahydroaniline	108-60-2	GX0700000
0168	Hexahydrobenzenamine	108-91-8	GX0700000 GX0700000
0163	Hexahydrobenzene Hexahydrobenzene	110-82-7	GU6300000
0407	Hexahydrocresol	25639-42-3	GW0175000
0407	Hexahydromethylphenol	25639-42-3	GW0175000 GW0175000
0165	Hexahydrophenol	108-93-0	GV7875000
0100	TICTALLY AT OPTICITOT	±00 99 °0	JV 1013000

0406	Hexahydrotoluene	108-87-2	GV6125000
0165 0321*	Hexalin Hexamethyl phosphoramide	108-93-0 680-31-9	GV7875000 TD0875000
0163	Hexamethylene	110-82-7	GU6300000
0320*	Hexamethylene diisocyanate	822-06-0	MO1740000
0320	1,6-Hexamethylene diisocyanate	822-06-0	MO1740000
0320	Hexamethylene-1,6-diisocyanate	822-06-0 680-31-9	MO1740000
0321 0321	Hexamethylphosphoric triamide Hexamethylphosphorotriamide	680-31-9	TD0875000 TD0875000
0163	Hexanaphthene	110-82-7	GU6300000
0322	Hexane	110-54-3	MN9275000
0322*	n-Hexane	110-54-3	MN9275000
0322 0323*	normal-Hexane Hexane isomers (excluding n-Hexane)	110-54-3	MN9275000
0015	Hexanedinitrile	111-69-3	AV2625000
0324*	n-Hexanethiol	111-31-9	MO4550000
0324	1-Hexanethiol	111-31-9	MO4550000
0325* 0326*	2-Hexanone Hexone	591-78-6 108-10-1	MP1400000 SA9275000
0327*	sec-Hexyl acetate	108-84-9	SA7525000
0322	Hexyl hydride	110-54-3	MN9275000
0324	Hexyl mercaptan	111-31-9	MO4550000
0324 0328*	n-Hexyl mercaptan	111-31-9 107-41-5	MO4550000 SA0810000
0324	Hexylene glycol n-Hexylthiol	111-31-9	MO4550000
0438	High solvent naphtha	8030-30-6	DE3030000
0335	<u>High-strength hydrogen peroxide</u>	7722-84-1	MX0900000
0165	Hydralin The description of the least of the	108-93-0 1332-58-7	GV7875000
0364 0308	Hydrated aluminum silicate Hydrated calcium sulfate	1332-58-7	GF1670500 MG2360000
0092	Hydrated lime	1305-62-0	EW2800000
0521	Hydraulic cement	65997-15-1	VV8770000
0329*	Hydrazine	302-01-2	MU7175000
0329 0329	Hydrazine (anhydrous) Hydrazine base	302-01-2 302-01-2	MU7175000 MU7175000
0499	Hydrazinobenzene	100-63-0	MW8925000
0364	Hydrite	1332-58-7	GF1670500
0528	Hydroacrylic acid	57-57-8	R07350000
0331 0332	Hydrobromic acid) Hydrochloric acid	10035-10-6 7647-01-0	MW3850000 MW4025000
0267	Hydrochloric ether	75-00-3	KH7525000
0148	Hydrocobalt tetracarbonyl	16842-03-8	GG0900000
0333	Hydrocyanic acid	74-90-8	MW6825000
0334 0568	Hydrofluoric acid) Hydrogen antimonide	7664-39-3 7803-52-3	MW7875000 WJ0700000
0040	Hydrogen arsenide	7784-42-1	CG6475000
0331*	Hydrogen bromide	10035-10-6	MW3850000
0296	Hydrogen carboxylic acid	64-18-6	LO4900000
0332*	Hydrogen chloride	7647-01-0	MW4025000
0160 0333*	Hydrogen cyanamide Hydrogen cyanide	420-04-2 74-90-8	<u>GS5950000</u> <u>MW6825000</u>
0335	Hydrogen dioxide	7722-84-1	MX0900000
0334*	Hydrogen fluoride	7664-39-3	<u>MW7875000</u>
0447 0335*	Hydrogen nitrate	7697-37-2 7722-84-1	OU5775000 MX0900000
0335	Hydrogen peroxide Hydrogen peroxide (aqueous)	7722-84-1	MX0900000 MX0900000
0505	Hydrogen phosphide	7803-51-2	SY7525000
0336*	Hydrogen selenide	7783-07-5	MX1050000
0577 0337*	Hydrogen sulfate Hydrogen sulfide	7664-93-9 7783-06-4	WS5600000 MX1225000
0412	Hydrogenated MDI	5124-30-1	NO9250000
0330	Hydrogenated diphenylbenzenes	61788-32-7	WZ6535000
0330	Hydrogenated phenylbiphenyls	61788-32-7	WZ6535000
0330*	Hydrogenated terphenyls	61788-32-7	WZ6535000
0330 0373	Hydrogenated triphenyls Hydromagnesite	61788-32-7 546-93-0	WZ6535000 OM2470000
0375	Hydroperoxide	7722-84-1	MX0900000
0338*	Hydroquinone	123-31-9	MX3500000
0390	Hydroquinone monomethyl ether	<u>150-76-5</u>	SL7700000
0337 0584	Hydrosulfuric acid Hydrous magnesium silicate	7783-06-4 14807-96-6	MX1225000 WW2710000
0525	3-Hydroxy-1-propanesulphonic acid sulton	1120-71-4	RP5425000
0005	2-Hydroxy-2-methyl-propionitrile	75-86-5	OD9275000
0154	1-Hydroxy-2-methylbenzene	95-48-7	GO6300000
<u>0665</u> 0155	4-Hydroxy-3-(3-oxo-1-phenyl butyl)-2H-1-1-Hydroxy-3-methylbenzene	81-81-2 108-39-4	GN4550000 GO6125000
0178	4-Hydroxy-4-methyl-2-pentanone	123-42-2	SA9100000
0156	1-Hydroxy-4-methylbenzene	106-44-5	G06475000
0435	3-Hydroxy-N-methylcrotonamide dimethylph	6923-22-4	TC4375000
<u>0528</u> <u>0528</u>	3-Hydroxy-propionic acid	<u>57-57-8</u> 57-57-8	RO7350000 RO7350000
	o matory proprofite actu	<u> </u>	<u> </u>

0304	Hydroxyacetonitrile	107-16-4	AM0350000
0390	p-Hydroxyanisole	150-76-5	SL7700000
0493	Hydroxybenzene	108-95-2	SJ3325000
0076	1-Hydroxybutane	71-36-3	E01400000
0077	2-Hydroxybutane	78-92-2	EO1750000
0110	Hydroxycellulose	9004-34-6	FJ5691460
0165	Hydroxycyclohexane	108-93-0	GV7875000
0357	beta-Hydroxyethyl isopropyl ether	109-59-1	KL5075000
0208	bis(2-Hydroxyethyl)amine	111-42-2	KL2975000
0256	2-Hydroxyethylamine	141-43-5	KJ5775000
0005	alpha-Hydroxyisobutyronitrile	75-86-5	OD9275000
0303	Hydroxymethyl ethylene oxide	556-52-5	UB4375000
0303	2-Hydroxymethyl oxiran	556-52-5	UB4375000
<u> 0485</u>	2,2-bis(Hydroxymethyl)-1,3-propanediol	115-77-5	RZ2490000
<u>0298</u>	<u>2-Hydroxymethylfuran</u>	98-00-0	LU9100000
<u>0543</u>	m-Hydroxyphenol	108-46-3	VG9625000
<u>0543</u>	3-Hydroxyphenol	108-46-3	<u>VG9625000</u>
0109	2-Hydroxyphenol	120-80-9	UX1050000
0339*	2-Hydroxypropyl acrylate	999-61-1	AT1925000
0339	beta-Hydroxypropyl acrylate	999-61-1	AT1925000
0303	3-Hydroxypropylene oxide	556-52-5	UB4375000
0156	4-Hydroxytoluene	106-44-5	G06475000
0155	3-Hydroxytoluene	108-39-4	G06125000
0154	2-Hydroxytoluene	95-48-7	G06300000
0210	2-Hydroxytriethylamine	100-37-8	KK5075000
0465	Hyponitrous acid anhydride	10024-97-2	OX1350000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
GOIDE	CHEMICAL NAME	CAD NO	KIECS NO
0352	IBA	78-83-1	NP9625000
0363	IGE	4016-14-2	TZ350000
0359	IPA	67-63-0	NT8050000
0356	IPDI	4098-71-9	NO9370000
0276	2-Imidazolidine-2-thione	96-45-7	NI9625000
0208	2,2'-Iminodiethanol	111-42-2	KL2975000
0250	Impure corundum	1302-74-5	GN0231000
0340*	Indene	95-13-6	NK8225000
0341*	Indium	7440-74-6	NL1050000
0341	Indium metal	7440-74-6	NL1050000
		/440-/4-0	
0340	Indonaphthene	95-13-6	NK8225000
0340	Indonaphthene		
0340 0480	Indonaphthene "Inert" dusts	95-13-6	NK8225000
0340 0480 0342* 0342 0343*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform	95-13-6 7553-56-2 7553-56-2 75-47-8	NK8225000 NN1575000 NN1575000 PB7000000
0340 0480 0342* 0342 0343* 0420	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000
0340 0480 0342* 0342 0343* 0420 0345	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000
0340 0480 0342* 0342 0343* 0420 0345 0205	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 LK0700000
0340 0480 0342* 0342 0343* 0420 0345 0205 0344*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe)	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 LK0700000 NO7400000
0340 0480 0342* 0342 0343* 0420 0345 0205 0344* 0549	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 1309-37-1	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 LK0700000 NO7400000 NO7400000
0340 0480 0342* 0342* 0343* 0420 0345 0205 0344* 0549 0345*	Indonaphthene "Inert" dusts Iodine Iodine Crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron pentacarbonyl (as Fe)	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 LK0700000 NO7400000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0344* 0549 0345* 0346*	Indonaphthene "Inert" dusts Iodine Iodine Crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe)	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 1309-37-1 13463-40-6	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 LK0700000 NO7400000 NO7400000 NO4900000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0344* 0549 0345* 0346*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 1309-37-1 13463-40-6 78-59-1	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 LK0700000 NO7400000 NO7400000 NO4900000 GW7700000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0344* 0549 0345* 0346* 0355 0347*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 LK0700000 NO7400000 NO7400000 NO4900000 GW7700000 NS9800000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0344* 0549 0345* 0346* 0355 0347* 0348*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl alcohol (primary)	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 LK0700000 NO7400000 NO7400000 NO4900000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0344* 0549 0345* 0346* 0348* 0349*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary)	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO4900000 GW7700000 NS9800000 EL5425000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0344* 0549 0345* 0346* 0355 0347* 0348* 0349*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl methyl ketone	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 LK0700000 NO7400000 NO7400000 NO7400000 NO7400000 S9800000 EL5425000 MP3850000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0344* 0549 0345* 0346* 0355 0347* 0348* 0349* 0421 0350*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl methyl ketone Isobutane	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 NO7400000 SB9800000 EL5425000 MP3850000 TZ4300000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0344* 0549 0345* 0346* 0355 0347* 0348* 0349*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl methyl ketone	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 NO7400000 SB800000 EL5425000 MP3850000 TZ4300000 NP9625000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0344* 0549 0345* 0346* 0355 0347* 0348* 0349* 0421 0350* 0352 0385	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl methyl ketone Isobutane Isobutanol	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 LK0700000 NO7400000 NO7400000 NO7400000 NS9800000 EL5425000 MP3850000 TZ4300000 NP9625000 SB4200000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0344* 0549 0345* 0346* 0355 0347* 0348* 0349* 0350* 0352	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl methyl ketone Isobutane Isobutanol Isobutenyl methyl ketone	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7	NK8225000 NN1575000 NN1575000 PB7000000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 NO7400000 TZ4300000 TZ4300000 TZ4300000 SB4200000 AI4025000
0340 0480 0342* 0342* 0343* 0420 0345* 0549 0345* 0346* 0355 0347* 0348* 0349* 0421 0350* 0352 0385 0351*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutanol Isobutenyl methyl ketone Isobutyl acetate Isobutyl acetate Isobutyl alcohol	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 LK0700000 NO7400000 NO7400000 NO7400000 NS9800000 EL5425000 MP3850000 TZ4300000 NP9625000 SB4200000
0340 0480 0342* 0342* 0343* 0420 0345* 0549 0345* 0346* 0355* 0347* 0348* 0350* 0352*	Indonaphthene "Inert" dusts Iodine Iodine Crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl methyl ketone Isobutane Isobutanol Isobutenyl methyl ketone Isobutyl acetate Isobutyl acetate	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0	NK8225000 NN1575000 NN1575000 PB700000 PB700000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 MP3850000 TZ4300000 MP3850000 SB4200000 AI4025000 NP9625000 NP9625000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0345* 0345* 0346* 0355* 0347* 0348* 0350* 0352* 0352* 0348* 0351* 0352*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutanol Isobutyl acetate Isobutyl ester of acetic acid Isobutyl methyl ketone	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 SP800000 EL5425000 MP3850000 TZ4300000 NP9625000 SB4200000 AI4025000 AI4025000 SA9275000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0345* 0345* 0346* 0355* 0347* 0349* 0421 0350* 0352* 0351* 0352* 0352* 0348* 0351* 0352* 0348*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutane Isobutyl acetate Isobutyl carbinol Isobutyl ester of acetic acid	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 NO7400000 NO7400000 NO7400000 NO7400000 NO7400000 NO7400000 NO9900000 EL5425000 MP3850000 TZ4300000 NP9625000 SB4200000 AI4025000 NP9625000 EL5425000 AI4025000 SA9275000 SA9275000 SA7350000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0345* 0345* 0346* 0355 0347* 0348* 0349* 0421 0350* 0352* 0348* 0352* 0348* 0353*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutane Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl ester of acetic acid Isobutyl methyl ketone Isobutylmethylcarbinol Isobutynethylcarbinol	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2 78-82-0	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 NO7400000 NO7400000 MS9800000 EL5425000 MP3850000 TZ4300000 AI4025000 SB4200000 AI4025000 SA9275000 SA9275000 SA7350000 TZ4900000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0344* 0549 0345* 0346* 0355 0347* 0348* 0349* 0421 0350* 0352* 0348 0351* 0352* 0348* 0351* 0352* 0348*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutane Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl ester of acetic acid Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl ester of acetic acid Isobutyl methyl ketone Isobutylmethylcarbinol Isobutyronitrile bis(4-Isocyanatocyclohexyl)methane	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2 78-82-0 5124-30-1	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 NO7400000 NO9900000 EL5425000 MP3850000 TZ4300000 AI4025000 AI4025000 AI4025000 SA9275000 SA9275000 SA7350000 TZ4900000 NO9250000
0340 0480 0342* 0342* 0343* 0420 0345 0205 0344* 0549 0345* 0355 0347* 0348* 0349* 0421 0350* 0352* 0348 0351* 0351* 0326 0422 0353* 0412 0356	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutanol Isobutyl acetate Isobutyl methyl ketone	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2 78-82-0 5124-30-1 4098-71-9	NK8225000 NN1575000 NN1575000 PB7000000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 NO9800000 EL5425000 MP3850000 TZ4300000 NP9625000 SB4200000 AI4025000 AI4025000 SA7350000 SA7350000 TZ4900000 NO9250000 NO9250000 NO9250000
0340 0480 0342* 0342* 0343* 0420 0345* 0549 0345* 0346* 0355* 0347* 0349* 0421 0350* 0352* 0351* 0352* 0348 0351 0352* 0348 0351 0356 0422 0353*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutane Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl methyl ketone Isobutyl acetate Isobutyl carbinol Isobutyl methyl ketone Isobutylmethylcarbinol Isobutyronitrile bis(4-Isocyanatocyclohexyl)methane 3-Isocyanatomethyl-3,5,5-trimethylcycloh Isodiphenylbenzene	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2 78-82-0 5124-30-1	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 NO7400000 NO9900000 EL5425000 MP3850000 TZ4300000 AI4025000 AI4025000 AI4025000 SA9275000 SA9275000 SA7350000 TZ4900000 NO9250000
0340 0480 0342* 0342* 0343* 0420 0345* 0549 0345* 0346* 0355* 0347* 0349* 0421 0350* 0352* 0351* 0352* 0351* 0352* 0348* 0351* 0352* 0353* 0353*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutane Isobutyl acetate Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl methyl ketone Isobutylmethylcarbinol Isobutyronitrile bis(4-Isocyanatocyclohexyl)methane 3-Isocyanatomethyl-3,5,5-trimethylcycloh Isodiphenylbenzene Isohexane	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2 78-82-0 5124-30-1 4098-71-9 92-06-8	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 S9800000 EL5425000 MP3850000 TZ4300000 NP9625000 SB4200000 AI4025000 AI4025000 SA9275000 SA9275000 SA7350000 TZ4900000 NO9250000 NO9250000 NO9370000 WZ6470000
0340 0480 0342* 0342* 0343* 0420 0345* 0549 0345* 0346* 0355* 0347* 0349* 0421 0350* 0352* 0351* 0352* 0348* 0351* 0352* 0353* 0422 0353* 0422 0353*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutanol Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl methyl ketone Isobutyl acetate Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl methyl ketone Isobutylmethylcarbinol Isobutynonitrile bis(4-Isocyanatocyclohexyl)methane 3-Isocyanatomethyl-3,5,5-trimethylcycloh Isodiphenylbenzene Isohexane Isooctanol	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2 78-82-0 5124-30-1 4098-71-9 92-06-8	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 NO7400000 NO7400000 NO7400000 MS9800000 EL5425000 MP3850000 TZ4300000 AI4025000 SB4200000 AI4025000 SA9275000 SA9275000 SA7350000 TZ4900000 NO9370000 NO9370000 NS7700000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0345* 0345* 0346* 0355* 0347* 0349* 0421 0350* 0352* 0352* 0353* 0422 0353* 0422 0353* 0422 0353* 0412 0353*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutanol Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl ester of acetic acid Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl acrbinol Isobutyl methyl ketone Isobutyl methyl carbinol Isobutyl methyl ketone Isobutylmethylcarbinol Isobutynonitrile bis(4-Isocyanatocyclohexyl)methane 3-Isocyanatomethyl-3,5,5-trimethylcycloh Isodiphenylbenzene Isooctanol Isooctyl alcohol	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2 78-82-0 5124-30-1 4098-71-9 92-06-8 26952-21-6 26952-21-6	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 NO7400000 NO9900000 EL5425000 MP3850000 TZ4300000 NP9625000 SB4200000 AI4025000 SB425000 EL5425000 NP9625000 SA7350000 TZ4900000 NO9250000 NO9250000 NO9370000 NS7700000 NS7700000
0340 0480 0342* 0342* 0342* 0343* 0420 0345* 0345* 0345* 0346* 0355* 0347* 0350* 0352* 0352* 0351* 0352* 0353* 0422* 0353* 0422* 0353* 0424* 0354* 0354* 0354*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutanol Isobutyl acetate Isobutyl ester of acetic acid Isobutyl methyl ketone Isobutylonitrile bis(4-Isocyanatocyclohexyl)methane 3-Isocyanatomethyl-3,5,5-trimethylcycloh Isodiphenylbenzene Isooctanol Isooctyl alcohol Isopentyl acetate	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 78-83-1 123-51-3 110-19-0 108-11-2 78-82-0 5124-30-1 4098-71-9 92-06-8 26952-21-6 26952-21-6 123-92-2	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 LK07700000 NO7400000 NO7400000 NO4900000 GW7700000 SP800000 EL5425000 TZ4300000 AI4025000 SB4200000 AI4025000 SA9275000 SA9275000 SA9275000 TZ4900000 NO9370000 NO9370000 NS7700000 NS7700000 NS7700000 NS7700000 NS7700000 NS9800000
0340 0480 0342* 0342* 0343* 0420 0345* 0549 0345* 0346* 0355 0347* 0348* 0352* 0352* 0351* 0352* 0353* 0412 0356* 0422 0353* 0412 0356* 0422 0353* 0412 0356* 0424 0355* 0348*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutane Isobutenyl methyl ketone Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl ester of acetic acid Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl ester of scetic acid Isobutyl methyl ketone Isobutyl alcohol Isopentyl alcohol Isopentyl acetate Isopentyl alcohol	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 1309-37-1 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2 78-82-0 5124-30-1 4098-71-9 92-06-8 26952-21-6 26952-21-6 123-92-2 123-51-3	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4950000 NO7400000 NO7400000 NO7400000 NO7400000 NO9900000 EL5425000 EL5425000 AI4025000 SA9275000 SA9275000 TZ4900000 NO9250000 NO9250000 NO9250000 NO9250000 NO9370000 NS7700000 NS7700000 NS7700000 NS7700000 NS9800000 EL5425000 EL5425000 DEL5425000
0340 0480 0342* 0342* 0343* 0420 0345* 0205 0344* 0549 0345* 0346* 0355 0347* 0348* 0352* 0351* 0352* 0353* 0421 0356 0422 0353* 0412 0356 0592 0323 0354* 0348* 0421	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutane Isobutanol Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl acrbinol Isobutyl ester of acetic acid Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl ester of acetic acid Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl methyl ketone Isobutylmethylcarbinol Isobutylmethylcarbinol Isobutynonitrile bis(4-Isocyanatocyclohexyl)methane 3-Isocyanatomethyl-3,5,5-trimethylcycloh Isodiphenylbenzene Isohexane Isooctanol Isooctyl alcohol Isopentyl acetate Isopentyl alcohol Isopentyl methyl ketone	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2 78-82-0 5124-30-1 4098-71-9 92-06-8 26952-21-6 223-92-2 123-51-3 110-12-3	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4950000 NO7400000 NO7400000 NO7400000 NO7400000 NO990000 EL5425000 EL5425000 AI4025000 AI4025000 AI4025000 SB4200000 AI4025000 SB4200000 AI4025000 SB425000 EL5425000 AI4025000 SA9275000 SA9275000 SA9275000 NO9370000 NO9370000 NS7700000 NS7700000 NS7700000 NS9800000 EL5425000 NS97700000 NS97700000 NS9800000 EL5425000 NS9800000 EL5425000 MS9800000 EL5425000 MS9800000 EL5425000 MS9800000 MS9800000 EL5425000
0340 0480 0342* 0342* 0343* 0420 0345* 0549 0345* 0346* 0355* 0347* 0349* 0421 0350* 0352* 0351* 0352* 0348* 0351* 0352* 0353* 0353* 0353* 0353* 0353* 0353* 0353*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutane Isobutyl acetate Isobutyl acetate Isobutyl acetate Isobutyl ester of acetic acid Isobutyl ester of acetic acid Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl ester of scetic acid Isobutyl methyl ketone Isobutyl methyl ketone Isobutylmethylcarbinol Isobutylalcohol Isopentyl alcohol Isopentyl acetate Isopentyl alcohol Isopentyl methyl ketone Isophorone	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2 78-82-0 5124-30-1 4098-71-9 92-06-8 26952-21-6 123-92-2 123-51-3 110-12-3 78-59-1	NK8225000 NN1575000 NN1575000 PB700000 PB700000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 NO7400000 MS9800000 EL5425000 MP3850000 TZ4300000 AI4025000 SB4200000 AI4025000 SB4200000 AI4025000 SA9275000 SA9275000 SA9275000 SA9275000 SA9275000 NO9370000 NO9370000 NS7700000 NS9800000 EL5425000 MP3850000 GW7700000 MP3850000 GW7700000
0340 0480 0342* 0342* 0343* 0420 0345* 0549 0345* 0346* 0355* 0347* 0348* 0351* 0352* 0351* 0351* 0351* 0351* 0351* 0351* 0351* 0351* 0355* 0351* 0355* 0351* 0355*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutane Isobutane Isobutyl acetate Isobutyl seter of acetic acid Isobutyl methyl ketone Isobutyl methyl setone Isobutyl methyl setone Isobutyl methyl setone Isobutyl methyl setone Isocyanatomethyl-3,5,5-trimethylcycloh Isodiphenylbenzene Isococtanol Isococtyl alcohol Isopentyl acetate Isopentyl methyl ketone Isopentyl methyl ketone Isophorone Isophorone	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2 78-82-0 5124-30-1 4098-71-9 92-06-8 26952-21-6 123-92-2 123-51-3 110-12-3 78-59-1 4098-71-9	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 NO7400000 SB420000 TZ4300000 TZ4300000 TZ4300000 AI4025000 SB420000 AI4025000 SA9275000
0340 0480 0342* 0342* 0343* 0420 0345* 0549 0345* 0346* 0355* 0347* 0349* 0421 0350* 0351* 0352* 0351* 0352* 0353* 0353* 0353* 0353* 0354* 0355* 0356* 0356* 0356* 0356*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutane Isobutane Isobutyl acetate Isobutyl acetate Isobutyl ester of acetic acid Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl ester of scelic acid Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl methyl carbinol Isobutyl methyl ketone Isobutyl methyl ketone Isobutyl methyl solution Isobutyl methyl solution Isobutyl methyl solution Isobutyl methyl ketone Isocyanatomethyl-3,5,5-trimethylcycloh Isodiphenylbenzene Isocyanato Isooctyl alcohol Isopentyl alcohol Isopentyl methyl ketone Isophorone Isophorone diamine diisocyanate	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2 78-82-0 5124-30-1 4098-71-9 92-06-8 26952-21-6 123-92-2 123-51-3 110-12-3 78-59-1 4098-71-9 4098-71-9	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 LK0700000 NO7400000 NO7400000 NO7400000 NO4900000 EL5425000 MP3850000 TZ4300000 AI4025000 SB4200000 AI4025000 SA9275000 SA9275000 SA9275000 SA7350000 TZ4900000 NO9370000 NS7700000 NS7700000 NS7700000 NS7700000 NS7700000 NS7700000 NS7700000 NS9800000 CEL5425000 NS7700000 NS7700000 NS9700000 NS9700000 NS9700000 NS97700000 NS9800000 NO93700000
0340 0480 0342* 0342* 0343* 0420 0345* 0549 0345* 0346* 0355* 0347* 0348* 0351* 0352* 0351* 0351* 0351* 0351* 0351* 0351* 0351* 0351* 0355* 0351* 0355* 0351* 0355*	Indonaphthene "Inert" dusts Iodine Iodine crystals Iodoform Iodomethane Iron carbonyl Iron dicyclopentadienyl Iron oxide dust and fume (as Fe) Iron oxide red Iron pentacarbonyl (as Fe) Iron salts (soluble, as Fe) Isoacetophorone Isoamyl acetate Isoamyl alcohol (primary) Isoamyl alcohol (secondary) Isoamyl methyl ketone Isobutane Isobutane Isobutane Isobutyl acetate Isobutyl seter of acetic acid Isobutyl methyl ketone Isobutyl methyl setone Isobutyl methyl setone Isobutyl methyl setone Isobutyl methyl setone Isocyanatomethyl-3,5,5-trimethylcycloh Isodiphenylbenzene Isococtanol Isococtyl alcohol Isopentyl acetate Isopentyl methyl ketone Isopentyl methyl ketone Isophorone Isophorone	95-13-6 7553-56-2 7553-56-2 75-47-8 74-88-4 13463-40-6 102-54-5 1309-37-1 13463-40-6 78-59-1 123-92-2 123-51-3 6032-29-7 110-12-3 75-28-5 78-83-1 141-79-7 110-19-0 78-83-1 123-51-3 110-19-0 108-10-1 108-11-2 78-82-0 5124-30-1 4098-71-9 92-06-8 26952-21-6 123-92-2 123-51-3 110-12-3 78-59-1 4098-71-9	NK8225000 NN1575000 NN1575000 PB7000000 PA9450000 NO4900000 NO7400000 NO7400000 NO7400000 S9800000 EL5425000 MP3850000 TZ4300000 MP9625000 SB4200000 AI4025000 SA9275000 SA9270000 NO9370000 NO9370000 NS7700000 NS7700000 NS9800000 EL5425000 MP3850000 GW7700000 NO9370000

<u>0395</u>	<u>Isoprene cyanide</u>	<u> 126-98-7</u>	<u>UD1400000</u>
0359	Isopropanol	67-63-0	NT8050000
0429	Isopropenyl benzene	98-83-9	WL5075300
0395	Isopropenylnitrile	126-98-7	UD1400000
0362	2-Isopropoxy propane	108-20-3	TZ5425000
0357*	2-Isopropoxyethanol	109-59-1	KL5075000
0363	Isopropoxymethyl oxirane	4016-14-2	TZ3500000
0531	o-Isopropoxyphenyl-N-methylcarbamate	114-26-1	FC3150000
0357	Isopropyl Cellosolve®	109-59-1	KL5075000
0358*	Isopropyl acetate	108-21-4	AI4930000
0359*	Isopropyl alcohol	67-63-0	NT8050000
0159	Isopropyl benzene	98-82-8	GR8575000
0353	Isopropyl cyanide	78-82-0	TZ4900000
0358	Isopropyl ester of acetic acid	108-21-4	AI4930000
0362*	Isopropyl ether	108-20-3	TZ5425000
	Isopropyl glycidyl ether	4016-14-2	TZ3500000
0357	Isopropyl glycol	109-59-1	KL5075000
0424	Isopropyl methyl ketone	563-80-4	EL9100000
0360*	Isopropylamine	75-31-0	NT8400000
0361	Isopropylaniline	768-52-5	BY4190000
0352	Isopropylcarbinol	78-83-1	NP9625000
0385	Isopropylideneacetone	141-79-7	SB4200000
0216	Isovalerone	108-83-8	MJ5775000
0210	<u> </u>	100 03 0	1103773000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
COLDE		0110	111100 110
0540	Jasmolin I or II	8003-34-7	UR4200000
0070	Jeffersol EB	111-76-2	KJ8575000
	#		
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0364*	Kaolin	1332-58-7	GF1670500
0247	Karmex®	330-54-1	YS8925000
	Kepone	143-50-0	PC8575000
	Kerosene	8008-20-6	
	Ketene	463-51-4	OA7700000
	Keto-ethylene	463-51-4	OA7700000
	Ketone propane	67-64-1	AL3150000
	Korax®	600-25-9	TX5075000
0130	KOTAKO	000 43 9	122012000
CIIIDE	CHEMICAI NAME	CAC NO	DTECC NO
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0372*	L.P.G.	68476-85-7	SE7545000
0372* 0372	L.P.G. LPG	68476-85-7 68476-85-7	SE7545000 SE7545000
0372*	L.P.G.	68476-85-7	SE7545000
0372* 0372 0528 0102	L.P.G. LPG	68476-85-7 68476-85-7 57-57-8 1333-86-4	SE7545000 SE7545000 RO7350000 FF5800000
0372* 0372 0528 0102 0387	L.P.G. LPG beta-Lactone	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000
0372* 0372 0528 0102 0387 0130	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan®	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000
0372* 0372 0528 0102 0387 0130 0465	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000
0372* 0372 0528 0102 0387 0130 0465 0096	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000
0372* 0372 0528 0102 0387 0130 0465 0096 0249	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000
0372* 0372 0528 0102 0387 0130 0465 0096	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 JR3155000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0249	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 JR3155000 OF7525000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0249 0368*	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 JR3155000 OF7525000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0249 0368* 0368	L.P.G. LPG beta-Lactone Lamp black Lannate® Laustan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 112-55-0	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 OF7525000 OF7525000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0368* 0368	L.P.G. LPG beta-Lactone Lamp black Lannate® Laustan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 OX1350000 EX1225000 JR3155000 JR3155000 OF7525000 OF7525000 TP4550000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0249 0368* 0368 0601 0603	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 OX1350000 EX1225000 JR3155000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0249 0368* 0368 0601 0603 0431	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Lepidolite	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000 VV8760000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0249 0368* 0368 0601 0603 0431 0144	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Lepidolite Lignite coal dust	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 OF7525000 OF7525000 TP4550000 TP4550000 TP4725000 VV8760000 GF8281000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0368* 0368 0601 0603 0431 0144 0664	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Lepidolite Lignoin	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 112-55-0 7439-92-1 78-00-2 75-74-1 12001-26-2	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 OX1350000 OX1350000 EX1225000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000 TP4725000 GF8281000 OI6180000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0368* 0368 0601 0603 0431 0144 0664 0093	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Leignite coal dust Ligroin Lime	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000 VV8760000 GF8281000 OI6180000 EW3100000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0368* 0368 0601 0603 0431 0144 0093 0091	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Leignite coal dust Ligroin Lime Lime Lime nitrogen	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000 TP4725000 VV8760000 GF8281000 OI6180000 EW3100000 GS60000000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0368* 0368 0601 0603 0431 0144 0093 0091 0369*	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Leignite coal dust Ligroin Lime Lime nitrogen Limestone	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 QX1350000 EX1225000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000 VV8760000 GF8281000 OI6180000 EW3100000 GS60000000 EV9580000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0368* 0368 0601 0603 0431 0144 0664 0093 0091 0369*	L.P.G. LPG beta-Lactone Lamp black Lannate® Laushing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Lepidolite Lignite coal dust Ligroin Lime Lime nitrogen Lindane	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 112-55-0 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9	SE7545000 SE7545000 RO7350000 FF5800000 FF5800000 AK2975000 OX1350000 EX1225000 JR3155000 JR3155000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000 CF8281000 GF8281000 OI6180000 EW3100000 EW3100000 GS6000000 EV9580000 GV4900000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0249 0368* 0368 0601 0603 0431 0144 0664 0093 0091 0369* 0370*	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Lepidolite Lignite coal dust Ligroin Lime Lime nitrogen Lindane Liquefied hydrocarbon gas	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000 TP4725000 GF8281000 OI6180000 EW3100000 EW3100000 EW3100000 GS60000000 EV9580000 GV4900000 SE7545000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0249 0368* 0368 0601 0603 0431 0144 0664 0093 0091 0369* 0370* 0372	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Leignite coal dust Lignoin Lime Lime nitrogen Lindane Liquefied hydrocarbon gas Liquefied petroleum gas	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7 68476-85-7	SE7545000 SE7545000 RO7350000 FF5800000 FF5800000 AK2975000 OX1350000 EX1225000 JR3155000 JR3155000 OF7525000 OF7525000 OF7525000 TP4550000 TP4725000 TP4725000 CF8281000 OI6180000 EW3100000 EW3100000 EW9580000 GS60000000 EV9580000 SE7545000 SE7545000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0249 0368* 0368 0601 0603 0431 0144 0664 0093 0091 0369* 0370* 0372 0371*	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Leignite coal dust Lignoin Lime Lime nitrogen Lindane Liquefied hydrocarbon gas Liquefied petroleum gas Lithium hydride	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7 7580-67-8	SE7545000 SE7545000 RO7350000 RO7350000 FF5800000 AK2975000 OX1350000 EX1225000 JR3155000 JR3155000 OF7525000 OF7525000 TP4550000 TP4750000 TP4750000 GF8281000 OI6180000 EW3100000 GS60000000 EV9580000 GV4900000 SE7545000 OJ6300000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0368* 0368 0601 0603 0431 0144 0664 0093 0091 0369* 0370* 0372 0371* 0371	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Leignite coal dust Lignoin Lime Lime nitrogen Limestone Lindane Liquefied hydrocarbon gas Lithium hydride Lithium monohydride	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7 7580-67-8 7580-67-8	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 OX1350000 OX1350000 DX1355000 JR3155000 OF7525000 OF7525000 TP4725000 TP4725000 TP4725000 GF8281000 OI6180000 EW3100000 GS6000000 EW3100000 GS7545000 SE7545000 SE7545000 OJ6300000 OJ6300000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0368* 0368* 0601 0603 0431 0144 0664 0093 0091 0369* 0370* 0372 0372 0371 0523	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Lepidolite Lignite coal dust Ligroin Lime Lime nitrogen Limestone Lindane Liquefied hydrocarbon gas Lithium hydride Lithium monohydride Lye	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7 7580-67-8 7580-67-8 1310-58-3	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000 TP4725000 GF8281000 GF8281000 GF8281000 GF8281000 GF8281000 SE7545000 SE7545000 SE7545000 OJ6300000 TT2100000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0368* 0368 0601 0603 0431 0144 0664 0093 0091 0369* 0370* 0372 0371* 0371	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Leignite coal dust Lignoin Lime Lime nitrogen Limestone Lindane Liquefied hydrocarbon gas Lithium hydride Lithium monohydride	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7 7580-67-8 7580-67-8	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 OX1350000 OX1350000 DX1355000 JR3155000 OF7525000 OF7525000 TP4725000 TP4725000 TP4725000 GF8281000 OI6180000 EW3100000 GS6000000 EV9580000 GV4900000 SE7545000 SE7545000 OJ6300000 OJ6300000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0368* 0368* 0601 0603 0431 0144 0664 0093 0091 0369* 0370* 0372 0372 0371 0523	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Lepidolite Lignite coal dust Ligroin Lime Lime nitrogen Limestone Lindane Liquefied hydrocarbon gas Lithium hydride Lithium monohydride Lye	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7 7580-67-8 7580-67-8 1310-58-3	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000 TP4725000 GF8281000 GF8281000 GF8281000 GF8281000 GF8281000 SE7545000 SE7545000 SE7545000 OJ6300000 TT2100000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0368* 0368* 0601 0603 0431 0144 0664 0093 0091 0369* 0370* 0372 0372 0371 0523	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Lepidolite Lignite coal dust Ligroin Lime Lime nitrogen Limestone Lindane Liquefied hydrocarbon gas Lithium hydride Lithium monohydride Lye	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7 7580-67-8 7580-67-8 1310-58-3	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000 TP4725000 GF8281000 GF8281000 GF8281000 GF8281000 GF8281000 SE7545000 SE7545000 SE7545000 OJ6300000 TT2100000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0368* 0368* 0601 0603 0431 0144 0664 0093 0091 0369* 0370* 0372 0372 0371 0523 0565	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Lepidolite Lignite coal dust Ligroin Lime Lime nitrogen Limestone Lindane Liquefied hydrocarbon gas Liquefied petroleum gas Lithium hydride Lye Lye	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7 7580-67-8 7580-67-8 1310-58-3 1310-73-2	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000 TP4725000 VV8760000 GF8281000 OI6180000 EW3100000 GS6000000 EV9580000 GV4900000 SE7545000 SE7545000 OJ6300000 OJ6300000 TT2100000 WB4900000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0368* 0368* 0601 0603 0431 0144 0664 0093 0091 0369* 0370* 0372 0372 0371 0523 0565	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Lepidolite Lignite coal dust Ligroin Lime Lime nitrogen Limestone Lindane Liquefied hydrocarbon gas Liquefied petroleum gas Lithium hydride Lye Lye	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7 7580-67-8 7580-67-8 1310-58-3 1310-73-2	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000 TP4725000 OI6180000 EW3100000 GF8281000 GF8281000 OI6180000 EW3100000 SE7545000 SE7545000 OJ6300000 OJ6300000 OJ6300000 TT2100000 WB4900000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0249 0368* 0368 0601 0603 0431 0144 0664 0093 0091 0369* 0370* 0372 0371* 0523 0565	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lead tetramethyl Lepidolite Lignite coal dust Ligroin Lime Lime nitrogen Limestone Lindane Liquefied hydrocarbon gas Liquefied petroleum gas Lithium hydride Lye Lye CHEMICAL NAME	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7 68476-85-7 7580-67-8 7580-67-8 1310-58-3 1310-73-2 CAS NO	SE7545000 SE7545000 RO7350000 FF5800000 AK2975000 TX5075000 OX1350000 EX1225000 JR3155000 JR3155000 OF7525000 OF7525000 TP4550000 TP4725000 TP4725000 GF8281000 OI6180000 EW3100000 EW3100000 EV9580000 GV4900000 SE7545000 SE7545000 OJ6300000 TT2100000 WB4900000 RTECS NO
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0249 0368* 0368* 0601 0603 0431 0144 0664 0093 0091 0369* 0372 0372 0371* 0523 0565 GUIDE	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lepidolite Lignite coal dust Ligroin Lime Lime nitrogen Limestone Lindane Liquefied hydrocarbon gas Liquefied petroleum gas Lithium hydride Lye Lye CHEMICAL NAME	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7 7580-67-8 7580-67-8 1310-58-3 1310-73-2 CAS NO	SE7545000 SE7545000 RO7350000 FF5800000 FF5800000 AK2975000 OX1350000 EX1225000 JR3155000 JR3155000 OF7525000 OF7525000 TP4550000 TP4550000 TP4550000 GF8281000 OI6180000 EW3100000 GS60000000 EV9580000 GV4900000 SE7545000 OJ6300000 OJ6300000 TT2100000 WB4900000 RTECS NO
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0249 0368* 0368 0601 0603 0431 0144 0664 0093 0091 0369* 0372 0372 0371* 0523 0565 GUIDE	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead metal Lead tetraethyl Lead tetramethyl Lepidolite Lignite coal dust Ligroin Lime Lime nitrogen Limestone Lindane Liquefied hydrocarbon gas Liquefied petroleum gas Lithium hydride Lye Lye CHEMICAL NAME	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7 7580-67-8 7580-67-8 1310-58-3 1310-73-2 CAS NO	SE7545000 SE7545000 RO7350000 FF5800000 FF5800000 AK2975000 OX1350000 EX1225000 JR3155000 JR3155000 OF7525000 OF7525000 TP4550000 TP4550000 TP4725000 CF8281000 OI6180000 EW3100000 EW3100000 EW3100000 SE7545000 SE7545000 OJ6300000 OJ6300000 TT2100000 WB4900000 RTECS NO BY4550000 UK4920000
0372* 0372 0528 0102 0387 0130 0465 0096 0249 0249 0368* 0368* 0601 0603 0431 0144 0664 0093 0091 0369* 0372 0372 0371* 0523 0565 GUIDE	L.P.G. LPG beta-Lactone Lamp black Lannate® Lanstan® Laughing gas Laurel camphor Lauryl mercaptan n-Lauryl mercaptan Lead Lead metal Lead tetraethyl Lepidolite Lignite coal dust Ligroin Lime Lime nitrogen Limestone Lindane Liquefied hydrocarbon gas Liquefied petroleum gas Lithium hydride Lye Lye CHEMICAL NAME	68476-85-7 68476-85-7 57-57-8 1333-86-4 16752-77-5 600-25-9 10024-97-2 76-22-2 112-55-0 7439-92-1 7439-92-1 78-00-2 75-74-1 12001-26-2 8032-32-4 1305-78-8 156-62-7 1317-65-3 58-89-9 68476-85-7 7580-67-8 7580-67-8 1310-58-3 1310-73-2 CAS NO	SE7545000 SE7545000 RO7350000 FF5800000 FF5800000 AK2975000 OX1350000 EX1225000 JR3155000 JR3155000 OF7525000 OF7525000 TP4550000 TP4550000 TP4725000 CF8281000 OI6180000 EW3100000 EW3100000 EW3100000 SE7545000 SE7545000 OJ6300000 OJ6300000 TT2100000 WB4900000 RTECS NO BY4550000 UK4920000

0101	MCD	100 00 7	GZ017E000
0121	MCB MCT	108-90-7 12079-65-1	CZ0175000
0380 0415	MDA	101-77-9	OO9720000 BY5425000
0413	MDI	101-77-3	NO9350000
0069	MEK	78-93-3	EL6475000
0416	MEK peroxide	1338-23-4	EL9450000
0416	MEKP	1338-23-4	EL9450000
0421	MIAK	110-12-3	MP3850000
0422	MIBC	108-11-2	SA7350000
0326	MIBK	108-10-1	SA9275000
0423	MIC	624-83-9	NO9450000
0424	MIPK	563-80-4	EL9100000
0419	MMH	60-34-4	MV5600000
0409	MMT	12108-13-3	OP1450000
0411	MOCA	101-14-4	CY1050000
0488	MPK	107-87-9	SA7875000
0671	MXDA	1477-55-0	PF8970000
0119	Mace®	532-27-4	AM6300000
0374	Magnesia fume	1309-48-4	OM3850000
0373*		546-93-0 546-93-0	OM2470000
0373 0374*	Magnesium carbonate Magnesium oxide fume	1309-48-4	OM2470000 OM3850000
0374	Magnesium(II) carbonate	546-93-0	OM2470000
0375*		121-75-5	WM8400000
0375	Maleic acid anhydride	108-31-6	ON3675000
0376*		108-31-6	ON3675000
0377*	Malonaldehyde	542-78-9	TX6475000
0377	Malonic aldehyde	542-78-9	TX6475000
0378	Malonic dinitrile	109-77-3	003150000
0377	Malonodialdehyde	542-78-9	TX6475000
0378*	Malononitrile	109-77-3	003150000
0379*	Manganese compounds and fume (as Mn)	7439-96-5	009275000
0380*		12079-65-1	009720000
0381	Manganese oxide	1317-35-7	OP0895000
0381*	Manganese tetroxide (as Mn)	1317-35-7	OP0895000
0409	Manganese tricarbonylmethylcyclopentadie	12108-13-3	OP1450000
0379	Manganese-55	7439-96-5	009275000
0381	Manganomanganic oxide	1317-35-7	OP0895000
0432	Manmade mineral fibers		PY8070000
0382*	<u>Marble</u>	1317-65-3	EV9580000
0431	Margarite	12001-26-2	VV8760000
<u>0558</u> 0405	Massive talc	137-05-3	VV8780000 AS7000000
0390	Mecrylate Mequinol	150-76-5	SL7700000
0610	Mercaptoacetate	68-11-1	AI5950000
0610	Mercaptoacetic acid	68-11-1	AI5950000 AI5950000
0610	2-Mercaptoacetic acid	68-11-1	AI5950000
0050	Mercaptobenzene	108-98-5	DC0525000
0083	1-Mercaptobutane	109-79-5	EK6300000
0176	1-Mercaptodecane	143-10-2	
0249	1-Mercaptododecane	112-55-0	JR3155000
0280	Mercaptoethane	75-08-1	K19625000
0425	Mercaptomethane	74-93-1	PB4375000
0467	1-Mercaptononane	1455-21-6	
0469	1-Mercaptooctadecane	2885-00-9	
0471	1-Mercaptooctane	111-88-6	
<u>0526</u>	3-Mercaptopropane	107-03-9	TZ7300000
0384*	Mercury (organo) alkyl compounds (as Hg)	T400 0T -	
0383*		7439-97-6	OV4550000
0383	Mercury metal: Colloidal mercury	7439-97-6	<u>OV4550000</u>
0385*	Mesityl oxide	141-79-7	SB4200000
0639	Mesitylene	108-67-8	OX6825000
0212	Metacetone Matagatania agid	<u>96-22-0</u>	SA8050000
0529	Metacetonic acid	79-09-4	<u>UE5950000</u>
0383	Metallic mercury	7439-97-6 7440-31-5	OV4550000
0613	Metallic tin		XP7320000
0587 0410	Metallum problematum Metasystox®	13494-80-9 8022-00-2	WY2625000 TG1760000
0426	Methacrylate monomer	80-62-6	OZ5075000
0386*		79-41-4	OZ2975000
0386	alpha-Methacrylic acid	79-41-4	OZ2975000
0386	Methacrylic acid (glacial)	79-41-4	OZ2975000
0386	Methacrylic acid (inhibited)	79-41-4	OZ2975000
0395	Methacrylonitrile	126-98-7	UD1400000
0293	Methanal	50-00-0	LP8925000
0295	Methanamide	75-12-7	L00525000
0106	Methane tetrabromide	558-13-4	FG4725000
0485	Methane tetramethylol	115-77-5	RZ2490000
0127	Methane trichloride	67-66-3	FS9100000
0002	Methanecarboxylic acid	64-19-7	AF1225000
0405	M-+b	74-93-1	PB4375000
0425	Methanethiol	/ 1 // // //	1111111111

0296	Methanoic acid	64-18-6	LO4900000
0397	Methanol	67-56-1	PC1400000
0389	Methoflurane	76-38-0	KN7820000
0387*	Methomyl	16752-77-5	AK2975000
<u>0179</u>	4-Methoxy-1,3-benzene-diamine	615-05-4	BZ8580500
<u>0536</u>	2-Methoxy-1-methylethanol	107-98-2	<u>UB7700000</u>
<u>0536</u>	1-Methoxy-2-hydroxypropane	107-98-2	UB7700000
0536	1-Methoxy-2-propanol	107-98-2	<u>UB7700000</u>
0388	Methoxy-DDT	72-43-5	KJ3675000
0179	4-Methoxy-m-phenylene-diamine	615-05-4	BZ8580500
0035	p-Methoxyaniline	104-94-9	BZ5450000
0034 0394	o-Methoxyaniline Methoxycarbonylethylene	90-04-0 96-33-3	BZ5410000 AT2800000
0388*	Methoxychlor	72-43-5	KJ3675000
0401	2-Methoxyethanol	109-86-4	KL5775000
0402	2-Methoxyethyl acetate	110-49-6	KL5950000
0389	Methoxyfluorane	76-38-0	KN7820000
0389*		76-38-0	KN7820000
0396	Methoxymethyl methyl ether	109-87-5	PA8750000
0390*		150-76-5	SL7700000
0390	p-Methoxyphenol	<u> 150-76-5</u>	SL7700000
0388	2,2-bis(p-Methoxyphenyl)-1,1,1-trichloro	72-43-5	KJ3675000
0048	Methyl 1-(butylcarbamoyl)-2-benzimidazol	17804-35-2	DD6475000
0326	4-Methyl 2-pentanone	108-10-1 16752-77-5	SA9275000
0387 0391*	Methyl N-((methylamino)carbonyl)oxy)etha Methyl acetate	79-20-9	AK2975000 AI9100000
0529	Methyl acetic acid	79-20-9	UE5950000
0069	Methyl acetone	78-93-3	EL6475000
0392*	 	74-99-7	UK4250000
0393	Methyl acetylene-allene mixture	59355-75-8	UK4920000
	Methyl acetylene-propadiene mixture	59355-75-8	UK4920000
0393	Methyl acetylene-propadiene mixture (sta	59355-75-8	UK4920000
0157	beta-Methyl acrolein	4170-30-3	GP9499000
0394*		96-33-3	AT2800000
0397*		67-56-1	PC1400000
0293	Methyl aldehyde	50-00-0	LP8925000
0405	Methyl alpha-cyanoacrylate	137-05-3	AS7000000
<u>0422</u> 0399*	Methyl amyl alcohol Methyl (n-amyl) ketone	108-11-2 110-43-0	SA7350000 MJ5075000
0044	Methyl azinphos	86-50-0	TE1925000
0619	Methyl benzene	108-88-3	XS5250000
0619	Methyl benzol	108-88-3	XS5250000
	Methyl bromide	74-83-9	PA4900000
0424	3-Methyl butan-2-one	563-80-4	EL9100000
0325	Methyl butyl ketone	<u>591-78-6</u>	MP1400000
0401*	Methyl Cellosolve®	109-86-4	KL5775000
0402*	Methyl Cellosolve® acetate	110-49-6	KL5950000
0403*	Methyl chloride	74-87-3	PA6300000 PA5250000
0123	Methyl chloroform	74-97-5 71-55-6	
	Methyl chloroform Methyl cyanide	75-05-8	KJ2975000 AL7700000
	Methyl cyanoacrylate	137-05-3	AS7000000
	Methyl cyclopentadienyl manganese tricar		OP1450000
0410*	Methyl demeton	8022-00-2	TG1760000
0405	Methyl ester of 2-cyanoacrylic acid	137-05-3	AS7000000
0391	Methyl ester of acetic acid	79-20-9	AI9100000
0394	Methyl ester of acrylic acid	96-33-3	AT2800000
0417	Methyl ester of formic acid	107-31-3	L08925000
0423	Methyl ester of isocyanic acid	624-83-9	NO9450000
0426	Methyl ester of methacrylic acid	80-62-6	OZ5075000
0391 0077	Methyl ethanoate Methyl ethyl carbinol	79-20-9 78-92-2	AI9100000 EO1750000
0069	Methyl ethyl ketone	78-9 <u>2-2</u> 78-93-3	EL6475000
0416	Methyl ethyl ketone hydroperoxide	1338-23-4	EL9450000
	Methyl ethyl ketone peroxide	1338-23-4	EL9450000
	Methyl ethylene oxide	75-56-9	TZ2975000
	Methyl formate	107-31-3	L08925000
	Methyl hydrazine	60-34-4	MV5600000
0420*	Methyl iodide	74-88-4	PA9450000
0421*	Methyl isoamyl ketone	110-12-3	MP3850000
0385	Methyl isobutenyl ketone	141-79-7	SB4200000
0422*	Methyl isobutyl carbinol	108-11-2	SA7350000
	Methyl isobutyl ketone	108-10-1 624-83-9	SA9275000 NO9450000
	Methyl isocyanate Methyl isopropyl ketone	563-80-4	EL9100000
0425*	Methyl mercaptan	74-93-1	PB4375000
	Methyl mercaptophos	8022-00-2	TG1760000
	Methyl methacrylate	80-62-6	OZ5075000
0417	Methyl methanoate	107-31-3	L08925000
0325	Methyl n-butyl ketone	591-78-6	MP1400000
0428	Methyl orthosilicate	681-84-5	<u>VV9800000</u>

0/127*	Methyl parathion	298-00-0	TG0175000
0156	4-Methyl phenol	106-44-5	G06475000
0155	3-Methyl phenol	108-39-4	GO6125000
0154	2-Methyl phenol	95-48-7	G06300000
0640	Methyl phosphite	121-45-9	TH1400000
0394	Methyl propenoate	96-33-3	AT2800000
0488	Methyl propyl ketone	107-87-9	SA7875000
0428*	Methyl silicate	681-84-5	VV9800000
0429*	alpha-Methyl styrene	98-83-9	WL5075300
0229	Methyl sulfate	77-78-1	WS8225000
0425	Methyl sulfhydrate	74-93-1	PB4375000
0410	Methyl systox®	8022-00-2	TG1760000
0066	Methyl tribromide	75-25-2	PB5600000
0220	Methyl yellow	60-11-7	BX7350000
0348	3-Methyl-1-butanol	123-51-3	EL5425000
0347	3-Methyl-1-butanol acetate	123-92-2	NS9800000
0429	1-Methyl-1-phenylethylene	98-83-9	WL5075300
0352	2-Methyl-1-propanol	78-83-1	NP9625000
0641	1-Methyl-2,4,6-trinitrobenzene	118-96-7	<u>XU0175000</u>
0328	2-Methyl-2,4-pentanediol	107-41-5	SA0810000
0328	4-Methyl-2,4-pentanediol	107-41-5	SA0810000
0246	4-Methyl-2,6-di-tert-butyl phenol	128-37-0	GO7875000
0622	1-Methyl-2-aminobenzene	95-53-4	XU2975000
0349	3-Methyl-2-butanol	6032-29-7 <	
0424	3-Methyl-2-butanone	563-80-4	EL9100000
0405*	Methyl-2-cyanoacrylate	137-05-3	AS7000000
0421	5-Methyl-2-hexanone	110-12-3	MP3850000
0426	Methyl-2-methyl-2-propenoate	80-62-6	OZ5075000
0422	4-Methyl-2-pentanol	108-11-2	SA7350000
0178	2-Methyl-2-pentanol-4-one	123-42-2	SA9100000
0078	2-Methyl-2-propanol	75-65-0	E01925000
0446	3-(1-Methyl-2-pyrrolidyl)pyridine	54-11-5	OS5250000
0230	2-Methyl-3,5-dinitrobenzamide	148-01-6	XS4200000
0418*	5-Methyl-3-heptanone	541-85-5	MJ7350000
0385	4-Methyl-3-penten-2-one	141-79-7	SB4200000
0085	1-Methyl-4-tert-butylbenzene	98-51-1	XS8400000
0418	3-Methyl-5-heptanone	541-85-5	MJ7350000
0421	2-Methyl-5-hexanone	110-12-3	MP3850000
0386	2-Methylacrylic acid	79-41-4	OZ2975000
0395* 0395	Methylacrylonitrile alpha-Methylacrylonitrile	126-98-7 126-98-7	UD1400000
			UD1400000
0396*	Methylal	109-87-5	PA8750000
0396* 0398*	Methylal Methylamine	109-87-5 74-89-5	PA8750000 PF6300000
0396* 0398* 0398	Methylal Methylamine Methylamine (anhydrous)	109-87-5 74-89-5 74-89-5	PA8750000 PF6300000 PF6300000
0396* 0398* 0398 0398	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous)	109-87-5 74-89-5 74-89-5 74-89-5	PA8750000 PF6300000 PF6300000 PF6300000
0396* 0398* 0398 0398 0436	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000
0396* 0398* 0398 0398 0436 0624	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000
0396* 0398* 0398 0398 0436 0624 0623	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000
0396* 0398* 0398 0398 0436 0624 0623 0622	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000
0396* 0398* 0398 0398 0436 0624 0623 0622	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000 XU2975000
0396* 0398* 0398 0398 0436 0624 0623 0622	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000
0396* 0398* 0398 0398 0436 0624 0623 0622 0622	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 4-Methylaniline	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000 XU2975000 CM8050000 XU3150000
0396* 0398* 0398 0398 0436 0624 0623 0622 0622 0537 0624	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 3-Methylaniline 3-Methylaniline	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000 XU2975000 CM8050000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000 CM8050000 XU3150000 XU3150000 AJ2100000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0032 0347	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 3-Methylaniline 3-Methylaniline	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 CM8050000 XU3150000 XU3150000 XU3150000 XU3150000 XU3975000 XU3975000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0032 0347 0347 0129	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaridine 4-Methylbenzenamine 3-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylchloromethyl ether	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 CM8050000 XU3150000 XU3150000 XU3150000 XU3150000 XU3150000 XU3150000 XU3800000 AJ2100000 NS9800000 KN6650000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0347 0347 0129 0406*	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 3-Methylaridine 4-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 CM8050000 XU3150000 XU3150000 XU3150000 XU3150000 XU3150000 XU3150000 XU3150000 AJ2100000 NS9800000 NS9800000 KN6650000 GV6125000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0032 0347 0347 0129 0406* 0407*	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylariline 3-Methylbaziridine 4-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexane Methylcyclohexanol	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000 CM8050000 XU3150000 XU2800000 XU3150000 XU3150000 XU3800000 XU39800000 XU39800000 XU39800000 XU39800000 XU300000 XU3000000 XU3000000000000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0032 0347 0347 0129 0406* 0407* 0408	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexanol 2-Methylcyclohexanone	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000 CM8050000 XU3150000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0032 0347 0347 0129 0406* 0407* 0408	Methylal Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 1-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexanol 2-Methylcyclohexanone o-Methylcyclohexanone	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000 CM8050000 XU3150000 XU3150000 XU3150000 XU3150000 XU3150000 XU3150000 GM650000 CM8050000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0032 0347 0347 0129 0406* 0408* 0409	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexanol 2-Methylcyclohexanone 0-Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclopentadienyl manganese trica	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 12108-13-3	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000 XU2975000 XU3150000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0032 0347 0347 0129 0406* 0407* 0408* 0409 0235	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline 2-Methylariline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 3-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexane Methylcyclohexanone 0-Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclopentadienyl manganese trica Methyldinitrobenzene	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 12108-13-3 25321-14-6	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 XU2975000 XU2975000 XU2975000 CM8050000 XU3150000 XU2800000 AJ2100000 NS9800000 NS9800000 GW6125000 GW1750000 GW1750000 GW1750000 OP1450000 XT1300000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 032 0347 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412*	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylchloromethyl ether Methylcyclohexane Methylcyclohexanonl 2-Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclopentadienyl manganese trica Methyldinitrobenzene Methylene bis(4-cyclohexylisocyanate)	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 583-60-8 583-60-8 583-108-13-3 25321-14-6 5124-30-1	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 XU2975000 XU2975000 XU2975000 CM8050000 XU3150000 XU3150000 XU3150000 AJ2100000 NS9800000 NS9800000 KN6650000 GW1750000 GW1750000 GW1750000 GW1750000 OP1450000 NO9250000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 032 0347 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 3-Methylbenzenamine 3-Methylbenzenamine 3-Methylbenzenamine 3-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexanol 2-Methylcyclohexanone o-Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclopentadienyl manganese trica Methylene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate)	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 12108-13-3 25321-14-6 5124-30-1 101-68-8	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 XU2975000 XU2975000 XU2975000 XU3150000 XU3150000 XU3150000 XU3150000 AJ2100000 NS9800000 NS9800000 GV6125000 GW1750000 GW1750000 GW1750000 GW1750000 CP1450000 XT1300000 NO9250000 NO9250000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0032 0347 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 3-Methylbenzenamine 3-Methylbenzenamine 1-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexane Methylcyclohexanone 2-Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclopentadienyl manganese trica Methyldinitrobenzene Methylene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate) Methylene bisphenyl isocyanate	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 12108-13-3 25321-14-6 5124-30-1 101-68-8	PA8750000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 XU2975000 XU3150000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 032 0347 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413* 0414*	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexane Methylcyclohexanone 0-Methylcyclohexanone 0-Methylcyclopentadienyl manganese trica Methylene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate Methylene bisphenyl isocyanate	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 12108-13-3 25321-14-6 5124-30-1 101-68-8 101-68-8 75-09-2	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 CM8050000 XU3150000 XU3150000 XU3150000 GM8050000 AJ2100000 NS9800000 NS9800000 GW61250000 GW1750000 GW1750000 GW1750000 GW1750000 GW1750000 OP1450000 XT1300000 NO9250000 NO9350000 PA8050000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0032 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413* 0414*	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexane Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclopentadienyl manganese trica Methylene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate Methylene bisphenyl isocyanate Methylene chloride Methylene di-p-phenylene ester of isocya	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 12108-13-3 25321-14-6 5124-30-1 101-68-8 75-09-2 101-68-8	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000 CM8050000 XU3150000 XU3150000 XU3150000 XU3150000 CM8050000 XU3150000 XU31500000 XU31500000 XU31500000 XU31500000 XU31500000 XU31500000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0032 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413* 0414*	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexane Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclopentadienyl manganese trica Methylene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate) Methylene chloride Methylene di-p-phenylene ester of isocya Methylene dichloride	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 12108-13-3 25321-14-6 5124-30-1 101-68-8 75-09-2 101-68-8 75-09-2	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000 CM8050000 XU3150000 XU3150000 XU3150000 XU3150000 CM8050000 XU3150000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0032 0347 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413 0414* 0413	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 3-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexane Methylcyclohexanone 2-Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 3-Methyleyclohexanone 3-Methylcyclohexanone 3-Methylcyclohexanon	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 12108-13-3 25321-14-6 5124-30-1 101-68-8 101-68-8 75-09-2 109-87-5	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000 CM8050000 XU3150000 XU2800000 XU3150000 XU3150000 CM8050000 CM91750000 CM1750000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 032 0347 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413 0413* 0414* 0490 0293	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 3-Methylbenzenamine 3-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexane Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate) Methylene bisphenyl isocyanate Methylene chloride Methylene dichloride Methylene dimethyl ether Methylene oxide	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 593-60-8	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 XU2975000 XU3150000 XU2975000 CM8050000 XU3150000 XU3150000 AJ2100000 NS9800000 KN6650000 GW1750000 GW1750000 GW1750000 GW1750000 GW1750000 CM1750000 CM17500000 CM1750000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 032 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413 0413* 0414* 0413 0414* 0396 0293 0411*	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 3-Methylbenzenamine 3-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexanone 0-Methylcyclohexanone 0-Methylcyclohexanone 0-Methylcyclohexanone 0-Methylcyclohexanone 0-Methylcyclohexanone Methylene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate) Methylene bisphenyl isocyanate Methylene chloride Methylene di-p-phenylene ester of isocya Methylene dichloride Methylene dimethyl ether Methylene dimethyl ether Methylene oxide 4,4'-Methylenebis(2-chloroaniline)	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 XU2975000 XU3150000 XU3150000 XU3150000 XU3150000 XU3150000 XU3150000 AJ2100000 NS9800000 RN6650000 GW1750000 GW1750000 GW1750000 GW1750000 CW1750000 NO9350000 NO9350000 PA8050000 PA8050000 PA8750000 CY1050000 CY1050000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0347 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413 0414* 0413 0414* 0396 0293 0411*	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline o-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 3-Methylbenzenamine 3-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexanol 2-Methylcyclohexanone o-Methylcyclohexanone o-Methylcyclohexanone 2-Methylcyclopentadienyl manganese trica Methyldinitrobenzene Methylene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate) Methylene bisphenyl isocyanate Methylene di-p-phenylene ester of isocya Methylene di-p-phenylene ester of isocya Methylene dimethyl ether Methylene dimethyl ether Methylene dimethyl ether Methylene oxide 4,4'-Methylenebis(2-chloroaniline) 4,4'-Methylenebis(2-chlorobenzenamine)	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 12108-13-3 25321-14-6 5124-30-1 101-68-8 75-09-2 109-87-5 50-00-0 101-14-4 101-14-4	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 CM8050000 XU3150000 XU3150000 XU3150000 XU3150000 CM8050000 AJ2100000 AJ2100000 AJ2100000 AJ2100000 NS9800000 AJ210000 GW1750000 GW1750000 GW1750000 GW1750000 CW1750000 DP1450000 AJ210000 NO9350000 NO9350000 PA8050000 PA8050000 PA8750000 CY1050000 CY1050000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0322 0347 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413 0414* 0413 0414* 0396 0293 0411*	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 3-Methylbenzenamine 3-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexanol 2-Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone bethylcyclohexanone 2-Methylcyclohexanone 3-Methylcyclohexanone 3-Methy	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 12108-13-3 25321-14-6 5124-30-1 101-68-8 75-09-2 109-87-5 50-00-0 101-14-4 101-14-4 101-14-4	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 XU2975000 XU2800000 XU3150000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0322 0347 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413 0414* 0413 0414* 0413 0411* 0411	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 3-Methylaniline 3-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylchloromethyl ether Methylcyclohexane Methylcyclohexanol 2-Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone bethylchene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate) Methylene bis(4-phenyl isocyanate) Methylene di-p-phenylene ester of isocya Methylene dichloride Methylene dichloride Methylene dichloride Methylene oxide 4,4'-Methylenebis(2-chloroaniline) 4,4'-Methylenebis(0-chloro aniline) 4,4'-Methylenebis(0-chloro aniline) 4,4'-Methylenebis(0-chloro aniline)	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 12108-13-3 25321-14-6 5124-30-1 101-68-8 75-09-2 109-87-5 50-00-0 101-14-4 101-77-9	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 CM8050000 XU3150000 XU3150000 XU3150000 CM8050000 CM8050000 AJ2100000 NS9800000 NS9800000 NS9800000 GW1750000 GW1750000 GW1750000 GW1750000 OP1450000 XT1300000 NO9350000 PA8050000 PA8050000 PA8750000 PA8750000 CY1050000 CY1050000 CY1050000 CY1050000 CY1050000 BY5425000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0347 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413 0414* 0413 0414* 0413 0411* 0415* 0358	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexanol 2-Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone bethylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 3-Methylene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate) Methylene bisphenyl isocyanate Methylene di-p-phenylene ester of isocya Methylene di-p-phenylene ester of isocya Methylene dimethyl ether Methylene dimethyl ether Methylene oxide 4,4'-Methylenebis(2-chloroaniline) 4,4'-Methylenebis(0-chloro aniline) 4,4'-Methylenebis(o-chloro aniline) 4,4'-Methylenebis(o-chloro aniline) 4,4'-Methylenebis(o-chloro aniline) 4,4'-Methylenebis(o-chloro aniline)	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 12108-13-3 25321-14-6 5124-30-1 101-68-8 75-09-2 101-68-8 75-09-2 101-14-4 101-14-4 101-77-9 108-21-4	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 RY4550000 XU3150000 XU2975000 XU2975000 XU2975000 XU3150000 RY6125000 GW1750000 GW1750000 GW1750000 CW1750000 XT1300000 XT1300000 XT1300000 XT1300000 XY09250000 NO9350000 PA8050000 PA8050000 PA8750000 PA8750000 CY1050000 CY1050000 CY1050000 RY5425000 AI4930000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 0032 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413 0414* 0413 0414* 0396 0293 0411* 0411 0415* 0358 0537	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 3-Methylbutyl acetate 3-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexane Methylcyclohexanol 2-Methylcyclohexanone 0-Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclopentadienyl manganese trica Methyldinitrobenzene Methylene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate) Methylene chloride Methylene di-p-phenylene ester of isocya Methylene di-p-phenylene ester of isocya Methylene dimethyl ether Methylene dimethyl ether Methylene oxide 4,4'-Methylenebis(2-chloroaniline) 4,4'-Methylenebis(0-chloro aniline) 4,4'-Methylenebis(0-chloro aniline) 4,4'-Methylenedianiline 1-Methylethyl ester of acetic acid 2-Methylethyleneimine	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 12108-13-3 25321-14-6 5124-30-1 101-68-8 101-68-8 75-09-2 101-68-8 75-09-2 101-14-4 101-14-4 101-14-4 101-77-9 108-21-4 75-55-8	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 PF6300000 RV4550000 XU3150000 XU2975000 XU2975000 XU2975000 XU2975000 XU2975000 XU2975000 XU2975000 XU2975000 XU2975000 XU2800000 XU2800000 XU3150000 XU2800000 XU3150000 RY61250000 GW1750000 GW1750000 GW1750000 GW1750000 AT1300000 NO9350000 NO9350000 PA8050000 PA8050000 PA8750000 CY1050000 CY1050000 CY1050000 BY5425000 AI4930000 CM8050000 CM8050000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 032 0347 0347 0129 0406* 0407* 0408* 0409 0235 0412* 0413 0413* 0414* 0413 0414* 0419 0293 0411* 0411 0411 0415* 0358 0537 0068	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 3-Methylbutyl acetate 3-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexane Methylcyclohexanol 2-Methylcyclohexanone 2-Methylcyclopentadienyl manganese trica Methyldinitrobenzene Methylene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate) Methylene di-p-phenylene ester of isocya Methylene di-p-phenylene ester of isocya Methylene dimethyl ether Methylene dimethyl ether Methylene dimethyl ether Methylene oxide 4,4'-Methylenebis(2-chloroaniline) 4,4'-Methylenebis(0-chloro aniline) 4,4'-Methylenebis(0-chloro aniline) 4,4'-Methylenedianiline 1-Methylethyleneimine Methylethyleneimine Methylethyleneimine Methylethyleneimine	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 583-60-8 583-60-8 583-60-8 12108-13-3 25321-14-6 5124-30-1 101-68-8 101-68-8 75-09-2 101-68-8 75-09-2 101-14-4 101-14-4 101-14-4 101-14-4 101-17-9 108-21-4 75-55-8 106-97-8	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000 XU2975000 XU2975000 XU2975000 XU2975000 XU2975000 XU2975000 XU2975000 XU2975000 XU29750000 XU3150000 XU3150000 AJ2100000 NS9800000 NS9800000 GW1750000 GW1750000 GW1750000 GW1750000 GW1750000 CW1050000 NO9350000 PA8050000 PA8050000 PA8750000 PA8750000 CY1050000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 032 0347 0129 0406* 0407* 0408 0408* 0409 0235 0412* 0413 0413* 0414* 0413 0411 0411 0415* 0358 0537 0068 0327	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaniline 2-Methylaniline 3-Methylbenzenamine 3-Methylbenzenamine 3-Methylbenzenamine 1-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexanol 2-Methylcyclohexanone 0-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclohexanone 2-Methylcyclopentadienyl manganese trica Methylene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate) Methylene bisphenyl isocyanate Methylene di-p-phenylene ester of isocya Methylene di-p-phenylene ester of isocya Methylene dimethyl ether Methylene displaniline 4,4'-Methylenebis(2-chloroaniline) 4,4'-Methylenedianiline 1-Methylethyl ester of acetic acid 2-Methylethyleneimine Methylisoamyl acetate	109-87-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 583-60-8 583-60-8 583-60-8 583-60-8 583-60-8 583-60-8 583-60-8 583-60-8 583-60-8 583-60-8 583-60-8 583-60-8 583-60-8 583-60-8 583-60-8 583-60-8 101-68-8 101-68-8 75-09-2 101-68-8 75-09-2 101-14-4 101-14-4 101-14-4 101-14-4 101-14-4 101-77-9 108-21-4 75-55-8 106-97-8 108-84-9	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2975000 XU2975000 XU2975000 XU2975000 XU3150000 XU3150000 XU3150000 XU3150000 XU3150000 AJ2100000 NS9800000 RN6650000 GW1750000 GW1750000 GW1750000 GW1750000 CW1050000 PA8050000 PA8050000 PA8050000 PA8050000 PA8050000 PA8750000 CY1050000 CY1050000 CY1050000 CY1050000 AI4930000 CM8050000 BY54250000 AI4930000 CM8050000 CM8050000 CY1050000 CY1050000 CY1050000 CY1050000 CY1050000 CY1050000 CY1050000 CM8050000
0396* 0398* 0398 0398 0436 0624 0623 0622 0537 0624 0623 032 0347 0347 0129 0406* 0407* 0408* 0409 0235 0412* 0413 0413* 0414* 0413 0414* 0419 0293 0411* 0411 0411 0415* 0358 0537 0068	Methylamine Methylamine (anhydrous) Methylamine (aqueous) (Methylamino)benzene 4-Methylaniline 3-Methylaniline 0-Methylaniline 2-Methylaniline 2-Methylaziridine 4-Methylbenzenamine 3-Methylbenzenamine 3-Methylbutyl acetate 3-Methylbutyl acetate 3-Methylbutyl ester of acetic acid 3-Methylbutyl ethanoate Methylcyclohexane Methylcyclohexane Methylcyclohexanol 2-Methylcyclohexanone 2-Methylcyclopentadienyl manganese trica Methyldinitrobenzene Methylene bis(4-cyclohexylisocyanate) Methylene bis(4-phenyl isocyanate) Methylene di-p-phenylene ester of isocya Methylene di-p-phenylene ester of isocya Methylene dimethyl ether Methylene dimethyl ether Methylene dimethyl ether Methylene oxide 4,4'-Methylenebis(2-chloroaniline) 4,4'-Methylenebis(0-chloro aniline) 4,4'-Methylenebis(0-chloro aniline) 4,4'-Methylenedianiline 1-Methylethyleneimine Methylethyleneimine Methylethyleneimine Methylethyleneimine	109-87-5 74-89-5 74-89-5 74-89-5 100-61-8 106-49-0 108-44-1 95-53-4 75-55-8 106-49-0 108-44-1 626-38-0 123-92-2 123-92-2 107-30-2 108-87-2 25639-42-3 583-60-8 583-60-8 583-60-8 583-60-8 12108-13-3 25321-14-6 5124-30-1 101-68-8 101-68-8 75-09-2 101-68-8 75-09-2 101-14-4 101-14-4 101-14-4 101-14-4 101-17-9 108-21-4 75-55-8 106-97-8	PA8750000 PF6300000 PF6300000 PF6300000 PF6300000 PF6300000 BY4550000 XU3150000 XU2800000 XU2975000 XU2975000 XU2975000 XU2975000 CM8050000 XU3150000 XU3150000 XU3150000 AJ2100000 NS9800000 NS9800000 GW1750000 GW1750000 GW1750000 GW1750000 GW1750000 CW1050000 PA8050000 PA8050000 PA8750000 PA8750000 CY1050000

0462	2-Methylnitrobenzene	88-72-2	XT3150000
0463	3-Methylnitrobenzene	99-08-1	XT2975000
0463	m-Methylnitrobenzene	99-08-1	XT2975000
0464	4-Methylnitrobenzene	99-99-0	XT3325000
0464	p-Methylnitrobenzene	99-99-0	XT3325000
0538	<u>Methyloxirane</u>	<u>75-56-9</u>	TZ2975000
0323	3-Methylpentane		
0323	2-Methylpentane		
0328	2-Methylpentane-2,4-diol	107-41-5	SA0810000
0436	<u>Methylphenylamine</u>	100-61-8	BY4550000
0620	Methylphenylene diamine	<u>25376-45-8</u>	XS9445000
0350 0353	2-Methylpropane 2-Methylpropanenitrile	75-28-5 78-82-0	TZ4300000 TZ4900000
0395	2-Methylpropenenitrile	126-98-7	UD1400000
0386	2-Methylpropenoic acid	79-41-4	OZ2975000
0353	2-Methylpropionitrile	78-82-0	TZ4900000
0073	1-Methylpropyl acetate	105-46-4	AF7380000
0351	2-Methylpropyl acetate	110-19-0	AI4025000
0351	2-Methylpropyl ester of acetic acid	110-19-0	AI4025000
0351	beta-Methylpropyl ethanoate	110-19-0	AI4025000
0084	2-(1-Methylpropyl)phenol	89-72-5	SJ8920000
<u>0663</u>	Methylstyrene	25013-15-4	WL5075000
	Metribuzin	<u>21087-64-9</u>	XZ2990000
0503	Mevinphos	7786-34-7	GO5250000
0431*		12001-26-2	VV8760000
0306	Mineral carbon	7782-42-5	MD9659600
0569	Mineral spirits	8052-41-3	WJ8925000
0308 0432*	Mineral white	13397-24-5	MG2360000
0064	Mineral wool fiber Molecular bromine	7726-95-6	PY8070000 EF9100000
0115	Molecular chlorine	7782-50-5	F02100000
0342	Molecular iodine	7553-56-2	NN1575000
0433*		7439-98-7	OA4680000
0434*		7 133 30 7	Q111000000
0433	Molybdenum metal	7439-98-7	OA4680000
0030	Monoammonium salt of sulfamic acid	7773-06-0	WO6125000
0265	Monobromoethane	74-96-4	KH6475000
0657	Monobromoethylene	593-60-2	KU8400000
0400	Monobromomethane	74-83-9	PA4900000
0634	Monobromotrifluoromethane	75-63-8	PA5425000
0120	Monochloroacetyl chloride	<u>79-04-9</u>	A06475000
0121	Monochlorobenzene	108-90-7	CZ0175000
0124 0267	Monochlorodifluoromethane	75-45-6	PA6390000 KH7525000
0658	Monochloroethane Monochloroethene	75-00-3 75-01-4	KU9625000
0658	Monochloroethylene	75-01-4	KU9625000
0403	Monochloromethane	74-87-3	PA630000
0131	Monochloropentafluoroethane	76-15-3	KH7877500
0435	Monocron	6923-22-4	TC4375000
0435*	Monocrotophos	6923-22-4	TC4375000
0256	Monoethanolamine	141-43-5	KJ5775000
0263	Monoethylamine	75-04-7	KH2100000
0272	Monoethylene glycol	107-21-1	KW2975000
0660	<u>Monofluoroethylene</u>	75-02-5	YZ7351000
0290	Monofluorotrichloromethane	75-69-4	PB6125000
0300	Monogermane	7782-65-2	LY4900000
0493 0420	Monohydroxybenzene Monoiodomethane	108-95-2 74-88-4	SJ3325000 PA9450000
0360	Monoisopropylamine	75-31-0	NT8400000
0436*		100-61-8	BY4550000
0390	Monomethyl ether hydroguinone	150-76-5	SL7700000
0398	Monomethylamine	74-89-5	PF6300000
0419	Monomethylhydrazine	60-34-4	MV5600000
0448	Mononitrogen monoxide	10102-43-9	OX0525000
0485	Monopentaerythritol	115-77-5	RZ2490000
0499	Monophenylhydrazine	100-63-0	MW8925000
0556	Monosilane	7803-62-5	VV1400000
0561	Monosodium salt of sulfurous acid	7631-90-5	VZ2000000
0105	Monoxide	630-08-0	FG3500000
0437*	Morpholine Motor fuel	110-91-8	OD6475000
<u>0299</u> 0299	Motor fuel	8006-61-9	LX3300000
0332	Motor spirits Muriatic acid)	8006-61-9 7647-01-0	LX3300000 MW4025000
0332	Muriatic acid) Muriatic ether	75-00-3	KH7525000
0431	Muscovite	12001-26-2	VV8760000

GUIDE CHEMICAL NAME CAS NO RIECS NO

0478 N,N'-Dimethyl-4,4'-bipyridinium dichlori 1910-42-5 DW2275000

	0185 N,N-Dibutylethanolamine	102-81-8	KK3850000
0218 N.N-Dimethyl acetamide			
0222 N.NDimethyl-4-aminoagobenzene	0210 N,N-Diethylethanolamine		KK5075000
0222 N.N.Dimethylanilon 121-69-7 8X4725000			
0223* N.N-Dimethylanijine			
0223 N.N-Dimethylbenzeneamine			
0224 N.N-Dimethylformamide			
0226 N.N-Dimethylformanide			
0636 N.N-Dimethylmitrosamine			
0461 N.N-pimethylnitrosamine			
0223 N.N-Diphenylaniline			
0643 N.N-Diphenylaniline 603-34-9 YK2680000 0276 N.N-Ethylenethiourea 96-45-7 NY5680000 0276 N.N-Ethylenethiourea 96-45-7 NY9625000 0098 N.(1,1,2,2-Tetrachloroethyllthio)-4-ovc 2425-06-1 GS490000 0361 N.(1-Methylethyl)-benzenamine 768-52-5 E9419000 0011 NCaminoethyll, 2-ethanediamine 111-40-0 IE1225000 0010 NAcetyl-2-zaminofiuorene 53-96-3 AB945000 0185 2.N-Dibutylaminoethanol 102-81-8 YK355000 0186 2.N-Dibutylaminoethanol 102-74-3 GR4025000 0361 N-IPA December 1 768-52-5 BY419000 0361 N-IPA 768-52-5 BY419000 9436 N-Methyl-2-isopropoxyphenyl-carbamate 10-61-8 BY455000 0436 N-Methyl-2-isopropoxyphenyl-carbamate 10-61-8 BY455000 9461 N-Methyl-2-10052500 0531 N-Methyl-3-1000 9461 N-Methyl-3-1000 9461 N-Methyl-3-1000 9461 N-Methyl-3-1000			
0643 N.N-Dibenylbenzenamine			
0.76 N.N-Ethylenethiourea			
0098 N-((1.1.2.2-Tetrachloroethyl)thio)-4-cyc 2425-06-1			
0361 N - (1-Methylethyl) - 2-propanamine			
0211 N-(2-minofthyl)1,2-ethanediamine			IM4025000
0007 N-Acetyl-2-aminofluorene 53-96-3 AB9450000 0185* 2-N-Dibutylaminethanol 102-81-8 KX855000 0281* N-Ethylethanamine 100-74-3 024025000 0361 N-Ethylmorpholine 100-74-3 024025000 0361 N-IPA 768-52-5 BY4190000 0361 N-IBOROTOVALITIE 768-52-5 BY4190000 0361 N-IBOROTOVALITIE 100-61-8 BY4550000 0531 N-Methyl-1-2-isopropoxyphenyl-carbamate 114-26-1 FC315000 0531 N-Methyl-N-1-nitroso-methanamine 124-40-3 JP8750000 0607 N-Methyl-N-nitroso-methanamine 124-40-3 JP8750000 0240 N-Nitroso-N-dimethylamine 62-75-9 J00525000 0461 N-Nitroso-N-dimethylamine 135-88-6 0M455000 0500* N-Phenylaniline 122-39-4 JJ780000 0240 N-Phenylaniline 122-39-4 JJ780000 0361 N-Phenylaniline 122-39-4 JJ780000 0436 N-Phenylaniline 122-39-4			
0188* 2-N-Dibutylaminoethanol			
0209 N-Ethylethanamine 109-89-7 HZ8750000 0261 N-IPA 768-52-5 BY4190000 0361 N-IPA 768-52-5 BY4190000 0361 N-ISOpropylaniline 768-52-5 BY4190000 0436 N-Methyl aniline 100-61-8 BY4550000 0531 N-Methyl-2-isopropxyphenyl-carbamate 114-61 F53150000 0607 N-Methyl-N.2.4.6-tetranitroaniline 479-45-8 BY6300000 0461 N-Methyl-Nnitroso-methanamine 62-75-9 100525000 0461 N-Methyl-Deta-naphthylamine 62-75-9 100525000 0461 N-Nitroso-N.N-dimethylamine 62-75-9 100525000 0500* N-Phenyl-beta-naphthylamine 135-88-6 0455000 0240 N-Phenylaniline 122-39-4 JJ780000 0361 N-Phenylaniline 106-18 BY4550000 0361 N-Phenylisopropylamine 768-52-5 BY4190000 0361 N-Phenylisopropylamine 768-52-5 BY4190000 0361 N-Serve® 1929-82-4 US7525000 0440 NDI 3173-72-6 N0950000 0450 NS 55-63-0 OX210000			
0281* N-Ethylmorpholine			
0361 N-IFA			
0361* N-Isopropylaniline			
0436 N-Methyl 2-isopropoxyphenyl-carbamate			
0.531 N-Methyl-2-isopropoxyphenyl-carbamate			
0461 N-Methyl-N-1itroso-methamamine 62-75-9 100525000 0219 N-Methylmethanamine 124-40-3 IPR750000 0461 N-Nitroso-N.N-dimethylamine 62-75-9 100525000 0461 N-Nitrosodimethylamine 62-75-9 100525000 0500* N-Phenyl-beta-naphthylamine 135-88-6 0M4550000 0240 N-Phenylamiline 122-39-4 JJ780000 0240 N-Phenylamiline 122-39-4 JJ780000 0240 N-Phenylamiline 122-39-4 JJ780000 0361 N-Phenylisopropylamine 768-52-5 BY4190000 0436 N-Phenylmethylamine 100-61-8 BY4550000 0099 N-Trichloromethylmercapto-4-cyclohexene 13-06-2 0M5075000 0136 N-Serve® 1929-82-4 US7525000 0440 NDI 3173-72-6 N09600000 0440 NDI 3173-72-6 N09600000 0456 NG 55-63-0 0X2100000 0221 NIAX® A99 3033-62-3 KR9460000 0221 NIAX® Catalyst Al 3033-62-3 KR9460000 0221 NIAX® Catalyst Al 3033-62-3 KR9460000 0459 1-NP 108-03-2 TZ5075000 0460 2-NP 109-03-2 TZ5075000 0438 Naphthal (coal tar) 8030-30-6 DE3030000 0438 Naphthalene 91-20-3 000525000 0440 1.5-Naphthalene 91-20-3 000525000 0440 1.5-Naphthalene 91-20-3 000525000 0440 1.5-Naphthalene diisocyanate 3173-72-6 N09600000 0440 1.5-Naphthalene diisocyanate 86-88-4 YT9275000 0440 1.5-Naphthalene diisocyanate 86-88-4 YT9275000 0440 1.5-Naphthalene 3173-72-6 N09600000 0440 1.5-Naphthalene 3173-72-6 N09600000 0440 1.5-Naphthalene 3173-72-6 N09600000 0440 1.5-Naphthalene 3173-72-6 N09600000 0440 1.5-Naphthyl h-methyl-carbamate 63-25-2 FC595000 0440 1.5-Naphthyl h-methyl-carbamate 63-25-2 FC5950000 0440 1.5-Naphthyl h-methyl h-methyl h-methyl h-methyl h-methyl h-methyl h-methyl h-methyl h-me			
0.461 N-Methylmethanamine			
0.219			
0461 N-Nitroso-N.N-dimethylamine 62-75-9 100525000 0461* N-Nitrosodimethylamine 62-75-9 100525000 0500* N-Phenyl-beta-naphthylamine 135-88-6 0M4550000 0240 N-Phenylbenzenamine 122-39-4 JJ7800000 0240 N-Phenylbenzenamine 122-39-4 JJ7800000 0240 N-Phenylbenzenamine 122-39-4 JJ7800000 0361 N-Phenylisopropylamine 768-52-5 BY4190000 0363 N-Phenylmethylamine 100-61-8 BY4550000 0436 N-Phenylmethylamine 100-61-8 BY4550000 0436 N-Phenylmethylamine 100-61-8 BY4550000 0316 N-Phenylmethylamine 133-06-2 GW5075000 0316 N-Serve® 107525000 0316 N-Serve® 107525000 0440 NDI 3173-72-6 N09600000 0440 NDI 3173-72-6 N09600000 0456 NG 55-63-0 GW2100000 0456 NG 55-63-0 GW2100000 0221 NIAX® A99 3033-62-3 KR9460000 0221 NIAX® Catalyst Al 3033-62-3 KR9460000 0459 N-Pm 108-03-2 TZ5075000 0450 Naled 300-76-5 TB9450000 0438* Naphtha Goal tar 8030-30-6 DB3030000 0438* Naphtha Goal tar 8030-30-6 DB3030000 0438* Naphthalene 91-20-3 GV525000 0440* Naphthalene 91-20-			
0.461* N-Nitrosodimethylamine			
0500* N-Phenyl-beta-naphthylamine			IO0525000
O240 N-Phenylhenzenamine		135-88-6	
N-Phenylisopropylamine 768-52-5 BY4190000	0240 N-Phenylaniline	122-39-4	
0.436 N-Phenylmethylamine			JJ7800000
One N-Trichloromethylmercapto-4-cyclohexene			
0.136 N-serve®			
0440 NDT			
0456 NG 55-63-0 OX2100000 0456 NG 55-63-0 OX2100000 0221 NIAX® A99 3033-62-3 KR9460000 0459 1-NP 108-03-2 KR9460000 0460 2-NP 79-46-9 TZ5275000 0460 2-NP 79-46-9 TZ5250000 0438 Naphtha 8030-30-6 DE3030000 0438* Naphthal (coal tar) 8030-30-6 DE3030000 0440* Naphthalene 91-20-3 OJ0525000 0440* Naphthalene diisocyanate 3173-72-6 N09600000 0440 1.5-Naphthalene ester of isocyanic acid 3173-72-6 N09600000 0440 1.5-Naphthalin 91-20-3 OJ0525000 0440 1.5-Naphthalene ester of isocyanic acid 3173-72-6 N09600000 0440 1.5-Naphthalin 91-20-3 OJ0525000 0410 1Naphthyl N-methyl-carbamate 63-25-2 FC595000 0421 1Naphthyl N-methyl-carbamide 86-88-4			
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0607 Nitramine 479-45-8 BY6300000 0136 Nitrapyrin 1929-82-4 US7525000	0238 Navadel® 0283 Nemacur® 0443* Niax® Catalyst ESN 0630 Nibren wax 0600 Nibren wax 0444* Nickel carbonyl 0445* Nickel metal and other compounds (as Ni	8006-61-9 78-34-2 22224-92-6 62765-93-9 1321-65-9 1335-88-2 13463-39-3) 7440-02-0	LX3300000 TE3350000 TB3675000 QR3900000 QK4025000 QK3700000 QR6300000 QR5950000
	0238 Navadel® 0283 Nemacur® 0443* Niax® Catalyst ESN 0630 Nibren wax 0600 Nibren wax 0444* Nickel carbonyl 0445* Nickel metal and other compounds (as Ni 0444 Nickel tetracarbonyl 0446* Nicotine	8006-61-9 78-34-2 22224-92-6 62765-93-9 1321-65-9 1335-88-2 13463-39-3) 7440-02-0 13463-39-3 54-11-5	LX3300000 TE3350000 TB3675000 OR3900000 OK4025000 OK3700000 OR6300000 OR5950000 OR6300000 OS5250000
<u>044/* Nitric acid 7697-37-2 0U5775000</u>	0238 Navadel® 0283 Nemacur® 0443* Niax® Catalyst ESN 0630 Nibren wax 0600 Nibren wax 0444* Nickel carbonyl 0445* Nickel metal and other compounds (as Ni 0444 Nickel tetracarbonyl 0446* Nicotine 0607 Nitramine	$\begin{array}{c} 8006-61-9 \\ 78-34-2 \\ 22224-92-6 \\ 62765-93-9 \\ 1321-65-9 \\ 1335-88-2 \\ 13463-39-3 \\)7440-02-0 \\ 13463-39-3 \\ 54-11-5 \\ 479-45-8 \end{array}$	LX3300000 TE3350000 TB3675000 OR3900000 OK4025000 OK3700000 OR6300000 OR6300000 OR6300000 OS5250000 BY6300000
	0238 Navadel® 0283 Nemacur® 0443* Niax® Catalyst ESN 0630 Nibren wax 0600 Nibren wax 0444* Nickel carbonyl 0445* Nickel metal and other compounds (as Ni 0444 Nickel tetracarbonyl 0446* Nicotine 0607 Nitramine 0136 Nitrapyrin	8006-61-9 78-34-2 22224-92-6 62765-93-9 1321-65-9 1335-88-2 13463-39-3) 7440-02-0 13463-39-3 54-11-5 479-45-8 1929-82-4	LX3300000 TE3350000 TB3675000 OR3900000 OK4025000 OK3700000 OR6300000 OR5950000 OR6300000 OS5250000 BY6300000 US7525000

	Nitric oxide	10102-43-9	OX0525000
0449*	p-Nitroaniline	100-01-6	BY7000000
0449	4-Nitroaniline	100-01-6	BY7000000
	4-Nitrobenzenamine Nitrobenzene	100-01-6 98-95-3	BY7000000 DA6475000
0450	Nitrobenzol	98-95-3 98-95-3	DA6475000 DA6475000
0451	p-Nitrobipheny	92-93-3	DV5600000
	4-Nitrobiphenyl	92-93-3	DV5600000
0457	Nitrocarbol	75-52-5	PA9800000
0452	4-Nitrochlorobenzene	100-00-5	CZ1050000
0452*	p-Nitrochlorobenzene	100-00-5	CZ1050000
0132	Nitrochloroform	76-06-2	PB6300000
0451	p-Nitrodiphenyl	92-93-3	DV5600000
0451	4-Nitrodiphenyl	92-93-3	DV5600000
0453	Nitroetan	79-24-3	K15600000
	Nitroethane	79-24-3	K15600000
	Nitrogen dioxide	10102-44-0	<u>OW9800000</u>
0455	Nitrogen fluoride	7783-54-2	OX1925000
0091	Nitrogen lime	156-62-7	GS6000000
0448	Nitrogen monoxide	10102-43-9	OX0525000
0454 0455*	Nitrogen peroxide Nitrogen trifluoride	10102-44-0 7783-54-2	<u>OW9800000</u> OX1925000
	Nitroglycerine	55-63-0	0X1923000 0X2100000
0273	Nitroglycol	628-96-6	KW5600000
	Nitromethane	75-52-5	PA9800000
	2-Nitronaphthalene	581-89-5	OJ9760000
0458	beta-Nitronaphthalene	581-89-5	OJ9760000
0449	p-Nitrophenylamine	100-01-6	BY700000
0459	Nitropropane	108-03-2	TZ5075000
0459*	1-Nitropropane	108-03-2	TZ5075000
	2-Nitropropane	79-46-9	TZ5250000
0460	<u>iso-Nitropropane</u>	79-46-9	TZ5250000
0462	2-Nitrotoluene	88-72-2	XT3150000
0462*	o-Nitrotoluene	88-72-2	XT3150000
0463	3-Nitrotoluene	99-08-1	XT2975000
	m-Nitrotoluene	99-08-1	XT2975000
0464*	p-Nitrotoluene	99-99-0 99-99-0	XT3325000
0464 0463	4-Nitrotoluene meta-Nitrotoluene	99-99-0	XT3325000 XT2975000
0463	para-Nitrotoluene	99-08-1	XT3325000
<u> </u>			
0462	ortho-Nitrotoluene	88-72-2	XT3150000
0462 0132	ortho-Nitrotoluene Nitrotrichloromethane	88-72-2 76-06-2	XT3150000 PB6300000
0462 0132 0465*	ortho-Nitrotoluene	88-72-2	XT3150000
0462 0132 0465* 0466* 0466	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane	88-72-2 76-06-2 10024-97-2 111-84-2	XT3150000 PB6300000 OX1350000
0462 0132 0465* 0466* 0466 0467*	Ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane	88-72-2 76-06-2 10024-97-2	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000
0462 0132 0465* 0466* 0466 0467* 0305	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000
0462 0132 0465* 0466* 0466 0467* 0305 0443	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000
0462 0132 0465* 0466* 0466 0467* 0305 0443	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000
0462 0132 0465* 0466* 0466 0467* 0305 0443 0597 0466	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None None Nonyl hydride	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan	88-72-2 76-06-2 10024-97-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000
0462 0132 0465* 0466* 0466* 0305 0443 0597 0466 0467 0467	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts	88-72-2 76-06-2 10024-97-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6	XT3150000 PB6300000 QX1350000 RA6115000 RA6115000 MD7900000 QR3900000 KI8450000 RA6115000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol	88-72-2 76-06-2 10024-97-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0480 0570	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica	88-72-2 76-06-2 10024-97-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9	XT3150000 PB6300000 QX1350000 RA6115000 RA6115000 MD7900000 QR3900000 KI8450000 RA6115000 WL2275000
0462 0132 0465* 0466* 0466* 0305 0443 0597 0466 0467 0467	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts	88-72-2 76-06-2 10024-97-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6	XT3150000 PB6300000 QX1350000 RA6115000 RA6115000 MD7900000 QR3900000 KI8450000 RA6115000
0462 0132 0465* 0466* 0466* 0305 0443 0597 0466 0467 0467 0480 0570	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica	88-72-2 76-06-2 10024-97-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9	XT3150000 PB6300000 QX1350000 RA6115000 RA6115000 MD7900000 QR3900000 KI8450000 RA6115000 WL2275000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0480 0570	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO	XT3150000 PB6300000 QX1350000 RA6115000 RA6115000 MD7900000 QR3900000 KI8450000 RA6115000 WL2275000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0480 0570	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 WL2275000 RTECS NO
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0480 0570	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME 0,0,0',0'-Tetraethyl S,S'-methylene di(p 0,0,0'0'-Tetramethyl 0,0'-thiodi-p-pheny 0,0-Diethyl 0-(p-methylsulfinyl)phenyl)p	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 WL2275000 RTECS NO
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0480 0570 GUIDE 0257 0589 0284 0137	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME 0,0,0',0'-Tetraethyl S,S'-methylene di(p 0,0,0'0'-Tetramethyl 0,0'-thiodi-p-pheny 0,0-Diethyl 0-(p-methylsulfinyl)phenyl)p 0,0-Diethyl 0-3,5,6-trichloro-2-pyridyl	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 RA6115000 RA6115000 TE4550000 TF6890000 TF6890000 TF6300000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME 0,0,0',0'-Tetraethyl S,S'-methylene di(p 0,0,0'0'-Tetramethyl 0,0'-thiodi-p-pheny 0,0-Diethyl 0-(p-methylsulfinyl)phenyl)p 0,0-Diethyl S-(ethylthio)methylphosphoro	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 RA6115000 RA6115000 TE4550000 TF6890000 TF6890000 TF6300000 TD9450000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME O,O,O',O'-Tetraethyl S,S'-methylene di(p 0,0,0'0'-Tetramethyl O,O'-thiodi-p-pheny 0,O-Diethyl O-(p-methylsulfinyl)phenyl)p 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-2-(ethylthio)-ethyl phosph	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2 298-04-4	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 TE4550000 TF6890000 TF6890000 TF6300000 TD9450000 TD9275000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME O,O,O',O'-Tetraethyl S,S'-methylene di(p 0,O,O'o')-Tetramethyl O,O'-thiodi-p-pheny 0,O-Diethyl O-(p-methylsulfinyl)phenyl)p 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-2-(ethylthio)-ethyl phosph 0,O-Diethyl S-ethylthiomethylthiothionop	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2 298-04-4 298-02-2	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 TE4550000 TF6890000 TF6300000 TF6300000 TD9450000 TD9450000 TD9450000
0462 0132 0465* 0466* 0466 0467* 0305 0443 0597 0466 0467 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME O,O,O',O'-Tetraethyl S,S'-methylene di(p 0,O,O'O'-Tetramethyl O,O'-thiodi-p-pheny 0,O-Diethyl O-(p-methylsulfinyl)phenyl)p 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-2-(ethylthio)-ethyl phosph 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl S-ethylthiomethylphosphoroth	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2 298-04-4 298-02-2 56-38-2	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 RTECS NO TE4550000 TF6890000 TF6300000 TD9450000 TD9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000
0462 0132 0465* 0466* 0466 0467* 0305 0443 0597 0466 0467 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502 0479 0181	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME O,O,O',O'-Tetraethyl S,S'-methylene di(p 0,O,O'O'-Tetramethyl O,O'-thiodi-p-pheny 0,O-Diethyl O-(p-methylsulfinyl)phenyl)p 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-2-(ethylthio)-ethyl phosph 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl-O(p-nitrophenyl) phosphoroth 0,O-Diethyl-O(p-nitrophenyl) phosphoroth 0,O-Diethyl-O-2-isopropyl-4-methyl-6-pyr	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2 298-04-4 298-02-2 56-38-2 333-41-5	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 RTECS NO TE4550000 TF6890000 TF6300000 TD9450000 TD9450000 TF9450000 TT94550000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502 0479 0181 0410	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME O.O.O'.O'-Tetraethyl S.S'-methylene di(p 0.O.O'O'-Tetramethyl O.O'-thiodi-p-pheny 0.O-Diethyl O-(p-methylsulfinyl)phenyl)p 0.O-Diethyl S-(ethylthio)methylphosphoro 0.O-Diethyl S-2-(ethylthio)-ethyl phosph 0.O-Diethyl S-ethylthiomethylthiothionoph 0.O-Diethyl-O(p-mitrophenyl) phosphoroth 0.O-Diethyl-O(p-nitrophenyl) phosphoroth 0.O-Diethyl-O(2-isopropyl-4-methyl-6-pyr 0.O-Diemthyl 2-ethylmercaptoethyl thioph	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2 298-04-4 298-02-2 56-38-2 333-41-5 8022-00-2	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 K18450000 RA6115000 RTECS NO TE4550000 TF6890000 TF6300000 TD9450000 TD9450000 TD9450000 TF9450000 TF3325000 TG17600000 TG17600000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502 0479 0181 0410 0546	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME O.O.O'.O'-Tetraethyl S.S'-methylene di(p 0.O.O'o'-Tetramethyl O.O'-thiodi-p-pheny 0.O-Diethyl O-(p-methylsulfinyl)phenyl)p 0.O-Diethyl S-(ethylthio)methylphosphoro 0.O-Diethyl S-2-(ethylthio)-ethyl phosph 0.O-Diethyl S-ethylthiomethylthiothionop 0.O-Diethyl-O(p-mitrophenyl) phosphorot 0.O-Diethyl-O(p-nitrophenyl) phosphorot 0.O-Diethyl-O(p-nitrophenyl) phosphorot 0.O-Diethyl-O-2-isopropyl-4-methyl-6-pyr 0.O-Dimethyl 2-ethylmercaptoethyl thioph 0.O-Dimethyl 2-ethylmercaptoethyl thioph 0.O-Dimethyl O-(2,4,5-trichlorophenyl) p	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2 298-04-4 298-02-2 256-38-2 333-41-5 8022-00-2 299-84-3	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 WL2275000 TE4550000 TF6890000 TF6300000 TF6300000 TD9450000 TD9450000 TF3325000 TF3325000 TG1760000 TG0525000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502 0479 0181 0410 0546 0285	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME O.O.O'.O'-Tetraethyl S.S'-methylene di(p 0.O.O'o'-Tetramethyl O.O'-thiodi-p-pheny 0.O-Diethyl O-(p-methylsulfinyl)phenyl)p 0.O-Diethyl S-2-(ethylthio)methylphosphoro 0.O-Diethyl S-2-(ethylthio)methylphosphoro 0.O-Diethyl S-ethylthiomethylthiothionop 0.O-Diethyl S-ethylthiomethylthiothionop 0.O-Diethyl-O(p-nitrophenyl) phosphoroth 0.O-Diethyl-O-2-isopropyl-4-methyl-6-pyr 0.O-Dimethyl 2-ethylmercaptoethyl thiophen 0.O-Dimethyl O-(2.4.5-trichlorophenyl) p 0.O-Dimethyl O-(2.4.5-trichlorophenyl) p 0.O-Dimethyl O-3-methyl-4-methylthiophen	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-04-4 298-02-2 298-04-4 298-02-2 333-41-5 8022-00-2 299-84-3 55-38-9	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 TE4550000 TF6890000 TF6890000 TF6300000 TD9450000 TD9450000 TD9450000 TT94550000 TG1760000 TG1760000 TG9525000 TF9625000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502 0479 0181 0410 0546 0285 0427	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME O,O,O',O'-Tetraethyl S,S'-methylene di(p 0,O,O'O'-Tetramethyl O,O'-thiodi-p-pheny 0,O-Diethyl O-(p-methylsulfinyl)phenyl)p 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl-O(p-nitrophenyl) phosphoroth 0,O-Diethyl-O-2-isopropyl-4-methyl-6-pyr 0,O-Dimethyl O-2-ethylmercaptoethyl thioph 0,O-Dimethyl O-2-ethylmercaptoethyl thioph 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-04-4 298-02-2 298-04-4 298-02-2 56-38-2 333-41-5 8022-00-2 299-84-3 55-38-9 298-00-0	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 WL2275000 RTECS NO TE4550000 TF6300000 TF6300000 TD9450000 TD9450000 TD9450000 TF9325000 TG1760000 TG90525000 TG90175000 TG0175000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502 0479 0181 0410 0546 0285 0427 0044	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME O,O,O',O'-Tetraethyl S,S'-methylene di(p 0,O,O'o'-Tetramethyl O,O'-thiodi-p-pheny 0,O-Diethyl O-(p-methylsulfinyl)phenyl)p 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-2-(ethylthio)-ethyl phosph 0,O-Diethyl S-2-(ethylthio)-ethyl phosph 0,O-Diethyl S-2-isopropyl-4-methyl-6-pyr 0,O-Diethyl-O(p-nitrophenyl) phosphoroth 0,O-Diethyl O-2-isopropyl-4-methyl-6-pyr 0,O-Dimethyl O-2-isopropyl-4-methyl-6-pyr 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl-O-p-nitrophenylphosphorothi 0,O-Dimethyl-O-p-nitrophenylphosphorothi	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2 298-04-4 298-02-2 298-04-4 298-02-2 298-04-4 298-02-2 299-84-3 55-38-9 298-00-0 86-50-0	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 WL2275000 RTECS NO TE4550000 TF6890000 TF6300000 TF6300000 TD9450000 TD9450000 TD9450000 TG9450000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502 0479 0181 0410 0285 0427 0044 0582	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME O,O,O',O'-Tetraethyl S,S'-methylene di(p 0,O,O'o')-Tetramethyl O,O'-thiodi-p-pheny 0,O-Diethyl O-(p-methylsulfinyl)phenyl)p 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-2-(ethylthio)methylphosphoro 0,O-Diethyl S-2-(ethylthio)-ethyl phosph 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl-O(p-nitrophenyl) phosphoroth 0,O-Diethyl-O-2-isopropyl-4-methyl-6-pyr 0,O-Dimethyl O-2-ethylmercaptoethyl thioph 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl-S-4-oxo-1,2,3-benzotriazin- 0-Ethyl O-(4-methylthio)phenyl S-propylp	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 2921-88-2 298-02-2 298-04-4 298-02-2 298-04-4 298-02-2 298-04-4 298-02-2 299-84-3 55-38-9 298-00-0 86-50-0 35400-43-2	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 RTECS NO TE4550000 TF6890000 TF6300000 TF9450000 TD9450000 TD9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF1325000 TF1760000 TG1760000 TG1760000 TG1760000 TG1760000 TG1760000 TG175000
0462 0132 0465* 0466* 0466 0467* 0305 0443 0597 0466 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502 0479 0181 0410 0546 0285 0427 0044 0582 0255	Ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME O,O,O',O'-Tetraethyl S,S'-methylene di(p 0,O,O'O'-Tetramethyl O,O'-thiodi-p-pheny 0,O-Diethyl O-(p-methylsulfinyl)phenyl)p 0,O-Diethyl O-3,5,6-trichloro-2-pyridyl 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-2-(ethylthio)-ethyl phosph 0,O-Diethyl S-ethylthiomethylphiothionop 0,O-Diethyl S-ethylthiomethylphiothionop 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl O-2-isopropyl-4-methyl-6-pyr 0,O-Dimethyl O-2-isopropyl-4-methyl-6-pyr 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl S-4-oxo-1,2,3-benzotriazin- 0-Ethyl O-(4-methylthio)phenyl S-propylp 0-Ethyl O-(4-nitrophenyl) phenylphosphon	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2 298-04-4 298-02-2 298-04-4 298-02-2 298-04-4 298-02-2 299-84-3 55-38-9 298-00-0 86-50-0 35400-43-2	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 RTECS NO TE4550000 TF6890000 TF630000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF96250000 TF96250000 TF96250000 TF96250000 TE19250000 TE19250000 TE19250000 TB19250000 TB19250000 TB19250000 TB19250000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502 0479 0181 0410 0285 0427 0044 0582	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME O,O,O',O'-Tetraethyl S,S'-methylene di(p 0,O,O'o')-Tetramethyl O,O'-thiodi-p-pheny 0,O-Diethyl O-(p-methylsulfinyl)phenyl)p 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-2-(ethylthio)methylphosphoro 0,O-Diethyl S-2-(ethylthio)-ethyl phosph 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl-O(p-nitrophenyl) phosphoroth 0,O-Diethyl-O-2-isopropyl-4-methyl-6-pyr 0,O-Dimethyl O-2-ethylmercaptoethyl thioph 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl-S-4-oxo-1,2,3-benzotriazin- 0-Ethyl O-(4-methylthio)phenyl S-propylp	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2 298-04-4 298-02-2 298-04-4 298-02-2 299-84-3 55-38-9 298-00-0 35400-43-2 2104-64-5	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 RTECS NO TE4550000 TF6890000 TF6300000 TF9450000 TD9450000 TD9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF9450000 TF3325000 TG1760000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502 0479 0181 0410 0546 0285 0427 0044 0582 0255 0292	Ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME O,O,O',O'-Tetraethyl S,S'-methylene di(p 0,O,O'O'-Tetramethyl O,O'-thiodi-p-pheny 0,O-Diethyl O-(p-methylsulfinyl)phenyl)p 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-2-(ethylthio)methylphosphoro 0,O-Diethyl S-2-(ethylthio)methylphosphoroh 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl-O(p-nitrophenyl) phosphoroth 0,O-Diethyl-O-2-isopropyl-4-methyl-6-pyr 0,O-Dimethyl O-2-isopropyl-4-methyl-6-pyr 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl-O-p-nitrophenylphosphorothi 0,O-Dimethyl-O-p-nitrophenylphosphorothi 0,O-Dimethyl-S-4-oxo-1,2,3-benzotriazin O-Ethyl O-(4-methylthio)phenyl S-propylp O-Ethyl O-(4-nitrophenyl) phenylphosphon 0-Ethyl-S-phenyl ethylphosphorothioate	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2 298-04-4 298-02-2 56-38-2 333-41-5 8022-00-2 299-84-3 55-38-9 298-00-0 86-50-0 35400-43-2 2104-64-5 944-22-9	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 RTECS NO TE4550000 TF6890000 TF6300000 TF9625000 TF9625000 TG1760000 TG9255000 TG1760000 TG925000 TG175000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502 0479 0181 0410 0546 0285 0427 0044 0582 0292 0177	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME CHEMICAL NAME CHEMICAL NAME CHEMICAL NAME O,O,O'O'-Tetraethyl S,S'-methylene di(p 0,O,O'O'-Tetramethyl O,O'-thiodi-p-pheny 0,O-Diethyl O-(p-methylsulfinyl)phenyl)p 0,O-Diethyl O-3,5,6-trichloro-2-pyridyl 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl-O(p-nitrophenyl) phosphoroth 0,O-Dimethyl O-2-isopropyl-4-methyl-6-pyr 0,O-Dimethyl O-2-isopropyl-4-methyl-6-pyr 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl-S-4-oxo-1,2,3-benzotriazin- 0-Ethyl O-(4-mitrophenyl) phenylphosphorothi 0,Ethyl-S-phenyl ethylphosphorothioate 0-O-Diethyl-O(and S)-2-(ethylthio)ethyl 0CBM 0ctacarbonyldicobalt	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2 298-04-4 298-02-2 298-04-4 298-02-2 298-04-4 298-02-2 299-84-3 55-38-9 298-00-0 86-50-0 35400-43-2 2104-64-5 944-22-9 8065-48-3 2698-41-1 10210-68-1	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 RTECS NO TE4550000 TF6890000 TF6300000 TP9450000 TD9450000 TD9450000 TF9450000 TG1760000 TG1760000 TG1760000 TG1760000 TG175000 TE1925000 TE1925000 TE1925000 TE1925000 TE1925000 TF3150000 TF3150000 TF3150000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0487 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502 0479 0181 0410 0546 0285 0427 0044 0582 0292 0177 0122 0147 0112	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME CHEMICAL NAME CHEMICAL NAME O.O.O'O'-Tetraethyl S.S'-methylene di(p 0.O.O'O'-Tetramethyl O.O'-thiodi-p-pheny 0.O-Diethyl O-(p-methylsulfinyl)phenyl)p 0.O-Diethyl O-(p-methylsulfinyl)phenyl)p 0.O-Diethyl S-(ethylthio)methylphosphoro 0.O-Diethyl S-2-(ethylthio)-ethyl phosph 0.O-Diethyl S-ethylthiomethylthiothionop 0.O-Diethyl S-ethylthiomethylthiothionop 0.O-Diethyl-O(p-nitrophenyl) phosphoroth 0.O-Diethyl-O-2-isopropyl-4-methyl-6-pyr 0.O-Dimethyl O-3-methyl-4-methylthiophen 0.O-Dimethyl O-3-methyl-4-methylthiophen 0.O-Dimethyl-O-p-nitrophenylphosphorothi 0.O-Dimethyl-S-4-oxo-1,2,3-benzotriazin- 0-Ethyl O-(4-methylthio)phenyl S-propylp 0-Ethyl O-(4-methylthio)phenyl S-propylp 0-Ethyl O-(4-mitrophenyl) phenylphosphon 0-Ethyl-S-phenyl ethylphosphorothioate 0-O-Diethyl-O(and S)-2-(ethylthio)ethyl 0CBM 0ctacarbonyldicobalt 1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tet	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2 298-04-4 298-02-2 298-04-4 298-02-2 298-04-4 298-02-2 299-84-3 55-38-9 298-00-0 86-50-0 35400-43-2 2104-64-5 944-22-9 8065-48-3 2698-41-1 10210-68-1 57-74-9	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 RTECS NO TE4550000 TF6890000 TF6300000 TF6300000 TF9450000 TF9450000 TF9450000 TG0175000 TG1760000 TG1760000 TG9450000 TG9450000 TG9450000 TF9450000 TF9450000 TF3325000 TG1760000 TG1760000 TG1760000 TG1760000 TG175000
0462 0132 0465* 0466* 0466* 0467* 0305 0443 0597 0466 0467 0467 0480 0570 GUIDE 0257 0589 0284 0137 0502 0245 0502 0479 0181 0410 0546 0285 0427 0044 0582 0292 0177 0122 0147	ortho-Nitrotoluene Nitrotrichloromethane Nitrous oxide Nonane n-Nonane 1-Nonanethiol None None None Nonyl hydride n-Nonyl mercaptan Nonylthiol Nuisance dusts Nux vomica CHEMICAL NAME CHEMICAL NAME CHEMICAL NAME CHEMICAL NAME O,O,O'O'-Tetraethyl S,S'-methylene di(p 0,O,O'O'-Tetramethyl O,O'-thiodi-p-pheny 0,O-Diethyl O-(p-methylsulfinyl)phenyl)p 0,O-Diethyl O-3,5,6-trichloro-2-pyridyl 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-(ethylthio)methylphosphoro 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl S-ethylthiomethylthiothionop 0,O-Diethyl-O(p-nitrophenyl) phosphoroth 0,O-Dimethyl O-2-isopropyl-4-methyl-6-pyr 0,O-Dimethyl O-2-isopropyl-4-methyl-6-pyr 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl O-3-methyl-4-methylthiophen 0,O-Dimethyl-S-4-oxo-1,2,3-benzotriazin- 0-Ethyl O-(4-mitrophenyl) phenylphosphorothi 0,Ethyl-S-phenyl ethylphosphorothioate 0-O-Diethyl-O(and S)-2-(ethylthio)ethyl 0CBM 0ctacarbonyldicobalt	88-72-2 76-06-2 10024-97-2 111-84-2 111-84-2 1455-21-6 62765-93-9 630-20-6 111-84-2 1455-21-6 1455-21-6 57-24-9 CAS NO 563-12-2 3383-96-8 115-90-2 2921-88-2 298-02-2 298-04-4 298-02-2 298-04-4 298-02-2 298-04-4 298-02-2 299-84-3 55-38-9 298-00-0 86-50-0 35400-43-2 2104-64-5 944-22-9 8065-48-3 2698-41-1 10210-68-1	XT3150000 PB6300000 OX1350000 RA6115000 RA6115000 MD7900000 OR3900000 KI8450000 RA6115000 RTECS NO TE4550000 TF6890000 TF6300000 TF96300000 TF9630000 TF9625000 TG1760000 TG0525000 TG1760000 TG175000 TG175000 TG175000 TG175000 TG175000 TF1925000 TF1925000 TF3325000 TG175000

_0468* Oc	tachloronaphthalene	2234-13-1	ОК0250000
0468 1,	2,3,4,5,6,7,8-Octachloronaphthalene	2234-13-1	OK0250000
0469* 1-	Octadecanethiol	2885-00-9	
0469 Oc	tadecyl mercaptan	2885-00-9	
0016 Oc	talene	309-00-2	IO2100000
0470* Oc	tane	111-65-9	RG8400000
0470 n-	Octane	111-65-9	RG8400000
0470 no	rmal-Octane	111-65-9	RG8400000
0471* 1-	Octanethiol	111-88-6	
0471 n-	Octyl mercaptan	111-88-6	
	tvl phthalate	117-81-7	TI0350000
0471 Oc	tylthiol	111-88-6	
0471 1-	Octylthiol	111-88-6	
0472* Oi	l mist (mineral)	8012-95-1	PY8030000
0450 Oi	l of mirbane	98-95-3	DA6475000
0577 Oi	l of vitriol	7664-93-9	WS5600000
0020 On	ion oil	2179-59-1	J00350000
0506 Or	thophosphoric acid	7664-38-2	TB6300000
0473 Os	mic acid anhydride	20816-12-0	RN1140000
0473 Os	mium oxide	20816-12-0	RN1140000
	mium tetroxide	20816-12-0	RN1140000
0474* Ox	alic acid	144-62-7	RO2450000
0474 Ox	alic acid (aqueous)	144-62-7	RO2450000
0474 Ox	alic acid dihydrate	144-62-7	RO2450000
0161 Ox	alonitrile	460-19-5	GT1925000
0528 2-	Oxetanone	57-57-8	RO7350000
0275 Ox	irane	75-21-8	KX2450000
0097 2-	Oxohexamethyleneimine	105-60-2	CM3675000
0354 Ox	ooctyl alcohol	26952-21-6	NS7700000
0221 2,	2'-Oxybis(N,N-dimethyl ethylamine)	3033-62-3	KR9460000
0128 Ox	ybis(chloromethane)	542-88-1	KN1575000
	ygen difluoride	7783-41-7	RS2100000
0475 Ox	ygen fluoride	7783-41-7	RS2100000
0476* Oz		10028-15-6	RS8225000

GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0512	PAN	85-44-9	TI3150000
0500	PBNA	135-88-6	OM4550000
0126	PCB	11097-69-1	TO1360000
0125	PCB	53469-21-9	TO1356000
0489	PCM	594-42-3	PB0370000
0452	PCNB	100-00-5	CZ1050000
0484	PCP	87-86-5	SM6300000
0513	m-PDN	626-17-5	CZ1900000
0485	PE	115-77-5	RZ2490000
0501	PF	638-21-1	SZ2100000
0535	PGDN	6423-43-4	TY6300000
<u>0498</u>	PGE	122-60-1	TZ3675000
0489	PMM	594-42-3	PB0370000
0449	PNA	100-01-6	BY7000000
0451	PNB	92-93-3	DV5600000
0452	PNCB	100-00-5	CZ1050000
0480	PNOR		
0664	Painters naphtha	8032-32-4	OI6180000
0477	Paraffin fume	8002-74-2	RV0350000
0472	Paraffin oil mist	8012-95-1	PY8030000
0477	Paraffin scale fume	8002-74-2	RV0350000
	Paraffin wax fume	8002-74-2	RV0350000
	Paraguat (Paraguat dichloride)	1910-42-5	DW2275000
0478		1910-42-5	DW2275000
0478	Paraguat dichloride	<u> 1910-42-5</u>	DW2275000
	Parathion	56-38-2	TF4550000
0427	Parathion methyl	<u> 298-00-0</u>	TG0175000
0479	Parathion-ethyl	56-38-2	TF4550000
	Particulates not otherwise regulated	1205 50 0	Tr:210000
0093	Pebble lime	1305-78-8	EW3100000
0484	Penta	<u>87-86-5</u>	SM6300000
	Pentaborane	19624-22-7	RY8925000
0481	Pentaboron nonahydride	19624-22-7	RY8925000
0345 0482*	Pentacarbonyl iron	<u>13463-40-6</u> 76-01-7	NO4900000 KI6300000
0482	Pentachloroethane Pentachloronaphthalene	1321-64-8	
0483	1,2,3,4,5-Pentachloronaphthalene	1321-64-8	OK0300000
0483 0484*	Pentachlorophenol	87-86-5	OK0300000 SM6300000
0484	2.3.4.5.6-Pentachlorophenol	87-86-5 87-86-5	SM6300000 SM6300000
0509	Pentachlorophosphorus	10026-13-8	TB6125000
0485*		100 <u>26-13-8</u> 115-77-5	RZ2490000
0482	Pentalin	76-01-7	KI6300000
<u> 0402</u>	remeatin	10-01-1	VIOSOOOO

0171	Pentamethylene	287-92-3	GY2390000
0652	Pentanal	110-62-3	YV3600000
0486	Pentane	109-66-0	RZ9450000
0486*		109-66-0	RZ9450000
0486	normal-Pentane	109-66-0	RZ9450000
0301	1.5-Pentanedial	111-30-8	MA2450000
0487*	1-Pentanethiol	110-66-7	SA3150000
0032	2-Pentanol acetate	626-38-0	AJ210000
0032	1-Pentanol acetate	628-63-7	AJ1925000
0488*	2-Pentanone	107-87-9	SA7875000
0212	3-Pentanone	96-22-0	SA8050000
0389	Penthrane	76-38-0	KN7820000
0031	Pentyl ester of acetic acid	628-63-7	AJ1925000
0031	2-Pentyl ester of acetic acid	626-38-0	AJ2100000
0487	Pentyl mercaptan	110-66-7	SA3150000
0599	Perchlorethylene	127-18-4	KX3850000
0314	Perchlorobutadiene	87-68-3	EJ070000
0314	Perchlorocyclopentadiene	77-47-4	GY1225000
0315	Perchloroethane	67-72-1	KI4025000
0510	Perchloroethylene	127-18-4	KX3850000
0489*	Perchloromethyl mercaptan	594-42-3	PB0370000
0468	Perchloronaphthalene	2234-13-1	OK0250000
	Perchloryl fluoride	7616-94-6	SD1925000
0319	Perfluoroacetone	684-16-2	UC2450000
0599	Perk	127-18-4	KX3850000
	Perlite	93763-70-3	S05254000
0335	Peroxide	7722-84-1	MX0900000
0299	Petrol	8006-61-9	LX3300000
0042	Petroleum asphalt	8052-42-4	CI9900000
0042	Petroleum bitumen	8052-42-4	CI9900000
	Petroleum distillates (naphtha)	8002-05-9	SE7449000
0664	Petroleum ether	8032-32-4	OI6180000
0492	Petroleum naphtha	8002-05-9	SE7449000
0569	Petroleum solvent	8052-41-3	WJ8925000
0664	Petroleum spirit	8032-32-4	OI6180000
0119	Phenacyl chloride	532-27-4	AM6300000
0283	Phenamiphos	22224-92-6	TB3675000
0493*	Phenol	108-95-2	SJ3325000
0515	Phenol trinitrate	88-89-1	TJ7875000
0494*	Phenothiazine	92-84-2	SN5075000
0494	Phenoxy benzene	101-84-8	KN8970000
0498	Phenyl 2,3-epoxypropyl ether	122-60-1	TZ3675000
0493	Phenyl alcohol	108-95-2	SJ3325000
0239	Phenyl benzene	92-52-4	DU8050000
0121	Phenyl chloride	108-90-7	CZ0175000
0121	Phenyl chloromethyl ketone	532-27-4	AM6300000
0496*	Phenyl ether (vapor)	101-84-8	KN8970000
0497*	Phenyl ether-biphenyl mixture (vapor)	8004-13-5	DV1500>
<u> </u>	THEHAT SELECT PARTIETTAL WITNESSE (AGROL)	000± .T2-2	N TOUV

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NT CT7	E=3>0498* Phenyl glycidyl ether	1	.22-60-1	Z3675000
0049	Phenyl hydride	71-43-2	CY1400000	. <u>23073000</u>
0493	Phenyl hydroxide	108-95-2	SJ3325000	-
0050	Phenyl mercaptan	108-98-5	DC0525000	_
0619	Phenyl methane	108-88-3	XS5250000	_
0496	Phenyl oxide	101-84-8	KN8970000	_
0644	Phenyl phosphate	115-86-6	TC8400000	_
0159	2-Phenyl propane	98-82-8	GR8575000	_
0429	2-Phenyl propylene	98-83-9	WL5075300	_
0500	Phenyl-beta-naphthylamine	135-88-6	OM4550000	_
0033	Phenylamine	62-53-3	BW6650000	-
0500	2-Phenylaminonaphthalene	135-88-6	OM4550000	_
0240	Phenylaniline	122-39-4	JJ7800000	_
0025	4-Phenylaniline	92-67-1	DU8925000	_
0591	2-Phenylbiphenyl	84-15-1	WZ6472000	_
0592	3-Phenylbiphenyl	92-06-8	WZ6470000	_
0593	4-Phenylbiphenyl	92-94-4	WZ6475000	_
0495*	p-Phenylene diamine	106-50-3	SS8050000	_
0495	1,4-Phenylene diamine	106-50-3	SS8050000	_
0671	m-Phenylenebis(methylamine)	1477-55-0	PF8970000	_
0264	Phenylethane	100-41-4	DA0700000	_
0571	Phenylethylene	100-42-5	WL3675000	_
0499*	Phenylhydrazine	100-63-0	MW8925000	_
0451	4-Phenylnitrobenzene	92-93-3	DV5600000	_
0451	p-Phenylnitrobenzene	92-93-3	DV5600000	_
0501*	Phenylphosphine	638-21-1	SZ2100000	_
0431	Phlogopite	12001-26-2	2 VV8760000	_

0502* Phorate	298-02-2	TD9450000
0503* Phosdrin	7786-34-7	GO5250000
0504* Phosgene	75-44-5	SY5600000
0501 Phosphaniline	638-21-1	SZ2100000
0505* Phosphine	7803-51-2	SY7525000
0505 Phosphorated hydrogen	7803-51-2	SY7525000
0506* Phosphoric acid	7664-38-2	TB630000
0506 Phosphoric acid (aqueous)	7664-38-2	TB6300000
0509 Phosphoric chloride	10026-13-8	TB6125000
0507* Phosphorus (yellow)	7723-14-0	TH3500000
0508 Phosphorus chloride	10025-87-3	TH4897000
0511 Phosphorus chloride	7719-12-2	TH3675000
0505 Phosphorus hydride	7803-51-2	SY7525000
0508* Phosphorus oxychloride	10025-87-3	TH4897000
0508 Phosphorus oxytrichloride	10025-87-3	TH4897000
0509* Phosphorus pentachloride	10026-13-8	TB6125000
0510* Phosphorus pentasulfide	1314-80-3	TH4375000
0509 Phosphorus perchloride	10026-13-8	TB6125000
0510 Phosphorus persulfide	1314-80-3	TH4375000
0510 Phosphorus sulfide	1314-80-3	TH4375000
0511* Phosphorus trichloride	7719-12-2	TH3675000
0505 Phosphorus trihydride	7803-51-2	SY7525000
0508 Phosphoryl chloride	10025-87-3	TH4897000
0512 Phthalic acid anhydride	85-44-9	TI3150000
0512* Phthalic anhydride	85-44-9	TI3150000
0513* m-Phthalodinitrile	626-17-5	CZ1900000
0514* Picloram	1918-02-1	TJ7525000
0515* Picric acid	88-89-1	TJ7875000
0166 Pimelic ketone	108-94-1	GW1050000
0516* Pindone	83-26-1	NK6300000
0517* Piperazine dihydrochloride	142-64-3	TL4025000
0517 Piperazine hydrochloride	142-64-3	TL4025000
0516 Pivalyl	83-26-1	NK6300000
0516 2-Pivalyl-1,3-indandione	83-26-1	NK6300000
_0516 Pival®	83-26-1	NK6300000
0518* Plaster of Paris	26499-65-0	TP0700000
0519* Platinum	7440-06-4	TP2160000
0520* Platinum (soluble salts, as Pt)	7440 06 4	mp.01.60000
0519 Platinum black	7440-06-4	TP2160000
0519 Platinum metal	7440-06-4	TP2160000
0519 Platinum sponge 0306 Plumbago	7440-06-4 7782-42-5	TP2160000 MD9659600
0306 Plumbago 0368 Plumbum	7439-92-1	OF7525000
0126 Polychlorinated biphenyl	11097-69-1	TO1360000
0125 Polychlorinated biphenyl	53469-21-9	TO1356000
0113 Polychlorocamphene	8001-35-2	XW5250000
0364 Porcelain clay	1332-58-7	GF1670500
0521* Portland cement	65997-15-1	VV8770000
0521 Portland cement silicate	65997-15-1	VV8770000
0522* Potassium cyanide (as CN)	151-50-8	TS8750000
0523 Potassium hydrate	1310-58-3	TT2100000
0523* Potassium hydroxide	1310-58-3	TT2100000
0522 Potassium salt of hydrocyanic acid	151-50-8	TS8750000
0552 Precipitated amorphous silica	7631-86-9	VV7310000
0031 Primary amyl acetate	628-63-7	AJ1925000
0348 Primary isoamyl alcohol	123-51-3	EL5425000
0393 Propadiene-methyl acetylene	59355-75-8	UK4920000
0524* Propane	74-98-6	TX2275000
0524 n-Propane	74-98-6	TX2275000
0525* Propane sultone	1120-71-4	RP5425000
0525 1,3-Propane sultone	1120-71-4	RP5425000
0526 Propane-1-thiol	107-03-9	TZ7300000
0377 Propanedial	542-78-9	TX6475000
0377 1,3-Propanedial	542-78-9	TX6475000
0530 Propanenitrile	107-12-0	UF9625000
0526* 1-Propanethiol	107-03-9	TZ7300000
0302 1,2,3-Propanetriol	<u>56-81-5</u>	MA8050000
0456 1,2,3-Propanetriol trinitrate	55-63-0 79-09-4	OX2100000
0529 Propanoic acid 0359 2-Propanol	<u>79-09-4</u> 67-63-0	UE5950000 NT8050000
0533 n-Propanol	71-23-8	UH8225000
0533 1-Propanol	71-23-8	UH8225000
0004 2-Propanone	67-64-1	AL3150000
0527* Propargyl alcohol	107-19-7	UK5075000
0192 Propellant 12	75-71-8	PA8200000
0017 1-Propen-3-ol	107-18-6	BA5075000
0017 Propend 5 01	107-02-8	AS1050000
0011 2-Propenal	107-02-8	AS1050000
0012 Propenamide	79-06-1	AS3325000
0012 2-Propenamide	79-06-1	AS3325000
	<u>/</u> 9-00-1	<u> </u>
0538 Propene oxide	75-56-9	TZ2975000

0014	Propenenitrile	107-13-1	AT5250000
0014	2-Propenenitrile	107-13-1	AT5250000
0013	2-Propenoic acid	79-10-7	AS4375000
0017 0017	Propenol 2-Propenol	107-18-6 107-18-6	BA5075000 BA5075000
0017	2-Propenol propyl disulfide	2179-59-1	J00350000
	[(2-Propenyloxy)methyl] oxirane	106-92-3	RR0875000
0392	Propine	74-99-7	UK4250000
0528	3-Propiolacetone	57-57-8	RO7350000
0528*	beta-Propiolactone	57-57-8	RO7350000
0212	Propione	96-22-0	SA8050000
	Propionic acid	79-09-4	UE5950000
	Propionic nitrile	107-12-0 107-12-0	<u>UF9625000</u>
	Propionitrile Propiononitrile	107-12-0	UF9625000 UF9625000
	Propoxur	114-26-1	FC3150000
0358	2-Propyl acetate	108-21-4	AI4930000
	n-Propyl acetate	109-60-4	AJ3675000
	Propyl alcohol	71-23-8	UH8225000
	n-Propyl alcohol	71-23-8	UH8225000
	sec-Propyl alcohol	67-63-0	NT8050000
	Propyl allyl disulfide	<u>2179-59-1</u>	J00350000
	n-Propyl carbinol Propyl cyanide	71-36-3 109-74-0	E01400000 ET8750000
	n-Propyl cyanide	109-74-0	ET8750000
	n-Propyl ester of acetic acid	109-74-0	AJ3675000
0532	Propyl ester of nitric acid	627-13-4	UK0350000
0524	Propyl hydride	74-98-6	TX2275000
0242	Propyl ketone	123-19-3	MJ5600000
	Propyl mercaptan	107-03-9	TZ7300000
	n-Propyl mercaptan	107-03-9	TZ7300000
	n-Propyl nitrate Propylacetate	627-13-4 109-60-4	<u>UK0350000</u> AJ3675000
	2-Propylamine	75-31-0	NT8400000
0360	sec-Propylamine	75-31-0	NT8400000
0157	Propylene aldehyde	4170-30-3	GP9499000
	Propylene dichloride	78-87-5	TX9625000
	Propylene glycol dinitrate	6423-43-4	TY6300000
0535	1,2-Propylene glycol dinitrate	6423-43-4	TY6300000
0536		107-98-2 999-61-1	UB7700000
0339	Propylene glycol monoacrylate Propylene glycol monomethyl ether	107-98-2	AT1925000 UB7700000
	Propylene glycol-1,2-dinitrate	6423-43-4	TY6300000
	Propylene imine	75-55-8	CM8050000
0537	Propylene imine (inhibited)	75-55-8	CM8050000
	Propylene oxide	75-56-9	TZ2975000
0538	1,2-Propylene oxide	75-56-9	TZ2975000
0537 0537	Propyleneimine Drawylenimine	75-55-8	CM8050000 CM8050000
0527	Propylenimine 2-Propyn-1-ol	75-55-8 107-19-7	UK5075000
0527	1-Propyn-3-ol	107-19-7	UK5075000
0392	Propyne	74-99-7	UK4250000
0392	1-Propyne	74-99-7	UK4250000
0393	Propyne-allene mixture	59355-75-8	UK4920000
0393	Propyne-propadiene mixture	<u>59355-75-8</u>	UK4920000
0527	2-Propynyl alcohol	107-19-7	<u>UK5075000</u>
0572	Proteolytic enzymes Prussic acid	1395-21-7 (CO9450000
0333 0638	Pseudocumene	74-90-8 95-63-6	MW6825000 DC3325000
0540	Pyrethrin I or II	8003-34-7	UR4200000
	Pyrethrum	8003-34-7	UR4200000
0540	Pyrethrum I or II	8003-34-7	UR4200000
0541*	Pyridine	110-86-1	UR8400000
0026	alpha-Pyridylamine	504-29-0	US1575000
0109	Pyrocatechol	120-80-9	UX1050000
	Pyrocellulose Dyrolignous apirit	9004-34-6 67-56-1	FJ5691460
0397 0606	Pyroligneous spirit Pyrophosphate	7722-88-5	PC1400000 UX7350000
0000	1 1 1 Option Prince	, , <u>, , , , , , , , , , , , , , , , , </u>	3217330000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0553	<u>Ouartz</u>	14808-60-7	VV7330000
0093	Quick lime	1305-78-8	EW3100000
0383	Quicksilver	<u>7439-97-6</u>	OV4550000
0338	Quinol	123-31-9	MX3500000
0542* 0542	<u>Ouinone</u> p-Ouinone	106-51-4 106-51-4	DK2625000 DK2625000
UJTA	₽ Ø#THOHE	TOO DI-4	
		CAS NO	RTECS NO

0169	RDX	121-82-4	XY9450000
_0528	beta-lactone	<u>57-57-8</u>	RQ7350000
0366	Range oil	8008-20-6	OA5500000
0152	Raw cotton dust		GN2275000
0447	Red fuming nitric acid (RFNA)	7697-37-2	OU5775000
0549	Red iron oxide	1309-37-1	NO7400000
0549	Red oxide	1309-37-1	NO740000
0412	Reduced MDI	5124-30-1	NO9250000
0664	Refined solvent naphtha	8032-32-4	OI6180000
0290	Refrigerant 11	75-69-4	PB6125000
0596	Refrigerant 112	76-12-0	KI1420000
0595	Refrigerant 112a	76-11-9	KI1425000
0632	Refrigerant 113	76-13-1	KJ400000
0201	Refrigerant 114	76-14-2	KI1101000
0192	Refrigerant 12	75-71-8	PA8200000
0634	Refrigerant 13B1	75-63-8	PA5425000
0197	Refrigerant 21	75-43-4	PA8400000
0124	Refrigerant 22	75-45-6	PA6390000
0543*	Resorcinol	108-46-3	VG9625000
	Rhodium (metal fume and insoluble compou		VI9069000
	Rhodium (soluble compounds, as Rh)	7110 10 0	<u>VIJOOJOOO</u>
	-	9005-25-8	CMECOCOCO
0567	Rice starch		GM5090000
	Ro-Sulfiram®	97-77-8	J01225000
0042	Road asphalt	8052-42-4	CI9900000
0574	Rock candy	57-50-1	WN6500000
0432	Rock wool		PY8070000
	Ronnel	299-84-3	TG0525000
0042	Roofing asphalt	8052-42-4	CI9900000
0431	Roscoelite	12001-26-2	VV8760000
		TZ00T-70-7	V V O / O U U U U
	Rosin core solder, pyrolysis products (a		
	Rosin core soldering flux pyrolysis prod		
0547	Rosin flux pyrolysis products		
0548*	Rotenone	83-79-4	DJ2800000
0549*		1309-37-1	NO7400000
0492	Rubber solvent	8002-05-9	SE7449000
	Rubbing alcohol	67-63-0	
0359			NT8050000
0158	Ruelene®	299-86-5	TB3850000
<u>0617</u>	Rutile	<u> 13463-67-7</u>	XR2275000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
		2-12 2.0	
0387	S-Methyl-N-(methylcarbamoyloxy)thioaceti	16752-77-5	AK2975000
0387 0375	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim	16752-77-5 121-75-5	AK2975000 WM8400000
0387 0375 0564	S-Methyl-N-(methylcarbamoyloxy)thioaceti	16752-77-5 121-75-5 62-74-8	AK2975000 WM8400000 AH9100000
0387 0375	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim	16752-77-5 121-75-5	AK2975000 WM8400000
0387 0375 0564 0574	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose	16752-77-5 121-75-5 62-74-8 57-50-1	AK2975000 WM8400000 AH9100000 WN6500000
_0387 _0375 _0564 _0574 _0029	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000
0387 0375 0564 0574 0029 0412	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000
0387 0375 0564 0574 0029 0412 0349	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 <	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000
0387 0375 0564 0574 0029 0412 0349 0630	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000
0387 0375 0564 0574 0029 0412 0349 0630 0600	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 QK4025000 QK3700000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 OK4025000 QK3700000 VS7700000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 OK4025000 QK3700000 VS7700000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 OK3700000 VS7700000 VS7700000 WX1050000 VS9450000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 OK3700000 VS7700000 VS7700000 WX1050000 VS9450000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 OK3700000 VS7700000 VS7700000 VS7700000 VS9450000 VS9450000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1 7783-07-5	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 OK3700000 VS7700000 VS7700000 VS7700000 VS9450000 VS9450000 MX1050000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551* 0336 0153	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Selenium hydride Selenium hydride	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1 7783-07-5 136-78-7	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 OK3700000 VS7700000 VS7700000 WX1050000 VS9450000 VS9450000 KK4900000 KK4900000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551* 0336 0153	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Sesone Sevin®	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 OK3700000 VS7700000 VS7700000 VS7700000 VS9450000 VS9450000 VS9450000 KK4900000 FC5950000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551* 0336 0153 0100	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Sesone Sevin® Sewer gas	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-06-4	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 OK3700000 VS7700000 VS7700000 WX1050000 VS9450000 VS9450000 WX1050000 KK4900000 KK4900000 MX1225000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0351 0153 0100 0337 0556	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Sesone Sevin® Sewer gas Silane	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 OK4025000 VS7700000 VS7700000 VS7700000 VS9450000 VS9450000 MX1050000 KK4900000 FC5950000 MX1225000 VV1400000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0351 0153 0100 0337 0556	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Sesone Sevin® Sewer gas Silane	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-06-4	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 OK4025000 VS7700000 VS7700000 VS7700000 VS9450000 VS9450000 MX1050000 KK4900000 FC5950000 MX1225000 VV1400000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0336 0153 0100 0337 0556 0552	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Sesone Sevin® Sewer gas Silane Silica gel	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-06-4 7803-62-5 7631-86-9	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 N09250000 OK4025000 OK3700000 VS7700000 VS7700000 VS7700000 WX1050000 VS9450000 WX1050000 KK4900000 FC5950000 MX1225000 VV1400000 VV7310000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0153 0100 0337 0556 0552	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium bydride Selenium hodride Selenium Selenium hodride Selenium fluoride Selenium hodride Selenium hodride Selenium hodride Selenium hodride Selenium hydride	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-66-4 7803-62-5 7631-86-9 7631-86-9	AK2975000 WM8400000 AH9100000 WN6500000 BP4550000 NO9250000 OK3700000 VS7700000 VS7700000 VS7700000 WX1050000 VS9450000 WX1050000 KK4900000 FC5950000 MX1225000 VV1400000 VV7310000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0153 0100 0337 0556 0552 0552* 0553*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Selenium hydride Selenium fluoride Silica gel Silica, amorphous Silica, crystalline (as respirable dust)	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-79-1 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-06-4 7803-62-5 7631-86-9 14808-60-7	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000 VS7700000 VS7700000 VS9450000 MX1050000 KK4900000 FC5950000 MX1225000 VV1400000 VV7310000 VV7330000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551* 0337 0100 0337 0556	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hoydride Selenium hoydride Selenium fluoride Selenium hoydride	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-06-4 7803-62-5 7631-86-9 14808-60-7 7803-62-5	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000 WX1050000 VS9450000 MX1050000 KK4900000 FC5950000 MX1225000 VY7310000 VY7310000 VY7310000 VY7330000 VV1400000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551* 0336 0153 0100 0337 0556 0552* 0552* 0553*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Selenium hydride Silica gel Silica, crystalline (as respirable dust) Silicane Silicane	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-6-4 7803-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NQ9250000 OK4025000 OK3700000 VS7700000 WX1050000 WX1050000 WX1050000 MX1050000 MX1050000 WX9450000 VS9450000 VS94500000 VS94500000 VS94500000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551* 0337 0100 0337 0556 0552* 0552* 0552* 0554* 0555*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Sesone Sevin® Sewer gas Silane Silica gel Silica, crystalline (as respirable dust) Silicane Silicon Silicon carbide	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-06-4 7803-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3 409-21-2	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000 VS7700000 VS7700000 WX1050000 VS9450000 MX1050000 KK4900000 FC5950000 MX1225000 VV1400000 VV7310000 VV7310000 VV7330000 VV7330000 VV1400000 VV0400000 VW0400000 VW0450000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551* 0336 0153 0100 0337 0556 0552 0552* 0552* 0554* 0555*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Selenium hydride Silica gel Silica, crystalline (as respirable dust) Silicane Silicane	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-6-4 7803-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3 409-21-2 7631-86-9	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000 VS7700000 WX1050000 VS9450000 WX1050000 VS9450000 WX1050000 VS9450000 VV1400000 VV7310000 VV7310000 VV7310000 VV7310000 VV7310000 VV0450000 VV7310000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551* 0337 0100 0337 0556 0552* 0552* 0552* 0554* 0555*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Sesone Sevin® Sewer gas Silane Silica gel Silica, crystalline (as respirable dust) Silicane Silicon Silicon carbide	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-06-4 7803-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3 409-21-2	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000 VS7700000 VS7700000 WX1050000 VS9450000 MX1050000 KK4900000 FC5950000 MX1225000 VV1400000 VV7310000 VV7310000 VV7330000 VV7330000 VV1400000 VV0400000 VW0400000 VW0450000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551* 0336 0153 0100 0337 0556 0552 0552* 0552* 0554* 0555*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hydride Selenium hydride Selenium hydride Sesone Sevin® Sewer gas Silane Silica gel Silica, crystalline (as respirable dust) Silicane Silicon carbide Silicon dioxide (amorphous) Silicon monocarbide	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-79-1 7783-79-1 7783-79-1 7783-79-1 7783-79-1 7783-79-1 7783-79-1 7783-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3 409-21-2 7631-86-9 409-21-2	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000 VS7700000 WX1050000 VS9450000 WX1050000 VS9450000 WX1050000 VS9450000 VY9450000 VY1400000 VY7310000 VV7310000 VV0400000 VW0450000 VW0450000 VW0450000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0153 0100 0337 0556 0552 0552* 0553* 0554* 0555*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Selenium (as respirable dust) Silicane Silicon carbide Silicon monocarbide Silicon monocarbide Silicon monocarbide Silicon monocarbide Silicon monocarbide	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-06-4 7803-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3 409-21-2 7803-62-5	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 N09250000 OK4025000 OK3700000 VS7700000 VS7700000 VS7700000 WX1050000 MX1050000 MX1050000 KK4900000 FC5950000 MX1225000 VV1400000 VV7310000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550* 0336 0153 0100 0337 0556 0552* 0552* 0553* 0556* 0554* 0555* 0556* 0555* 0556* 0555*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Selinium hydride Selinium hydride Selinium hydride Selinium hydride Selenium hydride Selenium hydride Selenium hydride Selenium hydride Selenium hydride Selenium hydride Silica gel Silica gel Silica gel Silica, crystalline (as respirable dust) Silicane Silicon Silicon carbide Silicon monocarbide Silicon monocarbide Silicon metal dust and soluble compounds	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-06-4 7803-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3 409-21-2 7803-62-5 7440-22-4	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000 VS7700000 VS7700000 WX1050000 VS9450000 MX1050000 KK4900000 FC5950000 MX1225000 VV1400000 VV7310000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551* 0336 0153 0100 0337 0556 0552 0552* 0555* 0554* 0555* 0555* 0555*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hoydride Silica gel Silica gel Silica, crystalline (as respirable dust) Silicane Silicon Silicon carbide Silicon dioxide (amorphous) Silicon monocarbide Silicon tetrahydride Silver (metal dust and soluble compounds	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-06-4 7803-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3 409-21-2 7803-62-5	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK3700000 VS7700000 VS7700000 WX1050000 WX1050000 WX1050000 WX1050000 WX1050000 WX1050000 WX1050000 VY7310000 VY0450000 VY1400000 VY0450000 VY1400000 VY3500000 MD9659600
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551* 0337 0100 0337 0556 0552* 0552* 0553* 0555* 0555* 0555* 0555* 0555*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hoydride Selenium hoydride Selenium fluoride Silica capl Silica gel Silica, amorphous Silica, crystalline (as respirable dust) Silicane Silicon carbide Silicon dioxide (amorphous) Silicon monocarbide Silicon tetrahydride Silver (metal dust and soluble compounds Silver graphite Slag wool	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-79-1 7783-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3 409-21-2 7803-62-5 7440-22-4 7782-42-5	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000 WX1050000 WX1050000 WX1050000 WX1050000 WX1050000 WX1050000 VS9450000 VS9450000 VS9450000 VY7310000 VV7310000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551* 0337 0100 0337 0556 0552* 0552* 0555* 0555* 0555* 0555* 0555*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyllo,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Selenium horide Selenium hydride Selenium hydride Silicane Silica gel Silica, amorphous Silica, crystalline (as respirable dust) Silicane Silicon dioxide (amorphous) Silicon monocarbide Silicon tetrahydride Silver (metal dust and soluble compounds Silver graphite Slag wool Slaked lime	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-06-4 7803-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3 409-21-2 7803-62-5 7440-22-4	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000 WX1050000 WX1050000 WX1050000 WX1050000 WX1050000 WX1050000 VS9450000 VS9450000 VY1400000 VV7310000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551* 0337 0100 0337 0556 0552* 0552* 0552* 0555* 0555*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium horide Silica gel Silica, crystalline (as respirable dust) Silicane Silicon Silicon carbide Silicon terrahydride Silicon tetrahydride Silver (metal dust and soluble compounds Silver graphite Slag wool Slaked lime Soapstone (containing less than 1% quart	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-79-1 7783-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3 409-21-2 7803-62-5 7440-22-4 7782-42-5	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000 VS7700000 WX1050000 VS9450000 MX1050000 WX1050000 WX1050000 VY1400000 VY7310000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550* 0336 0153 0100 0337 0556 0552* 0552* 0553* 05552* 05558* 0556* 0555* 0556* 0555* 0556* 0557* 0306 0550*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyllo,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium hydride Selenium horide Selenium hydride Selenium hydride Silicane Silica gel Silica, amorphous Silica, crystalline (as respirable dust) Silicane Silicon dioxide (amorphous) Silicon monocarbide Silicon tetrahydride Silver (metal dust and soluble compounds Silver graphite Slag wool Slaked lime	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-79-1 7783-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3 409-21-2 7803-62-5 7440-22-4 7782-42-5	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000 WX1050000 WX1050000 WX1050000 WX1050000 WX1050000 WX1050000 VS9450000 VS9450000 VY1400000 VV7310000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550* 0336 0153 0100 0337 0556 0552* 0552* 0553* 05552* 05558* 0556* 0555* 0556* 0555* 0556* 0557* 0306 0550*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyllo,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium horide Selenium horide Selenium horide Selenium horide Selenium horide Selenium horide Selenium hydride Sesone Sevin® Sewer gas Silane Silica gel Silica, crystalline (as respirable dust) Silicane Silicon dioxide (amorphous) Silicon monocarbide Silicon tetrahydride Silicon tetrahydride Silver (metal dust and soluble compounds Silver graphite Slag wool Slaked lime Soapstone (containing less than 1% quart Soapstone silicate	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-07-5 136-78-7 63-25-2 7783-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3 409-21-2 7631-86-9 409-21-2 7631-86-9 409-21-2 7631-86-9 409-21-2 7631-86-9 409-21-2 7631-86-9 409-21-2 7631-86-9 409-21-2 7631-86-9 409-21-2 7631-86-9 409-21-2 7631-86-9 409-21-2 7631-86-9	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000 VS7700000 VS7700000 VS9450000 VS9450000 WX1050000 VS9450000 MX1050000 VY9450000 VY1400000 VY7310000
0387 0375 0564 0574 0029 0412 0349 0630 0600 0550* 0550 0336 0551 0551* 0337 0100 0337 0556 0552* 0552* 0552* 0555* 0555*	S-Methyl-N-(methylcarbamoyloxy)thioaceti S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dim SFA Saccarose Sal ammoniac fume Saturated MDI Secondary isoamyl alcohol Seekay wax Seekay wax Selenium Selenium alloy Selenium dihydride Selenium fluoride Selenium hexafluoride Selenium hydride Selenium horide Silica gel Silica, crystalline (as respirable dust) Silicane Silicon Silicon carbide Silicon terrahydride Silicon tetrahydride Silver (metal dust and soluble compounds Silver graphite Slag wool Slaked lime Soapstone (containing less than 1% quart	16752-77-5 121-75-5 62-74-8 57-50-1 12125-02-9 5124-30-1 6032-29-7 < 1321-65-9 1335-88-2 7782-49-2 7783-07-5 7783-79-1 7783-79-1 7783-79-1 7783-62-5 7631-86-9 14808-60-7 7803-62-5 7440-21-3 409-21-2 7803-62-5 7440-22-4 7782-42-5	AK2975000 WM8400000 AH9100000 WM6500000 BP4550000 NO9250000 OK4025000 OK3700000 VS7700000 VS7700000 WX1050000 VS9450000 MX1050000 WX1050000 WX1050000 VY1400000 VY7310000

OFFO* Codium aluminum fluorida (ad E)	15096-52-3	WA9625000
0559* Sodium aluminum fluoride (as F)		
0560* Sodium azide	26628-22-8	VY8050000
_0561* Sodium bisulfite	<u>7631-90-5</u>	VZ2000000
_0561 Sodium bisulphite	7631-90-5	VZ2000000
0057 Sodium borate (anhydrous)	1330-43-4	ED4588000
0058 Sodium borate decahydrate	1303-96-4	VZ2275000
0059 Sodium borate pentahydrate	12179-04-3	
0562* Sodium cyanide (as CN)	143-33-9	VZ7530000
0563* Sodium fluoride (as F)	7681-49-4	WB0350000
0564* Sodium fluoroacetate	62-74-8	AH9100000
0559 Sodium hexafluoroaluminate	15096-52-3	WA9625000
0565 Sodium hydrate	1310-73-2	WB4900000
0561 Sodium hydrogen sulfite	7631-90-5	VZ2000000
0565* Sodium hydroxide	1310-73-2	WB4900000
	7681-57-4	
0566* Sodium metabisulfite		UX8225000
_0566 Sodium metabisulphite	7681-57-4	UX8225000
_0563 Sodium monofluoride	7681-49-4	WB0350000
_0564 Sodium monofluoroacetate	62-74-8	AH9100000
0606 Sodium pyrophosphate	7722-88-5	UX7350000
0566 Sodium pyrosulfite	7681-57-4	UX8225000
0560 Sodium salt of hydrazoic acid	26628-22-8	VY8050000
0562 Sodium salt of hydrocyanic acid	143-33-9	VZ7530000
0057 Sodium tetraborate	1330-43-4	ED4588000
0058 Sodium tetraborate decahydrate	1303-96-4	VZ2275000
0059 Sodium tetraborate pentahydrate	12179-04-3	
0667 Soft wood dust		ZC9850000
0277 Solvent ether	60-29-7	KI5775000
0567 Sorghum gum	9005-25-8	GM5090000
0181 Spectracide®	333-41-5	TF3325000
0648 Spirits of turpentine	8006-64-2	Y08400000
0569 Spotting naphtha	8052-41-3	WJ8925000
0616 Stannic dioxide	18282-10-5	X04000000
0616 Stannic oxide	18282-10-5	XQ400000
0615 Stannous oxide	21651-19-4	
<u>0567* Starch</u>	9005-25-8	GM5090000
0567 alpha-Starch	9005-25-8	GM5090000
0567 Starch gum	9005-25-8	GM5090000
0648 Steam distilled turpentine	8006-64-2	Y08400000
0469 Stearyl mercaptan	2885-00-9	
0558 Steatite		VV8780000
0584 Steatite talc	14807-96-6	WW2710000
	7803-52-3	WJ0700000
0568* Stibine		
0036 Stibium	7440-36-0	CC4025000
0036 Stibium 0569* Stoddard solvent	7440-36-0 8052-41-3	CC4025000 WJ8925000
0036 Stibium 0569* Stoddard solvent 0306 Stove black	7440-36-0 8052-41-3 7782-42-5	CC4025000 WJ8925000 MD9659600
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine	7440-36-0 8052-41-3 7782-42-5 57-24-9	CC4025000 WJ8925000 MD9659600 WL2275000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos	7440-36-0 8052-41-3 7782-42-5 57-24-9 57-24-9	CC4025000 WJ8925000 MD9659600 WL2275000 WL2275000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene	7440-36-0 8052-41-3 7782-42-5 57-24-9 57-24-9 100-42-5	CC4025000 WJ8925000 MD9659600 WL2275000 WL2275000 WL3675000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer	7440-36-0 $8052-41-3$ $7782-42-5$ $57-24-9$ $57-24-9$ $100-42-5$ $100-42-5$	CC4025000 WJ8925000 MD9659600 WL2275000 WL2275000 WL3675000 WL3675000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0571 Styrol	$7440-36-0 \\ 8052-41-3 \\ 7782-42-5 \\ 57-24-9 \\ 100-42-5 \\ 100-42-5 \\ 100-42-5$	CC4025000 WJ8925000 MD9659600 WL2275000 WL2275000 WL3675000 WL3675000 WL3675000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0571 Styrol 0572 Subtilisin BPN	$7440-36-0 \\ 8052-41-3 \\ 7782-42-5 \\ 57-24-9 \\ 57-24-9 \\ 100-42-5 \\ 100-42-5 \\ 1395-21-7$	CC4025000 WJ8925000 MD9659600 WL2275000 WL3675000 WL3675000 WL3675000 C09450000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0571 Styrol 0572 Subtilisin BPN 0572 Subtilisin Carlsburg	$7440-36-0 \\ 8052-41-3 \\ 7782-42-5 \\ 57-24-9 \\ 57-24-9 \\ 100-42-5 \\ 100-42-5 \\ 100-42-5 \\ 1395-21-7 \\ 1395-21-7$	CC4025000 WJ8925000 MD9659600 WL2275000 WL3675000 WL3675000 WL3675000 C09450000 C09450000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0571 Styrol 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0572* Subtilisins	$7440-36-0 \\ 8052-41-3 \\ 7782-42-5 \\ 57-24-9 \\ 100-42-5 \\ 100-42-5 \\ 100-42-5 \\ 1395-21-7 \\ 1395-21-7 \\ 1395-21-7$	CC4025000 WJ8925000 MD9659600 WL2275000 WL3675000 WL3675000 WL3675000 C09450000 C09450000 C09450000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0571 Styrol 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0573 Succinic dinitrile	$7440-36-0 \\ 8052-41-3 \\ 7782-42-5 \\ 57-24-9 \\ 100-42-5 \\ 100-42-5 \\ 1395-21-7 \\ 1395-21-7 \\ 110-61-2$	CC4025000 WJ8925000 MD9659600 WL2275000 WL3675000 WL3675000 WL3675000 C09450000 C09450000 C09450000 WN3850000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0571 Styrol 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0572* Subtilisins 0573 Succinic dinitrile 0573* Succinonitrile	$7440-36-0 \\ 8052-41-3 \\ 7782-42-5 \\ 57-24-9 \\ 57-24-9 \\ 100-42-5 \\ 100-42-5 \\ 1395-21-7 \\ 1395-21-7 \\ 1395-21-7 \\ 110-61-2 \\ 110-61-2 \\ 110-61-2$	CC4025000 WJ8925000 MD9659600 WL2275000 WL3675000 WL3675000 C09450000 C09450000 C09450000 WN3850000 WN3850000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0571 Styrol 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0572* Subtilisins 0573* Succinic dinitrile 0573* Succinonitrile	$7440-36-0 \\ 8052-41-3 \\ 7782-42-5 \\ 57-24-9 \\ 57-24-9 \\ 100-42-5 \\ 100-42-5 \\ 1395-21-7 \\ 1395-21-7 \\ 110-61-2 \\ 110-61-2 \\ 57-50-1$	CC4025000 WJ8925000 MD9659600 WL2275000 WL2275000 WL3675000 WL3675000 C09450000 C09450000 WN3850000 WN3850000 WN3850000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0571 Styrol 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0572* Subtilisins 0573* Succinic dinitrile 0573* Succinic dinitrile 0574* Sucrose 0574 Sugar	$\begin{array}{c} 7440 - 36 - 0 \\ 8052 - 41 - 3 \\ 7782 - 42 - 5 \\ 57 - 24 - 9 \\ 57 - 24 - 9 \\ 100 - 42 - 5 \\ 100 - 42 - 5 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 110 - 61 - 2 \\ 110 - 61 - 2 \\ 57 - 50 - 1 \\ 57 - 50 - 1 \end{array}$	CC4025000 WJ8925000 MD9659600 WL2275000 WL3675000 WL3675000 C09450000 C09450000 C09450000 WN3850000 WN3850000 WN6500000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0571 Styrol 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0572* Subtilisins 0573 Succinic dinitrile 0573* Succinonitrile 0574* Sucrose 0574 Sugar 0030 Sulfamate	$\begin{array}{c} 7440 - 36 - 0 \\ 8052 - 41 - 3 \\ 7782 - 42 - 5 \\ 57 - 24 - 9 \\ 57 - 24 - 9 \\ 100 - 42 - 5 \\ 100 - 42 - 5 \\ 100 - 42 - 5 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 110 - 61 - 2 \\ 110 - 61 - 2 \\ 57 - 50 - 1 \\ 7773 - 06 - 0 \end{array}$	CC4025000 WJ8925000 MD9659600 WL2275000 WL2275000 WL3675000 WL3675000 C09450000 C09450000 WN3850000 WN3850000 WN3850000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0571 Styrol 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0572* Subtilisins 0573* Succinic dinitrile 0573* Succinic dinitrile 0574* Sucrose 0574 Sugar	$\begin{array}{c} 7440 - 36 - 0 \\ 8052 - 41 - 3 \\ 7782 - 42 - 5 \\ 57 - 24 - 9 \\ 57 - 24 - 9 \\ 100 - 42 - 5 \\ 100 - 42 - 5 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 110 - 61 - 2 \\ 110 - 61 - 2 \\ 57 - 50 - 1 \\ 7773 - 06 - 0 \\ 8006 - 64 - 2 \end{array}$	CC4025000 WJ8925000 MD9659600 WL2275000 WL3675000 WL3675000 C09450000 C09450000 C09450000 WN3850000 WN3850000 WN6500000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0571 Styrol 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0572* Subtilisins 0573 Succinic dinitrile 0573* Succinonitrile 0574* Sucrose 0574 Sugar 0030 Sulfamate 0648 Sulfate wood turpentine 0611 Sulfinyl chloride	$\begin{array}{c} 7440 - 36 - 0 \\ 8052 - 41 - 3 \\ 7782 - 42 - 5 \\ 57 - 24 - 9 \\ 57 - 24 - 9 \\ 100 - 42 - 5 \\ 100 - 42 - 5 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 110 - 61 - 2 \\ 110 - 61 - 2 \\ 57 - 50 - 1 \\ 7773 - 06 - 0 \\ 8006 - 64 - 2 \\ 7719 - 09 - 7 \end{array}$	CC4025000 WJ8925000 MD9659600 WL2275000 WL2275000 WL3675000 WL3675000 C09450000 C09450000 C09450000 WN3850000 WN3850000 WN6500000 WN6500000 WN6500000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0571 Styrol 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0572* Subtilisins 0573 Succinic dinitrile 0573* Succinonitrile 0574* Sucrose 0574 Sugar 0030 Sulfamate 0648 Sulfate wood turpentine 0611 Sulfinyl chloride	$\begin{array}{c} 7440 - 36 - 0 \\ 8052 - 41 - 3 \\ 7782 - 42 - 5 \\ 57 - 24 - 9 \\ 57 - 24 - 9 \\ 100 - 42 - 5 \\ 100 - 42 - 5 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 110 - 61 - 2 \\ 110 - 61 - 2 \\ 57 - 50 - 1 \\ 7773 - 06 - 0 \\ 8006 - 64 - 2 \\ 7719 - 09 - 7 \end{array}$	CC4025000 WJ8925000 MD9659600 WL2275000 WL2275000 WL3675000 WL3675000 C09450000 C09450000 C09450000 WN3850000 WN3850000 WN6500000 WN6500000 W06125000 Y08400000 XM5150000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0572* Subtilisins 0573 Succinic dinitrile 0573* Succinic dinitrile 0574* Succinonitrile 0574* Sucrose 0574 Sugar 0030 Sulfamate 0648 Sulfate wood turpentine 0611 Sulfinyl chloride 0586 Sulfotep	$\begin{array}{c} 7440 - 36 - 0 \\ 8052 - 41 - 3 \\ 7782 - 42 - 5 \\ 57 - 24 - 9 \\ 57 - 24 - 9 \\ 100 - 42 - 5 \\ 100 - 42 - 5 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 110 - 61 - 2 \\ 110 - 61 - 2 \\ 57 - 50 - 1 \\ 57 - 50 - 1 \\ 7773 - 06 - 0 \\ 8006 - 64 - 2 \\ 7719 - 09 - 7 \\ 3689 - 24 - 5 \\ \end{array}$	CC4025000 WJ8925000 MJ8925000 MD9659600 WL2275000 WL2275000 WL3675000 WL3675000 C09450000 C09450000 C09450000 WN3850000 WN3850000 WN6500000 WN6500000 WN6500000 XM5150000 XM5150000
0036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0572* Subtilisins 0573 Succinic dinitrile 0573* Succinic dinitrile 0574* Sucrose 0574 Sugar 0030 Sulfamate 0648 Sulfate wood turpentine 0661 Sulfinyl chloride 0586 Sulfotep 0578 Sucfur chloride	$\begin{array}{c} 7440 - 36 - 0 \\ 8052 - 41 - 3 \\ 7782 - 42 - 5 \\ 57 - 24 - 9 \\ 57 - 24 - 9 \\ 100 - 42 - 5 \\ 100 - 42 - 5 \\ 100 - 42 - 5 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 110 - 61 - 2 \\ 110 - 61 - 2 \\ 57 - 50 - 1 \\ 7773 - 06 - 0 \\ 8006 - 64 - 2 \\ 7719 - 09 - 7 \\ 3689 - 24 - 5 \\ 10025 - 67 - 9 \end{array}$	CC4025000 WJ8925000 MJ8925000 MD9659600 WL2275000 WL3675000 WL3675000 CO9450000 CO9450000 WN3850000 WN3850000 WN6500000 WN6500000 WN6500000 XM5150000 XM5150000 XM4375000 WS430000
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036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene 0571 Styrol 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0573* Succinic dinitrile 0573* Succinic dinitrile 0574* Sucrose 0574 Sugar 0030 Sulfamate 0648 Sulfate wood turpentine 0611 Sulfinyl chloride 0586 Sulfotep 0578 Sulfur chloride oxide 0579 Sulfur decafluoride 0581 Sulfur difluoride dioxide 0576 Sulfur fluoride 0576* Sulfur fluoride 0578* Sulfur hexafluoride 0579* Sulfur monochloride 0579* Sulfur oxide 0579* Sulfur pentafluoride 0579* Sulfur pentafluoride 0578* Sulfur pentafluoride 0578 Sulfur pentafluoride 0578 Sulfur subchloride	$\begin{array}{c} 7440 - 36 - 0 \\ 8052 - 41 - 3 \\ 7782 - 42 - 5 \\ 57 - 24 - 9 \\ 57 - 24 - 9 \\ 100 - 42 - 5 \\ 100 - 42 - 5 \\ 100 - 42 - 5 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 1395 - 21 - 7 \\ 110 - 61 - 2 \\ 110 - 61 - 2 \\ 170 - 20 - 2 \\ 170 - 20 $	CC4025000 WJ8925000 MJ8925000 MD9659600 WL2275000 WL2275000 WL3675000 WL3675000 C09450000 C09450000 C09450000 WN3850000 WN3850000 WN6500000 WN6500000 XM5150000 XM5150000 XM5150000 XM5150000 XM5150000 WS4300000 WS4550000 WS4550000 WS4550000 WS4550000 WS4550000 WS4550000 WS4550000 WS4300000 WS4550000 WS4300000 WS4550000 WS4550000 WS4300000 WS4550000 WS4300000 WS4550000 WS4300000 WS4550000
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0336 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0573* Succinic dinitrile 0573* Succinic dinitrile 0574* Sucrose 0574 Sugar 0030 Sulfamate 0648 Sulfate wood turpentine 0611 Sulfinyl chloride 0586 Sulfotep 0578* Sulfur chloride 0611 Sulfur decafluoride 0511 Sulfur difluoride dioxide 0579 Sulfur decafluoride 0576* Sulfur fluoride 0576* Sulfur hexafluoride 0576* Sulfur pentafluoride 0578* Sulfur pentafluoride 0579* Sulfur pentafluoride 0578* Sulfur pentafluoride 0579* Sulfur pentafluoride 0577* Sulfur tetrafluoride 0578* Sulfur subchloride 0577* Sulfuric acid (aqueous) 0577* Sulfuric acid (aqueous)	7440-36-0 $8052-41-3$ $7782-42-5$ $57-24-9$ $57-24-9$ $100-42-5$ $100-42-5$ $100-42-5$ $1395-21-7$ $1395-21-7$ $1395-21-7$ $110-61-2$ $110-61-2$ $17-50-1$ $7773-06-0$ $8006-64-2$ $7719-09-7$ $3689-24-5$ $10025-67-9$ $7714-22-7$ $2699-79-8$ $7446-09-5$ $2551-62-4$ $205-67-9$ $7446-09-5$ $5714-22-7$ $1314-80-3$ $10025-67-9$ $7783-60-0$ $7783-60-0$	CC4025000 WJ8925000 MJ8925000 MD9659600 WL2275000 WL2275000 WL3675000 WL3675000 C09450000 C09450000 C09450000 WN3850000 WN3850000 WN6500000 WN65000000 WN650000000 WN650000000 WN650000000 WN650000000 WN650000000 WN650000000 WN650000000 WN650000000
036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0571 Styrol 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0573* Succinic dinitrile 0573* Succinonitrile 0574* Sucrose 0574 Sugar 0030 Sulfamate 0648 Sulfate wood turpentine 0611 Sulfinyl chloride 0586 Sulfotep 0578 Sulfur chloride 0611 Sulfur decafluoride 0579* Sulfur difluoride 0576* Sulfur difluoride 0576* Sulfur fluoride 0576* Sulfur pentafluoride 0578* Sulfur pentafluoride 0579* Sulfur pentafluoride 0578* Sulfur subchloride 0579* Sulfur bexafluoride 0579* Sulfur pentafluoride 0578* Sulfur bexafluoride 0577 Sulfur subchloride 0578 Sulfur subchloride 0578 Sulfur subchloride 0577 Sulfuric acid (aqueous) 0577 Sulfuric acid (aqueous) 0575 Sulfurous acid anhydride 0611 Sulfurous dichloride	7440-36-0 $8052-41-3$ $7782-42-5$ $57-24-9$ $57-24-9$ $100-42-5$ $100-42-5$ $100-42-5$ $1395-21-7$ $1395-21-7$ $1395-21-7$ $110-61-2$ $110-61-2$ $1773-06-0$ $8006-64-2$ $7719-09-7$ $3689-24-5$ $10025-67-9$ $7719-09-7$ $2699-79-8$ $7446-09-5$ $2551-62-4$ $2055-67-9$ $7446-09-5$ $5714-22-7$ $1314-80-3$ $10025-67-9$ $7783-60-0$ $7783-60-0$	CC4025000 WJ8925000 MJ8925000 MD9659600 WL2275000 WL2275000 WL3675000 WL3675000 C09450000 C09450000 WN3850000 WN3850000 WN6500000 WN65000000 WN650000000
036 Stibium 0569* Stoddard solvent 0306 Stove black 0570* Strychnine 0570 Strynchnos 0571* Styrene 0571 Styrene monomer 0572 Subtilisin BPN 0572 Subtilisin Carlsburg 0573 Succinic dinitrile 0573* Succinic dinitrile 0574* Sucrose 0574 Sugar 0030 Sulfamate 0648 Sulfate wood turpentine 0611 Sulfinyl chloride 0586 Sulfotep 0578 Sulfur chloride 0518 Sulfur decafluoride 0519 Sulfur decafluoride 0576* Sulfur dispersioned 0576* Sulfur dispersioned 0576* Sulfur hexafluoride 0576* Sulfur pentafluoride 0578* Sulfur oxide 0576* Sulfur pentafluoride 0578* Sulfur pentafluoride 0575* Sulfur pentafluoride 0578* Sulfur pentafluoride 0578* Sulfur pentafluoride 0579* Sulfur pentafluoride 0578* Sulfur pentafluoride 0578* Sulfur subchloride 0579* Sulfur pentafluoride 0577* Sulfur subchloride 0578* Sulfur subchloride 0579* Sulfur tetrafluoride 0577* Sulfuric acid (aqueous) 0577* Sulfuric acid (aqueous)	7440-36-0 $8052-41-3$ $7782-42-5$ $57-24-9$ $57-24-9$ $100-42-5$ $100-42-5$ $100-42-5$ $1395-21-7$ $1395-21-7$ $110-61-2$ $110-61-2$ $157-50-1$ $7773-06-0$ $8006-64-2$ $7719-09-7$ $3689-24-5$ $10025-67-9$ $7744-22-7$ $2699-79-8$ $7446-09-5$ $5714-22-7$ $1314-80-3$ $10025-67-9$ $7783-60-0$ $7783-60-0$	CC4025000 WJ8925000 MJ8925000 MD9659600 WL2275000 WL2275000 WL3675000 WL3675000 C09450000 C09450000 C09450000 WN3850000 WN3850000 WN6500000 WN65000000 WN650000000 WN650000000 WN650000000 WN650000000 WN650000000 WN650000000 WN650000000 WN650000000

0581*	Sulfuryl fluoride	2699-79-8	WT5075000
_0582*	Sulprofos	35400-43-2	TE4165000
0009	Symmetrical tetrabromoethane	79-27-6	KI8225000
0598	Symmetrical tetrachloroethane	79-34-5	KI8575000
0639	Symmetrical trimethylbenzene	108-67-8	OX6825000
0096	Synthetic camphor	76-22-2	EX1225000
0432	Synthetic vitreous fibers	·	PY8070000
0177	Systoy®	8065-48-3	TE3150000

0432	Systox®	8065-48-3	TF3150000
GUIDE	CHEMICAL NAME	CAS NO	RTECS N
0583*	2,4,5-T	93-76-5	AJ8400000
0009	TBE	79-27-6	KI8225000
0625	TBP	126-73-8	TC7700000
0626	TCA	76-03-9	AJ7875000
0594	TCDBD	1746-01-6	HP3500000
0594	TCDD	1746-01-6	HP3500000
0594 0629	2,3,7,8-TCDD TCE	<u>1746-01-6</u> 79-01-6	HP3500000 KX4550000
0172	TCHH	13121-70-5	WH8750000
0642	TCP	78-30-8	TD0350000
0620	TDA	25376-45-8	XS9445000
0621	TDI	584-84-9	CZ6300000
0621	2,4-TDI	584-84-9	CZ6300000
0633	TEA	121-44-8	YEO175000
0586*	TEDP	3689-24-5	<u>XN4375000</u>
0601	TEL TEPP	78-00-2 107-49-3	TP4550000 UX6825000
0590* 0244	TETD	97-77-8	J01225000
0602	THF	109-99-9	LU5950000
0635	TMA	552-30-7	DC2050000
0636	TMA	75-50-3	PA0350000
0635	TMAN	552-30-7	DC2050000
0603	TML	75-74-1	TP4725000
0604	TMSN	3333-52-6	WN4025000
0605	TNM	509-14-8	PB4025000
0641	TNT	118-96-7	XU0175000
0642 0644	TOCP	78-30-8	TD0350000
0606	TPP TSPP	115-86-6 7722-88-5	TC8400000 UX7350000
0632	TTE	76-13-1	KJ400000
0574	Table sugar	57-50-1	WN6500000
0584*	Talc (containing no asbestos and less th	14807-96-6	WW2710000
0585*	Tantalum (metal and oxide dust, as Ta)	7440-25-7	WW5505000
0585	Tantalum-181	7440-25-7	<u>WW5505000</u>
0567	Tapioca starch	9005-25-8	GM5090000
0439 0119	Tar camphor Tear gas	91-20-3 532-27-4	OJ0525000 AM6300000
0587*	Tellurium	13494-80-9	WY2625000
0588	Tellurium fluoride	7783-80-4	WY2800000
0588*	Tellurium hexafluoride	7783-80-4	WY2800000
0056	Tellurobismuthite	1304-82-1	EB3110000
0199	Telone®	542-75-6	UC8310000
0589	Temefos	3383-96-8	TF6890000
0589*	Temephos	3383-96-8	TF6890000
	o-Terphenyl m-Terphenyl	84-15-1 92-06-8	WZ6472000 WZ6470000
	p-Terphenyl	92-94-4	WZ6470000 WZ6475000
0591	1,2-Terphenyl	84-15-1	WZ6473000 WZ6472000
	1,3-Terphenyl	92-06-8	WZ6470000
0593	1,4-Terphenyl	92-94-4	WZ6475000
0592	meta-Terphenyl	92-06-8	WZ6470000
0593	para-Terphenyl	92-94-4	WZ6475000
0591	ortho-Terphenyl	84-15-1	WZ6472000
0284	Terracur P®	<u>115-90-2</u> 509-14-8	TF3850000
0605 0009	Tetrahromoacetylene	79-14-8 79-27-6	PB4025000 KI8225000
0009	Tetrabromoethane	79-27-6	KI8225000
0009	1,1,2,2-Tetrabromoethane	79-27-6	KI8225000
0106	Tetrabromomethane	558-13-4	FG4725000
0444	Tetracarbonyl nickel	13463-39-3	OR6300000
0148	Tetracarbonylhydridocobalt	16842-03-8	GG0900000
0148	Tetracarbonylhydrocobalt	16842-03-8	GG0900000
0599	Tetrachlorethylene	127-18-4	KX3850000
0596*	1,1,2,2-Tetrachloro-1,2-difluoroethane	76-12-0	KI1420000
0595*	1,1,1,2-Tetrachloro-2,2-difluoroethane 2,2,2,6-Tetrachloro-2-picoline	76-11-9 1929-82-4	KI1425000 US7525000
	<u>4,4,4,0=1ettacm10t0=2=ptc011ne</u>		<u>∪5/545UUU</u>
0136 0594*	2.3.7.8-Tetrachloro-dibenzo-p-dioxin	1746-01-6	HP3500000

0500# 1 1 0 0 material and the second	70 24 5	**************
0598* 1,1,2,2-Tetrachloroethane	79-34-5	KI8575000
0599* Tetrachloroethylene	127-18-4	KX3850000
0107 Tetrachloromethane	56-23-5	FG4900000
0600* Tetrachloronaphthalene	1335-88-2	OK3700000
0282 Tetraethoxysilane	78-10-4	VV9450000
0586 Tetraethyl dithionopyrophosphate	3689-24-5	XN4375000
0586 Tetraethyl dithiopyrophosphate	3689-24-5	XN4375000
	78-00-2	
0601* Tetraethyl lead (as Pb)		TP4550000
<u>0282 Tetraethyl orthosilicate</u>	78-10-4	<u>VV9450000</u>
0590 Tetraethyl pyrophosphate	107-49-3	UX6825000
0282 Tetraethyl silicate	78-10-4	VV9450000
0601 Tetraethylplumbane	78-00-2	TP4550000
0244 Tetraethylthiuram disulfide	97-77-8	J01225000
	7783-60-0	WT4800000
_0437 Tetrahydro-1,4-oxazine	110-91-8	OD6475000
0204 3a,4,7,7a-Tetrahydro-4,7-methanoindene	77-73-6	PC1050000
0548 1,2,12,12a-Tetrahydro-8,9-dimethoxy-2-(1	83-79-4	DJ2800000
0437 Tetrahydro-p-oxazine	110-91-8	OD6475000
0167 Tetrahydrobenzene	110-83-8	GW2500000
0602* Tetrahydrofuran	109-99-9	LU5950000
0485 Tetrahydroxymethylolmethane	115-77-5	RZ2490000
0485 Tetranydroxymethylotmethane		
0428 Tetramethoxysilane	681-84-5	<u>VV9800000</u>
0428 Tetramethyl ester of silicic acid	681-84-5	VV9800000
0603* Tetramethyl lead (as Pb)	75-74-1	TP4725000
0428 Tetramethyl silicate	681-84-5	VV9800000
0604 Tetramethyl succinodinitrile	3333-52-6	WN4025000
0604* Tetramethyl succinonitrile	3333-52-6	WN4025000
0015 Tetramethylene cyanide	111-69-3	AV2625000
	109-99-9	LU5950000
0485 Tetramethylolmethane	115-77-5	RZ2490000
0603 Tetramethylplumbane	75-74-1	TP4725000
0612 Tetramethylthiuram disulfide	137-26-8	J01400000
0605* Tetranitromethane	509-14-8	PB4025000
0606 Tetrasodium diphosphate	7722-88-5	UX7350000
0606* Tetrasodium pyrophosphate	7722-88-5	UX7350000
	7722-88-5	
0606	7722-88-5	UX7350000
0590 Tetron®	107-49-3	<u>UX6825000</u>
<u>0607* Tetryl</u>	479-45-8	BY6300000
_0607	479-45-8	BY6300000
0608* Thallium (soluble compounds, as Tl)		
0102 Thermal black	1333-86-4	FF5800000
		チ ょうないしいしし
0502 Thimet	298-02-2	TD9450000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b	298-02-2 96-69-5	TD9450000 GP3150000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol	298-02-2 96-69-5 96-69-5	TD9450000 GP3150000 GP3150000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol)	298-02-2 96-69-5 96-69-5 96-69-5	TD9450000 GP3150000 GP3150000 GP3150000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan®	298-02-2 96-69-5 96-69-5 96-69-5 115-29-7	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton	298-02-2 96-69-5 96-69-5 96-69-5 115-29-7 298-04-4	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan®	298-02-2 96-69-5 96-69-5 96-69-5 115-29-7	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 AI5950000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 AI5950000 AI5950000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 AI5950000 AI5950000 XM5150000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 AI5950000 AI5950000 XM5150000 XM5150000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611 Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7 108-98-5	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 AI5950000 AX5950000 XM5150000 DC0525000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611 Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 AI5950000 AX5950000 XM5150000 XM5150000 DC0525000 WS4300000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp®	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5	TD9450000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 XM5150000 DC0525000 WS4300000 XN4375000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611 Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 AI5950000 AX5950000 XM5150000 XM5150000 DC0525000 WS4300000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 XM5150000 DC0525000 WS4300000 XM43750000 AI5950000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 XM5150000 DC0525000 WS4300000 XN4375000 J01400000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 DC0525000 WS4300000 XN4375000 AI5950000 J01400000 TD9450000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 XM5150000 DC0525000 WS4300000 XN4375000 J01400000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn)	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 XM5150000 DC0525000 WS4300000 XM4375000 AI5950000 J01400000 TD9450000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 XM5150000 DC0525000 WS4300000 XN4375000 AI5950000 J01400000 TD9450000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn)	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 XM5150000 DC0525000 WS4300000 XM4375000 AI5950000 J01400000 TD9450000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin metal	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 XM5150000 DC0525000 WS4300000 XN4375000 AI5950000 J01400000 TD9450000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin metal 0613 Tin powder	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 7440-31-5	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 XM5150000 XM5150000 DC0525000 WS4300000 XN4375000 AI5950000 J01400000 TD9450000 XP7320000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin metal 0613 Tin protoxide	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 21651-19-4	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 XM5150000 XM5150000 DC0525000 WS4300000 XN4375000 AI5950000 J01400000 TD9450000 XP7320000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0651 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin metal 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn)	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 21651-19-4 21651-19-4	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 DC0525000 WS4300000 XN4375000 J01400000 TD9450000 XP7320000 XP7320000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin metal 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Tin(IV) oxide (as Sn)	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 21651-19-4 18282-10-5	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 AI5950000 XM5150000 XM5150000 DC0525000 WS4300000 XN4375000 JO1400000 TD9450000 XP7320000 XP7320000 XP7320000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 1651-19-4 21651-19-4 18282-10-5 13463-67-7	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 A15950000 A15950000 XM5150000 DC0525000 WS4300000 XN4375000 A15950000 TD9450000 TD9450000 XP7320000 XP7320000 XP7320000 XP7320000 XP7320000 XP7320000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617 Titanium oxide	298-02-2 96-69-5 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 7440-31-5 21651-19-4 21651-19-4 18282-10-5 13463-67-7	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 A15950000 A15950000 XM5150000 DC0525000 WS4300000 XM4375000 A15950000 TD9450000 TD9450000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin metal 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Titanium dioxide 0617 Titanium oxide 0617 Titanium peroxide	298-02-2 96-69-5 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 7440-31-5 7440-31-5 21651-19-4 18282-10-5 13463-67-7 13463-67-7	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 A15950000 XM5150000 XM5150000 DC0525000 WS4300000 XA4375000 A15950000 J01400000 TD9450000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617 Titanium oxide	298-02-2 96-69-5 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 7440-31-5 21651-19-4 21651-19-4 18282-10-5 13463-67-7	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 A15950000 A15950000 XM5150000 DC0525000 WS4300000 XM4375000 A15950000 TD9450000 TD9450000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin metal 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617 Titanium oxide 0617 Titanium peroxide 0618* o-Tolidine	298-02-2 96-69-5 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 7440-31-5 7440-31-5 21651-19-4 18282-10-5 13463-67-7 13463-67-7	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 XM5150000 XM5150000 DC0525000 WS4300000 XN4375000 AI5950000 AI5950000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0611 Thiosulfurous dichloride 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin metal 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617 Titanium oxide 0618* o-Tolidine 0618 3,3'-Tolidine	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 7440-31-5 7440-31-5 21651-19-4 21651-19-4 18282-10-5 13463-67-7 13463-67-7 119-93-7	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 DC0525000 WS4300000 XN4375000 AI5950000 J01400000 TD9450000 XP7320000 XP7320000 XP7320000 XP7320000 XP7320000 XP7320000 XP7320000 XP7320000 DD1225000 DD1225000 DD1225000 DD1225000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611 Thionyl chloride 0611 Thionyl dichloride 0611 Thiosulfurous dichloride 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin metal 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617 Titanium peroxide 0618 o-Tolidine 0618* o-Tolidine 0619* Toluene	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 7440-31-5 21651-19-4 21651-19-4 18282-10-5 13463-67-7 13463-67-7 13463-67-7 119-93-7 108-88-3	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 DC0525000 WS4300000 XN4375000 J01400000 TD9450000 XP7320000
0502 Thimet 0609 1.1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4.4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4.4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611 Thionyl chloride 0611 Thionyl dichloride 0650 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin metal 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617 Titanium peroxide 0618* o-Tolidine 0618* O-Toluene diisocyanate	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 DC0525000 WS4300000 XN4375000 JO1400000 TD9450000 XP7320000 XP7320000 XP7320000 XP7320000 XP7320000 XP7320000 XP7320000 XR2275000 XR2275000 DD1225000 DD1225000 CZ6300000
0502 Thimet 0609 1.1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4.4'-Thiobis(3-methyl-6-tert-butylphenol 0609*4.4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611 Thionyl chloride 0611 Thionyl dichloride 0611 Thiosulfurous dichloride 050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin metal 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617 Titanium dioxide 0618* o-Tolidine 0618 3,3'-Tolidine 0619* Toluene 0621 2,4-Toluene diisocyanate 0621* Toluene-2,4-diisocyanate	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 A15950000 A15950000 XM5150000 DC0525000 WS4300000 XN4375000 JO1400000 TD9450000 XP7320000
0502 Thimet 0609 1.1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4.4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4.4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617* Titanium dioxide 0618* o-Tolidine 0618* o-Tolidine 0619* Toluene 0621* Toluene-2.4-diisocyanate 0621* Toluene-2.4-diisocyanate 0620* Toluenediamine	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 DC0525000 WS4300000 XM4375000 AI5950000 AI5950000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611 Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617 Titanium dioxide 0618* o-Tolidine 0618* Toluene 0619* Toluene 0621 2,4-Toluene diisocyanate 0621* Toluenediamine 0620 Toluenediamine	298-02-2 96-69-5 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-3	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 A15950000 A15950000 XM5150000 DC0525000 WS4300000 XM4375000 A15950000 XP320000 XP7320000
0502 Thimet 0609 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4,4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4,4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611 Thionyl chloride 0611 Thionyl dichloride 0611 Thiosulfurous dichloride 0586 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin metal 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617 Titanium dioxide 0617 Titanium oxide 0618* o-Tolidine 0619* Toluene 0621 2,4-Toluene diisocyanate 0621* Toluenediamine 0620 Toluenediamine 0620 Toluenediamine 0620 Toluenediamine isomers 0624 4-Toluidine	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-3	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 SN5075000 A15950000 A15950000 XM5150000 DC0525000 WS4300000 XM4375000 A15950000 A15950000 XP7320000
0502 Thimet 0609 1.1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4.4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4.4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611* Thionyl dichloride 0650 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin powder 0615 Tin protoxide 0615* Tin(II) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617 Titanium dioxide 0618* o-Tolidine 0618* o-Tolidine 0619* Toluene 0621 2.4-Toluene diisocyanate 0620* Toluenediamine 0620* Toluenediamine 0620* Toluenediamine 0620* Toluenediamine 0624* p-Toluidine	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 719-93-7 119-93-7 119-93-7 119-93-7 119-93-7 119-93-7 108-88-3 584-84-9 25376-45-8 25376-45-8 206-49-0 106-49-0	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 RB9275000 SN5075000 AI5950000 AI5950000 XM5150000 DC0525000 WS4300000 XN4375000 AI5950000 XN4375000 AI5950000 XN4375000 AI5950000 XN4375000 AI5950000 XP7320000
0502 Thimet 0609 1.1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4.4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4.4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin powder 0615 Tin protoxide 0615* Tin protoxide 0616* Tin(IV) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617* Titanium dioxide 0618* o-Tolidine 0618* o-Tolidine 0619* Toluene 0621* Toluene-2.4-diisocyanate 0621* Toluene-2.4-diisocyanate 0624* p-Toluidine 0624* p-Toluidine 0624* p-Toluidine 0624* p-Toluidine 0624* p-Toluidine	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 7440-31-5 21651-19-4 21651-19-4 18282-10-5 13463-67-7 13463-67-7 13463-67-7 13463-67-7 13463-67-7 139-93-7 119-93-7 119-93-7 108-88-3 584-84-9 25376-45-8 25376-45-8 25376-45-8 2106-49-0 106-49-0 108-44-1	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 XM5150000 XM5150000 XM5150000 XM4375000 AI5950000 XN4375000 XN4375000 AI5950000 XP7320000 XP73200000 XP73200000 XP73200000 XP73200000 XP73200000 XP732000000 XP73200000 XP73200000 XP732000000000000000000000000000000000000
0502 Thimet 0609 1.1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4.4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4.4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin powder 0615 Tin protoxide 0615* Tin protoxide 0616* Tin(IV) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617* Titanium dioxide 0618* o-Tolidine 0618* o-Tolidine 0619* Toluene 0621* Toluene-2.4-diisocyanate 0621* Toluene-2.4-diisocyanate 0624* p-Toluidine 0624* p-Toluidine 0624* p-Toluidine 0624* p-Toluidine 0624* p-Toluidine	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 7440-31-5 719-93-7 119-93-7 119-93-7 119-93-7 119-93-7 119-93-7 108-88-3 584-84-9 25376-45-8 25376-45-8 206-49-0 106-49-0	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 TD9275000 AI5950000 AI5950000 XM5150000 XM5150000 XM5150000 XM5150000 XM4375000 AI5950000 XN4375000 XN4375000 AI5950000 XP7320000 XP73200000 XP73200000 XP73200000 XP73200000 XP73200000 XP732000000 XP73200000 XP73200000 XP732000000000000000000000000000000000000
0502 Thimet 0609 1.1'-Thiobis(2-methyl-4-hydroxy-5-tert-b 0609 4.4'-Thiobis(3-methyl-6-tert-butylphenol 0609* 4.4'-Thiobis(6-tert-butyl-m-cresol) 0251 Thiodan® 0245 Thiodemeton 0494 Thiodiphenylamine 0610* Thioglycolic acid 0610 2-Thioglycolic acid 0611* Thionyl chloride 0611 Thionyl dichloride 0050 Thiophenol 0578 Thiosulfurous dichloride 0586 Thiotepp® 0610 Thiovanic acid 0612* Thiram 0502 Timet 0613* Tin 0614* Tin (organic compounds, as Sn) 0613 Tin flake 0613 Tin powder 0615 Tin protoxide 0615* Tin protoxide 0616* Tin(IV) oxide (as Sn) 0616* Tin(IV) oxide (as Sn) 0617* Titanium dioxide 0617* Titanium dioxide 0618* o-Tolidine 0618* o-Tolidine 0619* Toluene 0621* Toluene-2.4-diisocyanate 0621* Toluene-2.4-diisocyanate 0624* p-Toluidine 0624* p-Toluidine 0624* p-Toluidine 0624* p-Toluidine 0624* p-Toluidine	298-02-2 96-69-5 96-69-5 115-29-7 298-04-4 92-84-2 68-11-1 68-11-1 7719-09-7 7719-09-7 108-98-5 10025-67-9 3689-24-5 68-11-1 137-26-8 298-02-2 7440-31-5 7440-31-5 7440-31-5 21651-19-4 21651-19-4 18282-10-5 13463-67-7 13463-67-7 13463-67-7 13463-67-7 13463-67-7 139-93-7 119-93-7 119-93-7 108-88-3 584-84-9 25376-45-8 25376-45-8 25376-45-8 2106-49-0 106-49-0 108-44-1	TD9450000 GP3150000 GP3150000 GP3150000 RB9275000 RB9275000 SN5075000 AI5950000 AI5950000 XM5150000 DC0525000 WS4300000 XN4375000 AI5950000 XN4375000 AI5950000 XN4375000 AI5950000 XN4375000 AI5950000 XP7320000

0622	ortho-Toluidine	95-53-4	XU2975000
0619	Toluol	108-88-3	XS5250000
0663	Tolyethylene	25013-15-4	WL5075000
0135	o-Tolyl chloride	95-49-8	XS9000000
0624	Tolylamine	106-49-0	XU3150000
0623	m-Tolylamine	108-44-1	XU2800000
0620	Tolylenediamine	25376-45-8	XS9445000
0514	Tordon®	1918-02-1	TJ7525000
0113	Toxaphene	8001-35-2	XW5250000
0376	Toxilic anhydride	108-31-6	ON3675000
0041	Tremolite	1332-21-4	CI6475000
0041	Tremolite asbestos	1332-21-4	CI6475000
0625	Tri-n-butyl phosphate	126-73-8	TC7700000
0642 0642	Tri-o-cresyl ester of phosphoric acid Tri-o-cresyl phosphate	78-30-8 78-30-8	TD0350000 TD0350000
0476	Triatomic oxygen	10028-15-6	RS8225000
0061	Tribromoborane	10028-13-6	ED7400000
0066	Tribromomethane	75-25-2	PB5600000
0625	Tributyl ester of phosphoric acid	126-73-8	TC7700000
0625*	Tributyl phosphate	126-73-8	TC7700000
0089	Tricalcium arsenate	7778-44-1	CG0830000
0089	Tricalcium ortho-arsenate	7778-44-1	CG0830000
0632*	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	KJ4000000
0174	1,1,1-Trichloro-2,2-bis(p-chlorophenyl)e	50-29-3	KJ3325000
0388	1,1,1-Trichloro-2,2-bis-(p-methoxyphenyl	72-43-5	KJ3675000
0626*	Trichloroacetic acid	76-03-9	AJ7875000
0627	unsym-Trichlorobenzene	120-82-1	DC2100000
0627*	1,2,4-Trichlorobenzene	120-82-1	DC2100000
0627	1,2,4-Trichlorobenzol	120-82-1	DC2100000
0628	beta-Trichloroethane	79-00-5	KJ3150000
0404 0628*	1,1,1-Trichloroethane 1,1,2-Trichloroethane	71-55-6 79-00-5	KJ2975000 KJ3150000
0404	1,1,1-Trichloroethane (stabilized)	71-55-6	KJ2975000
0626	Trichloroethanoic acid	76-03-9	AJ7875000
0629	Trichloroethene	79-01-6	KX4550000
0629*	Trichloroethylene	79-01-6	KX4550000
0290	Trichlorofluoromethane	75-69-4	PB6125000
0631	Trichlorohydrin	96-18-4	TZ9275000
0127	Trichloromethane	67-66-3	FS9100000
0489	Trichloromethane sulfenyl chloride	594-42-3	PB0370000
0489	Trichloromethyl sulfur chloride	594-42-3	PB0370000
0290	Trichloromonofluoromethane	75-69-4	PB6125000
0630*	Trichloronaphthalene	1321-65-9	OK4025000
0132	Trichloronitromethane	76-06-2	PB6300000
<u> 0583</u>	2,4,5-Trichlorophenoxyacetic acid	93-76-5	AJ8400000
0631*	1,2,3-Trichloropropane	96-18-4	TZ9275000
0172	Tricyclohexylhydroxystannane	13121-70-5	WH8750000
0172	Tricyclohexylhydroxytin	13121-70-5	WH8750000
0172	Tricyclohexylstannium hydroxide	13121-70-5	WH8750000
0172	Tricyclohexyltin hydroxide	13121-70-5	WH8750000
0553	Tridymite Triethylamine	14808-60-7	VV7330000
0633* 0455	Trifluoramine	121-44-8 7783-54-2	YEO175000 OX1925000
0455	Trifluorammonia	7783-54-2	0X1925000 0X1925000
0310	2,2,2-Trifluoro-1-bromo-1-chloroethane	151-67-7	KH6550000
0310	1,1,1-Trifluoro-2-bromo-2-chloroethane	151-67-7	KH6550000
0062	Trifluoroborane	7637-07-2	ED2275000
0634*		75-63-8	PA5425000
0291	2,2,2-Trifluoroethoxyethene	406-90-6	KO4250000
0291	2,2,2-Trifluoroethyl vinyl ether	406-90-6	KO4250000
0634	Trifluoromonobromomethane	75-63-8	PA5425000
0302	Trihydroxypropane	56-81-5	MA8050000
0343	Triiodomethane	75-47-8	PB7000000
0629	Trilene	79-01-6	KX4550000
0381	Trimanganese tetraoxide	1317-35-7	OP0895000
0381	Trimanganese tetroxide	1317-35-7	OP0895000
0635	Trimellic acid anhydride	552-30-7	DC2050000
0635*	Trimellitic anhydride	552-30-7	DC2050000
0640 0078	Trimethoxyphosphine Trimethyl carbinol	121-45-9 75-65-0	TH1400000
0640	Trimethyl carpinol Trimethyl ester of phosphorous acid	75-65-0 121-45-9	E01925000 TH1400000
0640*		121-45-9	TH1400000 TH1400000
0355	3,5,5-Trimethyl-2-cyclo-hexen-1-one	78-59-1	GW7700000
0355	3,5,5-Trimethyl-2-cyclohexenone	78-59-1	GW7700000
0636*	Trimethylamine	75-50-3	PA0350000
0639	sym-Trimethylbenzene	108-67-8	OX6825000
0639*	1,3,5-Trimethylbenzene	108-67-8	OX6825000
0637*		526-73-8	DC330000
0638*	1,2,4-Trimethylbenzene	95-63-6	DC3325000
0169	Trimethylenetrinitramine	121-82-4	XY9450000
0169	1,3,5-Trinitro-1,3,5-triazacyclohexane	121-82-4	XY9450000

0456	Trinitroglycerine	<u>55-63-0</u>	OX2100000
0515 0607	2,4,6-Trinitrophenol	88-89-1 470-45-8	TJ7875000 BY6300000
0641	2,4,6-Trinitrophenyl-N-methylnitramine Trinitrotoluene	479-45-8 118-96-7	XU0175000
0641	sym-Trinitrotoluene	118-96-7	XU0175000 XU0175000
0641*	2,4,6-Trinitrotoluene	118-96-7	XU0175000 XU0175000
0641	Trinitrotoluol	118-96-7	XU0175000 XU0175000
0642*	Triorthocresyl phosphate	78-30-8	TD0350000
0490	Trioxychlorofluoride	7616-94-6	SD1925000
0591	o-Triphenyl	84-15-1	WZ6472000
0592	m-Triphenyl	92-06-8	WZ6472000 WZ6470000
0593	p-Triphenyl	92-94-4	WZ6475000
0644	Triphenyl ester of phosphoric acid	115-86-6	TC8400000
0644*	Triphenyl phosphate	115-86-6	TC8400000
0643*	Triphenylamine	603-34-9	YK2680000
0553	Tripoli	14808-60-7	VV7330000
0321	Tris(dimethylamino)phosphine oxide	680-31-9	TD0875000
0645*	Tungsten	7440-33-7	Y07175000
0646*	Tungsten (soluble compounds, as W)	7 1 1 0 3 3 7	107173000
0647*	Tungsten carbide (cemented)	11107-01-0	Y07350000
0645	Tungsten metal	7440-33-7	Y07175000
0648*	Turpentine	8006-64-2	Y08400000
0648	Turps	8006-64-2	Y08400000
			10010000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0227	UDMH	57-14-7	MV2450000
	1-Undecanethiol	5332-52-5	1112130000
0649	Undecyl mercaptan	5332-52-5	
0093	Unslaked lime	1305-78-8	EW3100000
0227	Unsymmetrical dimethylhydrazine	57-14-7	MV2450000
0650*	Uranium (insoluble compounds, as U)	7440-61-1	YR3490000
0651*	Uranium (soluble compounds, as U)		
0650	Uranium I	7440-61-1	YR3490000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
		100 05 4	7770075000
	VAC	108-05-4	AK0875000
0658	VC	75-01-4	KU9625000
0658 0014	VC VCN	75-01-4 107-13-1	KU9625000 AT5250000
0658 0014 0661	VC VCN VDC	75-01-4 107-13-1 75-35-4	KU9625000 AT5250000 KV9275000
0658 0014 0661 0662	VC VCN VDC VDF	75-01-4 107-13-1 75-35-4 75-38-7	KU9625000 AT5250000 KV9275000 KW0560000
0658 0014 0661 0662 0664*	VC VCN VDC VDF VM & P Naphtha	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4	KU9625000 AT5250000 KV9275000 KW0560000 OI6180000
0658 0014 0661 0662 0664* 0652	VC VCN VDC VDF VM & P Naphtha Valeral	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3	KU9625000 AT5250000 KV9275000 KW0560000 OI6180000 YV3600000
0658 0014 0661 0662 0664* 0652 0652	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3	KU9625000 AT5250000 KV9275000 KW0560000 OI6180000
0658 0014 0661 0662 0664* 0652 0652	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3	KU9625000 AT5250000 KV9275000 KW0560000 OI6180000 YV3600000 YV3600000 YV3600000
0658 0014 0661 0662 0664* 0652 0652 0652* 0652	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3	KU9625000 AT5250000 KV9275000 KW0560000 OI6180000 YV3600000 YV3600000 YV3600000 YV3600000
0658 0014 0661 0662 0664* 0652 0652 0652 0652	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valerone	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 108-83-8	KU9625000 AT5250000 KV9275000 KW0560000 OI6180000 YV3600000 YV3600000 YV3600000 YV3600000 MJ5775000
0658 0014 0661 0662 0664* 0652 0652* 0652 0216 0653	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valerone Vanadic anhydride dust	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 108-83-8 1314-62-1	KU9625000 AT5250000 KV9275000 KW0560000 OI6180000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000
0658 0014 0661 0662 0664* 0652 0652* 0652 0216 0653 0654	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valerone	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 108-83-8	KU9625000 AT5250000 KV9275000 KW0560000 OI6180000 YV3600000 YV3600000 YV3600000 YV3600000 MJ5775000
0658 0014 0661 0662 0664* 0652 0652* 0652* 0652 0216 0653 0654 0653* 0654*	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium fume	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 10-62-3 10-62-3 108-83-8 1314-62-1	KU9625000 AT5250000 KV9275000 KW0560000 OI6180000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 MJ5775000 YW2450000 YW2460000
0658 0014 0661 0662 0664* 0652 0652* 0652* 0216 0653 0654 0653* 0654* 0653	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium fume Vanadium oxide dust	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 110-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1	KU9625000 AT5250000 KV9275000 KW9560000 OI6180000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3450000 YW2450000 YW2450000 YW2450000 YW2450000
0658 0014 0661 0662 0664* 0652 0652 0652 0216 0653 0654 0653* 0654* 0653 0654	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium fume Vanadium oxide dust Vanadium oxide fume	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 110-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1	KU9625000 AT5250000 KV9275000 KW9560000 OI6180000 YV3600000 YV3600000 YV3600000 MJ5775000 YW2450000 YW2450000 YW2450000 YW2450000 YW2450000 YW2450000 YW2450000 YW2460000
0658 0014 0661 0662 0664* 0652 0652* 0652* 0653 0654 0653* 0654* 0653 0654* 0653	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium fume Vanadium oxide dust Vanadium oxide fume Vanadium pentaoxide dust	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 110-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1	KU9625000 AT5250000 KV9275000 KW0560000 OI6180000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3450000 YW2450000 YW2450000 YW2450000 YW2450000 YW2450000 YW2450000
0658 0014 0661 0662 0664* 0652 0652* 0652 0216 0653 0654 0653* 0654* 0653 0654	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium fume Vanadium oxide dust Vanadium oxide dust Vanadium pentaoxide dust Vanadium pentaoxide fume Vanadium pentaoxide fume	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 110-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1	KU9625000 AT5250000 KV9275000 KW0560000 OI6180000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 MJ5775000 YW2450000 YW2450000 YW2450000 YW2450000 YW2450000 YW2450000 YW2460000 YW2460000 YW2460000 YW2460000 YW2460000
0658 0014 0661 0662 0664* 0652 0652* 0652 0216 0653 0654 0653* 0654* 0653 0654	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium fume Vanadium oxide dust Vanadium oxide dust Vanadium pentaoxide dust Vanadium pentaoxide fume	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 110-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 8032-32-4	KU9625000 AT5250000 KV9275000 KW9560000 OI6180000 YV3600000 YV3600000 YV3600000 MJ5775000 YW2450000 YW2460000 YW2460000 OI6180000
0658 0014 0661 0662 0664* 0652 0652* 0652 0216 0653 0654 0653 0654* 0653 0654 0653	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium fume Vanadium oxide dust Vanadium oxide dust Vanadium pentaoxide fume Vanish makers' & painters' naphtha Vegetable mist	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 110-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 8032-32-4 68956-68-3	KU9625000 AT5250000 KV9275000 KW9560000 OI6180000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3450000 YW2450000
0658 0014 0661 0662 0664* 0652 0652* 0652* 0653 0654 0653* 0654* 0653 0654* 0653 0654 0653 0654	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium oxide dust Vanadium oxide dust Vanadium pentaoxide dust Vanadium pentaoxide fume Varnish makers' & painters' naphtha Vegetable mist Vegetable oil mist	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 110-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 8032-32-4 68956-68-3 68956-68-3	KU9625000 AT5250000 KV9275000 KW9560000 OI6180000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 YV3450000 YW2450000
0658 0014 0661 0662 0664* 0652 0652 0652 0216 0653 0654 0653* 0654 0653 0654 0653 0654 0655 0655 0655	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium fume Vanadium oxide dust Vanadium pentaoxide dust Vanadium pentaoxide fume Vanadium pentaoxide fume Vanadium pentaoxide fume Vanadium pentaoxide fume Varnish makers' & painters' naphtha Vegetable mist Vegetable oil mist Vikane®	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 110-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 8032-32-4 68956-68-3 2699-79-8	KU9625000 AT5250000 KV9275000 KV9275000 KW0560000 OI6180000 YV3600000 YV3600000 YV3600000 MJ5775000 YW2450000
0658 0014 0661 0662 0664* 0652 0652 0652 0216 0653 0654 0653* 0654* 0653 0654 0653 0654 0655 0655 0655*	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium fume Vanadium oxide dust Vanadium pentaoxide dust Vanadium pentaoxide fume Varnish makers' & painters' naphtha Vegetable mist Vegetable oil mist Vikane® Vinyl acetate	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 110-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 8032-32-4 68956-68-3 68956-68-3 2699-79-8 108-05-4	KU9625000 AT5250000 KV9275000 KV9275000 KW0560000 OI6180000 YV3600000 YV3600000 YV3600000 MJ5775000 YW2450000
0658 0014 0661 0662 0664* 0652 0652 0652 0216 0653 0654 0653* 0654 0653 0654 0653 0654 0655 0655 0655 0655	VCN VDC VDF VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium fume Vanadium oxide dust Vanadium pentaoxide dust Vanadium pentaoxide fume Varnish makers' & painters' naphtha Vegetable mist Vegetable oil mist Vikane® Vinyl acetate Vinyl acetate	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 10-62-3 110-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 8032-32-4 68956-68-3 68956-68-3 2699-79-8 108-05-4 108-05-4	KU9625000 AT5250000 KV9275000 KV9275000 KW0560000 OI6180000 YV3600000 YV3600000 YV3600000 MJ5775000 YW2450000 AK0875000 AK0875000
0658 0014 0661 0662 0664* 0652 0652* 0652* 0653 0654 0653* 0654* 0653 0654 0653 0654 0655 0655* 0655* 0655*	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium fume Vanadium oxide dust Vanadium pentaoxide dust Vanadium pentaoxide fume Varnish makers' & painters' naphtha Vegetable mist Vegetable oil mist Vikane® Vinyl acetate Vinyl acetate Vinyl benzene	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 110-62-1 1314-62-1	KU9625000 AT5250000 KV9275000 KW9560000 OI6180000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 MJ5775000 YW2450000 YW31850000 YW31850000 WT5075000 AK0875000 AK0875000
0658 0014 0661 0662 0664* 0652 0652* 0652* 0653 0654 0653* 0654* 0653 0654* 0653 0654* 0655 0655* 0655* 0655* 0655*	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium oxide dust Vanadium oxide dust Vanadium oxide fume Vanadium pentaoxide dust Vanadium pentaoxide fume Vanadium pentaoxide fume Vanadium pentaoxide fume Varnish makers' & painters' naphtha Vegetable mist Vegetable oil mist Vikane® Vinyl acetate Vinyl acetate Vinyl benzene Vinyl bromide	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 110-62-1 1314-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1 1014-62-1	KU9625000 AT5250000 KV9275000 KW9560000 OI6180000 YV3600000 YV3600000 YV3600000 YV3600000 YV3600000 MJ5775000 YW2450000
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0658 0014 0661 0662 0664* 0652 0652* 0652* 0653* 0654 0653* 0654* 0653* 0654 0655 0655* 0581 0656* 0656* 0571 0657* 0017 0658*	VC VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium dust Vanadium oxide dust Vanadium pentaoxide dust Vanadium pentaoxide fume Vanish makers' & painters' naphtha Vegetable mist Vegetable oil mist Vikane® Vinyl acetate monomer Vinyl benzene Vinyl bromide Vinyl carbinol Vinyl carbinol Vinyl chloride	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 1314-62-1 100-42-1 100-42-1 100-42-1 100-42-1 100-42-1 100-42-1 100-42-1 100-42-1 100-42-1 100-42-1 100-42-1 100-42-1 100-42-1 100-42-1 100-42-1	KU9625000 AT5250000 KV9275000 KV9275000 KW0560000 OI6180000 YV3600000 YV3600000 YV3600000 MJ5775000 YW2450000
0658 0014 0661 0662 0664* 0652 0652* 0652* 0653* 0654 0653* 0654* 0653 0654* 0653 0654* 0655 0655* 0717 0658* 0658*	VCN VDC VDF VM & P Naphtha Valeral Valeraldehyde n-Valeraldehyde Valeric aldehyde Valerone Vanadic anhydride dust Vanadic anhydride fume Vanadium fume Vanadium oxide dust Vanadium pentaoxide dust Vanadium pentaoxide fume Vanish makers' & painters' naphtha Vegetable mist Vegetable oil mist Vikane® Vinyl acetate Vinyl acetate Vinyl benzene Vinyl bomide Vinyl carbinol Vinyl chloride Vinyl chloride Vinyl chloride	75-01-4 107-13-1 75-35-4 75-38-7 8032-32-4 110-62-3 110-62-3 110-62-3 110-62-3 110-62-1 1314-62-1	KU9625000 AT5250000 KV9275000 KV9275000 KW9560000 OI6180000 YV3600000 YV3600000 YV3600000 MJ5775000 YW2450000
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0661* Vinylidene chloride

KV9275000

75-35-4

0661	Vinylidene chloride monomer	75-35-4	KV9275000
	Vinylidene dichloride	75-35-4	KV9275000 KV9275000
0662	Vinylidene difluoride	75-33-4	KW0560000
	Vinylidene fluoride	75-38-7	KW0560000
	Vinylstyrene	1321-74-0	CZ9370000
0248	vinyistyrene	1321-74-0	<u>CZ9370000</u>
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0665	WARF	81-81-2	GN4550000
0665*	Warfarin	81-81-2	GN4550000
0666*	Welding fumes		ZC2550000
0667	Western red cedar dust		ZC9850000
0447	White fuming nitric acid (WFNA)	7697-37-2	OU5775000
0472	White mineral oil mist	8012-95-1	PY8030000
0506	White phosphoric acid	7664-38-2	TB6300000
0507	White phosphorus	7723-14-0	TH3500000
0439	White tar	91-20-3	OJ0525000
0616	White tin oxide	18282-10-5	XO400000
0645	Wolfram	7440-33-7	Y07175000
0094	Wollastonite (mineral)	1344-95-2	VV9150000
0397	Wood alcohol	67-56-1	PC1400000
0667*	Wood dust	07-30-1	ZC9850000
0397	Wood dust Wood naphtha	67-56-1	PC1400000
0397	Wood spirit	67-56-1	PC1400000 PC1400000
0648	Wood turpentine		Y08400000
		8006-64-2	
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0670*	p-Xylene	106-42-3	ZE2625000
	m-Xylene	108-38-3	ZE2275000
	o-Xylene	95-47-6	ZE2450000
	para-Xylene	106-42-3	ZE2430000 ZE2625000
	meta-Xylene	108-38-3	ZE2275000
	ortho-Xylene	95-47-6	ZE2450000
	m-Xylene-alpha,alpha'-diamine	1477-55-0	PF8970000
	Xylidine - Xylidine	1300-73-8	ZE8575000
0672	Xylidine isomers (e.g.	1300-73-8	ZE8575000 ZE8575000
0670	p-Xylol	106-42-3	ZE2625000
0669	-	108-38-3	ZE2275000
	m-Xylol		
0668	o-Xylol	95-47-6	ZE2450000
0671	m-Xylylenediamine	1477-55-0	PF8970000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0673* 0673	Yttrium Yttrium metal	7440-65-5 7440-65-5	ZG2980000 ZG2980000
GUIDE	CHEMICAL NAME	CAS NO	RTECS NO
0431		12001-26-2	VV8760000
_0674*	Zinc chloride fume	7646-85-7	ZH1400000
0674	Zinc dichloride fume	7646-85-7	ZH1400000
_0676	Zinc distearate	557-05-1	ZH5200000
	Zinc oxide	1314-13-2	ZH4810000
0675	Zinc peroxide	1314-13-2	ZH4810000
0676	Zinc salt of stearic acid	557-05-1	ZH5200000
0676*	Zinc stearate	557-05-1	ZH5200000
0677	Zirconium	7440-67-7	ZH7070000
0677*	Zirconium compounds (as Zr)	7440-67-7	ZH7070000
_0230	Zoalene	148-01-6	XS4200000

^{*}primary chemical name

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Acetaldehyde	CAS 75-07-0			
CH ₃ CHO	RTECS AB1925000			
Synonyms & Trade Names Acetic aldehyde, Ethanal, Ethyl aldehyde DOT ID & Guide 1089 129				
Exposure	NIOSH REL: Ca See Appen	dix A See Appendix C (Aldel	hydes)	
Limits	OSHA PEL†: TWA 200 ppn	m (360 mg/m ³)		
IDLH Ca [2000 ppm]		Conversion 1 ppm = 1.80 m	ng/m ³	
Physical Description Colorless liquid or gas (above 69°F) with a pungent, fruity odor.				
MW: 44.1	BP: 69°F	FRZ: -190°F	Sol: Miscible	
VP: 740 mmHg	IP: 10.22 eV		Sp.Gr: 0.79	
Fl.P: -36°F	UEL: 60%	LEL: 4.0%		
Class IA Flammable Liquid:	Fl.P. below 73°F and BP below	ow 100°F.		
Incompatibilities & Reactivities Strong oxidizers, acids, bases, alcohols, ammonia & amines, phenols, ketones, HCN, H ₂ S [Note: Prolonged contact with air may cause formation of peroxides that may explode and burst containers; easily undergoes polymerization.]				
Measurement Methods NIOSH 2538; OSHA 68				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately				

Respirator Recommendations NIOSH

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; eye, skin burns; dermatitis; conjunctivitis; cough; central nervous system depression; delayed pulmonary edema; in animals: kidney, reproductive, teratogenic effects; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, kidneys, central nervous system, reproductive system

Cancer Site [in animals: nasal cancer]

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Acetic acid			CAS 64-19-7		
CH ₃ COOH		RTECS AF1225000			
	s noic acid, Glacial acetic acid (nte: Can be found in concentra		DOT ID & Guide 2790 153 (10-80% acid) 2789 132 (>80% acid)		
Exposure	NIOSH REL: TWA 10 ppm	(25 mg/m ³) ST 15 ppm (37 r	mg/m ³)		
Limits	OSHA PEL: TWA 10 ppm ((25 mg/m ³)			
IDLH 50 ppm		Conversion 1 ppm = 2.46 m	ng/m ³		
Physical Description Colorless liquid or crystals v in an aqueous solution.]	Colorless liquid or crystals with a sour, vinegar-like odor. [Note: Pure compound is a solid below 62°F. Often used				
MW: 60.1	BP: 244°F	FRZ: 62°F	Sol: Miscible		
VP: 11 mmHg	IP: 10.66 eV		Sp.Gr: 1.05		
Fl.P: 103°F	UEL(200°F): 19.9%	LEL: 4.0%			
Class II Combustible Liquid	: Fl.P. at or above 100°F and	below 140°F.			
Incompatibilities & Reacti Strong oxidizers (especially metals.]	vities chromic acid, sodium peroxid	le & nitric acid), strong caustic	cs [Note: Corrosive to		
Measurement Methods NIOSH 1603; OSHA ID186	SG				
Personal Protection & San Skin: Prevent skin contact (Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or conta Change: No recommendatio Provide: Eyewash (>5%), Q	>10%) ated (>10%) aminated (>10%) n	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supports Swallow: Medical attention in	ort		

Respirator Recommendations NIOSH/OSHA

Up to 50 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing

apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; eye, skin burns; skin sensitization; dental erosion; black skin, hyperkeratosis; conjunctivitis, lacrimation (discharge of tears); pharyngeal edema, chronic bronchitis

Target Organs Eyes, skin, respiratory system, teeth

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Acetic anhydride CAS 108-24-7					
(CH ₃ CO) ₂ O	RTECS AK1925000				
Synonyms & Trade Names Acetic acid anhydride, Acetic oxide, Acetyl oxide, Ethanoic anhydride DOT ID & Guid 1715 137					
Exposure	NIOSH REL: C 5 ppm (20 n	ng/m ³)			
Limits	OSHA PEL†: TWA 5 ppm (20 mg/m ³)			
IDLH 200 ppm		Conversion 1 ppm = 4.18 m	ng/m ³		
Physical Description Colorless liquid with a strong, pungent, vinegar-like odor.					
MW: 102.1	BP: 282°F	FRZ: -99°F	Sol: 12%		
VP: 4 mmHg	IP: 10.00 eV		Sp.Gr: 1.08		
Fl.P: 120°F	UEL: 10.3%	LEL: 2.7%			
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.			
Incompatibilities & Reactivities Water, alcohols, strong oxidizers (especially chromic acid), amines, strong caustics [Note: Corrosive to iron, steel & other metals. Reacts with water to form acetic acid.]					
Measurement Methods NIOSH 3506; OSHA 82, 102					
Personal Protection & Sani	Personal Protection & Sanitation First Aid (See procedures)				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 125 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$

Up to 200 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

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organic vapor cartridge(s) /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Conjunctivitis, lacrimation (discharge of tears), corneal edema, opacity, photophobia (abnormal visual intolerance to light); nasal, pharyngeal irritation; cough, dyspnea (breathing difficulty), bronchitis; skin burns, vesiculation, sensitization dermatitis

Target Organs Eyes, skin, respiratory system

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Acetone CAS 67-64-1				
(CH ₃) ₂ CO RTECS AL3150000				
Synonyms & Trade Names Dimethyl ketone, Ketone propane, 2-Propanone DOT ID & 1090 127				
Exposure NIOSH REL: TWA 250 ppm		n (590 mg/m ³)		
Limits	OSHA PEL†: TWA 1000 pp	om (2400 mg/m ³)		
IDLH 2500 ppm [10%LEL]		Conversion 1 ppm = 2.38 m	ng/m ³	
Physical Description Colorless liquid with a fragra	ant, mint-like odor.			
MW: 58.1	BP: 133°F	FRZ: -140°F	Sol: Miscible	
VP: 180 mmHg	IP: 9.69 eV		Sp.Gr: 0.79	
Fl.P: 0°F	UEL: 12.8%	LEL: 2.5%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.		
Incompatibilities & Reactive Oxidizers, acids	vities			
Measurement Methods NIOSH 1300, 3800; OSHA 69				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort	

Respirator Recommendations NIOSH

Up to 2500 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system

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Acetone cyanohydrin CH ₃ C(OH)CNCH ₃			CAS 75-86-5	
			RTECS OD9275000	
Synonyms & Trade Names Cyanohydrin-2-propanone, 2-Cyano-2-propanol, alpha-Hydroxyisobutyronitrile, 2- Hydroxy-2-methyl-propionitrile, 2-Methyllactonitrile			DOT ID & Guide 1541 155 (stabilized)	
Exposure	NIOSH REL: C 1 ppm (4	mg/m ³) [15-minute]		
Limits	OSHA PEL: none			
IDLH N.D. $\mathbf{Conversion} \ 1 \ \mathrm{ppm} = 3.48 \ \mathrm{mg/m}^3$			mg/m ³	
Physical Description Colorless liquid with a fair	t odor of bitter almond. [No	te: Forms cyanide in the body.]		
MW: 85.1	BP: 203°F	FRZ: -4°F	Sol: Miscible	
VP: 0.8 mmHg	IP: ?		Sp.Gr(77°F): 0.93	
Fl.P: 165°F	UEL: 12.0%	LEL: 2.2%		
Class IIIA Combustible Lie	quid: Fl.P. at or above 140°F	and below 200°F.		
Incompatibilities & Reactivities Sulfuric acid, caustics [Note: Slowly decomposes to acetone & HCN at room temperatures; rate is accelerated by an increase in pH, water content, or temperature.]				
Measurement Methods NIOSH 2506				
Personal Protection & Sanitation Skin: Prevent skin contact First Aid (See procedures) Eye: Irrigate immediately				

Skin: Prevent skin contact

Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 10 ppm: (APF = 10) Any supplied-air respirator

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 50 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any suppliedair respirator with a full facepiece

Up to 250 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-

demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; dizziness, lassitude (weakness, exhaustion), headache, confusion, convulsions; liver, kidney injury; pulmonary edema, asphyxia

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system, liver, kidneys, gastrointestinal tract

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Acetonitrile			CAS 75-05-8
CH ₃ CN			RTECS AL7700000
Synonyms & Trade Names Cyanomethane, Ethyl nitrile, Methyl cyanide [Note: Forms cyanide in the body.]			DOT ID & Guide 1648 131
Exposure	NIOSH REL: TWA 20 ppm	(34 mg/m^3)	
Limits	OSHA PEL†: TWA 40 ppm	(70 mg/m ³)	
IDLH 500 ppm		Conversion 1 ppm = 1.68 m	ng/m ³
Physical Description Colorless liquid with an aromatic odor.			
MW: 41.1	BP: 179°F	BP: 179°F FRZ: -49°F Sol: Misci	
VP: 73 mmHg	IP: 12.20 eV		Sp.Gr: 0.78
Fl.P(oc): 42°F	UEL: 16.0%	LEL: 3.0%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.	
Incompatibilities & Reactive Strong oxidizers	vities		
Measurement Methods NIOSH 1606			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supports Swallow: Medical attention in	ort

Respirator Recommendations NIOSH

Up to 200 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 500 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation nose, throat; asphyxia; nausea, vomiting; chest pain; lassitude (weakness, exhaustion); stupor, convulsions; in animals: liver, kidney damage

Target Organs respiratory system, cardiovascular system, central nervous system, liver, kidneys

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2-Acetylaminofluorene			CAS 53-96-3		
C ₁₅ H ₁₃ NO			RTECS AB9450000		
Synonyms & Trade Names AAF, 2-AAF, 2-Acetaminofluorene, N-Acetyl-2-aminofluorene, FAA, 2-FAA, 2-Fluorenylacetamide			DOT ID & Guide		
Exposure	NIOSH REL: Ca See Appen	dix A			
Limits	OSHA PEL: [1910.1014] <u>Se</u>	e Appendix B			
IDLH Ca [N.D.]		Conversion			
Physical Description Tan, crystalline powder.					
MW: 223.3	BP: ?	MLT: 381°F	Sol: Insoluble		
VP: ?	IP:?		Sp.Gr: ?		
Fl.P: ?	UEL: ?	LEL: ?			
Combustible Solid					
Incompatibilities & Reactive None reported	rities				
Measurement Methods None available					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort		

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

Respirator Recommendations NIOSH

pressure breathing apparatus

appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Reduced function of liver, kidneys, bladder, pancreas; [potential occupational carcinogen]

Target Organs Liver, bladder, kidneys, pancreas, skin

Cancer Site [in animals: tumors of the liver, bladder, lungs, skin & pancreas]

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Acetylene		CAS 74-86-2		
$\overline{\mathrm{C_{2}H_{2}}}$			RTECS AO9600000	
Synonyms & Trade Names Ethine, Ethyne [Note: A comp	pressed gas used in the weldi	ng & cutting of metals.]	DOT ID & Guide 1001 116	
Exposure	NIOSH REL: C 2500 ppm (2	2662 mg/m ³)		
Limits	OSHA PEL: none			
IDLH N.D.		Conversion 1 ppm = 1.06 n	ng/m ³	
Physical Description Colorless gas with a faint, eth dissolved in acetone.]	nereal odor. [Note: Commerc	ial grade has a garlic-like od	or. Shipped under pressure	
MW: 26.0	BP: Sublimes	FRZ: -119°F (Sublimes)	Sol: 2%	
VP: 44.2 atm	IP: 11.40 eV	RGasD: 0.91		
Fl.P: NA (Gas)	UEL: 100%	LEL: 2.5%		
Flammable Gas				
Incompatibilities & Reactive Zinc; oxygen & other oxidizing mercury, silver & brasses (co.	ng agents such as halogens [I		ide compounds with copper,	
Measurement Methods NIOSH Acetylene Crit. Doc.				
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation Provide: Frostbite		First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Fresh air		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact (liquid)				
Symptoms Headache, dizziness; asphyxia; liquid: frostbite				
Target Organs central nervous system, respiratory system				

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Acetylene tetrabromide			CAS 79-27-6	
CHBr ₂ CHBr ₂			RTECS KI8225000	
Synonyms & Trade Names Symmetrical tetrabromoethan 1,1,2,2-Tetrabromoethane	DOT ID & Guide 2504 159			
Exposure	NIOSH REL: See Appendix	<u>k D</u>		
Limits	OSHA PEL: TWA 1 ppm (OSHA PEL: TWA 1 ppm (14 mg/m ³)		
IDLH 8 ppm				
Physical Description Pale-yellow liquid with a pu	ngent odor similar to campho	or or iodoform. [Note: A solid	below 32°F.]	
MW: 345.7	BP: 474°F (Decomposes)	FRZ: 32°F	Sol: 0.07%	
VP: 0.02 mmHg	IP: ?		Sp.Gr: 2.97	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid				
Incompatibilities & Reactivities Strong caustics; hot iron; reducing metals such as aluminum, magnesium & zinc				
Measurement Methods NIOSH 2003				
		30		

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Water flush promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations OSHA

Up to 8 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; anorexia, nausea; headache; abdominal pain; jaundice; leukocytosis (increased blood leukocytes); central nervous system depression

Target Organs Eyes, respiratory system, liver, central nervous system

kidney injury

Target Organs

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Acetylsalicyclic acid			CAS 50-78-2		
CH ₃ COOC ₆ H ₄ COOH			RTECS VO0700000		
Synonyms & Trade Names Acetal, o-Acetoxybenzoic ac	id, 2-Acetoxybenzoic acid, A	spirin	DOT ID & Guide		
Exposure	NIOSH REL: TWA 5 mg/m ³				
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion			
Physical Description Odorless, colorless to white, contact with moisture.]	Odorless, colorless to white, crystal-line powder. [aspirin] [Note: Develops the vinegar-like odor of acetic acid on				
MW: 180.2	BP: 284°F (Decomposes)	MLT: 275°F	Sol(77°F): 0.3%		
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.35		
Fl.P: NA	UEL: NA	LEL: NA	MEC: 40 g/m ³		
Combustible Powder; explos	ion hazard if dispersed in air	•			
Incompatibilities & Reactive Solutions of alkali hydroxide salicyclic & acetic acids.]		zers, moisture [Note: Slowly h	ydrolyzes in moist air to		
Measurement Methods NIOSH 0500					
Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: No recommendatio Change: Daily Provide: Eyewash, Quick dre	ited n	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendation	Respirator Recommendations To be added later				
Exposure Routes inhalation	, ingestion, skin and/or eye co	ontact			

Symptoms Irritation eyes, skin, upper respiratory system; increased blood clotting time; nausea, vomiting; liver,

Acrolein

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CAS 107-02-8

CH ₂ =CHCHO			RTECS AS1050000		
Synonyms & Trade Names Acraldehyde, Acrylaldehyde,	Synonyms & Trade Names Acraldehyde, Acryladehyde, Acrylic aldehyde, Allyl aldehyde, Propenal, 2-Propenal 1092 131P (inhibited)				
Exposure	NIOSH REL: TWA 0.1 ppm (0.25 mg/m ³) ST 0.3 ppm (0.8 mg/m ³) See Appendix C (Aldehydes)				
Limits	OSHA PEL†: TWA 0.1 ppm	(0.25 mg/m ³)			
IDLH 2 ppm		Conversion 1 ppm = 2.29 m	g/m ³		
Physical Description Colorless or yellow liquid with a piercing, disagreeable odor.					
MW: 56.1	BP: 127°F	FRZ: -126°F	Sol: 40%		
VP: 210 mmHg	IP: 10.13 eV		Sp.Gr: 0.84		
Fl.P: -15°F	UEL: 31%	LEL: 2.8%			
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.			
Incompatibilities & Reactivities Oxidizers, acids, alkalis, ammonia, amines [Note: Polymerizes readily unless inhibitedusually with hydroquinone. May form shock-sensitive peroxides over time.]					
Measurement Methods NIOSH 2501; OSHA 52					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Skin: Water flush immediately Skin: Water flush immediately Breathing: Respiratory support			· ·		

Respirator Recommendations NIOSH/OSHA

Remove: When wet (flammable)

Change: No recommendation Provide: Eyewash, Quick drench

Up to 2 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Swallow: Medical attention immediately

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; decreased pulmonary function; delayed pulmonary edema; chronic respiratory disease

Target Organs Eyes, skin, respiratory system, heart

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Acrylamide			CAS 79-06-1	
CH ₂ =CHCONH ₂			RTECS AS3325000	
			DOT ID & Guide 2074 153P	
Exposure	NIOSH REL: Ca TWA 0.03	mg/m ³ [skin] <u>See Appendix</u>	A	
Limits	OSHA PEL†: TWA 0.3 mg/s	m ³ [skin]		
IDLH Ca [60 mg/m ³] Conversion				
Physical Description White crystalline, odorless so	olid.			
MW: 71.1	BP: 347-572°F (Decomposes)	MLT: 184°F	Sol(86°F): 216%	
VP: 0.007 mmHg	IP: 9.50 eV		Sp.Gr: 1.12	
Fl.P: 280°F	UEL: ?	LEL: ?		
Combustible Solid (may also be dissolved in flammable liquids).				
Incompatibilities & Reactivities Strong oxidizers [Note: May polymerize violently upon melting.]				
Measurement Methods				

OSHA 21, PV2004

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; ataxia, numb limbs, paresthesia; muscle weakness; absent deep tendon reflex; hand sweating; lassitude (weakness, exhaustion), drowsiness; reproductive effects; [potential occupational carcinogen]

Target Organs Eyes, skin, central nervous system, peripheral nervous system, reproductive system

Cancer Site [in animals: tumors of the lungs, testes, thyroid & adrenal glands]

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Acrylic acid			CAS 79-10-7	
CH ₂ =CHCOOH			RTECS AS4375000	
Synonyms & Trade Names Acroleic acid, Aqueous acrylic acid (technical grade is 94%), Ethylenecarboxylic acid, Glacial acrylic acid (98% in aqueous solution), 2-Propenoic acid			DOT ID & Guide 2218 132P (inhibited)	
Exposure	NIOSH REL: TWA 2 ppm (NIOSH REL: TWA 2 ppm (6 mg/m ³) [skin]		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 2.95 m	g/m ³	
Physical Description Colorless liquid or solid (below 55°F) with a distinctive, acrid odor. [Note: Shipped with an inhibitor (e.g., hydroquinone) since it readily polymerizes.]				
MW: 72.1	BP: 286°F	FRZ: 55°F	Sol: Miscible	
VP: 3 mmHg	IP: ?		Sp.Gr: 1.05	
Fl.P: 121°F	UEL: 8.02%	LEL: 2.4%		
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.		
Incompatibilities & Reactive Oxidizers, amines, alkalis, an aminoethanol [Note: Corrosi	nmonium hydroxide, chloro-s	sulfonic acid, oleum, ethylene	diamine, ethyleneimine, 2-	
Measurement Methods OSHA 28, PV2005				
Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or conta Change: No recommendation Provide: Eyewash, Quick dre	ited minated 1	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendation	ons To be added later			
Exposure Routes inhalation	, skin absorption, ingestion, s	kin and/or eye contact		
Symptoms Irritation eyes, skidney injury	kin, respiratory system; eye, s	kin burns; skin sensitization; i	n animals: lung, liver,	

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Acrylonitrile			CAS 107-13-1	
CH ₂ =CHCN			RTECS AT5250000	
			DOT ID & Guide 1093 131P (inhibited)	
Exposure	NIOSH REL: Ca TWA 1 pp	m C 10 ppm [15-minute] [ski	n] See Appendix A	
Limits	OSHA PEL: [1910.1045] TV	VA 2 ppm C 10 ppm [15-min	nute] [skin]	
IDLH Ca [85 ppm]	IDLH Ca [85 ppm] $ Conversion 1 ppm = 2.17 mg/m^3 $			
Physical Description Colorless to pale-yellow liquid with an unpleasant odor. [Note: Odor can only be detected above the PEL.]				
MW: 53.1	BP: 171°F	FRZ: -116°F	Sol: 7%	
VP: 83 mmHg	IP: 10.91 eV		Sp.Gr: 0.81	
Fl.P: 30°F	UEL: 17%	LEL: 3.0%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.		
Incompatibilities & Reactivities Strong oxidizers, acids & alkalis; bromine; amines [Note: Unless inhibited (usually with methylhydroquinone), may polymerize spontaneously or when heated or in presence of strong alkali. Attacks copper.]				
Measurement Methods NIOSH 1604; OSHA 37				
Personal Protection & Sanitation First Aid (See procedures)				

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench

Eye: Irrigate immediately Skin: Water wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; asphyxia; headache; sneezing; nausea, vomiting; lassitude (weakness, exhaustion), dizziness; skin vesiculation; scaling dermatitis; [potential occupational carcinogen]

Target Organs Eyes, skin, cardiovascular system, liver, kidneys, central nervous system

Cancer Site [brain tumors, lung & bowel cancer]

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Adiponitrile			CAS 111-69-3		
NC(CH ₂) ₄ CN	NC(CH ₂) ₄ CN				
			DOT ID & Guide 2205 153		
Exposure	NIOSH REL: TWA	4 ppm (18 mg/m ³)			
Limits	OSHA PEL: none	OSHA PEL: none			
IDLH N.D.	H N.D. Conversion 1 ppm = 4.43 m		$= 4.43 \text{ mg/m}^3$		
Physical Description Water-white, practically of	odorless, oily liquid. [Not	e: A solid below 34°F. Form	s cyanide in the body.]		
MW: 108.2	BP: 563°F	FRZ: 34°F	Sol: 4.5%		
VP: 0.002 mmHg	IP: ?		Sp.Gr: 0.97		
Fl.P(o.c.): 199°F UEL: 5.0% LEL: 1.7		LEL: 1.7%			
Class IIIA Combustible L	Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.				
Incompatibilities & Reactivities Oxidizers (e.g., perchlorates, nitrates), strong acids (e.g., sulfuric acid) [Note: Decomposes above 194°F, forming hydrogen cyanide.]					
Measurement Methods	Maggurament Mathods				

Measurement Methods

NIOSH Nitriles Crit. Doc.

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Cl. D.'I

Change: Daily

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 40 ppm: (APF = 10) Any supplied-air respirator

Up to 100 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 200 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 250 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; headache, dizziness, lassitude (weakness, exhaustion), confusion, convulsions; blurred vision; dyspnea (breathing difficulty); abdominal pain, nausea, vomiting

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system

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Aldrin			CAS 309-00-2	
C ₁₂ H ₈ Cl ₆			RTECS IO2100000	
			DOT ID & Guide 2761 151	
Exposure	NIOSH REL: Ca TWA 0.25	mg/m ³ [skin] <u>See Appendix</u>	A	
Limits	OSHA PEL: TWA 0.25 mg/	OSHA PEL: TWA 0.25 mg/m ³ [skin]		
IDLH Ca [25 mg/m ³] Conversion				
Physical Description Colorless to dark-brown crys	talline solid with a mild cher	mical odor. [Note: Formerly us	sed as an insecticide.]	
MW: 364.9	BP: Decomposes	MLT: 219°F	Sol: 0.003%	
VP: 0.00008 mmHg	IP: ?		Sp.Gr: 1.60	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid, but m	ay be dissolved in flammable	e liquids.		
Incompatibilities & Reactivities Concentrated mineral acids, active metals, acid catalysts, acid oxidizing agents, phenol				
Measurement Methods NIOSH 5502				

Personal Protection & Sanitation Skin: Prevent skin contact

Eyes: Prevent eye contact Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort); myoclonic jerks of limbs; clonic, tonic convulsions; coma; hematuria (blood in the urine), azotemia; [potential occupational carcinogen]

Target Organs central nervous system, liver, kidneys, skin

Cancer Site [in animals: tumors of the lungs, liver, thyroid & adrenal glands]

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NIOSH Pocket Guide to Chemical Hazards

Allyl alcohol			CAS 107-18-6
CH ₂ =CHCH ₂ OH			RTECS BA5075000
			DOT ID & Guide 1098 131
Exposure	NIOSH REL: TWA 2	ppm (5 mg/m ³) ST 4 ppm (1	10 mg/m ³) [skin]
Limits	OSHA PEL†: TWA 2	ppm (5 mg/m ³) [skin]	
IDLH 20 ppm Conversion 1 ppm = 2		2.38 mg/m ³	
Physical Description Colorless liquid with a pungent, mustard-like odor.			
MW: 58.1	BP: 205°F	FRZ: -200°F	Sol: Miscible
VP: 17 mmHg	IP: 9.63 eV		Sp.Gr: 0.85
Fl.P: 70°F	Fl.P: 70°F UEL: 18.0% LEL: 2.5°		
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.			
Incompatibilities & Reactivities Strong oxidizers, acids, carbon tetrachloride [Note: Polymerization may be caused by elevated temperatures, oxidizers, or peroxides.]			
Measurement Methods			

Personal Protection & Sanitation

NIOSH 1402

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation
Provide: Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 20 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Eye irritation, tissue damage; irritation upper respiratory system, skin; pulmonary edema

Target Organs Eyes, skin, respiratory system

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Allyl chloride			CAS 107-05-1	
CH ₂ =CHCH ₂ Cl			RTECS UC7350000	
		DOT ID & Guide 1100 131		
Exposure	NIOSH REL: TWA 1 ppm (3 mg/m ³) ST 2 ppm (6 mg/m	³)	
Limits	OSHA PEL†: TWA 1 ppm (3 mg/m ³)		
IDLH 250 ppm		Conversion 1 ppm = 3.13 m	ng/m ³	
Physical Description Colorless, brown, yellow, or purple liquid with a pungent, unpleasant odor.				
MW: 76.5	BP: 113°F	MLT: -210°F	Sol: 0.4%	
VP: 295 mmHg	IP: 10.05 eV		Sp.Gr: 0.94	
Fl.P: -25°F	UEL: 11.1%	LEL: 2.9%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.		
II	Incompatibilities & Reactivities Strong oxidizers, acids, amines, iron & aluminum chlorides, magnesium, zinc			
Measurement Methods NIOSH 1000; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo	ort	

Respirator Recommendations NIOSH/OSHA

Provide: Quick drench

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 50 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 250 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, mucous membrane; pulmonary edema; in animals: liver, kidney injury

Target Organs Eyes, skin, respiratory system, liver, kidneys

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Allyl glycidyl ether CAS 106-92-3				
$C_6H_{10}O_2$			RTECS RR0875000	
Synonyms & Trade Names AGE; 1-Allyloxy-2,3-epoxypoxirane	DOT ID & Guide 2219 129			
Exposure	NIOSH REL: TWA 5 ppm (2	22 mg/m ³) ST 10 ppm (44 mg	g/m ³) [skin]	
Limits	OSHA PEL†: C 10 ppm (45	mg/m ³)		
IDLH 50 ppm	IDLH 50 ppm Conversion 1 ppm = 4.67 mg/m^3			
Physical Description Colorless liquid with a pleasa	Physical Description Colorless liquid with a pleasant odor.			
MW: 114.2	BP: 309°F	FRZ: -148°F [forms glass]	Sol: 14%	
VP: 2 mmHg	IP: ?		Sp.Gr: 0.97	
Fl.P: 135°F	UEL: ?	LEL: ?		
Class II Combustible Liquid: Fl.P. at or above 100°F and below 140°F.				
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH 2545				
Parsonal Protection & Sanitation First Aid (See procedures)				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Change: No recommendation

Provide: Eyewash

First Aid (See procedures) Ever Irrigate immediately

Eye: Irrigate immediately
Skin: Water flush promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 50 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, respiratory system; dermatitis; pulmonary edema; narcosis; possible hematopoietic, reproductive effects

Target Organs Eyes, skin, respiratory system, blood, reproductive system

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Allyl propyl disulfide			CAS 2179-59-1
H ₂ C=CHCH ₂ S ₂ CH ₂ CH ₂ CH ₃			RTECS JO0350000
Synonyms & Trade Names 4,5-Dithia-1-octene; Onion o	il; 2-Propenyl propyl disulfid	e; Propyl allyl disulfide	DOT ID & Guide
Exposure	NIOSH REL: TWA 2 ppm (12 mg/m ³) ST 3 ppm (18 mg/m ³)		$/m^3$)
Limits	OSHA PEL†: TWA 2 ppm (12 mg/m ³)	
IDLH N.D. See: IDLH INDI	EX	Conversion 1 ppm = 6.07 m	ng/m ³
Physical Description Pale-yellow liquid with a stro	ong & irritating onion-like od	or. [Note: The chief volatile c	component of onion oil.]
MW: 148.3	BP: ?	FRZ: 5°F	Sol: Insoluble
VP: ?	IP: ?		Sp.Gr(59°F): 0.93
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Liquid			
Incompatibilities & Reactive Oxidizers	rities		
Measurement Methods None available			
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: No recommendation Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort
Respirator Recommendations To be added later			
Exposure Routes inhalation, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, nose, respiratory system; lacrimation (discharge of tears)			
Target Organs Eyes, respiratory system			
See also: INTRODUCTION			

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alpha-Alumina		CAS 1344-28-1		
$\overline{\mathrm{Al_2O_3}}$		RTECS BD1200000		
Synonyms & Trade Names Alumina, Aluminum oxide, Aluminum trioxide [Note: alpha-Alumina is the main component of technical grade alumina. Corundum is natural Al ₂ O ₃ . Emery is an impure crystalline variety of Al ₂ O ₃ .]			DOT ID & Guide	
Exposure	NIOSH REL: See Appendix	D		
Limits	OSHA PEL†: TWA 15 mg/r	m ³ (total) TWA 5 mg/m ³ (res	p)	
IDLH N.D.		Conversion		
Physical Description White, odorless, crystalline	powder.			
MW: 101.9	BP: 5396°F	MLT: 3632°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 4.0	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible solid, but	dusts may form explosive mixt	tures in air.		
	ivities orinated rubber, acids, oxidized ure during crushing & milling		e formed when finely	
Measurement Methods NIOSH 0500, 0600				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Blot/brush away Breathing: Fresh air Swallow: Medical attention in	mmediately	
Respirator Recommendations To be added later				
Exposure Routes Irritation eyes, skin, respiratory system				
Symptoms irritation eyes,	Symptoms irritation eyes, skin, respiratory system			
Target Organs Eyes, skin, respiratory system				

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Aluminum		CAS 7429-90-5		
Al			RTECS BD0330000	
Synonyms & Trade Names Aluminium, Aluminum metal, Aluminum powder, Elemental aluminum		ntal aluminum	DOT ID & Guide 1309 170 (powder, coated) 1396 138 (powder, uncoated) 9260 169 (molten)	
Exposure	NIOSH REL: TWA 10 mg/r	m ³ (total) TWA 5 mg/m ³ (resp	p)	
Limits	OSHA PEL: TWA 15 mg/m	³ (total) TWA 5 mg/m ³ (resp))	
IDLH N.D.		Conversion		
Physical Description Silvery-white, malleable, due	ctile, odorless metal.			
MW: 27.0	BP: 4221°F	MLT: 1220°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.70	
Fl.P: NA	UEL: NA	LEL: NA		
Combustible Solid, finely div	vided dust is easily ignited; m	ay cause explosions.		
Strong oxidizers & acids, hal	Incompatibilities & Reactivities Strong oxidizers & acids, halogenated hydrocarbons [Note: Corrodes in contact with acids & other metals. Ignition may occur if powders are mixed with halogens, carbon disulfide, or methyl chloride.]			
Measurement Methods NIOSH 7013, 7300; OSHA I	ID121			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact				
Symptoms Irritation eyes, skin, respiratory system				

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Aluminum (pyro powders and welding fumes, as Al)			CAS
			RTECS
Synonyms & Trade Names Synonyms vary depending up	pon the specific aluminum cor	mpound.	DOT ID & Guide 1383 135 (powder, pyrophoric)
Exposure	NIOSH REL: TWA 5 mg/m ³		
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description Appearance and odor vary de	epending upon the specific alu	ıminum compound.	
Properties vary depending upon the specific aluminum compound.			
Incompatibilities & Reactive Varies	vities		
Measurement Methods NIOSH 7300			
Personal Protection & Sani Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation	tion n	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediat Breathing: Respiratory supp Swallow: Medical attention	port
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation	, ingestion, skin and/or eye co	ntact	
Symptoms Irritation skin, re	spiratory system; pulmonary t	fibrosis	
Target Organs Skin, respira	tory system		
See also: INTRODUCTION			

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Aluminum (soluble salts and alkyls, as Al)		as Al)	CAS	
			RTECS	
Synonyms & Trade Names Synonyms vary depending upon the specific aluminum compound.			DOT ID & Guide 3051 135 (alkyls)	
Exposure	NIOSH REL: TWA 2 mg/m	NIOSH REL: TWA 2 mg/m ³		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Appearance and odor vary de	epending upon the specific al	uminum compound.		
Properties vary depending upon the specific aluminum compound.				
Incompatibilities & Reactive Varies	vities			
Measurement Methods NIOSH 7300; OSHA ID121				
Personal Protection & Sant Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or contact Change: Daily	ited	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory support Swallow: Medical attention in	ort	
Respirator Recommendation	ons To be added later			
Exposure Routes inhalation	, ingestion, skin and/or eye co	ontact		
Symptoms Irritation skin, re	<u> </u>			
Target Organs Skin, respira	ntory system			
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4-Aminodiphenyl			CAS 92-67-1
$C_6H_5C_6H_4NH_2$			RTECS DU8925000
Synonyms & Trade Names 4-Aminobiphenyl, p-Aminodiphenyl, 4-Phenylaniline		DOT ID & Guide	
Exposure	NIOSH REL: Ca See Appen	dix A	
Limits	OSHA PEL: [1910.1011] <u>Se</u>	e Appendix B	
IDLH Ca [N.D.]		Conversion	
Physical Description Colorless crystals with a floral odor. [Note: Turns purple on contact with air.]			
MW: 169.2	BP: 576°F	MLT: 127°F	Sol: Slight
VP(227°F): 1 mmHg	IP: ? Sp.Gr: 1.16		Sp.Gr: 1.16
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Solid, but must	be preheated before ignition	possible.	
Incompatibilities & Reactivities Oxidized by air			
Measurement Methods NIOSH P&CAM269 (II-4); OSHA 93			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention is	ort

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Headache, dizziness; drowsiness, dyspnea (breathing difficulty); ataxia, lassitude (weakness, exhaustion); methemoglobinemia; urinary burning; acute hemorrhagic cystitis; [potential occupational carcinogen]

Target Organs Bladder, skin

Cancer Site [bladder cancer]

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2-Aminopyridine			CAS 504-29-0
NH ₂ C ₅ H ₄ N			RTECS US1575000
Synonyms & Trade Names alpha-Aminopyridine, alpha-Pyridylamine			DOT ID & Guide 2671 153
Exposure	NIOSH REL: TWA	0.5 ppm (2 mg/m ³)	
Limits	OSHA PEL: TWA	0.5 ppm (2 mg/m ³)	
IDLH 5 ppm		Conversion 1 ppm :	$= 3.85 \text{ mg/m}^3$
Physical Description White powder, leaflets, or crystals with a characteristic odor.			
MW: 94.1	BP: 411°F	MLT: 137°F	Sol: >100%
VP(77°F): 0.8 mmHg	IP: 8.00 eV		Sp.Gr: ?
Fl.P: 154°F	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reac Strong oxidizers	tivities		
Measurement Methods NIOSH S158 (II-4)			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Quick drench		First Aid (See proce Eye: Irrigate immed Skin: Water flush in Breathing: Respirate Swallow: Medical at	iately nmediately

Respirator Recommendations NIOSH/OSHA

Up to 5 ppm: (APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a

full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; headache, dizziness; excitement; nausea; high blood pressure; respiratory distress; lassitude (weakness, exhaustion); convulsions; stupor

Target Organs central nervous system, respiratory system

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Amitrole			CAS 61-82-5	
$C_2H_4N_4$			RTECS XZ3850000	
Synonyms & Trade Names Aminotriazole; 3-Amino-1,3,4-triazole; 3-Amino-1,2,4-triazole			DOT ID & Guide	
Exposure	NIOSH REL: Ca TWA 0.2 r	mg/m ³ See Appendix A		
Limits	OSHA PEL†: none			
IDLH Ca [N.D.]		Conversion		
Physical Description Colorless to white, crystalline powder. [herbicide] [Note: Odorless when pure.]				
MW: 84.1	BP: ?	MLT: 318°F	Sol(77°F): 28%	
VP: <0.000008 mmHg	IP: ?		Sp.Gr: 1.14	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid, but m	ay be dissolved in flammable	e liquids.		
Incompatibilities & Reactive Light (decomposes), strong of		ron, aluminum & copper.]		
Measurement Methods NIOSH 0500; OSHA PV2006				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash immediately Breathing: Respiratory support		
Remove: When wet or contain	minated	Swallow: Medical attention immediately		

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-

contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; dyspnea (breathing difficulty), muscle spasms, ataxia, anorexia, salivation, increased body temperature; lassitude (weakness, exhaustion), skin dryness, depression (thyroid function suppression)

Target Organs Eyes, skin, thyroid

Cancer Site [in animals: liver, thyroid & pituitary gland tumors]

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Ammonia		CAS 7664-41-7	
NH ₃			RTECS BO0875000
Synonyms & Trade Names Anhydrous ammonia, Aqua ammonia, Aqueous ammonia [Note: Often used in an aqueous solution.]			DOT ID & Guide 1005 125 (anhydrous) 2672 154 (10-35% solution) 2073 125 (>35-50% solution) 1005 125 (>50% solution)
Exposure	NIOSH REL: TWA 25 ppr	m (18 mg/m ³) ST 35 ppm (2	7 mg/m ³)
Limits	OSHA PEL†: TWA 50 ppr	m (35 mg/m ³)	
IDLH 300 ppm		Conversion 1 ppm = 0.70	O mg/m ³
Physical Description Colorless gas with a pung pressure.]	ent, suffocating odor. [Note: S	nipped as a liquefied compre	essed gas. Easily liquefied under
MW: 17.0	BP: -28°F	FRZ: -108°F	Sol: 34%
VP: 8.5 atm	IP: 10.18 eV	RGasD: 0.60	
Fl.P: NA (Gas)	UEL: 28%	LEL: 15%	
[Note: Although NH ₃ doe treated as one.]	s not meet the DOT definition	of a Flammable Gas (for lab	peling purposes), it should be
Incompatibilities & Read Strong oxidizers, acids, ha	ctivities logens, salts of silver & zinc [Note: Corrosive to copper &	galvanized surfaces.]
Measurement Methods NIOSH 6015, 6016; OSH	A ID188		
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated (solution) Remove: When wet or contaminated (solution) Change: No recommendation Provide: Eyewash (>10%), Quick drench (>10%)		First Aid (See procedures Eye: Irrigate immediately Skin: Water flush immedi Breathing: Respiratory su Swallow: Medical attention	(solution/liquid) ately (solution/liquid) pport

Up to 250 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the

Respirator Recommendations NIOSH

compound of concern*/(APF = 10) Any supplied-air respirator*

Up to 300 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern*/(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front-or back-mounted canister providing protection against the compound of concern/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion (solution), skin and/or eye contact (solution/liquid)

Symptoms Irritation eyes, nose, throat; dyspnea (breathing difficulty), wheezing, chest pain; pulmonary edema; pink frothy sputum; skin burns, vesiculation; liquid: frostbite

Target Organs Eyes, skin, respiratory system

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Ammonium chlor	ride fume		CAS 12125-02-9	
NH ₄ Cl			RTECS BP4550000	
Synonyms & Trade Names Ammonium chloride, Ammonium muriate fume, Sal ammoniac fume		DOT ID & Guide 9085 171		
Exposure	NIOSH REL: TWA 10 mg/s	m ³ ST 20 mg/m ³		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Finely divided, odorless, wh	nite particulate dispersed in air			
MW: 53.5	BP: Sublimes	MLT: 662°F (Sublimes)	Sol: 37%	
VP(321°F): 1 mmHg	IP: NA		Sp.Gr: 1.53	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
	ivities lead & silver salts, strong oxio most metals at high (i.e., fire)		tassium chlorate, bromine	
Measurement Methods OSHA ID188				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact				
Symptoms Irritation eyes, skin, respiratory system; cough, dyspnea (breathing difficulty), pulmonary sensitization				
Target Organs Eyes, skin,	respiratory system			

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Ammonium sulfamate			CAS 7773-06-0	
NH ₄ OSO ₂ NH ₂			RTECS WO6125000	
			DOT ID & Guide 9089 171	
Exposure	NIOSH REL: TWA 10 mg/	m ³ (total) TWA 5 mg/m ³ (res	sp)	
Limits	OSHA PEL†: TWA 15 mg/	/m ³ (total) TWA 5 mg/m ³ (res	sp)	
IDLH 1500 mg/m ³	Conversion			
Physical Description Colorless to white crystalline	e, odorless solid. [herbicide]			
MW: 114.1	BP: 320°F (Decomposes)	MLT: 268°F	Sol: 200%	
VP: 0 mmHg (approx)	IP: ?		Sp.Gr: 1.77	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactivities Acids, hot water [Note: Elevated temperatures cause a highly exothermic reaction with water.]				
Measurement Methods NIOSH S348 (II-5)				
Personal Protection & Sanitation First Aid (See procedures)				

Skin: No recommendation
Eyes: No recommendation
Wash skin: No recommendation
Remove: No recommendation
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 50 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 100 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any supplied-air respirator

Up to 250 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter

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Up to 500 mg/m: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1500 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; cough, dyspnea (breathing difficulty)

Target Organs Eyes, respiratory system

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n-Amyl acetate			CAS 628-63-7	
CH ₃ COO[CH ₂] ₄ CH ₃			RTECS AJ1925000	
			DOT ID & Guide 1104 129	
Exposure	NIOSH REL: TWA 100 ppn	n (525 mg/m ³)		
Limits	OSHA PEL: TWA 100 ppm	(525 mg/m ³)		
IDLH 1000 ppm		Conversion 1 ppm = 5.33 n	ng/m ³	
Physical Description Colorless liquid with a persis	stent banana-like odor.			
MW: 130.2	BP: 301°F	FRZ: -95°F	Sol: 0.2%	
VP: 4 mmHg	IP: ?		Sp.Gr: 0.88	
Fl.P: 77°F	UEL: 7.5%	LEL: 1.1%		
Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.				
Incompatibilities & Reactivities Nitrates; strong oxidizers, alkalis & acids				
Measurement Methods NIOSH 1450, 2549; OSHA 7				

Personal Protection & Sanitation Skin: Prevent skin contact

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Water flush promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 1000 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; dermatitis; possible central nervous system depression, narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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sec-Amyl acetate			CAS 626-38-0	
CH ₃ COOCH(CH ₃)C ₃ H ₇			RTECS AJ2100000	
			DOT ID & Guide 1104 129	
Exposure	NIOSH REL: TWA 125 ppn	n (650 mg/m ³)		
Limits	OSHA PEL: TWA 125 ppm	(650 mg/m ³)		
IDLH 1000 ppm		Conversion 1 ppm = 5.33 m	ng/m ³	
Physical Description Colorless liquid with a mild odor.				
MW: 130.2	BP: 249°F	FRZ: -109°F	Sol: Slight	
VP: 7 mmHg	IP: ?		Sp.Gr: 0.87	
Fl.P: 89°F	UEL: 7.5%	LEL: 1%		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	low 100°F.		
Incompatibilities & Reactive Nitrates; strong oxidizers, all				
Measurement Methods NIOSH 1450, 2549; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 1000 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose; narcosis; dermatitis; possible kidney, liver injury; possible central nervous system depression

Target Organs Eyes, skin, respiratory system, kidneys, liver, central nervous system

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Aniline (and homologs)			CAS 62-53-3	
$C_6H_5NH_2$			RTECS BW6650000	
			DOT ID & Guide 1547 153	
Exposure	NIOSH REL: Ca See Appen	dix A		
Limits	OSHA PEL†: TWA 5 ppm (19 mg/m ³) [skin]		
IDLH Ca [100 ppm]		Conversion 1 ppm = 3.81 m	ng/m ³	
Physical Description Colorless to brown, oily liquid with an aromatic amine-like odor. [Note: A solid below 21°F.]				
MW: 93.1	BP: 363°F	FRZ: 21°F	Sol: 4%	
VP: 0.6 mmHg	IP: 7.70 eV		Sp.Gr: 1.02	
Fl.P: 158°F	UEL: 11%	LEL: 1.3%		
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.		
Incompatibilities & Reactive Strong oxidizers, strong acid	rities s, toluene diisocyanate, alkali	S		
Measurement Methods NIOSH 2002, 2017				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supports Swallow: Medical attention in		

Respirator Recommendations NIOSH

Change: No recommendation

Provide: Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Headache, lassitude (weakness, exhaustion), dizziness; cyanosis; ataxia; dyspnea (breathing difficulty) on effort; tachycardia; irritation eyes; methemoglobinemia; cirrhosis; [potential occupational carcinogen]

Target Organs Blood, cardiovascular system, eyes, liver, kidneys, respiratory system

Cancer Site [bladder cancer]

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o-Anisidine			CAS 90-04-0	
NH ₂ C ₆ H ₄ OCH ₃			RTECS BZ5410000	
			DOT ID & Guide 2431 153	
Exposure	NIOSH REL: Ca 0.5 mg/m ³	[skin] See Appendix A		
Limits	OSHA PEL: TWA 0.5 mg/m	³ [skin]		
IDLH Ca [50 mg/m ³]		Conversion		
Physical Description Red or yellow, oily liquid wi	th an amine-like odor. [Note:	A solid below 41°F.]		
MW: 123.2	BP: 437°F	FRZ: 41°F	Sol(77°F): 1%	
VP: <0.1 mmHg	IP: 7.44 eV		Sp.Gr: 1.10	
Fl.P(oc): 244°F	UEL: ?	LEL: ?		
Class IIIB Combustible Liquid: Fl.P. at or above 200°F.				
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH 2514				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Percent When wet or contaminated

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Headache, dizziness; cyanosis; red blood cell Heinz bodies; [potential occupational carcinogen]

Target Organs Blood, kidneys, liver, cardiovascular system, central nervous system

Cancer Site [in animals: tumors of the thyroid gland, bladder & kidneys]

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p-Anisidine			CAS 104-94-9
NH ₂ C ₆ H ₄ OCH ₃			RTECS BZ5450000
Synonyms & Trade Names para-Aminoanisole, 4-Anisidine, p-Methoxyaniline			DOT ID & Guide 2431 153
Exposure	NIOSH REL: TWA 0.5 mg/s	m ³ [skin]	
Limits	OSHA PEL: TWA 0.5 mg/n	n ³ [skin]	
IDLH 50 mg/m ³		Conversion	
Physical Description Yellow to brown, crystalline	solid with an amine-like odo	r.	
MW: 123.2	BP: 475°F	MLT: 135°F	Sol: Moderate
VP(77°F): 0.006 mmHg	IP: 7.44 eV		Sp.Gr: 1.07
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reactive Strong oxidizers	vities		
Measurement Methods NIOSH 2514			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention	ort
Dagnington Dagaman and di	NIOCIL/OCILA		

Respirator Recommendations NIOSH/OSHA

Up to 5 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any supplied-air respirator

Up to 12.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter

Up to 25 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency

particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode*

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Headache, dizziness; cyanosis; red blood cell Heinz bodies

Target Organs Blood, kidneys, liver, cardiovascular system, central nervous system

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Antimony		CAS 7440-36-0		
Sb			RTECS CC4025000	
Synonyms & Trade Names Antimony metal, Antimony powder, Stibium			DOT ID & Guide 1549 157 (inorganic compounds, n.o.s.) 2871 170 (powder) 3141 157 (inorganic liquid compounds, n.o.s.)	
Exposure	NIOSH REL*: TWA 0.5 mg compounds (as Sb).]	g/m ³ [*Note: The REL also ap	oplies to other antimony	
Limits	OSHA PEL*: TWA 0.5 mg/compounds (as Sb).]	m ³ [*Note: The PEL also app	lies to other antimony	
IDLH 50 mg/m ³ (as Sb)		Conversion		
Physical Description Silver-white, lustrous, hard,	brittle solid; scale-like crysta	ls; or a dark-gray, lustrous po	wder.	
MW: 121.8	BP: 2975°F	MLT: 1166°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 6.69	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid in bu	lk form, but a moderate explo	sion hazard in the form of du	st when exposed to flame.	
Incompatibilities & Reacti Strong oxidizers, acids, halo formed) hydrogen.]	vities genated acids [Note: Stibine i	s formed when antimony is ex	sposed to nascent (freshly	
Measurement Methods NIOSH P&CAM261 (II-4);	OSHA ID121, ID125G, ID20	6		
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort	
Respirator Recommendations NIOSH/OSHA				

Up to 5 mg/m: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators^/(APF = 10) Any supplied-air respirator

Up to 12.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter^

Up to 25 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat, mouth; cough; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly

Target Organs Eyes, skin, respiratory system, cardiovascular system

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ANTU			CAS 86-88-4	
$C_{10}H_7NHC(NH_2)S$			RTECS YT9275000	
Synonyms & Trade Names alpha-Naphthyl thiocarbamide, 1-Naphthyl thiourea, alpha-Naphthyl thiourea			DOT ID & Guide 1651 153	
Exposure	NIOSH REL: TWA 0.3 mg/	$/m^3$		
Limits	OSHA PEL: TWA 0.3 mg/r	m^3		
IDLH 100 mg/m ³		Conversion		
Physical Description White crystalline or gray, odorless powder. [rodenticide]				
MW: 202.3	BP: Decomposes	MLT: 388°F	Sol: 0.06%	
VP: Low	IP: ?		Sp.Gr: ?	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive Strong oxidizers, silver nitrate				
Measurement Methods NIOSH S276 (II-5)				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supposed Swallow: Medical attention		

Respirator Recommendations NIOSH/OSHA

Up to 3 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter/(APF = 10) Any supplied-air respirator

Up to 7.5 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter Up to 15 mg/m^3 : (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas

mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 mg/m^3 : (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion

Symptoms After ingestion of large doses: vomiting, dyspnea (breathing difficulty), cyanosis, coarse pulmonary rales; liver damage

Target Organs respiratory system, blood, liver

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Arsenic (inorganic compounds, as As)			CAS 7440-38-2 (metal)
Ac (metal)			RTECS CG0525000 (metal)
Synonyms & Trade Names Arsenic metal: Arsenia Other synonyms vary dependence on siders "Inorganic Arsenic compounds containing arsenic arsenic compounds containing arsenic containing architecture containing arch	DOT ID & Guide 1558 152 (metal) 1562 152 (dust)		
Exposure	NIOSH REL: Ca C 0.002 m	g/m ³ [15-minute] See Append	dix A
Limits	OSHA PEL: [1910.1018] T	WA 0.010 mg/m ³	
IDLH Ca [5 mg/m ³ (as As)]		Conversion	
Physical Description Metal: Silver-gray or tin-wh	ite, brittle, odorless solid.		
MW: 74.9	BP: Sublimes	MLT: 1135°F (Sublimes)	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 5.73 (metal)
Fl.P: NA	UEL: NA	LEL: NA	
Metal: Noncombustible Solid	d in bulk form, but a slight ex	plosion hazard in the form of	dust when exposed to flame.
Incompatibilities & Reactive Strong oxidizers, bromine az arsine.]		react with inorganic arsenic t	o form the highly toxic gas
Measurement Methods NIOSH 7300, 7900; OSHA I	ID105		
Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or conta Change: Daily Provide: Eyewash, Quick dre	nted/Daily minated	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediatel Breathing: Respiratory supposultow: Medical attention	ort
Respirator Recommendation	ons NIOSH		

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, skin and/or eye contact ingestion

Symptoms Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, [potential occupational carcinogen]

Target Organs Liver, kidneys, skin, lungs, lymphatic system

Cancer Site [lung & lymphatic cancer]

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Arsenic, organic compounds (as As)			CAS		
			RTECS		
Synonyms & Trade Names Synonyms vary depending upon the specific organic arsenic compound.		DOT ID & Guide			
Exposure	NIOSH REL: none				
Limits	OSHA PEL: TWA 0.5 mg/m ³				
IDLH N.D.		Conversion			
Physical Description Appearance and odor vary de	epending upon the specific org	ganic arsenic compound.			
Properties vary depending upon the specific organic arsenic compound.					
Incompatibilities & Reactive Varies	Incompatibilities & Reactivities Varies				
Measurement Methods NIOSH 5022					
Personal Protection & Sanitation Recommendations regarding personal protective clothing vary depending upon the specific compound. Recommendations regarding eye protection vary depending upon the specific compound. Recommendations regarding washing the skin vary depending upon the specific compound. Recommendations regarding the removal of personal protective clothing that becomes wet or contaminated vary depending upon the specific compound. Recommendations regarding the daily changing of personal protective clothing vary depending upon the specific compound. Recommendations regarding the need for eyewash or quick drench facilities vary depending upon the specific		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort		

compound.

Respirator Recommendations To be added later

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation skin, possible dermatitis; respiratory distress; diarrhea; kidney damage; muscle tremor, convulsions; possible gastrointestinal tract, reproductive effects; possible liver damage

Target Organs Skin, respiratory system, kidneys, central nervous system, liver, gastrointestinal tract, reproductive system

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Arsine		CAS 7784-42-1		
AsH ₃			RTECS CG6475000	
Synonyms & Trade Na Arsenic hydride, Arsenic Hydrogen arsenide		hydrogen, Arsenous hydride,	DOT ID & Guide 2188 119	
Exposure	posure NIOSH REL: Ca C 0.002 mg/m ³ [15-minute] See App		Appendix A	
Limits	OSHA PEL: TWA 0.	OSHA PEL: TWA 0.05 ppm (0.2 mg/m ³)		
IDLH Ca [3 ppm]		Conversion 1 ppm = 3	Conversion 1 ppm = 3.19 mg/m^3	
Physical Description Colorless gas with a mild, garlic-like odor. [Note: Shipped as a liquefied compressed gas.]				
MW: 78.0	BP: -81°F	FRZ: -179°F	Sol: 20%	
VP(70°F): 14.9 atm	IP: 9.89 eV	RGasD: 2.69		
Fl.P: NA (Gas)	UEL: 78%	LEL: 5.1%		
Flammable Gas				
,	e, nitric acid [Note: Decon	nposes above 446°F. There is a nascent (freshly formed) hydro	a high potential for the generation ogen.]	
Measurement Methods NIOSH 6001; OSHA ID				
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation		First Aid (See procedu Eye: Frostbite Skin: Frostbite Breathing: Respiratory		

Respirator Recommendations NIOSH

Remove: When wet (flammable) Change: No recommendation

Provide: Frostbite

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Headache, malaise (vague feeling of discomfort), lassitude (weakness, exhaustion), dizziness; dyspnea (breathing difficulty); abdominal, back pain; nausea, vomiting; bronze skin; hematuria (blood in the urine); jaundice; peripheral neuropathy; liquid: frostbite; [potential occupational carcinogen]

Target Organs Blood, kidneys, liver

Cancer Site [lung & lymphatic cancer]

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Asbestos			CAS 1332-21-4	
Hydrated mineral silicates			RTECS CI6475000	
Synonyms & Trade Names Actinolite, Actinolite asbestos, Amosite (cummingtonite-grunerite), Anthophyllite, Anthophyllite asbestos, Chrysotile, Crocidolite (Riebeckite), Tremolite, Tremolite asbestos			DOT ID & Guide 2212 171 (blue, brown) 2590 171 (white)	
Exposure	NIOSH REL: Ca See Apper	ndix A See Appendix C		
Limits	OSHA PEL: [1910.1001] [1	OSHA PEL: [1910.1001] [1910.1101] See Appendix C		
IDLH Ca [N.D.]	•	Conversion		
Physical Description White or greenish (chrysotil	Physical Description White or greenish (chrysotile), blue (crocidolite), or gray-green (amosite) fibrous, odorless solids.			
MW: Varies	BP: Decomposes	MLT: 1112°F (Decomposes)	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: ?	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solids				
Incompatibilities & Reactivities None reported				
Measurement Methods NIOSH 7400, 7402; OSHA ID160, ID191				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air		

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Asbestosis (chronic exposure): dyspnea (breathing difficulty), interstitial fibrosis, restricted pulmonary function, finger clubbing; irritation eyes; [potential occupational carcinogen]

Target Organs respiratory system, eyes

Cancer Site [lung cancer]

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Asphalt fumes		CAS 8052-42-4		
			RTECS C19900000	
Synonyms & Trade Names Asphalt: Asphaltum, Bitumen (European term), Petroleum asphalt, Petroleum bitumen, Road asphalt, Roofing asphalt		DOT ID & Guide 1999 130 (asphalt)		
Exposure	NIOSH REL: Ca C 5 mg/m ³	[15-minute] See Appendix A	1	
Limits	OSHA PEL: none			
IDLH Ca [N.D.]		Conversion		
	Physical Description Fumes generated during the production or application of asphalt (a dark-brown to black cement-like substance manufactured by the vacuum distillation of crude petroleum oil).			
Properties vary depending upon the specific asphalt formulation or mixture.				
Asphalt: Combustible Solid				
Incompatibilities & Reactiv None reported [Note: Asphal	v ities t becomes molten at about 20	0°F.]		
Measurement Methods NIOSH 5042				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Breathing: Respiratory suppo	ort	

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

Respirator Recommendations NIOSH

pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, skin and/or eye contact

Symptoms Irritation eyes, respiratory system; [potential occupational carcinogen]

Target Organs Eyes, respiratory system

Cancer Site [in animals: skin tumors]

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Atrazine			CAS 1912-24-9
C ₈ H ₁₄ ClN ₅			RTECS XY5600000
Synonyms & Trade Names 2-Chloro-4-ethylamino-6-isopropylamino-s-triazine; 6-Chloro-N-ethyl-N'- (1-methylethyl)-1,3,5-triazine-2,4-diamine		DOT ID & Guide 2763 151 (triazine pesticide)	
Exposure	NIOSH REL: TWA 5 mg/m ³		
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description Colorless or white, odorless, crystalline powder. [herbicide]			
MW: 215.7	BP: Decomposes	MLT: 340°F	Sol: 0.003%
VP: 0.0000003 mmHg	IP: NA		Sp.Gr: 1.19
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid, but m	nay be mixed with flammab	ole liquids.	
Incompatibilities & Reactivities Strong acids, strong bases			
Measurement Methods NIOSH 5602			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be added later			
Exposure Routes inhalation	, ingestion, skin and/or eye	contact	
Symptoms Irritation eyes, skexhaustion), incoordination,			fficulty), lassitude (weakness,
Target Organs Eyes, skin, r	espiratory system, central r	nervous system, liver	

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Azinphos-methyl		CAS 86-50-0		
$C_{10}H_{12}O_3PS_2N_3$			RTECS TE1925000	
Synonyms & Trade Names O,O-Dimethyl-S-4-oxo-1,2 Guthion®; Methyl azinphos	,3-benzotriazin-3(4H)-ylmet	hyl phosphorodithioate;	DOT ID & Guide 2783 152	
Exposure	NIOSH REL: TWA 0.2 mg/m ³ [skin]			
Limits	OSHA PEL: TWA 0.2 mg/	OSHA PEL: TWA 0.2 mg/m ³ [skin]		
IDLH 10 mg/m ³	IDLH 10 mg/m ³ Conversion			
Physical Description Colorless crystals or a brown, waxy solid. [insecticide]				
MW: 317.3	BP: Decomposes	MLT: 163°F	Sol: 0.003%	
VP: 8 x 10 ⁻⁹ mmHg	IP: ?		Sp.Gr: 1.44	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reacti Strong oxidizers, acids	vities			
Measurement Methods NIOSH 5600				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendati				
Up to 2 mg/m^3 : (APF = 10)	Any chemical cartridge resp	pirator with organic vapor ca	artridge(s) in combination with a	

Up to 5 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter Up to 10 mg/m^3 : (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)

dust, mist, and fume filter/(APF = 10) Any supplied-air respirator

in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece (APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Miosis; ache eyes; blurred vision, lacrimation (discharge of tears), rhinorrhea (discharge of thin mucus); headache; tightness chest, wheezing, laryngeal spasm; salivation; cyanosis; anorexia; nausea, vomiting, diarrhea; sweating; twitching, paralysis, convulsions; low blood pressure, cardiac irregularities

Target Organs respiratory system, central nervous system, cardiovascular system, blood cholinesterase

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Barium chloride (as Ba)		CAS 10361-37-2		
BaCl ₂			RTECS CQ8750000	
Barium dichloride		DOT ID & Guide 1564 154 (barium compounds, n.o.s.)		
Exposure		NIOSH REL*: TWA 0.5 mg/m ³ [*Note: The REL also applies to other soluble barium compounds (as Ba) except Barium sulfate.]		
Limits		OSHA PEL*: TWA 0.5 mg/m³ [*Note: The PEL also applies to other soluble barium compounds (as Ba) except Barium sulfate.]		
IDLH 50 mg/m ³ (as Ba)		Conversion		
Physical Description White, odorless solid.				
MW: 208.2	BP: 2840°F	MLT: 1765°F	Sol: 38%	
VP: Low	IP: ?		Sp.Gr: 3.86	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Read Acids, oxidizers	tivities			
Measurement Methods NIOSH 7056; OSHA ID12	21			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		Eye: Irrigate immedi Skin: Water flush im Breathing: Respirato	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommenda	tions NIOSH/OSHA			

Up to 5 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any supplied-air respirator

Up to 12.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter

Up to 25 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse, extrasystoles; hypokalemia

Target Organs Eyes, skin, respiratory system, heart, central nervous system

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Barium nitrate (as Ba)			CAS 10022-31-8
Ba(NO ₃) ₂			RTECS CQ9625000
Synonyms & Trade Name Barium dinitrate, Barium(II	s) nitrate (1:2), Barium salt of 1	nitric acid	DOT ID & Guide 1446 141
Exposure	NIOSH REL*: TWA 0.5 mg compounds (as Ba) except E		oplies to other soluble barium
Limits	OSHA PEL*: TWA 0.5 mg/compounds (as Ba) except E	/m ³ [*Note: The PEL also app Barium sulfate.]	olies to other soluble barium
IDLH 50 mg/m ³ (as Ba)		Conversion	
Physical Description White, odorless solid.			
MW: 261.4	BP: Decomposes	MLT: 1094°F	Sol: 9%
VP: Low	IP: ?		Sp.Gr: 3.24
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid, but	will accelerate the burning of	combustible materials.	
Incompatibilities & React Acids, oxidizers, aluminum may cause fire.]	i vities -magnesium alloys, (barium d	ioxide + zinc) [Note: Contact	with combustible material
Measurement Methods NIOSH 7056; OSHA ID12	1		
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supp Swallow: Medical attention	ort

Respirator Recommendations NIOSH/OSHA

Up to 5 mg/m^3 : (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any supplied-air respirator

Up to 12.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter

Up to 25 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse, extrasystoles; hypokalemia

Target Organs Eyes, skin, respiratory system, heart, central nervous system

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Barium sulfate			CAS 7727-43-7	
BaSO ₄		RTECS CR0600000		
Synonyms & Trade Names Artificial barite, Barium salt of sulfuric acid, Barytes (natural)		DOT ID & Guide 1564 154 (barium compounds, n.o.s.)		
Exposure	NIOSH REL: TWA 10 mg/r	m ³ (total) TWA 5 mg/m ³ (resp)	
Limits	OSHA PEL†: TWA 15 mg/r	m ³ (total) TWA 5 mg/m ³ (resp)	
IDLH N.D.		Conversion		
Physical Description White or yellowish, odorles	ss powder.			
MW: 233.4	BP: 2912°F (Decomposes)	MLT: 2876°F	Sol(64°F): 0.0002%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 4.25-4.5	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & React Phosphorus, aluminum [No	ivities te: Aluminum in the presence	of heat can cause an explos	sion.]	
Measurement Methods NIOSH 0500, 0600				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: No recommendation Change: No recommendation Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately			pport	
Respirator Recommendations To be added later				
Exposure Routes inhalatio	n, skin and/or eye contact			
Symptoms Irritation eyes,	nose, upper respiratory system	; benign pneumoconiosis (l	paritosis)	
Target Organs Eyes, respi	ratory system			
See also: INTRODUCTION	V			

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Benomyl			CAS 17804-35-2		
$C_{14}H_{18}N_4O_3$			RTECS DD6475000		
Methyl 1-(butylcarbamoyl)-2-benzimidazolecarbamate		DOT ID & Guide 2757 151 (carbamate pesticide, solid)			
Exposure	NIOSH REL: See Appendix	D			
Limits	OSHA PEL†: TWA 15 mg/r	m ³ (total) TWA 5 mg/m ³ (res	p)		
IDLH N.D.		Conversion			
Physical Description White crystalline solid with a faint, acrid odor. [fungicide] [Note: Decomposes without melting above 572°F.]					
MW: 290.4	BP: Decomposes	MLT: >572°F (Decomposes)	Sol: 0.0004%		
VP: <0.00001 mmHg	IP: NA		Sp.Gr: ?		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid					
Incompatibilities & Reactive Heat, strong acids, strong alk					
Measurement Methods NIOSH 0500, 0600					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort		
Respirator Recommendation	Respirator Recommendations To be added later				
Exposure Routes inhalation	, ingestion, skin and/or eye co	ontact			
Symptoms Irritation eyes, skeffects	in, upper respiratory system;	skin sensitization; possible re	productive, teratogenic		

Target Organs Eyes, skin, respiratory system, reproductive system

See also: <u>INTRODUCTION</u>

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Benzene			CAS 71-43-2	
C_6H_6			RTECS CY1400000	
Synonyms & Trade Names Benzol, Phenyl hydride	S		DOT ID & Guide 1114 130	
Exposure	NIOSH REL: Ca TWA 0.1 I	ppm ST 1 ppm See Appendix	A	
Limits	OSHA PEL: [1910.1028] TV	WA 1 ppm ST 5 ppm See App	pendix F	
IDLH Ca [500 ppm]		Conversion 1 ppm = 3.19 m	ng/m ³	
Physical Description Colorless to light-yellow liquid with an aromatic odor. [Note: A solid below 42°F.]				
MW: 78.1	BP: 176°F	BP: 176°F FRZ: 42°F Sol: 0.07%		
VP: 75 mmHg	IP: 9.24 eV		Sp.Gr: 0.88	
Fl.P: 12°F	UEL: 7.8%	LEL: 1.2%		
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.				
Incompatibilities & Reactivities Strong oxidizers, many fluorides & perchlorates, nitric acid				
Measurement Methods NIOSH 1500, 1501, 3700, 3800; OSHA 12				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort	

Respirator Recommendations NIOSH

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, blood, central nervous system, bone marrow

Cancer Site [leukemia]

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Benzenethiol			CAS 108-98-5	
C ₆ H ₅ SH			RTECS DC0525000	
Synonyms & Trade Names Mercaptobenzene, Phenyl me			DOT ID & Guide 2337 131	
Exposure	NIOSH REL: C 0.1 ppm (0.5	5 mg/m ³) [15-minute]		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 4.51 m	ng/m ³	
Physical Description Water-white liquid with an offensive, garlic-like odor. [Note: A solid below 5°F.]				
MW: 110.2	BP: 336°F	FRZ: 5°F	Sol(77°F): 0.08%	
VP(65°F): 1 mmHg	IP: 8.33 eV		Sp.Gr: 1.08	
Fl.P: 132°F	UEL: ?	LEL: ?		
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.		
Incompatibilities & Reactivities Strong acids & bases, calcium hypochlorite, alkali metals [Note: Oxidizes on exposure to air.]				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo	ort	

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Up to 1 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 2.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 5 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; dermatitis; cyanosis; cough, wheezing, dyspnea (breathing difficulty), pulmonary edema, pneumonitis; headache, dizziness, central nervous system depression; nausea, vomiting; kidney, liver, spleen damage

Target Organs Eyes, skin, respiratory system, central nervous system, kidneys, liver, spleen

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Benzidine			CAS 92-87-5	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$			RTECS DC9625000	
	4'-Bianiline; 4,4'-Bipher	nyldiamine; 1,1'-Biphenyl-4,4' nyl [Note: Benzidine has been		
Exposure	NIOSH REL: Ca S	ee Appendix A See Appendix	C	
Limits	OSHA PEL: [1910.	1010] See Appendix B See A	ppendix C	
IDLH Ca [N.D.]	,,	Conversion		
Physical Description Grayish-yellow, reddish-	gray, or white crystallin	e powder. [Note: Darkens on e	exposure to air and light.]	
MW: 184.3	BP: 752°F	BP: 752°F		
VP: Low	IP: ?		Sp.Gr: 1.25	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Solid, but d	ifficult to burn.			
Incompatibilities & Reactivities Red fuming nitric acid				
Measurement Methods NIOSH 5509; OSHA 65				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See proce Eye: Irrigate immed Skin: Soap wash imm Breathing: Respirate Swallow: Medical a	iately mediately ory support	

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Hematuria (blood in the urine); secondary anemia from hemolysis; acute cystitis; acute liver disorders; dermatitis; painful, irregular urination; [potential occupational carcinogen]

Target Organs Bladder, skin, kidneys, liver, blood

Cancer Site [liver, kidney & bladder cancer]

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Benzoyl peroxide			CAS 94-36-0	
$(C_6H_5CO)_2O_2$			RTECS DM8575000	
Benzoperoxide, Dibenzoyl peroxide		DOT ID & Guide 2085 146 2087 146 2088 146 2089 146 2090 146		
Exposure	NIOSH REL: TWA 5 mg/m	3		
Limits	OSHA PEL: TWA 5 mg/m ³			
IDLH 1500 mg/m ³		Conversion		
Physical Description Colorless to white crystals or a granular powder with a faint, benzaldehyde-like odor.				
MW: 242.2	BP: Decomposes explosively	MLT: 217°F	Sol: <1%	
VP: <1 mmHg	IP: ?		Sp.Gr: 1.33	
Fl.P: 176°F	UEL: ?	LEL: ?		
Combustible Solid (easily ign	nited and burns very rapidly).			
`		alcohols, amines, ethers [Not & friction.]	te: Containers may explode	
Measurement Methods NIOSH 5009				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supports Swallow: Medical attention		
Respirator Recommendation	ons NIOSH/OSHA			

Up to 50 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators*/(APF =

10) Any supplied-air respirator*

Up to 125 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter*

Up to 250 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1500 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; sensitization dermatitis

Target Organs Eyes, skin, respiratory system

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Benzyl chloride		CAS 100-44-7		
C ₆ H ₅ CH ₂ Cl			RTECS XS8925000	
Synonyms & Trade Names Chloromethylbenzene, alpha			DOT ID & Guide 1738 156	
Exposure	NIOSH REL: C 1 ppm (5 mg	g/m ³) [15-minute]		
Limits	OSHA PEL: TWA 1 ppm (5	mg/m^3)		
IDLH 10 ppm		Conversion 1 ppm = 5.18 m	g/m ³	
Physical Description Colorless to slightly yellow liquid with a pungent, aromatic odor.				
MW: 126.6	BP: 354°F	FRZ: -38°F	Sol: 0.05%	
VP: 1 mmHg	IP: ?		Sp.Gr: 1.10	
Fl.P: 153°F	UEL: ? LEL: 1.1%			
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.		
Incompatibilities & Reactivities Oxidizers, acids, copper, aluminum, magnesium, iron, zinc, tin [Note: Can polymerize when in contact with all common metals except nickel & lead. Hydrolyzes in H ₂ O to benzyl alcohol.]				
Measurement Methods NIOSH 1003; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort	

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash, Quick drench

Up to 10 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor and acid gas cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor and acid gas canister/(APF = 25) Any powered, air-purifying respirator with organic vapor and acid gas cartridge(s)*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor and acid gas canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose; lassitude (weakness, exhaustion); irritability; headache; skin eruption; pulmonary edema

Target Organs Eyes, skin, respiratory system, central nervous system

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Beryllium & beryl	lium compounds (a	as Be)	CAS 7440-41-7 (metal)	
Be (metal)			RTECS DS1750000 (metal)	
Synonyms & Trade Names Beryllium metal: Beryllium Other synonyms vary depend	ling upon the specific berylliu	m compound.	DOT ID & Guide 1566 154 (compounds) 1567 134 (powder)	
Exposure	NIOSH REL: Ca Not to exce	eed 0.0005 mg/m ³ See Appen	dix A	
Limits	OSHA PEL: TWA 0.002 mg peak]	$_{\rm c/m^3} { m C~0.005~mg/m^3~0.025~mg}$	g/m ³ [30-minute maximum	
IDLH Ca [4 mg/m ³ (as Be)]		Conversion		
Physical Description Metal: A hard, brittle, gray-white solid.				
MW: 9.0	BP: 4532°F	MLT: 2349°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.85 (metal)	
Fl.P: NA	UEL: NA	LEL: NA		
Metal: Noncombustible Solid in bulk form, but a slight explosion hazard in			a powder or dust.	
Incompatibilities & Reactivities Acids, caustics, chlorinated hydrocarbons, oxidizers, molten lithium				
Measurement Methods NIOSH 7102, 7300; OSHA ID125G, ID206				
Personal Protection & Sanitation		First Aid (See procedures)		
Skin: Prevent skin contact		Eye: Irrigate immediately		
Eyes: Prevent eye contact Wash skin: Daily		Breathing: Fresh air		
Remove: When wet or conta	minated	Dicaming, i resii an		
Change: Daily				

Respirator Recommendations NIOSH

Provide: Eyewash

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation eyes; dermatitis; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system

Cancer Site [lung cancer]

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Bismuth telluride, Bi ₂ Te ₃)	doped with Seleni	um sulfide (as	CAS
			RTECS
Doped tellurobismuthite [No	le, Doped bismuth telluride, I te: Doped with selenium sulfi annous telluride, plus some te	de. Commercial mix may	DOT ID & Guide
Exposure	NIOSH REL: TWA 5 mg/m	3	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description Gray, crystalline solid that hat Doping alters the conductivit		h a small amount of selenium	sulfide (SeS). [Note:
Properties are unavailable but should be similar to Bismuth telluride, undoped.			
			Sp.Gr: ?
Noncombustible Solid			
Incompatibilities & Reactive Strong oxidizers, moisture	vities		
Measurement Methods NIOSH 0500; OSHA ID121			
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendation	ons To be added later		

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; garlic breath; in animals: pulmonary lesions (nonfibrotic)

Target Organs Eyes, skin, respiratory system

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Bismuth telluride, undoped CAS 1304-82-1			
$\overline{\mathrm{Bi}_2\mathrm{Te}_3}$			RTECS EB3110000
Synonyms & Trade Name Bismuth sesquitelluride, Bis	smuth telluride, Bismuth tritel	luride, Tellurobismuthite	DOT ID & Guide
Exposure	NIOSH REL: TWA 10 mg/	m ³ (total) TWA 5 mg/m ³ (res	p)
Limits	OSHA PEL: TWA 15 mg/m	n ³ (total) TWA 5 mg/m ³ (resp)
IDLH N.D.		Conversion	
Physical Description Gray, crystalline solid.			
MW: 800.8	BP: ?	MLT: 1063°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 7.7
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid			
Incompatibilities & React Strong oxidizers (e.g., brom		isture, nitric acid (decomposes	s)
Measurement Methods NIOSH 0500, 0600; OSHA	ID121		
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be added later			
Exposure Routes inhalation, skin and/or eye contact			
Symptoms Irritation eyes, skin, upper respiratory system; garlic breath			
Target Organs Eyes, skin,	respiratory system		
See also: INTRODUCTION	<u></u>		

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Borates, tetra, sodium salts (Anhydrous)			CAS 1330-43-4
$Na_2B_4O_7$			RTECS ED4588000
Synonyms & Trade Names Anhydrous borax, Borax dehydrated, Disodium salt of boric acid, Disodium tetrabromate, Fused borax, Sodium borate (anhydrous), Sodium tetraborate			DOT ID & Guide
Exposure	NIOSH REL: TWA 1 mg/m	3	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description White to gray, odorless pow	der. [herbicide] [Note: Becom	nes opaque on exposure to air.]
MW: 201.2	BP: 2867°F (Decomposes)	MLT: 1366°F	Sol: 4%
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.37
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid			
Incompatibilities & Reacti Moisture [Note: Forms parti			
Measurement Methods NIOSH 0500; OSHA ID125	G		
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: Daily Remove: No recommendation Change: Daily First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendati			
	n, ingestion, skin and/or eye co		1)
Name and a second secon	kin upper respiratory system.	dermatitis; epistaxis (noseble	ed): cough, dyspnea
(breathing difficulty)	kin, upper respiratory system,		

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Borates, tetra, sodium salts (Decahydrate) CAS 1303-96-4				
Na ₂ B ₄ O ₇ • 10H ₂ O			RTECS VZ2275000	
Synonyms & Trade Names Borax, Borax decahydrate, Sodium borate decahydrate, Sodium tetraborate decahydrate			DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 mg/m	3		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description White, odorless, crystalline	solid. [herbicide] [Note: Beco	mes anhydrous at 608°F.]		
MW: 381.4	BP: 608°F	MLT: 167°F	Sol: 6%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.73	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid (an i	nherent fire retardant).			
Incompatibilities & React Zirconium, strong acids, me				
Measurement Methods NIOSH 0500; OSHA ID12:	5G			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: Daily Remove: No recommendation Change: Daily First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately				
Respirator Recommendations To be added later				
	n, ingestion, skin and/or eye co		10	
Symptoms Irritation eyes, skin, upper respiratory system; dermatitis; epistaxis (nosebleed); cough, dyspnea (breathing difficulty)				
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				

(breathing difficulty)

Target Organs Eyes, skin, respiratory system

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Borates, tetra, sod	CAS 12179-04-3				
Na ₂ B ₄ O ₇ • 5H ₂ O			RTECS		
Synonyms & Trade Names Borax pentahydrate, Sodium borate pentahydrate, Sodium tetraborate pentahydrate			DOT ID & Guide		
Exposure	NIOSH REL: TWA 1 mg/n	n ³			
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion			
Physical Description Colorless or white, odorless 252°F.]	crystals or free-flowing power	der. [herbicide] [Note: Begins	to lose water of hydration at		
MW: 291.4	BP: ?	BP: ? MLT: 392°F Sol: 3%			
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.82		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid					
Incompatibilities & Reactive None reported [However, see decahydrate above.]		ibilities reported for the related	d substance Borax		
Measurement Methods NIOSH 0500; OSHA ID1250	G				
Personal Protection & San Skin: No recommendation Eyes: No recommendation Wash skin: Daily Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendation Exposure Routes inhalation		ontact			

Symptoms Irritation eyes, skin, upper respiratory system; dermatitis; epistaxis (nosebleed); cough, dyspnea

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Up to 50 mg/m^3 : (APF = 5) Any dust and mist respirator*

powered, air-purifying respirator with a dust and mist filter^*

= 10) Any supplied-air respirator*

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Boron oxide		CAS 1303-86-2		
B_2O_3		RTECS ED7900000		
Synonyms & Trade Names Boric anhydride, Boric oxide, Boron trioxide		DOT ID & Guide		
Exposure	NIOSH REL: TWA 10 mg/r	m^3		
Limits	OSHA PEL†: TWA 15 mg/r	m^3		
IDLH 2000 mg/m ³		Conversion		
Physical Description Colorless, semitransparent lu	amps or hard, white, odorless	crystals.		
MW: 69.6	BP: 3380°F	BP: 3380°F		
VP: 0 mmHg (approx)	IP: 13.50 eV		Sp.Gr: 2.46	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive Water [Note: Reacts slowly	vities with water to form boric acid	.]		
Measurement Methods NIOSH 0500				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Fresh air Swallow: Medical attention immediately			immediately	
Respirator Recommendation	ons NIOSH	JL		

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Up to 500 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

Up to 100 mg/m^3 : (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators^*/(APF

Up to 250 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any

filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 2000 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; cough; conjunctivitis; skin erythema (skin redness)

Target Organs Eyes, skin, respiratory system

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Boron tribromid	e		CAS 10294-33-4
BBr ₃			RTECS ED7400000
Synonyms & Trade Name Boron bromide, Tribromob			DOT ID & Guide 2692 157
Exposure	NIOSH REL: C 1 ppm (10 mg/m ³)	
Limits	OSHA PEL†: none		
IDLH N.D.	''-	Conversion 1 ppm	$= 10.25 \text{ mg/m}^3$
Physical Description Colorless, fuming liquid w	ith a sharp, irritating odor.		
MW: 250.5	BP: 194°F	FRZ: -51°F	Sol: Decomposes
VP(57°F): 40 mmHg	IP: 9.70 eV		Sp.Gr(65°F): 2.64
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Liquid			
Incompatibilities & React Moisture, water, heat, potat form boric acid and hydrog	ssium, sodium, alcohols [N	ote: Attacks metals, wood	d & rubber. Reacts with water to
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendat		II.	
	on, ingestion, skin and/or ey	re contact	
_			preathing difficulty), pulmonary

Target Organs Eyes, skin, respiratory system

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Boron trifluoride CA			CAS 7637-07-2	
BF ₃			RTECS ED2275000	
Synonyms & Trade Names Boron fluoride, Trifluorobora			DOT ID & Guide 1008 125	
Exposure	NIOSH REL: C 1 ppm (3 m	g/m ³)		
Limits	OSHA PEL: C 1 ppm (3 mg	$/m^3$)		
IDLH 25 ppm		Conversion 1 ppm = 2.77 m	ng/m ³	
Colorless gas with a pungent nonliquefied compressed gas	Physical Description Colorless gas with a pungent, suffocating odor. [Note: Forms dense white fumes in moist air. Shipped as a nonliquefied compressed gas.]			
MW: 67.8	BP: -148°F	FRZ: -196°F	Sol: 106% (in cold H ₂ O)	
VP: >50 atm	IP: 15.50 eV	RGasD: 2.38		
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Gas				
Incompatibilities & Reactivities Alkali metals, calcium oxide [Note: Hydrolyzes in moist air or hot water to form boric acid, hydrogen fluoride & fluoboric acid.]				
Measurement Methods None available				
Personal Protection & Sanitation Skin: No recommendation First Aid (See procedures) Eye: Irrigate immediately				

Respirator Recommendations NIOSH/OSHA

Eyes: No recommendation Wash skin: No recommendation

Remove: No recommendation Change: No recommendation

Up to 10 ppm: (APF = 10) Any supplied-air respirator*

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

Skin: Water flush immediately

Breathing: Respiratory support

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, respiratory system; epistaxis (nosebleed); eye, skin burns; in animals: pneumonitis; kidney damage

Target Organs Eyes, skin, respiratory system, kidneys

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Bromacil		CAS 314-40-9		
$C_9H_{13}BrN_2O_2$		RTECS YQ9100000		
Synonyms & Trade Names 5-Bromo-3-sec-butyl-6-met	hyluracil, 5-Bromo-6-methyl-	-3-(1-methylpropyl)uracil	DOT ID & Guide	
Exposure	NIOSH REL: TWA 1 ppm (10 mg/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 10.68	mg/m ³	
Physical Description Odorless, colorless to white, liquid formulations.]	crystalline solid. [herbicide]	[Note: Commercially availabl	e as a wettable powder or in	
MW: 261.2	BP: Sublimes	MLT: 317°F (Sublimes)	Sol(77°F): 0.08%	
VP(212°F): 0.0008 mmHg	IP: ?		Sp.Gr: 1.55	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid, but n	nay be dissolved in flammable	e liquids.		
Incompatibilities & Reactive Strong acids (decomposes sle	vities owly), oxidizers, heat, sparks,	open flames		
Measurement Methods NIOSH 0500				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort	
Respirator Recommendations To be added later				
Exposure Routes inhalation	, ingestion, skin and/or eye co	ontact		
Symptoms Irritation eyes, sl	kin, upper respiratory system;	in animals: thyroid injury		
Target Organs Eyes, skin, r	respiratory system, thyroid			
See also: INTRODUCTION				

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Bromine			CAS 7726-95-6	
Br ₂			RTECS EF9100000	
Synonyms & Trade Names Molecular bromine			DOT ID & Guide 1744 154	
Exposure	NIOSH REL: TWA 0.1 ppm	(0.7 mg/m ³) ST 0.3 ppm (2	mg/m ³)	
Limits	OSHA PEL†: TWA 0.1 ppm	(0.7 mg/m ³)		
IDLH 3 ppm		Conversion 1 ppm = 6.54 m	ng/m ³	
Physical Description Dark reddish-brown, fuming liquid with suffocating, irritating fumes.				
MW: 159.8	BP: 139°F	FRZ: 19°F	Sol: 4%	
VP: 172 mmHg	IP: 10.55 eV		Sp.Gr: 3.12	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid, but accelerates the burning of combustibles.				
Incompatibilities & Reactivities Combustible organics (sawdust, wood, cotton, straw, etc.), aluminum, readily oxidizable materials, ammonia, hydrogen, acetylene, phosphorus, potassium, sodium [Note: Corrodes iron, steel, stainless steel & copper.]				
Measurement Methods NIOSH 6011; OSHA ID108				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 2.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern $^{\&\pounds}$ Up to 3 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern $^{\&L}$ /(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern $^{\&L}$ /(APF =

50) Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against the compound of concern i,f /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concernⁱ/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Dizziness, headache; lacrimation (discharge of tears), epistaxis (nosebleed); cough, feeling of oppression, pulmonary edema, pneumonitis; abdominal pain, diarrhea; measle-like eruptions; eye, skin burns

Target Organs respiratory system, eyes, central nervous system, skin

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RTECS EF9350000 Synonyms & Trade Names DOT ID & Guide 1745 144 Exposure Limits OSHA PEL†: none Conversion 1 ppm = 7.15 mg/m³	Bromine pentafluoride			CAS 7789-30-2
Bromine fluoride NIOSH REL: TWA 0.1 ppm (0.7 mg/m³)	BrF ₅			RTECS EF9350000
Conversion 1 ppm = 7.15 mg/m³				11
Physical Description Colorless to pale-yellow, fuming liquid with a pungent odor. [Note: A colorless gas above 105°F. Shipped as compressed gas.] MW: 174.9 BP: 105°F FRZ: -77°F Sol: Reacts violently VP: 328 mmHg IP: ? Sp.Gr: 2.48 Fl.P: NA UEL: NA Noncombustible Liquid, but a very powerful oxidizer. Incompatibilities & Reactivities Acids, halogens, arsenic, selenium, sulfur, glass, organic materials, water [Note: Reacts with all elements exceinert gases, nitrogen & oxygen.] Measurement Methods None available Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later	Exposure	osure NIOSH REL: TWA 0.1 ppm (0.7 mg/m³)		
Physical Description Colorless to pale-yellow, fuming liquid with a pungent odor. [Note: A colorless gas above 105°F. Shipped as compressed gas.] MW: 174.9 BP: 105°F FRZ: -77°F Sol: Reacts violently VP: 328 mmHg IP: ? Sp.Gr: 2.48 Fl.P: NA VUEL: NA Noncombustible Liquid, but a very powerful oxidizer. Incompatibilities & Reactivities Acids, halogens, arsenic, selenium, sulfur, glass, organic materials, water [Note: Reacts with all elements exceinert gases, nitrogen & oxygen.] Measurement Methods None available Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Skin: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later	Limits	OSHA PEL†: none		
Colorless to pale-yellow, fuming liquid with a pungent odor. [Note: A colorless gas above 105°F. Shipped as compressed gas.] MW: 174.9 BP: 105°F FRZ: -77°F Sol: Reacts violently VP: 328 mmHg IP: ? Sp.Gr: 2.48 Fl.P: NA UEL: NA LEL: NA Noncombustible Liquid, but a very powerful oxidizer. Incompatibilities & Reactivities Acids, halogens, arsenic, selenium, sulfur, glass, organic materials, water [Note: Reacts with all elements exceinert gases, nitrogen & oxygen.] Measurement Methods None available Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later	IDLH N.D.		Conversion 1 ppm = 7.15 m	ng/m ³
VP: 328 mmHg	Colorless to pale-yellow, fur	ning liquid with a pungent oc	lor. [Note: A colorless gas abo	ove 105°F. Shipped as a
FI.P: NA UEL: NA LEL: NA	MW: 174.9	BP: 105°F	FRZ: -77°F	Sol: Reacts violently
Noncombustible Liquid, but a very powerful oxidizer. Incompatibilities & Reactivities Acids, halogens, arsenic, selenium, sulfur, glass, organic materials, water [Note: Reacts with all elements exceinert gases, nitrogen & oxygen.] Measurement Methods None available Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later	VP: 328 mmHg	IP: ?		Sp.Gr: 2.48
Incompatibilities & Reactivities Acids, halogens, arsenic, selenium, sulfur, glass, organic materials, water [Note: Reacts with all elements exceinert gases, nitrogen & oxygen.] Measurement Methods None available Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later	Fl.P: NA	UEL: NA	LEL: NA	
Acids, halogens, arsenic, selenium, sulfur, glass, organic materials, water [Note: Reacts with all elements exceinert gases, nitrogen & oxygen.] Measurement Methods None available Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later	Noncombustible Liquid, but	a very powerful oxidizer.		
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately Respirator Recommendations To be added later	Acids, halogens, arsenic, sele	enium, sulfur, glass, organic r	materials, water [Note: Reacts	with all elements except
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately Respirator Recommendations To be added later				
•	Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately			
Exposure Routes inhalation, ingestion, skin and/or eye contact	Respirator Recommendation	ons To be added later		
	Exposure Routes inhalation	, ingestion, skin and/or eye co	ontact	
Symptoms Irritation eyes, skin, respiratory system; corneal necrosis; skin burns; cough, dyspnea (breathing				, dyspnea (breathing

difficulty), pulmonary edema; liver, kidney injury

Target Organs Eyes, skin, respiratory system, liver, kidneys

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Bromoform			CAS 75-25-2	
CHBr ₃			RTECS PB5600000	
			DOT ID & Guide 2515 159	
Exposure	NIOSH REL: TWA	0.5 ppm (5 mg/m ³) [skin]		
Limits	OSHA PEL: TWA 0.	.5 ppm (5 mg/m ³) [skin]		
IDLH 850 ppm	IDLH 850 ppm $\mathbf{Conversion} \ 1 \text{ ppm} = 10.34 \text{ mg/m}^3$			
Physical Description Colorless to yellow liquid with a chloroform-like odor. [Note: A solid below 47°F.]				
MW: 252.8	BP: 301°F	FRZ: 47°F	Sol: 0.1%	
VP: 5 mmHg	IP: 10.48 eV		Sp.Gr: 2.89	
FI.P: NA UEL: NA LEL: NA				
Noncombustible Liquid				
Incompatibilities & Reactivities Lithium, sodium, potassium, calcium, aluminum, zinc, magnesium, strong caustics, acetone [Note: Gradually decomposes, acquiring yellow color; air & light accelerate decomposition.]				
Measurement Methods				

Measurement Methods

NIOSH 1003; OSHA 7

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

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organic vapor cartridge(s) /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 850 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; central nervous system depression; liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

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1,3-Butadiene CAS 106-99-0					
CH ₂ =CHCH=CH ₂			RTECS EI9275000		
•	Synonyms & Trade Names Biethylene, Bivinyl, Butadiene, Divinyl, Erythrene, Vinylethylene				
Exposure	NIOSH REL: Ca See	Appendix A			
Limits	OSHA PEL: [1910.10	051] TWA 1 ppm ST 5 ppm			
IDLH Ca [2000 ppm] [10	%LEL]	Conversion 1 ppm =	2.21 mg/m ³		
compressed gas.]		e odor. [Note: A liquid below			
MW: 54.1	BP: 24°F	FRZ: -164°F	Sol: Insoluble		
VP: 2.4 atm	4 atm IP: 9.07 eV RGasD: 1.88 Sp.Gr: 0.65 (Liquid at 24°F)				
Fl.P: NA (Gas) -105°F					
Flammable Gas Class IA Flammable Liquid					
Incompatibilities & Reactivities Phenol, chlorine dioxide, copper, crotonaldehyde [Note: May contain inhibitors (such as tributylcatechol) to prevent self-polymerization. May form explosive peroxides upon exposure to air.]					
Measurement Methods NIOSH 1024; OSHA 56					

Personal Protection & Sanitation

Skin: Frostbite
Eyes: Frostbite
Wash skin: No recommendation
Remove: When wet (flammable)

Change: No recommendation Provide: Frostbite

First Aid (See procedures)

Eye: Frostbite Skin: Frostbite

Breathing: Respiratory support

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Irritation eyes, nose, throat; drowsiness, dizziness; liquid: frostbite; teratogenic, reproductive effects; [potential occupational carcinogen]

Target Organs Eyes, respiratory system, central nervous system, reproductive system

Cancer Site [hematopoietic cancer]

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n-Butane			CAS 106-97-8	
CH ₃ CH ₂ CH ₂ CH ₃			RTECS EJ4200000	
normal-Butane, Butyl hydride, Diethyl, Methylethylmethane [Note: Also see specific			DOT ID & Guide 1011 115 1075 115	
Exposure	NIOSH REL: TWA 800 ppn	NIOSH REL: TWA 800 ppm (1900 mg/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 2.38 m	ng/m ³	
Physical Description Colorless gas with a gasolin below 31°F.]	e-like or natural gas odor. [No	ote: Shipped as a liquefied con	mpressed gas. A liquid	
MW: 58.1	BP: 31°F	FRZ: -217°F	Sol: Slight	
VP: 2.05 atm	IP: 10.63 eV	RGasD: 2.11	Sp.Gr: 0.6 (Liquid at 31°F)	
Fl.P: NA (Gas)	UEL: 8.4%	LEL: 1.6%		
Flammable Gas Class IA Fla	mmable Liquid			
Incompatibilities & Reacti Strong oxidizers (e.g., nitrate	vities es & perchlorates), chlorine, f	luorine, (nickel carbonyl + ox	ygen)	
Measurement Methods OSHA 56				
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation Provide: Frostbite First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory support			ort	
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact (liquid)				
Symptoms Drowsiness, narcosis, asphyxia; liquid: frostbite				
Symptoms Drowsiness, nare	cosis, asphyxia; liquid: frostbi	te		

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2-Butanone			CAS 78-93-3	
CH ₃ COCH ₂ CH ₃			RTECS EL6475000	
Synonyms & Trade Names Ethyl methyl ketone, MEK, M	DOT ID & Guide 1193 127 1232 127			
Exposure	NIOSH REL: TWA 200 ppn	n (590 mg/m ³) ST 300 ppm (8	885 mg/m ³)	
Limits	OSHA PEL†: TWA 200 ppm	n (590 mg/m ³)		
IDLH 3000 ppm		Conversion 1 ppm = 2.95 m	ng/m ³	
Physical Description Colorless liquid with a moderately sharp, fragrant, mint- or acetone-like odor.				
	rately sharp, fragrant, mint- c	r acetone-like odor.		
	rately sharp, fragrant, mint- o	r acetone-like odor. FRZ: -123°F	Sol: 28%	
Colorless liquid with a mode			Sol: 28% Sp.Gr: 0.81	
Colorless liquid with a mode MW: 72.1	BP: 175°F			
Colorless liquid with a mode MW: 72.1 VP: 78 mmHg	BP: 175°F IP: 9.54 eV UEL(200°F): 11.4%	FRZ: -123°F LEL(200°F): 1.4%		
Colorless liquid with a mode MW: 72.1 VP: 78 mmHg Fl.P: 16°F	BP: 175°F IP: 9.54 eV UEL(200°F): 11.4% Fl.P. below 73°F and BP at corities	FRZ: -123°F LEL(200°F): 1.4% r above 100°F.		

|NIOSH 2500, 3800; OSHA 16, 84

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

Provide: Eyewash

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water wash immediately

Breathing: Fresh air

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 3000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{£}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{£}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose; headache; dizziness; vomiting; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system

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C4H9OCH2CH2OH RTECS KJ8575000	2-Butoxyethanol	CAS 111-76-2			
Butyl Cellosolve®, Butyl oxitol, Dowanol® EB, EGBE, Ektasolve EB®, Ethylene glycol monobutyl ether, Jeffersol EB NIOSH REL: TWA 5 ppm (24 mg/m³) [skin]	C ₄ H ₉ OCH ₂ CH ₂ OH	RTECS KJ8575000			
Limits OSHA PEL†: TWA 50 ppm (240 mg/m³) [skin] DLH 700 ppm Conversion 1 ppm = 4.83 mg/m³ Physical Description Colorless liquid with a mild, ether-like odor. MW: 118.2 BP: 339°F FRZ: -107°F Sol: Miscible VP: 0.8 mmHg IP: 10.00 eV FI.P: 143°F UEL(275°F): 12.7% LEL(200°F): 1.1% Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F. Incompatibilities & Reactivities Strong oxidizers, strong caustics Measurement Methods	Butyl Cellosolve®, Butyl ox	II .			
IDLH 700 ppm Conversion 1 ppm = 4.83 mg/m³ Physical Description	Exposure	NIOSH REL: TWA 5 ppm	(24 mg/m ³) [skin]		
Physical Description Colorless liquid with a mild, ether-like odor. MW: 118.2 BP: 339°F FRZ: -107°F Sol: Miscible VP: 0.8 mmHg IP: 10.00 eV Fl.P: 143°F UEL(275°F): 12.7% LEL(200°F): 1.1% Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F. Incompatibilities & Reactivities Strong oxidizers, strong caustics Measurement Methods	Limits	OSHA PEL†: TWA 50 ppr	m (240 mg/m ³) [skin]		
Colorless liquid with a mild, ether-like odor. MW: 118.2 BP: 339°F FRZ: -107°F Sol: Miscible VP: 0.8 mmHg IP: 10.00 eV Fl.P: 143°F UEL(275°F): 12.7% LEL(200°F): 1.1% Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F. Incompatibilities & Reactivities Strong oxidizers, strong caustics Measurement Methods	IDLH 700 ppm	IDLH 700 ppm Conversion 1 ppm = 4.83 mg/m^3			
VP: 0.8 mmHg		ether-like odor.			
Fl.P: 143°F UEL(275°F): 12.7% LEL(200°F): 1.1% Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F. Incompatibilities & Reactivities Strong oxidizers, strong caustics Measurement Methods	MW: 118.2	BP: 339°F	FRZ: -107°F	Sol: Miscible	
Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F. Incompatibilities & Reactivities Strong oxidizers, strong caustics Measurement Methods	VP: 0.8 mmHg	IP: 10.00 eV		Sp.Gr: 0.90	
Incompatibilities & Reactivities Strong oxidizers, strong caustics Measurement Methods	Fl.P: 143°F	UEL(275°F): 12.7%	LEL(200°F): 1.1%		
Strong oxidizers, strong caustics Measurement Methods	Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F	and below 200°F.		
110011 1103, 00111 03	Measurement Methods NIOSH 1403; OSHA 83				

Personal Protection & Sanitation

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated

Remove: When wet or contaminated

Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately

Skin: Soap wash promptly

Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Provide: Quick drench

Up to 50 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 125 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*

Up to 250 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 700 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; hemolysis, hematuria (blood in the urine); central nervous system depression, headache; vomiting

Target Organs Eyes, skin, respiratory system, central nervous system, hematopoietic system, blood, kidneys, liver, lymphoid system

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2-Butoxyethanol acetate			CAS 112-07-2	
C ₄ H ₉ O(CH ₂) ₂ OCOCH ₃			RTECS KJ8925000	
Synonyms & Trade Names 2-Butoxyethyl acetate, Butyl Cellosolve® acetate, Butyl glycol acetate, EGBEA, Ektasolve EB® acetate, Ethylene glycol monobutyl ether acetate			DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 ppm ((33 mg/m^3)		
Limits	OSHA PEL: none			
IDLH N.D.		Conversion 1 ppm = 6.55 m	mg/m ³	
Physical Description Colorless liquid with a pleasant, sweet, fruity odor.				
MW: 160.2	BP: 378°F	FRZ: -82°F	Sol: 1.5%	
VP: 0.3 mmHg	IP: ?		Sp.Gr: 0.94	
Fl.P: 71°F	UEL(275°F): 8.54%	LEL(200°F): 0.88%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at	or above 100°F.		
Incompatibilities & Reacti Oxidizers	vities			
Measurement Methods OSHA 83				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supp	ort	

Respirator Recommendations NIOSH

Remove: When wet (flammable)

Change: No recommendation

Up to 50 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Swallow: Medical attention immediately

Up to 125 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*

Up to 250 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 700 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; hemolysis, hematuria (blood in the urine); central nervous system depression, headache; vomiting

Target Organs Eyes, skin, respiratory system, central nervous system, hematopoietic system, blood, kidneys, liver, lymphoid system

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n-Butyl acetate			CAS 123-86-4
CH ₃ COO[CH ₂] ₃ CH ₃			RTECS AF7350000
Synonyms & Trade Names Butyl acetate, n-Butyl ester of	of acetic acid, Butyl ethanoate)	DOT ID & Guide 1123 129
Exposure	NIOSH REL: TWA 150 ppn	n (710 mg/m ³) ST 200 ppm (9	950 mg/m ³)
Limits	OSHA PEL†: TWA 150 ppr	m (710 mg/m ³)	
IDLH 1700 ppm [10%LEL]		Conversion 1 ppm = 4.75 m	ng/m ³
Physical Description Colorless liquid with a fruity	odor.		
MW: 116.2	BP: 258°F	FRZ: -107°F	Sol: 1%
VP: 10 mmHg	IP: 10.00 eV		Sp.Gr: 0.88
Fl.P: 72°F	UEL: 7.6%	LEL: 1.7%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.	
Incompatibilities & Reactive Nitrates; strong oxidizers, all			
Measurement Methods NIOSH 1450; OSHA 7			
Personal Protection & Sanitation First Aid (See procedures)			
Skin: Prevent skin contact		Eye: Irrigate immediately	
Eyes: Prevent eye contact	. 1	Skin: Water flush promptly	
Wash skin: When contaminated		Breathing: Respiratory support Swallow: Medical attention immediately	
Remove: When wet (flamma Change: No recommendation		Swanow: Medical attention i	immediately
Change. No recommendation	ı		

Respirator Recommendations NIOSH/OSHA

Up to 1500 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 1700 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; headache, drowsiness, narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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sec-Butyl acetate	CAS 105-46-4			
CH ₃ COOCH(CH ₃)CH ₂ CH	[3		RTECS AF7380000	
Synonyms & Trade Names sec-Butyl ester of acetic acid			DOT ID & Guide 1123 129	
Exposure	NIOSH REL: TWA 200 ppn	n (950 mg/m ³)		
Limits	OSHA PEL: TWA 200 ppm	(950 mg/m ³)		
IDLH 1700 ppm [10%LEL]		Conversion 1 ppm = 4.75 m	g/m ³	
Physical Description Colorless liquid with a please	ant, fruity odor.			
MW: 116.2	BP: 234°F	FRZ: -100°F	Sol: 0.8%	
VP: 10 mmHg	IP: 9.91 eV		Sp.Gr: 0.86	
Fl.P: 62°F	UEL: 9.8% LEL: 1.7%			
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.		
Incompatibilities & Reactive Nitrates; strong oxidizers, alk				
Measurement Methods NIOSH 1450; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory supports Swallow: Medical attention i		

Respirator Recommendations NIOSH/OSHA

Up to 1700 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes; headache; drowsiness; dryness upper respiratory system, skin; narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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[Q1 Q 710 00 7				
tert-Butyl acetate	CAS 540-88-5			
CH ₃ COOC(CH ₃) ₃			RTECS AF7400000	
Synonyms & Trade Names tert-Butyl ester of acetic acid			DOT ID & Guide 1123 129	
Exposure	NIOSH REL: TWA 200 ppn	n (950 mg/m ³)		
Limits	OSHA PEL: TWA 200 ppm	(950 mg/m ³)		
IDLH 1500 ppm [10%LEL]		Conversion 1 ppm = 4.75 m	g/m ³	
Physical Description Colorless liquid with a fruity	odor.			
MW: 116.2	BP: 208°F	FRZ: ?	Sol: Insoluble	
VP: ?	IP: ?		Sp.Gr: 0.87	
Fl.P: 72°F	UEL: ?	LEL: 1.5%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.		
Incompatibilities & Reactive Nitrates; strong oxidizers, all				
Measurement Methods NIOSH 1450; OSHA 7				
Personal Protection & San	Personal Protection & Sanitation First Aid (See procedures)			
Skin: Prevent skin contact		Eye: Irrigate immediately		
Eyes: Prevent eye contact		Skin: Water flush promptly		
Wash skin: When contamina		Breathing: Respiratory support		
Remove: When wet (flamma		Swallow: Medical attention immediately		
Change: No recommendation	1			

Respirator Recommendations NIOSH/OSHA

Up to 1500 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode *\(\frac{\pmu}{APF} = 25\) Any powered, air-purifying respirator with organic vapor cartridge(s)*\(\frac{\pmu}{APF} = 50\) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions. (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Itch, inflammation eyes; irritation upper respiratory tract; headache; narcosis; dermatitis

Target Organs respiratory system, eyes, skin, central nervous system

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Butyl acrylate			CAS 141-32-2
CH ₂ =CHCOOC ₄ H ₉			RTECS UD3150000
Synonyms & Trade Names n-Butyl acrylate, Butyl ester	of acrylic acid, Butyl 2-prope	enoate	DOT ID & Guide 2348 129P
Exposure	NIOSH REL: TWA 10 ppm	(55 mg/m ³)	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 5.24 m	ng/m ³
Physical Description Clear, colorless liquid with a spontaneous polymerization.		ighly reactive; may contain ar	n inhibitor to prevent
MW: 128.2	BP: 293°F	FRZ: -83°F	Sol: 0.1%
VP: 4 mmHg	IP: ?		Sp.Gr: 0.89
Fl.P: 103°F	UEL: 9.9%	LEL: 1.5%	
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.	-
Incompatibilities & Reactive Strong acids & alkalis, amine readily on heating.]		ounds, oxidizers, heat, flame, s	sunlight [Note: Polymerizes
Measurement Methods OSHA PV2011			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation,	, skin absorption, ingestion, s	kin and/or eye contact	
Symptoms Irritation eyes, sk	in, upper respiratory system;	sensitization dermatitis; dysp	nea (breathing difficulty)
Target Organs Eyes, skin, re	espiratory system		

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NIOSH Pocket Guide to Chemical Hazards

n-Butyl alcohol	CAS 71-36-3			
CH ₃ CH ₂ CH ₂ CH ₂ OH	CH ₃ CH ₂ CH ₂ OH			
Synonyms & Trade Names 1-Butanol, n-Butanol, Butyl	alcohol, 1-Hydroxybutane, n-	Propyl carbinol	DOT ID & Guide 1120 129	
Exposure	NIOSH REL: C 50 ppm (150	O mg/m ³) [skin]		
Limits	OSHA PEL†: TWA 100 ppn	n (300 mg/m ³)		
IDLH 1400 ppm [10%LEL]		Conversion 1 ppm = 3.03 m	g/m ³	
Physical Description Colorless liquid with a stron	g, characteristic, mildly alcoh	olic odor.		
MW: 74.1	BP: 243°F	FRZ: -129°F	Sol: 9%	
VP: 6 mmHg	IP: 10.04 eV		Sp.Gr: 0.81	
Fl.P: 84°F	UEL: 11.2%	LEL: 1.4%		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	elow 100°F.		
Incompatibilities & Reactive Strong oxidizers, strong mine	vities eral acids, alkali metals, halog	gens		
Measurement Methods NIOSH 1450; OSHA 7				
Personal Protection & San	itation	First Aid (See procedures)		
Skin: Prevent skin contact		Eye: Irrigate immediately		
Eyes: Prevent eye contact	. 1	Skin: Water flush promptly		
Wash skin: When contamina		Breathing: Respiratory support		
Remove: When wet (flamma Change: No recommendation		Swallow: Medical attention i	innediately	

Respirator Recommendations NIOSH

Up to 1250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}/(APF = 25)$ Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$

Up to 1400 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50)

Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; headache, dizziness, drowsiness; corneal inflammation, blurred vision, lacrimation (discharge of tears), photophobia (abnormal visual intolerance to light); dermatitis; possible auditory nerve damage, hearing loss; central nervous system depression

Target Organs Eyes, skin, respiratory system, central nervous system

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sec-Butyl alcohol	CAS 78-92-2		
CH ₃ CH(OH)CH ₂ CH ₃			RTECS E01750000
Synonyms & Trade Names 2-Butanol, Butylene hydrate,	2-Hydroxybutane, Methyl et	hyl carbinol	DOT ID & Guide 1120 129
Exposure	NIOSH REL: TWA 100 ppn	n (305 mg/m ³) ST 150 ppm (4	455 mg/m ³)
Limits	OSHA PEL†: TWA 150 ppr	m (450 mg/m ³)	
IDLH 2000 ppm		Conversion 1 ppm = 3.03 m	ng/m ³
Physical Description Colorless liquid with a strong	g, pleasant odor.		
MW: 74.1	BP: 211°F	FRZ: -175°F	Sol: 16%
VP: 12 mmHg	IP: 10.10 eV		Sp.Gr: 0.81
Fl.P: 75°F	UEL(212°F): 9.8%	LEL(212°F): 1.7%	
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	elow 100°F.	
Incompatibilities & Reactive Strong oxidizers, organic per	vities oxides, perchloric & permono	osulfuric acids	
Measurement Methods NIOSH 1450; OSHA 7			
Personal Protection & Sanitation First Aid (See procedures)			
Skin: Prevent skin contact		Eye: Irrigate immediately	
Eyes: Prevent eye contact	. 1	Skin: Water flush promptly	
Wash skin: When contamina		Breathing: Respiratory support	
Remove: When wet (flamma Change: No recommendation		Swallow: Medical attention i	mmediatery
Change. No recommendation	ı		

Respirator Recommendations NIOSH

Up to 1000 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 2000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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tert-Butyl alcohol CAS 75-65-0				
(СН ₃) ₃ СОН	RTECS EO1925000			
Synonyms & Trade Names 2-Methyl-2-propanol, Trimethyl carbinol DOT ID & Guide 1120 129				
Exposure	NIOSH REL: TWA 100 ppn	n (300 mg/m ³) ST 150 ppm (4	450 mg/m ³)	
Limits	OSHA PEL†: TWA 100 ppn	n (300 mg/m ³)		
IDLH 1600 ppm		Conversion 1 ppm = 3.03 m	ng/m ³	
Physical Description Colorless solid or liquid (abo	Physical Description Colorless solid or liquid (above 77°F) with a camphor-like odor. [Note: Often used in aqueous solutions.]			
MW: 74.1	BP: 180°F	FRZ: 78°F	Sol: Miscible	
VP(77°F): 42 mmHg	IP: 9.70 eV		Sp.Gr: 0.79 (Solid)	
Fl.P: 52°F	UEL: 8.0%	LEL: 2.4%		
Combustible Solid Class IB I	Flammable Liquid			
Incompatibilities & Reactive Strong mineral acids, strong				
Measurement Methods NIOSH 1450; OSHA 7				
Personal Protection & Sani Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet (flamma	ted	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 1600 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; drowsiness, narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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n-Butylamine			CAS 109-73-9	
CH ₃ CH ₂ CH ₂ CH ₂ NH ₂			RTECS EO2975000	
Synonyms & Trade Names 1-Aminobutane, Butylamine			DOT ID & Guide 1125 132	
Exposure	NIOSH REL: C 5 ppm (15 n	ng/m ³) [skin]		
Limits	OSHA PEL: C 5 ppm (15 mg	g/m ³) [skin]		
IDLH 300 ppm		Conversion 1 ppm = 2.99 m	g/m ³	
Physical Description Colorless liquid with a fishy, ammonia-like odor.				
MW: 73.2	BP: 172°F	FRZ: -58°F	Sol: Miscible	
VP: 82 mmHg	IP: 8.71 eV		Sp.Gr: 0.74	
Fl.P: 10°F	UEL: 9.8%	LEL: 1.7%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.		
Incompatibilities & Reactive Strong oxidizers, strong acids	rities s [Note: May corrode some m	etals in presence of water.]		
Measurement Methods NIOSH 2012				
Personal Protection & Sanitation Skin: Prevent skin contact		First Aid (See procedures) Eye: Irrigate immediately		
Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		

Respirator Recommendations NIOSH/OSHA

Change: No recommendation Provide: Eyewash, Quick drench

Up to 50 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern*/(APF = 10) Any supplied-air respirator*

Up to 125 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern* Up to 250 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 50)

Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against the compound of concern*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 300 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; headache; skin flush, burns

Target Organs Eyes, skin, respiratory system

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tert-Butyl chromate			
[(CH ₃) ₃ CO] ₂ CrO ₂			
Synonyms & Trade Names di-tert-Butyl ester of chromic acid DOT ID & Guide			
NIOSH REL: Ca TWA 0.00	1 mg Cr(VI)/m ³ See Appendi	x A See Appendix C	
OSHA PEL: C 0.1 mg CrO ₃ .	/m ³ [skin] <u>See Appendix C</u>		
VI)}]	Conversion		
Physical Description Liquid. [Note: Solidifies at 32-23°F.]			
BP: ?	FRZ: 32-23°F	Sol: ?	
IP: ?		Sp.Gr: ?	
UEL: ?			
Incompatibilities & Reactivities Reducing agents, moisture, acids, alcohols, hydrazine, combustible materials			
Measurement Methods NIOSH 7604; OSHA ID103, ID215			
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
	NIOSH REL: Ca TWA 0.00 OSHA PEL: C 0.1 mg CrO ₃ . VI)}] 2-23°F.] BP: ? IP: ? UEL: ? ities cids, alcohols, hydrazine, con ID215 tation	NIOSH REL: Ca TWA 0.001 mg Cr(VI)/m³ See Appendix C OSHA PEL: C 0.1 mg CrO ₃ /m³ [skin] See Appendix C VI)}] Conversion 2-23°F.] BP: ? IP: ? UEL: ? Ities cids, alcohols, hydrazine, combustible materials ID215 tation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Skin: Soap wash immediately Breathing: Respiratory support	

Respirator Recommendations NIOSH

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; eye, skin burns; drowsiness, muscle weakness; skin ulcers; lung changes; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system

Cancer Site [lung cancer]

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n-Butyl glycidyl ether CAS 242			CAS 2426-08-6
$C_7H_{14}O_2$			RTECS TX4200000
Synonyms & Trade Names BGE; 1,2-Epoxy-3-butoxypropane			DOT ID & Guide
Exposure	NIOSH REL: C 5.6 ppm (30	mg/m ³) [15-minute]	
Limits	OSHA PEL†: TWA 50 ppm	(270 mg/m ³)	
IDLH 250 ppm		Conversion 1 ppm = 5.33 m	g/m ³
Physical Description Colorless liquid with an irritating odor.			
MW: 130.2	BP: 327°F	FRZ: ?	Sol: 2%
VP(77°F): 3 mmHg	IP: ?		Sp.Gr: 0.91
Fl.P: 130°F	UEL: ?		
Class II Combustible Liquid	: Fl.P. at or above 100°F and	below 140°F.	
Incompatibilities & Reactivities Strong oxidizers, strong caustics			
Measurement Methods NIOSH 1616; OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention i	ort

Respirator Recommendations NIOSH

Up to 56 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 140 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*

Up to 250 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose; skin sensitization; narcosis; possible hematopoietic effects; central nervous system depression

Target Organs Eyes, skin, respiratory system, central nervous system, blood

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CH3CH(OH)COOC4H9 RTECS OD4025000	n-Butyl lactate			CAS 138-22-7
Butyl ester of 2-hydroxypropanoic acid, Butyl ester of lactic acid, Butyl lactate liquid, n.o.s.) Exposure Limits DILH N.D. Conversion 1 ppm = 5.98 mg/m³	CH ₃ CH(OH)COOC ₄ H ₉			RTECS OD4025000
DLH N.D. Conversion 1 ppm = 5.98 mg/m³			1993 128 (combustible	
Physical Description Clear, colorless to white liquid with a mild, transient odor. MW: 146.2 BP: 370°F FRZ: -45°F Sol: Slight VP: 0.4 mmHg IP: ? Sp.Gr: 0.98 FLP: 160°F UEL: ? LEL: 1.15% Class IIIA Combustible Liquid: FI.P. at or above 140°F and below 200°F. Incompatibilities & Reactivities Strong acids & bases, strong oxidizers, heat, sparks, open flames Measurement Methods None available Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later Exposure Routes inhalation, ingestion, skin and/or eye contact Symptoms Irritation eyes, skin, nose, throat; drowsiness, headache, central nervous system depression; nausea, vomiting	Exposure	NIOSH REL: TWA 5 ppm (25 mg/m ³)	
Physical Description Clear, colorless to white liquid with a mild, transient odor. MW: 146.2 BP: 370°F FRZ: -45°F Sol: Slight VP: 0.4 mmHg IP: ? Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F. Incompatibilities & Reactivities Strong acids & bases, strong oxidizers, heat, sparks, open flames Measurement Methods None available Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later Exposure Routes inhalation, ingestion, skin and/or eye contact Symptoms Irritation eyes, skin, nose, throat; drowsiness, headache, central nervous system depression; nausea, vomiting	Limits	OSHA PEL†: none		
Clear, colorless to white liquid with a mild, transient odor. MW: 146.2 BP: 370°F FRZ: -45°F Sol: Slight VP: 0.4 mmHg IP: ? Sp.Gr: 0.98 FI.P: 160°F UEL: ? LEL: 1.15% Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F. Incompatibilities & Reactivities Strong acids & bases, strong oxidizers, heat, sparks, open flames Measurement Methods None available Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Irrigate immediately Skin: Soap wash immediately Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later Exposure Routes inhalation, ingestion, skin and/or eye contact Symptoms Irritation eyes, skin, nose, throat; drowsiness, headache, central nervous system depression; nausea, vomiting	IDLH N.D.		Conversion 1 ppm = 5.98 m	ng/m ³
VP: 0.4 mmHg				
FI.P: 160°F Class IIIA Combustible Liquid: FI.P. at or above 140°F and below 200°F. Incompatibilities & Reactivities Strong acids & bases, strong oxidizers, heat, sparks, open flames Measurement Methods None available Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later Exposure Routes inhalation, ingestion, skin and/or eye contact Symptoms Irritation eyes, skin, nose, throat; drowsiness, headache, central nervous system depression; nausea, vomiting	MW: 146.2	BP: 370°F	FRZ: -45°F	Sol: Slight
Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F. Incompatibilities & Reactivities Strong acids & bases, strong oxidizers, heat, sparks, open flames Measurement Methods None available Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later Exposure Routes inhalation, ingestion, skin and/or eye contact Symptoms Irritation eyes, skin, nose, throat; drowsiness, headache, central nervous system depression; nausea, vomiting	VP: 0.4 mmHg	IP: ?		Sp.Gr: 0.98
Incompatibilities & Reactivities Strong acids & bases, strong oxidizers, heat, sparks, open flames Measurement Methods None available Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later Exposure Routes inhalation, ingestion, skin and/or eye contact Symptoms Irritation eyes, skin, nose, throat; drowsiness, headache, central nervous system depression; nausea, vomiting	Fl.P: 160°F	UEL: ?	LEL: 1.15%	
Measurement Methods None available Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later Exposure Routes inhalation, ingestion, skin and/or eye contact Symptoms Irritation eyes, skin, nose, throat; drowsiness, headache, central nervous system depression; nausea, vomiting	Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.	
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later Exposure Routes inhalation, ingestion, skin and/or eye contact Symptoms Irritation eyes, skin, nose, throat; drowsiness, headache, central nervous system depression; nausea, vomiting	_		flames	
Skin: Prevent skin contact Eye: Irrigate immediately Skin: Soap wash immediately Skin: Soap wash immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately Respirator Recommendation Provide: Eyewash, Quick drench Respirator Recommendations To be added later Exposure Routes inhalation, ingestion, skin and/or eye contact Symptoms Irritation eyes, skin, nose, throat; drowsiness, headache, central nervous system depression; nausea, vomiting				
Exposure Routes inhalation, ingestion, skin and/or eye contact Symptoms Irritation eyes, skin, nose, throat; drowsiness, headache, central nervous system depression; nausea, vomiting	Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		ort	
Symptoms Irritation eyes, skin, nose, throat; drowsiness, headache, central nervous system depression; nausea, vomiting	Respirator Recommendation	ons To be added later		
vomiting	Exposure Routes inhalation	, ingestion, skin and/or eye co	ontact	
Target Organs Eyes, skin, respiratory system, central nervous system		in, nose, throat; drowsiness, l	headache, central nervous sys	tem depression; nausea,
	Target Organs Eyes, skin, r	espiratory system, central ner	vous system	

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n-Butyl mercaptan		CAS 109-79-5	
CH ₃ CH ₂ CH ₂ CH ₂ SH		RTECS EK6300000	
		DOT ID & Guide 2347 130	
Exposure	NIOSH REL: C 0.5 ppm (1	.8 mg/m ³) [15-minute]	
Limits	OSHA PEL†: TWA 10 ppn	n (35 mg/m ³)	
IDLH 500 ppm		Conversion 1 ppm = 3.69	mg/m^3
Physical Description Colorless liquid with a strong, garlic-, cabbage-, or skunk-like odor.			
MW: 90.2	BP: 209°F	FRZ: -176°F	Sol: 0.06%
VP: 35 mmHg	IP: 9.15 eV	IP: 9.15 eV Sp.Gr: 0.	
Fl.P: 35°F	UEL: ?	LEL: ?	
Class IB Flammable Liquid	: Fl.P. below 73°F and BP at	or above 100°F.	
Incompatibilities & Reactivities Strong oxidizers (such as dry bleaches), acids			
Measurement Methods NIOSH 2525, 2542			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode*

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; muscle weakness, malaise (vague feeling of discomfort), sweating, nausea, vomiting, headache, confusion; in animals: narcosis, incoordination, lassitude (weakness, exhaustion); cyanosis, pulmonary irritation; liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

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o-sec-Butylphenol CAS 89-72-5			CAS 89-72-5
CH ₃ CH ₂ CH(CH ₃)C ₆ H ₄ OH			RTECS SJ8920000
Synonyms & Trade Names 2-sec-Butylphenol, 2-(1-Methylpropyl)phenol		DOT ID & Guide 2228 153 (liquid) 2229 153 (solid)	
Exposure	NIOSH REL: TWA 5 ppm (30 mg/m ³) [skin]	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 6.14 m	ng/m ³
Physical Description Colorless liquid or solid (below 61°F).			
MW: 150.2	BP: 227°F	FRZ: 61°F	Sol: Insoluble
VP: Low	IP: ?		Sp.Gr: 0.89
Fl.P: 225°F	UEL: ?	LEL: ?	
Class IIB Combustible Liqui	d Combustible Solid		
Incompatibilities & Reactive None reported	vities		
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort
Respirator Recommendations To be added later			
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, skin, respiratory system; skin burns			
Target Organs Eyes, skin, respiratory system			
See also: INTRODUCTION			

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p-tert-Butyltoluene CAS 98-51-1			CAS 98-51-1
$(CH_3)_3CC_6H_4CH_3$		RTECS XS8400000	
Synonyms & Trade Names 4-tert-Butyltoluene, 1-Methy			DOT ID & Guide 2667 131
Exposure	NIOSH REL: TWA 10 ppm	(60 mg/m ³) ST 20 ppm (120	mg/m^3)
Limits	OSHA PEL†: TWA 10 ppm	(60 mg/m ³)	
IDLH 100 ppm		Conversion 1 ppm = 6.07 m	ng/m ³
Physical Description Colorless liquid with a distinct aromatic odor, somewhat like gasoline.			
MW: 148.3	BP: 379°F	BP: 379°F FRZ: -62°F Sol: Insoluble	
VP(77°F): 0.7 mmHg	IP: 8.28 eV		Sp.Gr: 0.86
Fl.P: 155°F	UEL: ?		
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.	
Incompatibilities & Reactivities Oxidizers			
Measurement Methods NIOSH 1501; OSHA 7			
Skin: Prevent skin contact Eyes: Prevent eye contact		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory suppo	

Respirator Recommendations NIOSH/OSHA

Up to 100 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode \(^\frac{f}{APF} = 25\) Any powered, air-purifying respirator with organic vapor cartridge(s)\(^\frac{f}{APF} = 50\) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; dry nose, throat; headache; low blood pressure, tachycardia, abnormalities cardiovascular system stress; central nervous system, hematopoietic depression; metallic taste; liver, kidney injury

Target Organs Eyes, skin, respiratory system, cardiovascular system, central nervous system, bone marrow, liver, kidneys

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n-Butyronitrile		CAS 109-74-0	
CH ₃ CH ₂ CH ₂ CN		RTECS ET8750000	
Synonyms & Trade Names Butanenitrile, Butyronitrile, 1-Cyanopropane, Propyl cyanide, n-Propyl		ide, n-Propyl cyanide	DOT ID & Guide 2411 131
Exposure	NIOSH REL: TWA 8 ppm (22 mg/m ³)	
Limits	OSHA PEL: none		
IDLH N.D.		Conversion 1 ppm = 2.83 m	ng/m ³
Physical Description Colorless liquid with a sharp, suffocating odor. [Note: Forms cyanide in the body.]			
MW: 69.1	BP: 244°F	FRZ: -170°F	Sol(77°F): 3%
VP: 14 mmHg	IP: 11.67 eV		Sp.Gr: 0.81
Fl.P: 62°F	UEL: ? LEL: 1.65%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.	
Incompatibilities & Reactivities Strong oxidizers & reducing agents, strong acids & bases			
Measurement Methods NIOSH 1606 (adapt)			
Personal Protection & Sanitation		First Aid (See procedures)	
Skin: Prevent skin contact		Eye: Irrigate immediately	
Eyes: Prevent eye contact Wash skin: When contaminated		Skin: Soap wash immediately Breathing: Respiratory support	
Remove: When wet (flammable)		Swallow: Medical attention immediately	
Change: No recommendation			
Provide: Quick drench			

Respirator Recommendations NIOSH

Up to 80 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 200 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 400 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1000 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; headache, dizziness, lassitude (weakness, exhaustion), confusion, convulsions; dyspnea (breathing difficulty); abdominal pain, nausea, vomiting

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system

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Cadmium dust (as Cd)		CAS 7440-43-9 (metal)		
(Cid (metal)		RTECS EU9800000 (metal)		
		DOT ID & Guide 2570 154 (compounds)		
Exposure	NIOSH REL*: Ca See Appendix A [*Note: The REL application compounds (as Cd).]		EL applies to all Cadmium	
Limits		OSHA PEL*: [1910.1027] TWA 0.005 mg/m ³ [*Note: The PEL applies to all Cadmium compounds (as Cd).]		
IDLH Ca [9 mg/m ³ (as Co	d)]	Conversion		
Physical Description Metal: Silver-white, blue-	tinged lustrous, odorless solic	1.		
MW: 112.4	BP: 1409°F	MLT: 610°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 8.65 (metal)	
Fl.P: NA	UEL: NA	LEL: NA		
Metal: Noncombustible So	olid in bulk form, but will bur	n in powder form.		
Incompatibilities & Read Strong oxidizers; elementa	ctivities al sulfur, selenium & telluriur	n		
Measurement Methods NIOSH 7048; OSHA ID12	21, ID125G, ID189, ID206			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: Daily Remove: No recommendation Change: Daily		First Aid (See procedure Eye: Irrigate immedia Skin: Soap wash Breathing: Respirator Swallow: Medical att	ry support	

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion

Symptoms Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]

Target Organs respiratory system, kidneys, prostate, blood

Cancer Site [prostatic & lung cancer]

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CdO/Cd			
	CdO/Cd		
Synonyms & Trade Names CdO: Cadmium monoxide, Cadmium oxide fume Cd: Cadmium			DOT ID & Guide
Exposure	NIOSH REL*: Ca See Appe compounds (as Cd).]	endix A [*Note: The REL app	lies to all Cadmium
Limits	OSHA PEL*: [1910.1027] T Cadmium compounds (as C	ΓWA 0.005 mg/m ³ [*Note: Thd).]	ne PEL applies to all
IDLH Ca [9 mg/m ³ (as Cd)]		Conversion	
Physical Description Odorless, yellow-brown, fine properties of Cd.]	ely divided particulate dispers	sed in air. [Note: See listing for	or Cadmium dust for
MW: 128.4	BP: Decomposes	MLT: 2599°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 8.15 (crystalline form)/6.95 (amorphous form)
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid			
Incompatibilities & Reactive Not applicable	vities		
Measurement Methods NIOSH 7048; OSHA ID121,	ID125G, ID189, ID206		
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: Daily Remove: No recommendation Change: Daily		First Aid (See procedures) Breathing: Respiratory support	ort

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or

Respirator Recommendations NIOSH

other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation

Symptoms Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; emphysema, proteinuria, anosmia (loss of the sense of smell), mild anemia; [potential occupational carcinogen]

Target Organs respiratory system, kidneys, blood

Cancer Site [prostatic & lung cancer]

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Calcium arsenate	CAS 7778-44-1				
Ca ₃ (AsO ₄) ₂	RTECS CG0830000				
Synonyms & Trade Name Calcium salt (2:3) of arseni ortho-arsenate [Note: Also As).]	DOT ID & Guide 1573 151				
Exposure	NIOSH REL: Ca C 0.002 m	g/m ³ [15-minute] See Append	dix A		
Limits	OSHA PEL: [1910.1018] T	WA 0.010 mg/m ³			
IDLH Ca [5 mg/m ³ (as As))]	Conversion			
Physical Description Colorless to white, odorless solid. [insecticide/herbicide]					
MW: 398.1	BP: Decomposes	MLT: ?	Sol(77°F): 0.01%		
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 3.62		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid					
Incompatibilities & React None reported [Note: Produ	ivities aces toxic fumes of arsenic wh	en heated to decomposition.]			
Measurement Methods NIOSH 7900; OSHA ID105					
Personal Protection & Sar	nitation	First Aid (See procedures)			
Skin: Prevent skin contact		Eye: Irrigate immediately			
Eyes: Prevent eye contact Wash skin: When contamin	ated/Daily	Skin: Soap wash promptly Breathing: Respiratory support			
Remove: When wet or cont		Swallow: Medical attention immediately			
Change: Daily					

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Lassitude (weakness, exhaustion); gastrointestinal disturbance; peripheral neuropathy; skin hyperpigmentation, palmar planter hyperkeratoses; dermatitis; [potential occupational carcinogen]; in animals: liver damage

Target Organs Eyes, respiratory system, liver, skin, central nervous system, lymphatic system

Cancer Site [lymphatic & lung cancer]

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RTECS EV9580000	Calcium carbonate			CAS 1317-65-3
Calcium salt of carbonic acid [Note: Occurs in nature as as limestone, chalk, marble, dolomite, aragonite, calcite & oyster shells.] Exposure NIOSH REL: TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp)	CaCO ₃			RTECS EV9580000
Limits OSHA PEL: TWA 15 mg/m³ (total) TWA 5 mg/m³ (resp) DLH N.D. Conversion Physical Description White, odorless powder or colorless crystals. MW: 100.1 BP: Decomposes MLT: 1517-2442°F (Decomposes) VP: 0 mmHg (approx) IP: NA Sp.Gr: 2.7-2.95 FI.P: NA Noncombustible Solid Incompatibilities & Reactivities Acids, alum, ammonium salts, mercury & hydrogen, fluorine, magnesium Measurement Methods NIOSH 7020; OSHA ID121 Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation Change: No recommendation Change: No recommendation	Calcium salt of carbonic acid [Note: Occurs in nature as as limestone, chalk, marble,			DOT ID & Guide
IDLH N.D. Conversion	Exposure	NIOSH REL: TWA 10 mg/r	m ³ (total) TWA 5 mg/m ³ (resp	p)
Physical Description White, odorless powder or colorless crystals. MW: 100.1 BP: Decomposes MLT: 1517-2442°F (Decomposes) VP: 0 mmHg (approx) IP: NA VEL: NA Noncombustible Solid Incompatibilities & Reactivities Acids, alum, ammonium salts, mercury & hydrogen, fluorine, magnesium Measurement Methods NIOSH 7020; OSHA ID121 Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation Change: No recommendation White, odorless crystals. MLT: 1517-2442°F (Decomposes) Sp.Gr: 2.7-2.95 File: NA First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air	_	OSHA PEL: TWA 15 mg/m	³ (total) TWA 5 mg/m ³ (resp)
White, odorless powder or colorless crystals. MW: 100.1 BP: Decomposes MLT: 1517-2442°F (Decomposes) VP: 0 mmHg (approx) IP: NA VEL: NA Noncombustible Solid Incompatibilities & Reactivities Acids, alum, ammonium salts, mercury & hydrogen, fluorine, magnesium Measurement Methods NIOSH 7020; OSHA ID121 Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Wash skin: No recommendation Change: No recommendation Change: No recommendation Change: No recommendation	IDLH N.D.		Conversion	
VP: 0 mmHg (approx) IP: NA UEL: NA Noncombustible Solid Incompatibilities & Reactivities Acids, alum, ammonium salts, mercury & hydrogen, fluorine, magnesium Measurement Methods NIOSH 7020; OSHA ID121 Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation Change: No recommendation	_	olorless crystals.		
FI.P: NA UEL: NA LEL: NA	MW: 100.1	BP: Decomposes	1	Sol: 0.001%
Noncombustible Solid Incompatibilities & Reactivities Acids, alum, ammonium salts, mercury & hydrogen, fluorine, magnesium Measurement Methods NIOSH 7020; OSHA ID121 Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation Change: No recommendation Remove: No recommendation Change: No recommendation	VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.7-2.95
Incompatibilities & Reactivities Acids, alum, ammonium salts, mercury & hydrogen, fluorine, magnesium Measurement Methods NIOSH 7020; OSHA ID121 Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation Change: No recommendation	Fl.P: NA	UEL: NA	LEL: NA	
Acids, alum, ammonium salts, mercury & hydrogen, fluorine, magnesium Measurement Methods NIOSH 7020; OSHA ID121 Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation Change: No recommendation	Noncombustible Solid			
NIOSH 7020; OSHA ID121 Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Skin: No recommendation Skin: Soap wash Breathing: Fresh air Soap was	_		rine, magnesium	
Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation Wash skin: Soap wash Breathing: Fresh air				
D. '. (D	Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Wash skin: No recommendation Remove: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air			
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact				
Symptoms Irritation eyes, skin, respiratory system; cough				
Target Organs Eyes, skin, respiratory system	Target Organs Eyes, skin, r	espiratory system		

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Calcium cyanamide			CAS 156-62-7		
CaCN ₂			RTECS GS6000000		
Synonyms & Trade Names Calcium carbimide, Cyanamide, Lime nitrogen, Nitrogen lime [Note: Cyanamide is also a synonym for Hydrogen cyanamide, NH ₂ CN.]			DOT ID & Guide 1403 138 (with >0.1% calcium carbide)		
Exposure	NIOSH REL: TWA 0.5 mg/r	m^3			
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion			
Physical Description Colorless, gray, or black crys	stals or powder. [fertilizer] [N	ote: Commercial grades may	contain calcium carbide.]		
MW: 80.1	BP: Sublimes	MLT: 2444°F	Sol: Insoluble		
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.29		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid, but a	fire risk if it contains calcium	n carbide.			
Incompatibilities & Reactiv Water [Note: May polymeriz & ammonia.]		ns to dicyanamide. Decompos	ses in water to form acetylene		
Measurement Methods NIOSH 0500					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendation	Respirator Recommendations To be added later				
Exposure Routes inhalation,	ingestion, skin and/or eye co	ontact			

Symptoms Irritation eyes, skin, respiratory system; headache, dizziness, rapid breathing, low blood pressure,

nausea, vomiting; skin burns, sensitization; cough; Antabuse-like effects

Target Organs Eyes, skin, respiratory system, vasomotor system

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Calcium hydroxide	e		CAS 1305-62-0
Ca(OH) ₂			RTECS EW2800000
Synonyms & Trade Names Calcium hydrate, Caustic lime, Hydrated lime, Slaked lime			DOT ID & Guide
Exposure	NIOSH REL: TWA 5 mg/m ²	3	
Limits	OSHA PEL: TWA 15 mg/m	³ (total) 5 mg/m ³ (resp)	
IDLH N.D.		Conversion	
Physical Description White, odorless powder. [Not	te: Readily absorbs CO ₂ from	the air to form calcium carbo	onate.]
MW: 74.1	BP: Decomposes	MLT: 1076°F (Decomposes) (Loses H ₂ O)	Sol(32°F): 0.2%
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.24
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid			
Incompatibilities & Reactiv Maleic anhydride, phosphorus		nitroparaffins, nitropropane [N	Note: Attacks some metals.]
Measurement Methods NIOSH 7020; ID121			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendation	ns To be added later		
Exposure Routes inhalation,	ingestion, skin and/or eye co	ntact	
Symptoms Irritation eyes, sk pneumonitis	in, upper respiratory system;	eye, skin burns; skin vesicula	tion; cough, bronchitis,

Target Organs Eyes, skin, respiratory system

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Calcium oxide			CAS 1305-78-8	
CaO			RTECS EW3100000	
Synonyms & Trade Names Burned lime, Burnt lime, Lime, Pebble lime, Quick lime, Unslaked lime DOT ID & G 1910 157				
Exposure	NIOSH REL: TWA 2 mg/m	3		
Limits	OSHA PEL: TWA 5 mg/m ³			
IDLH 25 mg/m ³		Conversion		
Physical Description White or gray, odorless lump	os or granular powder.			
MW: 56.1	BP: 5162°F	MLT: 4662°F	Sol: Reacts	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 3.34	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid, but w	rill support combustion by libe	eration of oxygen.		
Incompatibilities & Reactive Water (liberates heat), fluoring		water to form calcium hydro	oxide.]	
Measurement Methods NIOSH 7020; OSHA ID121				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory suppo Swallow: Medical attention i	ort	

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Up to 10 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 20 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any supplied-air respirator

Up to 25 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory tract; ulcer, perforation nasal septum; pneumonitis; dermatitis

Target Organs Eyes, skin, respiratory system

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Calcium silicate			CAS 1344-95-2	
CaSiO ₃			RTECS VV9150000	
Synonyms & Trade Names Calcium hydrosilicate, Calcium metasilicate, Calcium monosilicate, Calcium salt of silicic acid, Wollastonite (mineral)			DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 mg/m	m ³ (total) TWA 5 mg/m ³ (resp	p)	
Limits	OSHA PEL: TWA 15 mg/m	³ (total) TWA 5 mg/m ³ (resp))	
IDLH N.D.		Conversion		
& lime.]	e-flowing powder. [Note: The	commercial product is prepar	ed from diatomaceous earth	
MW: 116.2	BP: ?	MLT: 2804°F	Sol: 0.01%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.9	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive None reported [Note: After publica.]		solution reverts to soluble cal	cium salts & amorphous	
Measurement Methods NIOSH 7020; OSHA ID121				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact				
Symptoms Irritation eyes, skin, upper respiratory system				
Target Organs Eyes, skin, r	espiratory system			

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Calcium sulfate			CAS 7778-18-9		
CaSO ₄			RTECS WS6920000		
Synonyms & Trade Names Anhydrous calcium sulfate, Anhydrous gypsum, Anhydrous sulfate of lime, Calcium salt of sulfuric acid [Note: Gypsum is the dihydrate form & Plaster of Paris is the hemihydrate form.]			DOT ID & Guide		
Exposure	NIOSH REL: TWA 10 mg/s	m ³ (total) TWA 5 mg/m ³ (res	p)		
Limits	OSHA PEL: TWA 15 mg/m	³ (total) TWA 5 mg/m ³ (resp)		
IDLH N.D.		Conversion			
Physical Description Odorless, white powder or co	olorless, crystalline solid. [No	ote: May have blue, gray, or re	eddish tinge.]		
MW: 136.1	BP: Decomposes	MLT: 2840°F (Decomposes)	Sol: 0.3%		
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.96		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid					
Incompatibilities & Reactive Diazomethane, aluminum, playwater to form Gypsum & Play	nosphorus, water [Note: Hygr	oscopic (i.e., absorbs moisture	e from the air). Reacts with		
Measurement Methods NIOSH 0500, 0600					
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air					
Respirator Recommendation	Respirator Recommendations To be added later				
Exposure Routes inhalation	, skin and/or eye contact				
Symptoms Irritation eyes, skin, upper respiratory system; conjunctivitis; rhinitis, epistaxis (nosebleed)					

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Camphor (synthetic)				
$C_{10}H_{16}O$			RTECS EX1225000	
Synonyms & Trade Names 2-Camphonone, Gum camphor, Laurel camphor, Synthetic camphor			DOT ID & Guide 2717 133	
Exposure	NIOSH REL: TWA 2 mg/m	3		
Limits	OSHA PEL: TWA 2 mg/m ³			
IDLH 200 mg/m ³		Conversion		
Physical Description Colorless or white crystals w	rith a penetrating, aromatic od	or.		
MW: 152.3	BP: 399°F	MLT: 345°F	Sol: Insoluble	
VP: 0.2 mmHg	IP: 8.76 eV		Sp.Gr: 0.99	
Fl.P: 150°F	UEL: 3.5%	LEL: 0.6%		
Combustible Solid				
Incompatibilities & Reactive Strong oxidizers (especially	vities chromic anhydride & potassiu	ım permanganate)		
Measurement Methods NIOSH 1301; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention	ort	

Respirator Recommendations NIOSH/OSHA

Up to 50 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter[£] Up to 100 mg/m³: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)

in combination with a high-efficiency particulate filter /(APF = 50) Any self-contained breathing apparatus with a full facepiece /(APF = 50) Any supplied-air respirator with a full facepiece

Up to 200 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; nausea, vomiting, diarrhea; headache, dizziness, excitement, epileptiform convulsions

Target Organs Eyes, skin, respiratory system, central nervous system

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Caprolactam			CAS 105-60-2
C ₂ H ₁₁ NO			RTECS CM3675000
Synonyms & Trade Names Aminocaproic lactam, epsilon-Caprolactam, Hexahydro-2H-azepin-2-one, 2-Oxohexamethyleneimine			DOT ID & Guide
Exposure Limits	NIOSH REL: Dust: TWA 1 mg/m ³ ST 3 mg/m ³ Vapor: TWA 0.22 ppm (1 mg/m ³ ST 0.66 ppm (3 mg/m ³) OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 4	4.63 mg/m ³
Physical Description White, crystalline solid or expected only at elevated t		odor. [Note: Significant vapo	or concentrations would be
MW: 113.2	BP: 515°F	MLT: 156°F	Sol: 53%
VP: 0.00000008 mmHg	IP: ?		Sp.Gr: 1.01
	IP: ? UEL: 8.0%	LEL: 1.4%	Sp.Gr: 1.01
Fl.P: 282°F		LEL: 1.4%	Sp.Gr: 1.01
Combustible Solid Incompatibilities & Reac	UEL: 8.0%	LEL: 1.4%	Sp.Gr: 1.01
Fl.P: 282°F Combustible Solid	UEL: 8.0%	LEL: 1.4%	Sp.Gr: 1.01
Fl.P: 282°F Combustible Solid Incompatibilities & Reac Strong oxidizers, (acetic ac Measurement Methods	UEL: 8.0% tivities cid + dinitrogen trioxide) anitation	First Aid (See procedure) Eye: Irrigate immediat Skin: Water wash immediat Breathing: Respiratory Swallow: Medical atternal	ures) eely nediately support
Fl.P: 282°F Combustible Solid Incompatibilities & Reac Strong oxidizers, (acetic aced Measurement Methods OSHA PV2012 Personal Protection & Sa Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contami Remove: When wet or contact of the strong of	tivities cid + dinitrogen trioxide) anitation nated ataminated	First Aid (See procedule Eye: Irrigate immediat Skin: Water wash immediat Breathing: Respiratory	ures) eely nediately support

irritability, confusion, dizziness, headache; abdominal cramps, diarrhea, nausea, vomiting; liver, kidney injury

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system, liver, kidneys

See also: <u>INTRODUCTION</u>

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Captafol			CAS 2425-06-1		
$C_{10}H_9Cl_{14}NO_2S$			RTECS GS4900000		
Synonyms & Trade Names Captofol; Difolatan®; N-((1 dicarboximide	DOT ID & Guide				
Exposure	NIOSH REL: Ca TWA 0.1	mg/m ³ [skin] See Appendix A	L		
Limits	OSHA PEL†: none				
IDLH Ca [N.D.]		Conversion			
Physical Description White, crystalline solid with a slight, characteristic pungent odor. [fungicide] [Note: Available commercially as a wettable powder or in liquid form.]					
MW: 349.1	BP: Decomposes	MLT: 321°F (Decomposes)	Sol: 0.0001%		
VP: 0.000008 mmHg	IP: NA	Sp.Gr: ?			
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid, but n	nay be dissolved in flammab	ole liquids.			
Incompatibilities & Reactive Acids, acid vapors, strong ox					
Measurement Methods NIOSH 0500					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo	ort		

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; dermatitis, skin sensitization; conjunctivitis; bronchitis, wheezing; diarrhea, vomiting; liver, kidney injury; high blood pressure; in animals: teratogenic effects; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys, cardiovascular system

Cancer Site [in animals: tumors at many sites]

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Captan			CAS 133-06-2		
C ₉ H ₈ Cl ₃ NO ₂ S	RTECS GW5075000				
			DOT ID & Guide 9188 171		
Exposure	NIOSH REL: Ca TWA	5 mg/m ³ See Appendix A			
Limits	OSHA PEL†: none				
IDLH Ca [N.D.]	·	Conversion			
Physical Description Odorless, white, crystalline odor.]	powder. [fungicide] [Note	e: Commercial product is a yellow	powder with a pungent		
MW: 300.6	BP: Decomposes	MLT: 352°F (Decomposes)	Sol(77°F): 0.0003%		
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.74		
Fl.P: ?	UEL: ?	LEL: ?			
Combustible Solid; may be dissolved in flammable liquids.					
Incompatibilities & React Strong alkaline materials (e		Corrosive to metals.]			
Measurement Methods					

Measurement Methods

NIOSH 5601

Personal Protection & Sanitation
Skin: Prevent skin contact
Eyes: Prevent eye contact

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; blurred vision; dermatitis, skin sensitization; dyspnea (breathing difficulty); diarrhea, vomiting; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, gastrointestinal tract, liver, kidneys

Cancer Site [in animals: duodenal tumors]

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Carbaryl CAS 63-25-2					
CH ₃ NHCOOC ₁₀ H ₇	RTECS FC5950000				
Synonyms & Trade Names alpha-Naphthyl N-methyl-ca	rbamate, 1-Naphthyl N-Meth	yl-carbamate, Sevin®	DOT ID & Guide 2757 151		
Exposure	NIOSH REL: TWA 5 mg/m ²	3			
Limits	OSHA PEL: TWA 5 mg/m ³				
IDLH 100 mg/m ³		Conversion			
Physical Description White or gray, odorless solid	. [pesticide]				
MW: 201.2	BP: Decomposes	MLT: 293°F	Sol: 0.01%		
VP(77°F): <0.00004 mmHg	IP: ?		Sp.Gr: 1.23		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid, but m	ay be dissolved in flammable	liquids.			
Incompatibilities & Reactiv Strong oxidizers, strongly alk					
Measurement Methods NIOSH 5006, 5601; OSHA 63					
Personal Protection & Sani Skin: Prevent skin contact	tation	First Aid (See procedures) Eye: Irrigate immediately			
Eyes: Prevent eye contact Wash skin: When contaminat	ted	Skin: Soap wash promptly Breathing: Respiratory support			
Remove: When wet or contain Change: Daily		Swallow: Medical attention i			

Respirator Recommendations NIOSH/OSHA

Up to 50 mg/m^3 : (APF = 10) Any supplied-air respirator*

Up to 100 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Miosis, blurred vision, tear; rhinorrhea (discharge of thin mucus), salivation; sweating; abdominal cramps, nausea, vomiting, diarrhea; tremor; cyanosis; convulsions; irritation skin; possible reproductive effects

Target Organs respiratory system, central nervous system, cardiovascular system, skin, blood cholinesterase, reproductive system

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Carbofuran			CAS 1563-66-2	
C ₁₂ H ₁₅ NO ₃			RTECS FB9450000	
Synonyms & Trade Names 2,3-Dihydro-2,2-dimethyl-7-	te; Furacarb®; Furadan®	DOT ID & Guide 2757 151		
Exposure	NIOSH REL: TWA 0.1 mg/s	m^3		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Odorless, white or grayish, c	rystalline solid. [insecticide]	[Note: May be dissolved in a	liquid carrier.]	
MW: 221.3	BP: ?	MLT: 304°F	Sol(77°F): 0.07%	
VP(77°F): 0.000003 mmHg	IP: NA		Sp.Gr: 1.18	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive Alkaline substances, acid, str		tes, peroxides, chlorates, nitra	ates, permanganates)	
Measurement Methods NIOSH 5006, 5601; OSHA 6	53			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Fresh air Swallow: Medical attention immediately		
Respirator Recommendation	ons To be added later			
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms Miosis, blurred vision; sweating, salivation, abdominal cramps, diarrhea, headache, nausea, vomiting;				

lassitude (weakness, exhaustion), muscle twitching, incoordination, convulsions

See also: **INTRODUCTION**

Target Organs central nervous system, peripheral nervous system, blood cholinesterase

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Carbon black	CAS 1333-86-4			
C	RTECS FF5800000			
Synonyms & Trade Names Acetylene black, Channel bla	DOT ID & Guide			
Exposure	NIOSH REL: TWA 3.5 mg/m ³ Ca TWA 0.1 mg PAHs/m ³ [Carbon black in presence of polycyclic aromatic hydrocarbons (PAHs)] See Appendix A See Appendix C			
Limits	OSHA PEL: TWA 3.5 mg/n	1 ³		
IDLH 1750 mg/m ³		Conversion		
Physical Description Black, odorless solid.				
MW: 12.0	BP: Sublimes	MLT: Sublimes	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.8-2.1	
Fl.P: NA	UEL: NA	LEL: NA		
Combustible Solid that may	contain flammable hydrocarb	ons.		
Incompatibilities & Reactive Strong oxidizers such as chlo				
Measurement Methods NIOSH 5000; OSHA ID196				
Personal Protection & San Skin: No recommendation Eyes: Prevent eye contact Wash skin: Daily Remove: No recommendation Change: No recommendation	n	First Aid (See procedures) Eye: Irrigate promptly Breathing: Fresh air		

Respirator Recommendations NIOSH/OSHA

Up to 17.5 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 35 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any supplied-air respirator

Up to 87.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter

Up to 175 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1750 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

In presence of polycyclicaromatic hydrocarbons:

NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Cough; irritation eyes; in presence of polycyclic aromatic hydrocarbons: [potential occupational carcinogen]

Target Organs respiratory system, eyes

Cancer Site [lymphatic cancer (in presence of PAHs)]

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Carbon dioxid	e		CAS 124-38-9		
CO ₂			RTECS FF6400000		
Synonyms & Trade N Carbonic acid gas, Dry	ames ice [Note: Normal constitue	ent of air (about 300 ppm)].	DOT ID & Guide 1013 120 1845 120 (dry ice) 2187 120 (liquid)		
Exposure	NIOSH REL: TWA	5000 ppm (9000 mg/m ³) ST 30	0,000 ppm (54,000 mg/m ³)		
Limits	OSHA PEL†: TWA	5000 ppm (9000 mg/m ³)			
IDLH 40,000 ppm		Conversion 1 ppm = 1	1.80 mg/m^3		
Physical Description Colorless, odorless gas	. [Note: Shipped as a liquef	ied compressed gas. Solid form	ı is utilized as dry ice.]		
MW: 44.0	BP: Sublimes	MLT: -109°F (Sublime	es) Sol(77°F): 0.2%		
VP: 56.5 atm	IP: 13.77 eV	RGasD: 1.53			
Fl.P: NA	UEL: NA	LEL: NA			
Nonflammable Gas	'	,			
	s, such as magnesium, zirco	nium, titanium, aluminum, chro Forms carbonic acid in water.	omium & manganese are ignitable		
Measurement Methods NIOSH 6603; OSHA ID172					
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: No recommendation Change: No recommendation Provide: Frostbite		First Aid (See proced) Eye: Frostbite Skin: Frostbite Breathing: Respiratory			

Up to 40,000 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

Respirator Recommendations NIOSH/OSHA

a full facepiece

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid/solid)

Symptoms Headache, dizziness, restlessness, paresthesia; dyspnea (breathing difficulty); sweating, malaise (vague feeling of discomfort); increased heart rate, cardiac output, blood pressure; coma; asphyxia; convulsions; frostbite (liquid, dry ice)

Target Organs respiratory system, cardiovascular system

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Carbon disulfide CAS 75-15-0				
$\overline{\mathrm{CS}_2}$			RTECS FF6650000	
Synonyms & Trade Names Carbon bisulfide			DOT ID & Guide 1131 131	
Exposure	NIOSH REL: TWA 1 ppm (3 mg/m ³) ST 10 ppm (30 mg/m ³) [skin]			
Limits	OSHA PEL†: TWA 20 ppm C 30 ppm 100 ppm (30-minute maximum peak)			
IDLH 500 ppm				
Physical Description Colorless to faint-yellow liquid with a sweet ether-like odor. [Note: Reagent grades are foul smelling.]				
MW: 76.1	BP: 116°F	FRZ: -169°F	Sol: 0.3%	
VP: 297 mmHg	IP: 10.08 eV		Sp.Gr: 1.26	
Fl.P: -22°F	UEL: 50.0%	LEL: 1.3%		
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.				
Incompatibilities & Reactivities Strong oxidizers; chemically-active metals such as sodium, potassium & zinc; azides; rust; halogens; amines [Note: Vapors may be ignited by contact with ordinary light bulb.]				
Measurement Methods				

wieasurement wiethous

NIOSH 1600

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 10 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 50 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor

cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Dizziness, headache, poor sleep, lassitude (weakness, exhaustion), anxiety, anorexia, weight loss; psychosis; polyneuropathy; Parkinson-like syndrome; ocular changes; coronary heart disease; gastritis; kidney, liver injury; eye, skin burns; dermatitis; reproductive effects

Target Organs central nervous system, peripheral nervous system, cardiovascular system, eyes, kidneys, liver, skin, reproductive system

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Carbon monoxide CAS 630-08-0				
СО			RTECS FG3500000	
Synonyms & Trade Names Carbon oxide, Flue gas, Mon			DOT ID & Guide 1016 119 9202 168 (cryogenic liquid)	
Exposure	NIOSH REL: TWA 35 ppm	NIOSH REL: TWA 35 ppm (40 mg/m ³) C 200 ppm (229 mg/m ³)		
Limits	OSHA PEL†: TWA 50 ppm (55 mg/m ³)			
IDLH 1200 ppm		Conversion 1 ppm = 1.15 m	Conversion 1 ppm = 1.15 mg/m^3	
Physical Description Colorless, odorless gas. [Note: Shipped as a nonliquefied or liquefied compressed gas.]				
MW: 28.0	BP: -313°F	MLT: -337°F	Sol: 2%	
VP: >35 atm	IP: 14.01 eV	RGasD: 0.97		
Fl.P: NA (Gas)	UEL: 74%	LEL: 12.5%		
Flammable Gas				
Incompatibilities & Reactivities Strong oxidizers, bromine trifluoride, chlorine trifluoride, lithium				
Measurement Methods NIOSH 6604; OSHA ID209				
Personal Protection & San Skin: Frostbite	itation	First Aid (See procedures) Eye: Frostbite		

Respirator Recommendations NIOSH

Wash skin: No recommendation

Remove: When wet (flammable) Change: No recommendation

Eyes: Frostbite

Provide: Frostbite

Up to 350 ppm: (APF = 10) Any supplied-air respirator

Up to 875 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 1200 ppm: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern†/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

Skin: Frostbite

Breathing: Respiratory support

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern†/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Headache, tachypnea, nausea, lassitude (weakness, exhaustion), dizziness, confusion, hallucinations; cyanosis; depressed S-T segment of electrocardiogram, angina, syncope

Target Organs cardiovascular system, lungs, blood, central nervous system

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Carbon tetrabro		CAS 558-13-4			
CBr ₄			RTECS FG4725000		
Synonyms & Trade Nam Carbon bromide, Methane	tetrabromide, Tetrabromo	methane	DOT ID & Guide 2516 151		
Exposure	NIOSH REL: TWA 0.1	NIOSH REL: TWA 0.1 ppm (1.4 mg/m ³) ST 0.3 ppm (4 mg/m ³)			
Limits	OSHA PEL†: none				
IDLH N.D.	,	Conversion 1 ppm =	= 13.57 mg/m ³		
Physical Description Colorless to yellow-brown	n crystals with a slight odor	r.			
MW: 331.7	BP: 374°F	MLT: 194°F	Sol: 0.02%		
VP(205°F): 40 mmHg	IP: 10.31 eV		Sp.Gr: 3.42		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid					
Incompatibilities & Read Strong oxidizers, hexacycl					
Measurement Methods None available					
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: Daily Remove: No recommendation Change: Daily Provide: Eyewash		Eye: Irrigate immedi Skin: Soap wash pro Breathing: Respirato	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommenda	tions To be added later				
Exposure Routes inhalati	on, ingestion, skin and/or e	eye contact			
			ars); lung, liver, kidney injury; in		
-					

Target Organs Eyes, skin, respiratory system, liver, kidneys

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Carbon tetrachloride CAS 56-23-5				
CCl ₄	RTECS FG4900000			
Synonyms & Trade Names Carbon chloride, Carbon tet, Freon® 10, Halon® 104, Tetrachloromethane DOT ID & Guide 1846 151				
Exposure	NIOSH REL: Ca ST 2 ppm	(12.6 mg/m ³) [60-minute] See	e Appendix A	
Limits	OSHA PEL†: TWA 10 ppm C 25 ppm 200 ppm (5-minute maximum peak in any 4 hours)			
IDLH Ca [200 ppm]		Conversion 1 ppm = 6.29 m	ng/m ³	
Physical Description Colorless liquid with a chara	acteristic ether-like odor.			
MW: 153.8	BP: 170°F	FRZ: -9°F	Sol: 0.05%	
VP: 91 mmHg	IP: 11.47 eV		Sp.Gr: 1.59	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid				
Incompatibilities & Reactivities Chemically-active metals such as sodium, potassium & magnesium; fluorine; aluminum [Note: Forms highly toxic phosgene gas when exposed to flames or welding arcs.]				
Measurement Methods NIOSH 1003; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Skin: Soap wash immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort	

Respirator Recommendations NIOSH

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; central nervous system depression; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, incoordination; [potential occupational carcinogen]

Target Organs central nervous system, eyes, lungs, liver, kidneys, skin

Cancer Site [in animals: liver cancer]

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Carbonyl fluoride	CAS 353-50-4		
COF ₂		RTECS FG6125000	
Synonyms & Trade Names Carbon difluoride oxide, Car difluoride, Fluoroformyl fluo	oxyfluoride, Carbonyl	DOT ID & Guide 2417 125	
Exposure	NIOSH REL: TWA 2 ppm	(5 mg/m ³) ST 5 ppm (15 mg	(m^3)
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 2.70	mg/m ³
Physical Description Colorless gas with a pungen	t and very irritating odor. [No	ote: Shipped as a liquefied co	ompressed gas.]
MW: 66.0	BP: -118°F	FRZ: -173°F	Sol: Reacts
VP: 55.4 atm	IP: 13.02 eV	RGasD: 2.29	
Fl.P: NA	UEL: NA	LEL: NA	
Nonflammable Gas			
Incompatibilities & Reactive Heat, moisture, hexafluorois carbon dioxide.]	vities opropyl-ideneamino-lithium	[Note: Reacts with water to t	form hydrogen fluoride &
Measurement Methods None available			
Personal Protection & San Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: No recommendation Change: No recommendation Provide: Frostbite	tion on	First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory support	
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation	, skin and/or eye contact		
Symptoms Irritation eyes, sl	kin, mucous membrane, respi	ratory system; eye, skin burn	as; lacrimation (discharge of

tears); cough, pulmonary edema, dyspnea (breathing difficulty); chronic exposure: gastrointestinal pain, muscle

fibrosis, skeletal fluorosis; liquid: frostbite

Target Organs Eyes, skin, respiratory system, bone

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Catechol	Catechol CAS 120-80-9		CAS 120-80-9
$C_6H_4(OH)_2$		RTECS UX1050000	
Synonyms & Trade Names 1,2-Benzenediol; o-Benzenediol; 1,2-Dihydroxybenzene; o-Dihydroxybenzene; 2-Hydroxyphenol; Pyrocatechol		DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 ppm	(20 mg/m ³) [skin]	
Limits	OSHA PEL†: none		
IDLH N.D.	'	Conversion 1 ppm = 4.50	0 mg/m^3
Physical Description Colorless, crystalline solid	with a faint odor. [Note: Disc	colors to brown in air & light	<i>.</i> .]
MW: 110.1	BP: 474°F	MLT: 221°F	Sol: 44%
VP(244°F): 10 mmHg	IP: ?		Sp.Gr: 1.34
Fl.P: 261°F	UEL: ?	LEL: 1.4%	
Combustible Solid			
Incompatibilities & React Strong oxidizers, nitric acid			
Measurement Methods OSHA PV2014			
Personal Protection & Sa Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamin Remove: When wet or con Change: Daily Provide: Eyewash	nated	First Aid (See procedures Eye: Irrigate immediately Skin: Water wash immedi Breathing: Respiratory sup Swallow: Medical attention	ately pport
Respirator Recommendat	tions To be added later		
Exposure Routes inhalation	on, skin absorption, ingestion,	skin and/or eye contact	
	skin, respiratory system; skin creased blood pressure, kidne		rimation (discharge of tears),
Target Organs Eyes, skin,	, respiratory system, central no	ervous system, kidneys	

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Cellulose			CAS 9004-34-6
$(C_6H_{10}O_5)_n$		RTECS FJ5691460	
Synonyms & Trade Names Hydroxycellulose, Pyrocellulose		DOT ID & Guide	
Exposure	NIOSH REL: TWA 10	mg/m ³ (total) TWA 5 mg/m ³	(resp)
Limits	OSHA PEL: TWA 15 r	mg/m ³ (total) TWA 5 mg/m ³ ((resp)
IDLH N.D.		Conversion	
Physical Description Odorless, white substance. grass, etc.).]	[Note: The principal fiber	cell wall material of vegetable	e tissues (wood, cotton, flax,
MW: 160,000-560,000	BP: Decomposes	MLT: 500-518°F (Decomposes)	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.27-1.61
Fl.P: NA	UEL: NA	LEL: NA	
Combustible Solid			
Incompatibilities & React Water, bromine pentafluori		e, strong oxidizers	
Measurement Methods NIOSH 0500, 0600			
Personal Protection & San Skin: No recommendation Eyes: No recommendation Wash skin: No recommend Remove: No recommendation Change: No recommendation	ation on	First Aid (See procedur Eye: Irrigate immediate Skin: Soap wash Breathing: Fresh air	
Respirator Recommendat	ions To be added later	I	
Exposure Routes inhalatio	n, skin and/or eye contact		
Symptoms Irritation eyes,	skin, mucous membrane		
	respiratory system		

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Cesium hydroxide			CAS 21351-79-1
CsOH			RTECS FK9800000
Synonyms & Trade Names Cesium hydrate, Cesium hydroxide dimer			DOT ID & Guide 2682 157 2681 154 (solution)
Exposure	NIOSH REL: TWA 2 mg/m	NIOSH REL: TWA 2 mg/m ³	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description Colorless or yellowish, crysta	alline solid. [Note: Hygroscop	pic (i.e., absorbs moisture from	n the air).]
MW: 149.9	BP: ?	MLT: 522°F	Sol(59°F): 395%
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 3.68
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid			
Incompatibilities & Reactiv Water, acids, CO ₂ , metals (e. considerable heat in contact v	g., Al, Pb, Sn, Zn), oxygen [l	Note: CsOH is a strong base,	causing the generation of
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supports Swallow: Medical attention in	ort
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation,	ingestion, skin and/or eye co	ontact	
Symptoms Irritation eyes, sk	in, upper respiratory system;	eye, skin burns	
Target Organs Eyes, skin, re	espiratory system		

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Chlordane CAS 57-74-9			
$C_{10}H_6Cl_8$	RTECS PE		RTECS PB9800000
Synonyms & Trade Names Chlordan; Chlordano; 1,2,4,5 methanoindane	Chlordan; Chlordano; 1,2,4,5,6,7,8,8-Octachloro-3a,4,7,7a-tetrahydro-4,7-		DOT ID & Guide 2762 131
Exposure	NIOSH REL: Ca TWA 0.5	5 mg/m ³ [skin] See Append	dix A
Limits	OSHA PEL: TWA 0.5 mg	OSHA PEL: TWA 0.5 mg/m ³ [skin]	
IDLH Ca [100 mg/m ³]	Conversion Conversion		
Physical Description Amber-colored, viscous liquid with a pungent, chlorine-like odor. [insecticide]			
MW: 409.8	BP: Decomposes	FRZ: 217-228°F	Sol: 0.0001%
VP: 0.00001 mmHg	IP: ?		Sp.Gr(77°F): 1.6
Fl.P: NA	UEL: NA LEL: NA		
Noncombustible Liquid, but may be utilized in flammable solutions.			
Incompatibilities & Reactivities Strong oxidizers, alkaline reagents			
Measurement Methods NIOSH 5510; OSHA 67			
Personal Protection & San	itation	First Aid (See procedu	res)

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria; in animals: lung, liver, kidney damage; [potential occupational carcinogen]

Target Organs central nervous system, eyes, lungs, liver, kidneys

Cancer Site [in animals: liver cancer]

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Chlorinated camphene CAS 8001-35-2			CAS 8001-35-2
C ₁₀ H ₁₀ Cl ₈ RTECS XW5250000			RTECS XW5250000
		DOT ID & Guide 2761 151	
Exposure	NIOSH REL: Ca [skin] See Appendix A		
Limits	OSHA PEL†: TWA 0.5 mg/m ³ [skin]		
IDLH Ca [200 mg/m ³]	Conversion		
Physical Description Amber, waxy solid with a mild, piney, chlorine- and camphor-like odor. [insecticide]			
MW: 413.8	BP: Decomposes	MLT: 149-194°F	Sol: 0.0003%
VP(77°F): 0.4 mmHg	IP: ?		Sp.Gr: 1.65
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid, but may be dissolved in flammable liquids.			
Incompatibilities & Reactivities Strong oxidizers [Note: Slightly corrosive to metals under moist conditions.]			
Measurement Methods NIOSH 5039			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly	
Wash skin: When contamina Remove: When wet or conta		Breathing: Respiratory support Swallow: Medical attention immediately	

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-

contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Nausea, confusion, agitation, tremor, convulsions, unconsciousness; dry, red skin; [potential occupational carcinogen]

Target Organs central nervous system, skin

Cancer Site [in animals: liver cancer]

See also: <u>INTRODUCTION</u>

full facepiece

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Chlorinated diph	enyl oxide		CAS
$C_{12}H_{10-n}Cl_nO$		RTECS	
	s egree of chlorination of diphen phenyl oxide [(C ₆ H ₄ Cl)O(C ₆ H	. 0 3.2	DOT ID & Guide
Exposure	NIOSH REL: TWA 0.5 mg/m ³		
Limits	OSHA PEL: TWA 0.5 mg/m ³		
IDLH 5 mg/m ³		Conversion	
Physical Description Appearance and odor vary	depending upon the specific co	mpound.	
Properties vary depending upon the specific compound.			
Incompatibilities & React Strong oxidizers	ivities		
Measurement Methods NIOSH 5025			
Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamin Remove: When wet or cont Change: Daily	ated	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supp Swallow: Medical attention	
Respirator Recommendat	ions NIOSH/OSHA		

Up to 5 mg/m^3 : (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor and acid gas canister having a high efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Acne-form dermatitis, liver damage

Target Organs Skin, liver

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Chlorine	ine CAS 7782-50-5				
Cl ₂ RTECS FO210000		RTECS FO2100000			
		DOT ID & Guide 1017 124			
Exposure	Exposure NIOSH REL: C 0.5 ppm (1.45 mg/m ³) [15-minute]]		
Limits	OSHA PEL†: C 1 ppm	SHA PEL†: C 1 ppm (3 mg/m ³)			
IDLH 10 ppm See: $\frac{7782505}{1}$ Conversion 1 ppm = 2.90 mg/m ³					
Physical Description Greenish-yellow gas with a pungent, irritating odor. [Note: Shipped as a liquefied compressed gas.]					
MW: 70.9	BP: -29°F	P: -29°F FRZ: -150°F Sol: 0.7%			
VP: 6.8 atm	IP: 11.48 eV	RGasD: 2.47			
Fl.P: NA	UEL: NA	UEL: NA LEL: NA			
Nonflammable Gas, but a strong oxidizer.					
Incompatibilities & React Reacts explosively or form turpentine, ammonia, fuel g	s explosive compounds w	ith many common substance vided metals.	es such as acetylene, ether,		
Measurement Methods	Measurement Methods				

Personal Protection & Sanitation

NIOSH 6011: OSHA ID101

Skin: Frostbite Eyes: Frostbite

Wash skin: No recommendation Remove: No recommendation Change: No recommendation

Provide: Frostbite

First Aid (See procedures)

Eye: Frostbite Skin: Frostbite

Breathing: Respiratory support

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern*/(APF = 10) Any supplied-air respirator*

Up to 10 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern*/(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front-

or back-mounted canister providing protection against the compound of concern/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Burning of eyes, nose, mouth; lacrimation (discharge of tears), rhinorrhea (discharge of thin mucus); cough, choking, substernal (occurring beneath the sternum) pain; nausea, vomiting; headache, dizziness; syncope; pulmonary edema; pneumonitis; hypoxemia (reduced oxygen in the blood); dermatitis; liquid: frostbite

Target Organs Eyes, skin, respiratory system

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Chlorine dioxide	CAS 10049-04-4		
ClO ₂	RTECS FO3000000		
Synonyms & Trade Names Chlorine oxide, Chlorine per			DOT ID & Guide 9191 143 (hydrate, frozen)
Exposure	NIOSH REL: TWA 0.1 pp	MOSH REL: TWA 0.1 ppm (0.3 mg/m ³) ST 0.3 ppm (0.9	
Limits	OSHA PEL†: TWA 0.1 pj	OSHA PEL†: TWA 0.1 ppm (0.3 mg/m ³)	
IDLH 5 ppm	Conversion 1 ppm = 2.76 mg/m^3		
Physical Description Yellow to red gas or a red-b	orown liquid (below 52°F) w	vith an unpleasant odor similar	to chlorine and nitric acid.
MW: 67.5	BP: 52°F	FRZ: -74°F	Sol(77°F): 0.3%
VP: >1 atm	IP: 10.36 eV	RGasD: 2.33	Sp.Gr: 1.6 (Liquid at 32°F)
Fl.P: NA (Gas) ? (Liquid)	UEL: ?	JEL: ?	
Flammable Gas/Combustible	e Liquid		
Incompatibilities & Reactivities Organic materials, heat, phosphorus, potassium hydroxide, sulfur, mercury, carbon monoxide [Note: Unstable in light. A powerful oxidizer.]			
Measurement Methods OSHA ID202			

Personal Protection & Sanitation

Skin: Prevent skin contact (liquid) Eyes: Prevent eye contact (liquid) Wash skin: When contaminated (liquid)

Remove: When wet (flammable) Change: No recommendation

Provide: Eyewash (liquid), Quick drench (liquid)

First Aid (See procedures)

Eye: Irrigate immediately (liquid) Skin: Soap wash immediately (liquid)

Breathing: Respiratory support

Swallow: Medical attention immediately (liquid)

Respirator Recommendations NIOSH/OSHA

Up to 1 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern/(APF = 10) Any supplied-air respirator

Up to 2.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}/(APF = 25)$ Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern[£] Up to 5 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concernⁱ/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion (liquid), skin and/or eye contact

Symptoms Irritation eyes, nose, throat; cough, wheezing, bronchitis, pulmonary edema; chronic bronchitis

Target Organs Eyes, respiratory system

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RTECS FO2800000 DOT ID & Guide 1749 124	
SHA PEL: C 0.1 ppm (0.4 mg/m ³)	
Conversion 1 ppm = 3.78 mg/m^3	
what sweet, suffocating odor. [Note: Shipped as 5°F Sol: Reacts	
Sol: Reacts Sp.Gr: 1.77 (Liquid at 53°F)	
33.1)	
c materials may result in SPONTANEOUS	
i =	

None available

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact

Wash skin: When contaminated (liquid)

Remove: When wet or contaminated (liquid)

Change: No recommendation

Provide: Eyewash (liquid), Quick drench (liquid)

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately (liquid)

Respirator Recommendations NIOSH/OSHA

Up to 2.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$

Up to 5 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-

air respirator with a full facepiece

Up to 20 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion (liquid), skin and/or eye contact

Symptoms Eye, skin burns (liquid or high vapor concentration); respiratory irritation; in animals: lacrimation (discharge of tears), corneal ulcer; pulmonary edema

Target Organs Skin, eyes, respiratory system

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Chloroacetaldehyde			CAS 107-20-0
CICH ₂ CHO		RTECS AB2450000	
Synonyms & Trade Names Chloroacetaldehyde (40% aq			DOT ID & Guide 2232 153
Exposure	NIOSH REL: C 1 ppm (3 mg/m ³)		
Limits	OSHA PEL: C 1 ppm (3 mg/m ³)		
IDLH 45 ppm		Conversion 1 ppm = 3.21 mg/m^3	
Physical Description Colorless liquid with an acrie	d, penetrating odor. [Note: Ty	pically found as a 40% aqueo	ous solution.]
MW: 78.5	BP: 186°F	FRZ: -3°F (40% solution)	Sol: Miscible
VP: 100 mmHg	IP: 10.61 eV		Sp.Gr: 1.19 (40% solution)
Fl.P: 190°F (40% solution)	UEL: ?	LEL: ?	
Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.		nd below 200°F.	
Incompatibilities & Reactivities Oxidizers, acids			
Measurement Methods NIOSH 2015; OSHA 76			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supports Swallow: Medical attention	ort

Respirator Recommendations NIOSH/OSHA

Up to 10 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*

Up to 45 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation skin, eyes, mucous membrane; skin burns; eye damage; pulmonary edema; skin, respiratory system sensitization

Target Organs Eyes, skin, respiratory system

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alpha-Chloroacetophenone CAS 532-27-4				
C ₆ H ₅ COCH ₂ Cl RTECS A			RTECS AM6300000	
Synonyms & Trade Names 2-Chloroacetophenone, Chloromethyl phenyl ketone, Mace®, Phenacyl chloride, Phenyl chloromethyl ketone, Tear gas DOT ID & Guide 1697 153				
Exposure	NIOSH REL: TWA 0.3 mg/m ³ (0.05 ppm)			
Limits	OSHA PEL: TWA 0.3 mg/m ³ (0.05 ppm)			
$\boxed{ \textbf{IDLH } 15 \text{ mg/m}^3 } \boxed{ \textbf{Conversion } 1 \text{ ppm} = 6.32 \text{ mg/m}^3 }$				
Physical Description Colorless to gray crystalline solid with a sharp, irritating odor.				
MW: 154.6	BP: 472°F	MLT: 134°F	Sol: Insoluble	
VP: 0.005 mmHg	IP: 9.44 eV		Sp.Gr: 1.32	
Fl.P: 244°F	JEL: ? LEL: ?			
Combustible Solid				
-	Incompatibilities & Reactivities Water, steam, strong oxidizers [Note: Slowly corrodes metals.]			
Measurement Methods				

NIOSH P&CAM291 (II-5)

Personal Protection & SanitationSkin: Prevent skin contact

Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated

Change: Daily

Change: Daily Provide: Eyewash

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 3 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust and mist filter/(APF = 10) Any supplied-air respirator

Up to 7.5 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter $^{\pounds}$

Up to 15 mg/m³: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)

in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern and having a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern and having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; pulmonary edema

Target Organs Eyes, skin, respiratory system

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Chloroacetyl chlor	ride		CAS 79-04-9
CICH ₂ COCl			RTECS AO6475000
Synonyms & Trade Names Chloroacetic acid chloride, Chloroacetic chloride, Monochloroacetyl chloride		DOT ID & Guide 1752 156	
Exposure	NIOSH REL: TWA 0.05 pp	m (0.2 mg/m ³)	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 4.62 m	ng/m ³
Physical Description Colorless to yellowish liquid	with a strong, pungent odor.		
MW: 112.9	BP: 223°F	FRZ: -7°F	Sol: Decomposes
VP: 19 mmHg	IP: 10.30 eV		Sp.Gr: 1.42
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Liquid			
Incompatibilities & Reactive Water, alcohols, bases, metal hydrogen chloride gas.]	vities ls (corrosive), amines [Note:	Decomposes in water to form	chloroacetic acid &
Measurement Methods None available			
Personal Protection & Santa Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or conta Change: No recommendation Provide: Eyewash, Quick dre	nted minated 1	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supp Swallow: Medical attention	ort
Respirator Recommendation	ons To be added later		
<u>-</u>	ons To be added later, skin absorption, ingestion, s	kin and/or eye contact	
Exposure Routes inhalation	, skin absorption, ingestion, skin, respiratory system; eye, s	<u> </u>	lyspnea (breathing

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Chlorobenzene			CAS 108-90-7		
C ₆ H ₅ Cl			RTECS CZ0175000		
			DOT ID & Guide 1134 130		
Exposure NIOSH REL: See Appendix D					
Limits	OSHA PEL: TWA 75 ppm (350 mg/m ³)				
IDLH 1000 ppm			ng/m ³		
Physical Description Colorless liquid with an almond-like odor.					
MW: 112.6	BP: 270°F	BP: 270°F FRZ: -50°F Sol: 0.05%			
VP: 9 mmHg	IP: 9.07 eV Sp.Gr: 1.11		Sp.Gr: 1.11		
Fl.P: 82°F	UEL: 9.6%	LEL: 1.3%			
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	elow 100°F.			
Incompatibilities & Reactivities Strong oxidizers					
Measurement Methods NIOSH 1003; OSHA 7					
Personal Protection & Sanitation First Aid (See procedures)					
Skin: Prevent skin contact Eyes: Prevent eye contact		Eye: Irrigate immediately Skin: Soap wash promptly			
Wash skin: When contamina	ted	Breathing: Respiratory support			
Remove: When wet (flamma		Swallow: Medical attention i			
Change: No recommendation					

Respirator Recommendations OSHA

Up to 1000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose; drowsiness, incoordination; central nervous system depression; in animals: liver, lung, kidney injury

Target Organs Eyes, skin, respiratory system, central nervous system, liver

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o-Chlorobenzylidene malononitrile			CAS 2698-41-1	
CIC ₆ H ₄ CH=C(CN) ₂			RTECS 003675000	
			DOT ID & Guide 2810 153	
Exposure	Exposure NIOSH REL: C 0.05 ppm (0.4 mg/m³) [skin]			
Limits	OSHA PEL†: TWA 0.05 ppm (0.4 mg/m ³)			
IDLH 2 mg/m ³	IDLH 2 mg/m 3		ng/m ³	
Physical Description White crystalline solid with a pepper-like odor.				
MW: 188.6	BP: 590-599°F	BP: 590-599°F		
VP: 0.00003 mmHg	IP: ? Sp.Gr: ?		Sp.Gr: ?	
Fl.P: ?	UEL: ? LEL: ?		MEC: 25 g/m ³	
Combustible Solid				
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH P&CAM304 (II-5)				
Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or conta Change: Daily	nted/Daily	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo	ort	

Respirator Recommendations NIOSH/OSHA

Up to 2 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]/(APF = 50) Any airpurifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern and having a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern and having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Pain, burn eyes, lacrimation (discharge of tears), conjunctivitis; erythema (skin redness) eyelids, blepharospasm; irritation throat, cough, chest tightness; headache; erythema (skin redness), skin vesiculation

Target Organs Eyes, skin, respiratory system

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Chlorobromomethane			CAS 74-97-5
CH ₂ BrCl			RTECS PA5250000
Synonyms & Trade Names Bromochloromethane, CB, C chlorobromide	DOT ID & Guide 1887 160		
Exposure NIOSH REL: TWA 200 ppm (1050 mg/m ³)			
Limits	OSHA PEL: TWA 200 ppm (1050 mg/m ³)		
IDLH 2000 ppm			g/m ³
Physical Description Colorless to pale-yellow liquid with a chloroform-like odor. [Note: May be used as a fire extinguishing agent.]			
MW: 129.4	BP: 155°F	FRZ: -124°F	Sol: Insoluble
VP: 115 mmHg	IP: 10.77 eV		Sp.Gr: 1.93
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Liquid			
Incompatibilities & Reactivities Chemically-active metals such as calcium, powdered aluminum, zinc & magnesium			
Measurement Methods NIOSH 1003			

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 2000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, throat; confusion, dizziness, central nervous system depression; pulmonary edema

Target Organs Eyes, skin, respiratory system, liver, kidneys, central nervous system

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Chlorodifluoromethane CHCIF ₂ Synonyms & Trade Names Difluorochloromethane, Fluorocarbon-22, Freon® 22, Genetron® 22, Monochlorodifluoromethane, Refrigerant 22			CAS 75-45-6
			RTECS PA6390000
			DOT ID & Guide 1018 126
Exposure	Exposure NIOSH REL: TWA 1000 ppm (3500 mg/m ³) ST		1250 ppm (4375 mg/m ³)
Limits	OSHA PEL†: none	•	
IDLH N.D. See: IDLI	H INDEX	Conversion 1 ppm =	3.54 mg/m ³
Physical Description Colorless gas with a fa	aint, sweetish odor. [Note:	Shipped as a liquefied compres	sed gas.]
MW: 86.5	BP: -41°F	FRZ: -231°F	Sol(77°F): 0.3%
VP: 9.4 atm	IP: 12.45 eV	RGasD: 3.11	
Fl.P: NA	UEL: NA	LEL: NA	
Nonflammable Gas			
Incompatibilities & F Alkalis, alkaline earth		ıminum, sodium, potassium, zin	c)
Measurement Metho NIOSH 1018	ds		
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: No recommendation Change: No recommendation Provide: Frostbite		First Aid (See proce Eye: Frostbite Skin: Frostbite Breathing: Respirator	
Respirator Recomme	endations To be added late	er	
	alation alsin and/an ava acr	ntact (liquid)	
Exposure Routes inha	aration, skin and/or eye con	<u> </u>	
Symptoms Irritation re	<u> </u>	on, drowsiness, ringing in ears;	heart palpitations, cardiac

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Chlorodiphenyl (42% chlorine)			CAS 53469-21-9	
C ₆ H ₄ ClC ₆ H ₃ Cl ₂ (approx)			RTECS TQ1356000	
			DOT ID & Guide 2315 171	
Exposure	NIOSH REL*: Ca TWA 0.001 mg/m ³ See Appendix A [*Note: The REL also applies to other PCBs.]			
OSHA PEL: TWA 1 mg/m³ [skin]				
IDLH Ca [5 mg/m ³] Conversion				
Physical Description Colorless to light-colored, viscous liquid with a mild, hydrocarbon odor.				
MW: 258 (approx)	BP: 617-691°F FRZ: -2°F Sol: Insoluble			
VP: 0.001 mmHg	IP: ? Sp.Gr(77°F): 1.39			
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs, polychlorinated dibenzofurans & chlorinated dibenzo-p-dioxins.				
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH 5503				
Personal Protection & Sanitation Skin: Prevent skin contact Eye: Irrigate immediately Skin: Soap wash immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort	

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes; chloracne; liver damage; reproductive effects; [potential occupational carcinogen]

Target Organs Skin, eyes, liver, reproductive system

Cancer Site [in animals: tumors of the pituitary gland & liver, leukemia]

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a/m ³ Coo Amondin A F	RTECS TQ1360000 DOT ID & Guide 2315 171			
2/m ³ Soo Amondin A F*				
~/m3 Coo Amandin A [*				
NIOSH REL*: Ca TWA 0.001 mg/m ³ See Appendix A [*Note: The REL also applies to other PCBs.]				
g/m ³ [skin]				
iversion				
Physical Description Colorless to pale-yellow, viscous liquid or solid (below 50°F) with a mild, hydrocarbon odor.				
Z: 50°F	Sol: Insoluble			
	Sp.Gr(77°F): 1.38			
L: NA				
Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs, polychlorinated dibenzofurans, and chlorinated dibenzo-p-dioxins.				
Measurement Methods NIOSH 5503 See: NMAM or OSHA Methods				
	ort			
	nation of a black soot conins. It Aid (See procedures)			

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, chloracne; liver damage; reproductive effects; [potential occupational carcinogen]

Target Organs Skin, eyes, liver, reproductive system

Cancer Site [in animals: tumors of the pituitary gland & liver, leukemia]

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Chloroform			CAS 67-66-3		
CHCl ₃			RTECS FS9100000		
Synonyms & Trade Names Methane trichloride, Trichloromethane			DOT ID & Guide 1888 151		
Exposure NIOSH REL: Ca ST 2 ppm (9.78 mg/m ³) [60-minute] Se			nute] See Appendix A		
Limits	OSHA PEL†: C 50 ppm (240 mg/m ³)				
IDLH Ca [500 ppm] Convers		Conversion 1 ppm =	Conversion 1 ppm = 4.88 mg/m^3		
Physical Description Colorless liquid with a pleasant odor.					
MW: 119.4	BP: 143°F	BP: 143°F			
VP: 160 mmHg	IP: 11.42 eV	IP: 11.42 eV Sp.Gr: 1.48			
Fl.P: NA	UEL: NA LEL: NA				
Noncombustible Liquid					
Incompatibilities & Reactivities Strong caustics; chemically-active metals such as aluminum or magnesium powder, sodium & potassium; strong oxidizers [Note: When heated to decomposition, forms phosgene gas.]					
Measurement Methods					

NIOSH 1003

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

Change: No recommendation Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]

Target Organs Liver, kidneys, heart, eyes, skin, central nervous system

Cancer Site [in animals: liver & kidney cancer]

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bis-Chloromethyl ether			CAS 542-88-1		
(CH ₂ Cl) ₂ O			RTECS KN1575000		
Synonyms & Trade Names BCME, bis-CME, Chloromethyl ether, Dichlorodimethyl ether, Dichloromethyl ether, Oxybis(chloromethane)			DOT ID & Guide 2249 153		
Exposure NIOSH REL: Ca See Appendix A					
Limits	OSHA PEL: [1910.1008] <u>Se</u>	OSHA PEL: [1910.1008] See Appendix B			
IDLH Ca [N.D.]		Conversion			
Physical Description Colorless liquid with a sufform	Physical Description Colorless liquid with a suffocating odor.				
MW: 115.0	BP: 223°F	FRZ: -43°F	Sol: Reacts		
VP(72°F): 30 mmHg	IP: ?		Sp.Gr: 1.32		
Fl.P: <66°F	JEL: ? LEL: ?				
Class IB Flammable Liquid:	Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.				
Incompatibilities & Reactivities Acids, water [Note: Reacts with water to form hydrochloric acid & formaldehyde.]					
Measurement Methods OSHA 10					
Personal Protection & SanitationFirst Aid (See proced)Skin: Prevent skin contactEye: Irrigate immediEyes: Prevent eye contactSkin: Soap wash immedi			y		

Respirator Recommendations NIOSH

Wash skin: When contaminated/Daily

Remove: When wet (flammable)

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Breathing: Respiratory support

Swallow: Medical attention immediately

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane, respiratory system; pulmonary congestion, edema; corneal damage, necrosis; decreased pulmonary function, cough, dyspnea (breathing difficulty), wheezing; blood-stained sputum, bronchial secretions; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system

Cancer Site [lung cancer]

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Chloromethyl methyl ether			CAS 107-30-2		
CH ₃ OCH ₂ Cl			RTECS KN6650000		
Synonyms & Trade Names Chlorodimethyl ether, Chloro Methylchloromethyl ether	DOT ID & Guide 1239 131				
Exposure NIOSH REL: Ca See Appendix A					
Limits	OSHA PEL: [1910.1006] See Appendix B				
IDLH Ca [N.D.] Conversion					
Physical Description Colorless liquid with an irritating odor.					
MW: 80.5	BP: 138°F	FRZ: -154°F	Sol: Reacts		
VP(70°F): 192 mmHg	IP: 10.25 eV	IP: 10.25 eV Sp.Gr: 1.06			
Fl.P(oc): 32°F	UEL: ?				
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.			
Incompatibilities & Reactivities Water [Note: Reacts with water to form hydrochloric acid & formaldehyde.]					
Measurement Methods NIOSH P&CAM220 (II-1); OSHA 10					
Skin: Prevent skin contact		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately	V		

Respirator Recommendations NIOSH

Wash skin: When contaminated/Daily

Remove: When wet (flammable)

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Breathing: Respiratory support

Swallow: Medical attention immediately

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; pulmonary edema, pulmonary congestion, pneumonitis; skin burns, necrosis; cough, wheezing, pulmonary congestion; blood stained-sputum; weight loss; bronchial secretions; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system

Cancer Site [in animals: skin & lung cancer]

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NIOSH Pocket Guide to Chemical Hazards

1-Chloro-1-nitrop	CAS 600-25-9			
CH ₃ CH ₂ CHCINO ₂			RTECS TX5075000	
Synonyms & Trade Names Korax®, Lanstan®			DOT ID & Guide	
Exposure	NIOSH REL: TWA 2 ppm (10 mg/m ³)		
Limits	OSHA PEL†: TWA 20 ppm	(100 mg/m ³)		
IDLH 100 ppm		Conversion 1 ppm = 5.06 m	g/m ³	
Physical Description Colorless liquid with an unpleasant odor. [fungicide]				
MW: 123.6	BP: 289°F	FRZ: ?	Sol: 0.5%	
VP(77°F): 6 mmHg	IP: 9.90 eV		Sp.Gr: 1.21	
Fl.P(oc): 144°F	UEL: ?			
Class IIIA Combustible Liqu	uid: Fl.P. at or above 140°F ar	nd below 200°F.		
Incompatibilities & Reacti Strong oxidizers, acids	vities			
Measurement Methods NIOSH S211 (II-5)				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory supports Swallow: Medical attention in		

Respirator Recommendations NIOSH

Up to 20 ppm: (APF = 10) Any supplied-air respirator*

Up to 50 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*

Up to 100 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50)

Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes; pulmonary edema; liver, kidney, heart damage

Target Organs respiratory system, liver, kidneys, cardiovascular system, eyes

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Chloropentafluoro	ethane		CAS 76-15-3	
CCIF ₂ CF ₃			RTECS KH7877500	
		DOT ID & Guide 1020 126		
Exposure	NIOSH REL: TWA 1000 pp	m (6320 mg/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 6.32 m	g/m ³	
Physical Description Colorless gas with a slight, et	thereal odor. [Note: Shipped	as a liquefied compressed gas	.]	
MW: 154.5	BP: -38°F	FRZ: -223°F	Sol(77°F): 0.006%	
VP(70°F): 7.9 atm	IP: 12.96 eV	RGasD: 5.55		
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Gas				
Incompatibilities & Reactiv Alkalis, alkaline earth metals		ium, potassium, zinc)		
Measurement Methods None available				
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: No recommendation Change: No recommendation Provide: Frostbite		First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory support		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact (liquid)				
Symptoms Dyspnea (breathing difficulty); dizziness, incoordination, narcosis; nausea, vomiting; heart palpitations, cardiac arrhythmias, asphyxia; liquid: frostbite, dermatitis				
Target Organs Skin, central nervous system, cardiovascular system				

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NIOSH Pocket Guide to Chemical Hazards

Chloropicrin			CAS 76-06-2	
CCl ₃ NO ₂	CCl ₃ NO ₂			
Synonyms & Trade Names Nitrochloroform, Nitrotrichloromethane, Trichloronitromethane			DOT ID & Guide 1580 154 1583 154 (mixture, n.o.s.) 2929 131 (flammable mixture)	
Exposure	NIOSH REL: TWA 0.1 ppm	(0.7 mg/m^3)		
Limits	OSHA PEL: TWA 0.1 ppm	(0.7 mg/m^3)		
IDLH 2 ppm		Conversion 1 ppm = 6.72 m	ng/m ³	
Physical Description Colorless to faint-yellow, oil	ly liquid with an intensely irri	tating odor. [pesticide]		
MW: 164.4	BP: 234°F	FRZ: -93°F	Sol: 0.2%	
VP: 18 mmHg	IP: ?		Sp.Gr: 1.66	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid				
Incompatibilities & Reactive Strong oxidizers [Note: The	vities material may explode when h	eated under confinement.]		
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort	

Respirator Recommendations NIOSH/OSHA

Up to 2 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing

apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; lacrimation (discharge of tears); cough, pulmonary edema; nausea, vomiting

Target Organs Eyes, skin, respiratory system

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beta-Chloroprene			CAS 126-99-8	
CH ₂ =CCICH=CH ₂			RTECS EI9625000	
Synonyms & Trade Name 2-Chloro-1,3-butadiene; Ch			DOT ID & Guide 1991 131P (inhibited)	
Exposure	NIOSH REL: Ca C 1 ppm (3	3.6 mg/m ³) [15-minute] <u>See A</u>	Appendix A	
Limits	OSHA PEL†: TWA 25 ppm	(90 mg/m ³) [skin]		
IDLH Ca [300 ppm]		Conversion 1 ppm = 3.62 m	ng/m ³	
Physical Description Colorless liquid with a pungent, ether-like odor.				
MW: 88.5	BP: 139°F	FRZ: -153°F	Sol: Slight	
VP: 188 mmHg	IP: 8.79 eV		Sp.Gr: 0.96	
Fl.P: -4°F	UEL: 11.3%	LEL: 1.9%		
Class IB Flammable Liquid	Fl.P. below 73°F and BP at of	or above 100°F.		
Incompatibilities & Reacti Peroxides & other oxidizers	vities [Note: Polymerizes at room to	emperature unless inhibited w	ith antioxidants.]	
Measurement Methods NIOSH 1002; OSHA 112				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention	ort	

Respirator Recommendations NIOSH

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; anxiety, irritability; dermatitis; alopecia; reproductive effects; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, reproductive system

Cancer Site [lung & skin cancer]

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o-Chlorostyrene CAS 2039-87-				
CIC ₆ H ₄ CH=CH ₂			RTECS WL4160000	
Synonyms & Trade Names 2-Chlorostyrene, ortho-Chlor	rostyrene, 1-Chloro-2-ethenyl	benzene	DOT ID & Guide	
Exposure	NIOSH REL: TWA 50 ppm	(285 mg/m ³) ST 75 ppm (428	8 mg/m ³)	
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 5.67 m	ng/m ³	
Physical Description Colorless liquid.				
MW: 138.6	BP: 372°F	FRZ: -82°F	Sol: Insoluble	
VP(77°F): 0.96 mmHg	IP: ?		Sp.Gr: 1.10	
Fl.P: 138°F	UEL: ?	LEL: ?		
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.		
Incompatibilities & Reactive None reported	rities			
Measurement Methods None available				
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms In animals: irritation eyes, skin; hematuria (blood in the urine), proteinuria, acidosis; enlarged liver, jaundice				
Target Organs Eyes, skin, liver, kidneys, central nervous system, peripheral nervous system				
See also: INTRODUCTION				

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o-Chlorotoluene			CAS 95-49-8	
CIC ₆ H ₄ CH ₃			RTECS XS9000000	
Synonyms & Trade Names 1-Chloro-2-methylbenzene, 2-Chloro-1-methylbenzene, 2-Chlorotoluene, o-Tolyl chloride		DOT ID & Guide 2238 130		
Exposure	NIOSH REL: TWA 50 ppm	(250 mg/m ³) ST 75 ppm (375	5 mg/m ³)	
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 5.18 m	ng/m ³	
Physical Description Colorless liquid with an aron	matic odor.			
MW: 126.6	BP: 320°F	FRZ: -31°F	Sol(77°F): 0.009%	
VP(77°F): 4 mmHg	IP: 8.83 eV		Sp.Gr: 1.08	
Fl.P: 96°F	UEL: ?	LEL: ?		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	elow 100°F.		
Incompatibilities & Reactive Acids, alkalis, oxidizers, redu				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, mucous membrane; dermatitis; drowsiness, incoordination, anesthesia; cough; liver, kidney injury				
Target Organs Eyes, skin, r	respiratory system, central ner	vous system, liver, kidneys		

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2-Chloro-6-trichloromethyl pyridine			CAS 1929-82-4	
CIC ₅ H ₃ NCCl ₃			RTECS US7525000	
Synonyms & Trade Names 2-Chloro-6-(trichloro-methy picoline	s l)pyridine; Nitrapyrin; N-serv	ve®; 2,2,2,6-Tetrachloro-2-	DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 mg/r	n ³ (total) ST 20 mg/m ³ (total)	TWA 5 mg/m ³ (resp)	
Limits	OSHA PEL: TWA 15 mg/m	³ (total) TWA 5 mg/m ³ (resp))	
IDLH N.D.		Conversion		
Physical Description Colorless or white, crystallin	ne solid with a mild, sweet od	or.		
MW: 230.9	BP: ?	MLT: 145°F	Sol: Insoluble	
VP(73°F): 0.003 mmHg	IP: ?		Sp.Gr: ?	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Solid [Explosive	/e]			
Incompatibilities & Reactive Aluminum, magnesium [Not	vities te: Emits oxides of nitrogen ar	nd chloride ion when heated to	o decomposition.]	
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms No adverse effects noted in ingestion studies with animals.				
Target Organs Eyes, skin				
See also: INTRODUCTION				

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Chlorpyrifos			CAS 2921-88-2	
C ₉ H ₁₁ Cl ₃ NO ₃ PS			RTECS TF6300000	
Synonyms & Trade Names Chlorpyrifos-ethyl; O,O-Diethyl O-3,5,6-trichloro-2-pyridy. Dursban®		dyl phosphorothioate;	DOT ID & Guide 2783 152	
Exposure	NIOSH REL: TWA 0.2 mg/	/m ³ ST 0.6 mg/m ³ [skin]		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Colorless to white, crystallin may be combined with comb		an-like odor. [pesticide] [Note:	: Commercial formulations	
MW: 350.6	BP: 320°F (Decomposes)	MLT: 108°F	Sol: 0.0002%	
VP: 0.00002 mmHg	IP: ?		Sp.Gr: 1.40 (Liquid at 110°F)	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactive Strong acids, caustics, amine		& brass.]		
Measurement Methods NIOSH 5600; OSHA 62				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation		<u> </u>		
Symptoms Wheezing, laryngeal spasms, salivation; bluish lips, skin; miosis, blurred vision; nausea, vomiting, abdominal cramps, diarrhea				

Target Organs respiratory system, central nervous system, peripheral nervous system, plasma cholinesterase

See also: <u>INTRODUCTION</u>

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Chromic acid and chromates			CAS 1333-82-0 (CrO ₃)
CrO ₃ (acid)	RTECS GB6650000 (CrO ₃)		
Synonyms & Trade Names Chromic acid (CrO ₃): Chrom Chromium trioxide Synonyms of chromates (i.e. depending upon the specific	DOT ID & Guide 1755 154 (acid solution) 1463 141 (acid, solid)		
Exposure	NIOSH REL (as Cr): Ca TV	VA 0.001 mg/m ³ See Appendi	ix A See Appendix C
Limits	OSHA PEL (as CrO ₃): C 0.	1 mg/m ³ See Appendix C	
IDLH Ca [15 mg/m ³ {as Cr	(VI)}]	Conversion	
Physical Description CrO ₃ : Dark-red, odorless fla	kes or powder. [Note: Often	used in an aqueous solution (I	H ₂ CrO ₄).]
MW: 100.0	BP: 482°F (Decomposes)	MLT: 387°F (Decomposes)	Sol: 63%
VP: Very low	IP: NA		Sp.Gr: 2.70 (CrO ₃)
Fl.P: NA	UEL: NA	LEL: NA	
CrO ₃ : Noncombustible Solid	l, but will accelerate the burni	ng of combustible materials.	
Incompatibilities & Reactive Combustible, organic, or othe to metals		s (paper, wood, sulfur, alumin	um, plastics, etc.); corrosive
Measurement Methods NIOSH 7600, 7604; OSHA	ID103, ID215		
Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or conta Change: Daily Provide: Eyewash, Quick dre	nted minated	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory supports Swallow: Medical attention in	ort
Respirator Recommendations NIOSH At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF =			

10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation respiratory system; nasal septum perforation; liver, kidney damage; leukocytosis (increased blood leukocytes), leukopenia (reduced blood leukocytes), eosinophilia; eye injury, conjunctivitis; skin ulcer, sensitization dermatitis; [potential occupational carcinogen]

Target Organs Blood, respiratory system, liver, kidneys, eyes, skin

Cancer Site [lung cancer]

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Chromium(II) compounds (as Cr)			CAS	
			RTECS	
Synonyms & Trade Names Synonyms vary depending upon the specific Chromium(II) compound. [Note: Chromium(II) compounds include soluble chromous salts.]			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.5 mg/	m ³ See Appendix C		
Limits	OSHA PEL: TWA 0.5 mg/n	n ³ <u>See Appendix C</u>		
IDLH 250 mg/m ³ [as Cr(II)]]	Conversion		
Physical Description Appearance and odor vary d	epending upon the specific co	mpound.		
Properties vary depending upon the specific compound.				
Incompatibilities & Reactive Varies	vities			
Measurement Methods NIOSH 7024; OSHA ID121	, ID125G			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory sup Swallow: Medical attention	y port	
Respirator Recommendation	ons NIOSH/OSHA			

Up to 5 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators*/(APF =

Up to 12.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any

Up to 2.5 mg/m^3 : (APF = 5) Any dust and mist respirator*

powered, air-purifying respirator with a dust and mist filter*

10) Any supplied-air respirator*

Up to 25 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 250 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes; sensitization dermatitis

Target Organs Eyes, skin

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Chromium(III) compounds (as Cr)			CAS	
			RTECS	
Synonyms & Trade Names Synonyms vary depending upon the specific Chromium(III) compound. [Note: Chromium(III) compounds include soluble chromic salts.]			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.5 mg/	m ³ <u>See Appendix C</u>		
Limits	OSHA PEL: TWA 0.5 mg/n	n ³ <u>See Appendix C</u>		
IDLH 25 mg/m ³ [as Cr(III)]		Conversion		
Physical Description Appearance and odor vary d	epending upon the specific co	mpound.		
Properties vary depending upon the specific compound.				
Incompatibilities & Reactive Varies	vities			
Measurement Methods NIOSH 7024; OSHA ID121	, ID125G			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory sup Swallow: Medical attention	, port	
Respirator Recommendation	ons NIOSH/OSHA			

Up to 5 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators*/(APF =

Up to 12.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any

Up to 2.5 mg/m^3 : (APF = 5) Any dust and mist respirator*

powered, air-purifying respirator with a dust and mist filter*

10) Any supplied-air respirator*

Up to 25 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes; sensitization dermatitis

Target Organs Eyes, skin

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Chromium metal			CAS 7440-47-3	
Cr			RTECS GB4200000	
Synonyms & Trade Names Chrome, Chromium			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.5 mg/s	NIOSH REL: TWA 0.5 mg/m ³ See Appendix C		
Limits	OSHA PEL*: TWA 1 mg/m insoluble chromium salts.]	³ See Appendix C [*Note: Th	e PEL also applies to	
IDLH 250 mg/m ³ (as Cr)		Conversion		
Physical Description Blue-white to steel-gray, lustrous, brittle, hard, odorless solid.				
MW: 52.0	BP: 4788°F	MLT: 3452°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 7.14	
Fl.P: NA	UEL: NA LEL: NA			
Noncombustible Solid in bul	k form, but finely divided dus	st burns rapidly if heated in a	flame.	
Incompatibilities & Reactive Strong oxidizers (such as hydrogen such as hydrogen)				
Measurement Methods NIOSH 7024; OSHA ID121, ID125G				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory suppo		

Respirator Recommendations NIOSH

Up to 2.5 mg/m^3 : (APF = 5) Any dust and mist respirator*

Up to 5 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators*/(APF = 10) Any supplied-air respirator*

Up to 12.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter*

Up to 25 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 250 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; lung fibrosis (histologic)

Target Organs Eyes, skin, respiratory system

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Chromyl chloride			CAS 14977-61-8
Cr(OCl) ₂			RTECS GB5775000
			DOT ID & Guide 1758 137
Exposure	NIOSH REL: Ca 0.001 mg (Cr(VI)/m ³ See Appendix A Se	ee Appendix C
Limits	OSHA PEL: none		
IDLH Ca [N.D.]		Conversion	
Physical Description Deep-red liquid with a musty, burning, acrid odor. [Note: Fumes in moist air.]			
MW: 154.9	BP: 243°F	FRZ: -142°F	Sol: Reacts
VP: 20 mmHg	IP: 12.60 eV		Sp.Gr(77°F): 1.91
Fl.P: NA	UEL: NA LEL: NA		
Noncombustible Liquid, but	a powerful oxidizer.		
Incompatibilities & Reactivities Water, combustible substances, halides, phosphorus, turpentine [Note: Reacts violently in water; forms chromic acid, chromic chloride, hydrochloric acid & chlorine. Corrodes common metals.]			
Measurement Methods None available			
Personal Protection & Sanitation First Aid (See procedures)			
Skin: Prevent skin contact		Eye: Irrigate immediately	
Eyes: Prevent eye contact Wash skin: When contaminated		Skin: Water flush immediately Breathing: Respiratory support	
Remove: When wet or contaminated		Swallow: Medical attention immediately	
Change: No recommendation			,

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; eye, skin burns

Target Organs Eyes, skin, respiratory system

Cancer Site [lung cancer]

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Clopidol			CAS 2971-90-6	
		RTECS UU7711500		
, , , , , , , , , , , , , , , , , , ,		DOT ID & Guide		
Exposure	NIOSH REL: TWA 10 mg/r	n ³ (total) ST 20 mg/m ³ (total)	TWA 5 mg/m ³ (resp)	
Limits	OSHA PEL: TWA 15 mg/m	³ (total) TWA 5 mg/m ³ (resp))	
IDLH N.D.		Conversion		
Physical Description White to light-brown, crysta	lline solid.			
MW: 192.1	BP: ?	MLT: >608°F	Sol: Insoluble	
VP: ?	IP: ?		Sp.Gr: ?	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid, but d	ust may explode in cloud forr	n.		
Incompatibilities & Reactive None reported	vities			
Measurement Methods NIOSH 0500, 0600				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact				
Symptoms Irritation eyes, skin, nose, throat; cough				
Target Organs Eyes, skin, respiratory system				
See also: INTRODUCTION				

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Coal dust		CAS	
		RTECS GF8281000	
Synonyms & Trade Names Anthracite coal dust, Bituminous coal dust, Lignite coal dust		DOT ID & Guide 1361 133	
Evnoguro	NIOSH REL: See Appendix	D	
Exposure Limits	$\parallel OSHA DFI \div TWA 2.4 mg/m^3 (>5% SiO2) TWA 10 m$		$m^3/(\%SiO_2 + 2) (>5\%$
IDLH N.D.		Conversion	
Physical Description Dark-brown to black solid di	ispersed in air.		
Properties vary depending upon the specific coal type.			
Combustible Solid; slightly of	explosive when exposed to fla	me.	
Incompatibilities & Reactive None reported	vities		
Measurement Methods NIOSH 0600, 7500			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Fresh air	
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation			
Symptoms Chronic bronchit	is, decreased pulmonary func	tion, emphysema	
Target Organs respiratory s	ystem		
See also: INTRODUCTION			

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Coal tar pitch volatiles		CAS 65996-93-2	
			RTECS GF8655000
	upon the specific compound (ene & benzo(a)pyrene). [Note:		DOT ID & Guide
Exposure	NIOSH REL: Ca TWA 0.1 1 See Appendix C	mg/m ³ (cyclohexane-extractal	ple fraction) See Appendix A
Limits	OSHA PEL: TWA 0.2 mg/n	n ³ (benzene-soluble fraction)	[1910.1002] <u>See Appendix</u>
IDLH Ca [80 mg/m ³]		Conversion	
Physical Description Black or dark-brown amorp	hous residue.		
Properties vary depending upon the specific compound.			
Combustible Solids	<u> </u>		
Incompatibilities & Reacti Strong oxidizers	vities		
Measurement Methods OSHA 58			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention	ort
Respirator Recommendati At concentrations above the		is no REL, at any detectable o	concentration: (APF =

10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Dermatitis, bronchitis, [potential occupational carcinogen]

Target Organs respiratory system, skin, bladder, kidneys

Cancer Site [lung, kidney & skin cancer]

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Cobalt metal dust and fume (as Co)			CAS 7440-48-4	
Со			RTECS GF8750000	
Synonyms & Trade Names Cobalt metal dust, Cobalt metal fume			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.05 mg	$/m^3$		
Limits	OSHA PEL†: TWA 0.1 mg/	m^3		
IDLH 20 mg/m ³ (as Co)	IDLH 20 mg/m ³ (as Co) Conversion			
Physical Description Odorless, silver-gray to black	Physical Description Odorless, silver-gray to black solid.			
MW: 58.9	BP: 5612°F	MLT: 2719°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA	Sp.Gr: 8.92		
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid in bul	k form, but finely divided dus	st will burn at high temperatur	es.	
Incompatibilities & Reactivities Strong oxidizers, ammonium nitrate				
Measurement Methods NIOSH 7027, 7300; OSHA ID121, ID125G, ID213				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash		

Respirator Recommendations NIOSH

Wash skin: When contaminated

Change: Daily

Remove: When wet or contaminated

Up to 0.25 mg/m^3 : (APF = 5) Any dust and mist respirator^

Up to 0.5 mg/m^3 : (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators*^/(APF = 10) Any dust, mist, and fume respirator*/(APF = 10) Any supplied-air respirator*

Breathing: Respiratory support

Swallow: Medical attention immediately

Up to 1.25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter* $^/$ (APF = 25) Any powered, air-purifying respirator with a dust, mist, and fume filter*

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Up to 2.5 mg/m: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 20 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function; weight loss; dermatitis; diffuse nodular fibrosis; respiratory hypersensitivity, asthma

Target Organs Skin, respiratory system

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Cobalt carbonyl (as Co)		CAS 10210-68-1	
$\overline{\mathrm{C_8Co_2O_8}}$			RTECS GG0300000
Synonyms & Trade Names di-mu-Carbonylhexacarbonyldicobalt, Cobalt octacarbonyl, Cobalt tetracarbonyl dimer, Dicobalt carbonyl, Dicobalt Octacarbonyl, Octacarbonyldicobalt			DOT ID & Guide
Exposure	NIOSH REL: TWA 0.1 mg/	m ³	
Limits	OSHA PEL†: none		
IDLH N.D.	-	Conversion	
Physical Description Orange to dark-brown, crysta	alline solid. [Note: The pure	substance is white.]	
MW: 341.9	BP: 126°F (Decomposes)	MLT: 124°F	Sol: Insoluble
VP: 0.7 mmHg	IP: ?		Sp.Gr: 1.87
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid, but fla	ammable carbon monoxide is	s emitted during decompositio	n.
Incompatibilities & Reactive Air [Note: Decomposes on expression of the composes of the compos		in atmosphere of hydrogen &	carbon monoxide.]
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be added later			
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, skin, mucous membrane; cough, decreased pulmonary function, wheezing, dyspnea (breathing difficulty); in animals: liver, kidney injury, pulmonary edema			
Target Organs Eyes, skin, respiratory system, blood, central nervous system			

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Cobalt hydrocarbonyl (as Co)			
HCo(CO) ₄			
Synonyms & Trade Names Hydrocobalt tetracarbonyl, Tetracarbonylhydridocobalt, Tetracarbonylhydrocobalt		DOT ID & Guide	
NIOSH REL: TWA	0.1 mg/m ³		
OSHA PEL†: none			
	Conversion		
lor.			
BP: ?	FRZ: -15°F	Sol: 0.05%	
IP: ?	RGasD: 5.93		
UEL: ?	LEL: ?		
	in air at room temperature to	cobalt carbonyl & hydrogen.]	
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support		iately	
Respirator Recommendations To be added later			
tion, skin and/or eye con	tact		
	m; dyspnea (breathing difficu	lty), cough, decreased pulmonary	
in, respiratory system			
	mes yl, Tetracarbonylhydridoc NIOSH REL: TWA OSHA PEL†: none dor. BP: ? IP: ? UEL: ? activities that decomposes rapidly in the second contaminated ontaminated dations To be added lateration, skin and/or eye contamination respiratory systema	mes yl, Tetracarbonylhydridocobalt, Tetracarbonylhydrocob NIOSH REL: TWA 0.1 mg/m³ OSHA PEL†: none	

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Coke oven emissions			CAS	
			RTECS GH0346000	
Synonyms & Trade Names Synonyms vary depending upon the specific constituent.		DOT ID & Guide		
Exposure	NIOSH REL: Ca TWA 0.2 mg/m ³ (benzene-soluble fraction) See Appendix A See Appendix C			
Limits	OSHA PEL: [1910.1029] TV	OSHA PEL: [1910.1029] TWA 0.150 mg/m ³ (benzene-soluble fraction)		
IDLH Ca [N.D.]		Conversion		
Physical Description Emissions released during the for more information.]	Emissions released during the carbonization of bituminous coal for the production of coke. [Note: See Appendix C			
Properties vary depending upon the constituent.				
Incompatibilities & Reactive None reported	vities			
Measurement Methods OSHA 58				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Breathing: Respiratory suppo	ort	
Respirator Recommendation	ons NIOSH			

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

pressure breathing apparatus

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, respiratory system; cough, dyspnea (breathing difficulty), wheezing; [potential occupational carcinogen]

Target Organs Skin, respiratory system, urinary system

Cancer Site [skin, lung, kidney & bladder cancer]

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Copper (dusts and mists, as Cu)			CAS 7440-50-8	
Cu			RTECS GL5325000	
Synonyms & Trade Names Copper metal dusts, Copper			DOT ID & Guide	
Exposure	NIOSH REL*: TWA 1 mg/m³ [*Note: The REL also applies to other copper compounds (as Cu) except Copper fume.]			
Limits	OSHA PEL*: TWA 1 mg/m compounds (as Cu) except co	³ [*Note: The PEL also applied opper fume.]	es to other copper	
IDLH 100 mg/m ³ (as Cu)		Conversion		
Physical Description Reddish, lustrous, malleable, odorless solid.				
MW: 63.5	BP: 4703°F	BP: 4703°F MLT: 1981°F Sol: Insoluble		
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 8.94	
Fl.P: NA	UEL: NA LEL: NA			
Noncombustible Solid in bul	k form, but powdered form m	nay ignite.		
Incompatibilities & Reactivities Oxidizers, alkalis, sodium azide, acetylene				
Measurement Methods NIOSH 7029; OSHA ID121, ID125G				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supports Swallow: Medical attention in		

Respirator Recommendations NIOSH/OSHA

Up to 5 mg/m^3 : (APF = 5) Any dust and mist respirator*

Up to 10 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators*^/(APF = 10) Any supplied-air respirator*

Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter*

Up to 50 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, respiratory system; cough, dyspnea (breathing difficulty), wheezing; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, liver, kidneys (increase(d) risk with Wilson's disease)

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Copper fume (as Cu)			CAS 1317-38-0 (CuO)		
CuO/Cu			RTECS GL7900000 (CuO)		
Synonyms & Trade Names CuO: Black copper oxide fume, Copper monoxide fume, Copper(II) oxide fume, Cupric oxide fume Cu: Copper fume [Note: Also see specific listing for Copper (dusts and mists).]			DOT ID & Guide		
Exposure	NIOSH REL: TWA 0.1	mg/m^3			
Limits	OSHA PEL: TWA 0.1 r	mg/m ³			
IDLH 100 mg/m ³ (as Cu) Conversion					
Physical Description Finely divided black particulate dispersed in air. [Note: Exposure may occur in copper & brass plants and during the welding of copper alloys.]					
MW: 79.5	BP: Decomposes	BP: Decomposes MLT: 1879°F Sol: Insoluble (Decomposes)			
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 6.4 (CuO)		
Fl.P: NA	UEL: NA	UEL: NA LEL: NA			
CuO: Noncombustible Soli	d				
Incompatibilities & Reactivities CuO: Acetylene, zirconium [Note: See Copper (dusts and mists) for properties of Copper metal.]					
Measurement Methods NIOSH 7029; OSHA ID121, ID125G, ID206					
Personal Protection & Sa Skin: No recommendation Eyes: No recommendation Wash skin: No recommendat Remove: No recommendat Change: No recommendati	lation ion	First Aid (See procedure Breathing: Respiratory su	,		

powered, air-purifying respirator with a dust, mist, and fume filter

Up to 1 mg/m³: (APF = 10) Any dust, mist, and fume respirator/(APF = 10) Any supplied-air respirator

Up to 2.5 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

Respirator Recommendations NIOSH/OSHA

Up to 5 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, upper respiratory system; metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough, lassitude (weakness, exhaustion); metallic or sweet taste; discoloration skin, hair

Target Organs Eyes, skin, respiratory system (increase(d) risk with Wilson's disease)

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Cotton dust (raw)	CAS		
			RTECS GN2275000
Synonyms & Trade Names Raw cotton dust	S		DOT ID & Guide
	NIOSH REL: TWA <0.200 mg/m ³ See Appendix C		
Exposure Limits	OSHA PEL: [Z-1-A & 1910.1043] TWA 1 mg/m ³ (waste processing during waste recycling [sorting, blending, cleaning & willowing] & garnetting) TWA 0.200 mg/m ³ (textile yarn manufacturing) TWA 0.750 mg/m ³ (textile slashing & weaving) TWA 0.500 mg/m ³ (all other operations) See Appendix C		
IDLH 100 mg/m ³		Conversion	
Physical Description Colorless, odorless solid.			
MW: ?	BP: Decomposes	MLT: Decomposes	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: ?
Fl.P: NA	UEL: NA	LEL: NA	
Combustible Solid			
Incompatibilities & Reacti Strong oxidizers	vities		
Measurement Methods OSHA [1910.1043]			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Fresh air	
Respirator Recommendations NIOSH Up to 1 mg/m ³ : (APF = 5) Any dust respirator			
Up to 2 mg/m^3 : (APF = 10) Any dust respirator except single-use and quarter-mask respirators/(APF = 10) Any			

air-purifying respirator with a high-efficiency particulate filter/(APF = 10) Any supplied-air respirator

Up to 5 mg/m: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust filter

Up to 10 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation

Symptoms Byssinosis: chest tightness, cough, wheezing, dyspnea (breathing difficulty); decreased forced expiratory volume; bronchitis; malaise (vague feeling of discomfort); fever, chills, upper respiratory symptoms after initial exposure

Target Organs cardiovascular system, respiratory system

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Crag® herbicide			CAS 136-78-7	
C ₆ H ₃ Cl ₂ OCH ₂ CH ₂ OSO ₃ Na			RTECS KK4900000	
Synonyms & Trade Names Crag® herbicide No. 1; 2-(2,4-Dichlorophenoxy)ethyl sodium sulfate; Sesone		DOT ID & Guide		
Exposure	NIOSH REL: TWA 10 mg/s	m ³ (total) TWA 5 mg/m ³ (resp	p)	
Limits	OSHA PEL†: TWA 15 mg/	m ³ (total) TWA 5 mg/m ³ (res	p)	
IDLH 500 mg/m ³		Conversion		
Physical Description Colorless to white crystalline, odorless solid. [herbicide]				
MW: 309.1	BP: Decomposes	MLT: 473°F (Decomposes)	Sol(77°F): 26%	
VP: 0.1 mmHg	IP: ?		Sp.Gr: 1.70	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive Strong oxidizers, acids	vities			
Measurement Methods NIOSH S356 (II-5)				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash promptly Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendation	ons NIOSH			

Up to 500 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

Up to 100 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF =

Up to 250 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

Up to 50 mg/m^3 : (APF = 5) Any dust and mist respirator

powered, air-purifying respirator with a dust and mist filter

10) Any supplied-air respirator

filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; liver, kidney damage; in animals: central nervous system effects, convulsions

Target Organs Eyes, skin, central nervous system, liver, kidneys

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o-Cresol			CAS 95-48-7		
CH ₃ C ₆ H ₄ OH			RTECS GO6300000		
Synonyms & Trade Nam ortho-Cresol, 2-Cresol, o-C Hydroxytoluene, 2-Methyl	DOT ID & Guide 2076 153				
Exposure	NIOSH REL: TWA 2.	3 ppm (10 mg/m ³)			
Limits	OSHA PEL: TWA 5 p	pm (22 mg/m ³) [skin]			
IDLH 250 ppm	DLH 250 ppm				
Physical Description White crystals with a swee	Physical Description White crystals with a sweet, tarry odor. [Note: A liquid above 88°F.]				
MW: 108.2	BP: 376°F	MLT: 88°F	Sol: 2%		
VP(77°F): 0.29 mmHg	IP: 8.93 eV		Sp.Gr: 1.05		
Fl.P: 178°F	UEL: ?	LEL(300°F): 1.4%			
Combustible Solid Class II	IIA Combustible Liquid				
Incompatibilities & Reactivities Strong oxidizers, acids					
Measurement Methods NIOSH 2546; OSHA 32					
Dougonal Duotaction & Conitation First Aid (Con precedures)					

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 23 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust and mist filter/(APF = 10) Any supplied-air respirator

Up to 57.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter Up to 115 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 250 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; central nervous system effects: confusion, depression, respiratory failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin burns; dermatitis; lung, liver, kidney, pancreas damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys, pancreas, cardiovascular system

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m-Cresol			CAS 108-39-4	
CH ₃ C ₆ H ₄ OH			RTECS GO6125000	
• • •			DOT ID & Guide 2076 153	
Exposure	NIOSH REL: TWA 2.3 pp	m (10 mg/m ³)		
Limits	OSHA PEL: TWA 5 ppm	(22 mg/m ³) [skin]		
IDLH 250 ppm $ $ Conversion 1 ppm = 4.43 mg/m ³				
Physical Description Colorless to yellowish liquid	I with a sweet, tarry odor. [N	Note: A solid below 54°F.]		
MW: 108.2	BP: 397°F	FRZ: 54°F	Sol: 2%	
VP(77°F): 0.14 mmHg	IP: 8.98 eV		Sp.Gr: 1.03	
Fl.P: 187°F	UEL: ?	LEL(300°F): 1.1%		
Class IIIA Combustible Liqu	nid: Fl.P. at or above 140°F	and below 200°F.		
Incompatibilities & Reactivities Strong oxidizers, acids				
Measurement Methods NIOSH 2546; OSHA 32				

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 23 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust and mist filter/(APF = 10) Any supplied-air respirator

Up to 57.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter Up to 115 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 250 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; central nervous system effects: confusion, depression, respiratory failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin burns; dermatitis; lung, liver, kidney, pancreas damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys, pancreas, cardiovascular system

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p-Cresol			CAS 106-44-5	
CH ₃ C ₆ H ₄ OH			RTECS GO6475000	
• •			DOT ID & Guide 2076 153	
Exposure	NIOSH REL: TWA 2.3 pp	m (10 mg/m ³)		
Limits	OSHA PEL: TWA 5 ppm (22 mg/m ³) [skin]		
IDLH 250 ppm		Conversion 1 ppm = 4.43	mg/m^3	
Physical Description Crystalline solid with a sweet, tarry odor. [Note: A liquid above 95°F.]				
MW: 108.2	BP: 396°F	MLT: 95°F	Sol: 2%	
VP(77°F): 0.11 mmHg	IP: 8.97 eV		Sp.Gr: 1.04	
Fl.P: 187°F	UEL: ?	LEL(300°F): 1.1%		
Combustible Solid Class II	IA Combustible Liquid			
Incompatibilities & Reactivities Strong oxidizers, acids				
Measurement Methods NIOSH 2546; OSHA 32				
Personal Protection & Sa	nitation	First Aid (See procedures)	

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 23 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust and mist filter/(APF = 10) Any supplied-air respirator

Up to 57.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter Up to 115 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 250 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; central nervous system effects: confusion, depression, respiratory failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin burns; dermatitis; lung, liver, kidney, pancreas damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys, pancreas, cardiovascular system

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Crotonaldehyde			CAS 4170-30-3
CH ₃ CH=CHCHO			RTECS GP9499000
			DOT ID & Guide 1143 131P (inhibited)
Exposure	NIOSH REL: TWA 2 ppm	(6 mg/m ³) See Appendix C (A	Aldehydes)
Limits	OSHA PEL: TWA 2 ppm	(6 mg/m ³)	
IDLH 50 ppm	IDLH 50 ppm $\mathbf{Conversion} \ 1 \ \text{ppm} = 2.87 \ \text{mg/m}^3$		
Physical Description Water-white liquid with a su	ffocating odor. [Note: Turn	s pale-yellow on contact with a	ir.]
MW: 70.1	BP: 219°F	FRZ: -101°F	Sol: 18%
VP: 19 mmHg	IP: 9.73 eV		Sp.Gr: 0.87
Fl.P: 45°F	UEL: 15.5%	LEL: 2.1%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at	or above 100°F.	
Incompatibilities & Reactivities Caustics, ammonia, strong oxidizers, nitric acid, amines [Note: Polymerization may occur at elevated temperatures, such as in fire conditions.]			
Measurement Methods NIOSH 3516; OSHA 81			

Personal Protection & Sanitation Skin: Prevent skin contact

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 20 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 50 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing

apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, respiratory system; in animals: dyspnea (breathing difficulty), pulmonary edema, irritation skin

Target Organs Eyes, skin, respiratory system

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Crufomate			CAS 299-86-5		
C ₁₂ H ₁₉ ClNO ₃ P			RTECS TB3850000		
Synonyms & Trade Names 4-t-Butyl-2-chlorophenylmethyl methylphosphoramidate, Dowco® 132, Ruelene®		DOT ID & Guide			
Exposure	NIOSH REL: TWA 5 mg/	NIOSH REL: TWA 5 mg/m ³ ST 20 mg/m ³			
Limits	OSHA PEL†: none				
IDLH N.D.	1	Conversion			
Physical Description White, crystalline solid in p	ure form. [pesticide] [Note:	Commercial product is a yellow	v oil.]		
MW: 291.7	BP: Decomposes	MLT: 140°F	Sol: Insoluble		
VP(243°F): 0.01 mmHg	IP: ?		Sp.Gr: 1.16		
Fl.P: ?	UEL: ?	LEL: ?			
Combustible Solid					
Incompatibilities & Reacti Strongly alkaline & strongly 140°F.]		ble over long periods in aqueou	s preparations or above		
Measurement Methods NIOSH 0500; OSHA PV20	15				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort		
Respirator Recommendations To be added later					
_	Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
		eezing, dyspnea (breathing difficamps, diarrhea, nausea, anorexi			
Target Organs Eyes, skin,	respiratory system, blood ch	nolinesterase			

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Cumene			CAS 98-82-8	
$C_6H_5CH(CH_3)_2$			RTECS GR8575000	
			DOT ID & Guide 1918 130	
Exposure	NIOSH REL: TWA 50 ppm	(245 mg/m ³) [skin]		
Limits	OSHA PEL: TWA 50 ppm (245 mg/m ³) [skin]		
IDLH 900 ppm [10%LEL]		Conversion 1 ppm = 4.92 m	g/m ³	
Physical Description Colorless liquid with a sharp, penetrating, aromatic odor.				
MW: 120.2	BP: 306°F	FRZ: -141°F	Sol: Insoluble	
VP: 8 mmHg	IP: 8.75 eV		Sp.Gr: 0.86	
Fl.P: 96°F	UEL: 6.5%	LEL: 0.9%		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	low 100°F.		
Incompatibilities & Reactive Oxidizers, nitric acid, sulfur		droperoxide upon long exposi	ure to air.]	
Measurement Methods NIOSH 1501				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Up to 500 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 900 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma

Target Organs Eyes, skin, respiratory system, central nervous system

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Cyanamide			CAS 420-04-2	
NH ₂ CN			RTECS GS5950000	
Synonyms & Trade Names Amidocyanogen, Carbimide, Carbodiimide, Cyanogen nitride, Hydrogen cyanamide [Note: Cyanamide is also a synonym for Calcium cyanamide.]			DOT ID & Guide	
Exposure	NIOSH REL: TWA 2 mg/m	3		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Crystalline solid.				
MW: 42.1	BP: 500°F (Decomposes)	MLT: 113°F	Sol(59°F): 78%	
VP: ?	IP: 10.65 eV		Sp.Gr: 1.28	
Fl.P: 286°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactive Above 104°F: Moisture, acide evaporation of aqueous solutions	s, or alkalis; 1,2-phenylene d	liamine salts [Note: Polymeriz	cation may occur on	
Measurement Methods NIOSH 0500				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation,	, skin absorption, ingestion, s	kin and/or eye contact		

Symptoms Irritation eyes, skin, respiratory system; eye, skin burns; miosis, salivation, lacrimation (discharge of

Target Organs Eyes, skin, respiratory system, central nervous system

tears), twitching; Antabuse-like effects

Cyanogen

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CAS 460-19-5

NCCN			RTECS GT1925000	
Synonyms & Trade Names Carbon nitride, Dicyan, Dicyanogen, Ethanedinitrile, Oxalonitrile		DOT ID & Guide 1026 119		
Exposure	NIOSH REL: TWA 10 ppm (20 mg/m ³)			
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 2.13 m	ng/m ³	
Physical Description Colorless gas with a pungent, almond-like odor. [Note: Shipped as a liquefied compressed gas. Forms cyanide in the body.]				
MW: 52.0	BP: -6°F	FRZ: -18°F	Sol: 1%	
VP(70°F): 5.1 atm	IP: 13.57 eV	RGasD: 1.82	Sp.Gr: 0.95 (Liquid at -6°F)	
Fl.P: NA (Gas)	UEL: 32%	LEL: 6.6%		
Flammable Gas				
Incompatibilities & Reactive Acids, water, strong oxidizer cyanide, oxalic acid, or amm	rs (e.g., dichlorine oxide, fluor	rine) [Note: Slowly hydrolyze	d in water to form hydrogen	
Measurement Methods None available				
Personal Protection & Sanitation Skin: Frostbite Eyes: Prevent eye contact/Frostbite Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation Provide: Frostbite		First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory support		
Respirator Recommendations To be added later				

Target Organs Eyes, respiratory system, central nervous system, cardiovascular system

Symptoms Irritation eyes, nose, upper respiratory system; lacrimation (discharge of tears); cherry red lips,

tachypnea, hypernea, bradycardia; headache, convulsions; dizziness, loss of appetite, weight loss; liquid: frostbite

Exposure Routes inhalation, skin and/or eye contact

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Cyanogen chloride			CAS 506-77-4	
CICN			RTECS GT2275000	
Synonyms & Trade Names Chlorcyan, Chlorine cyanide, Chlorocyanide, Chlorocyanogen		DOT ID & Guide 1589 125 (inhibited)		
Exposure	NIOSH REL: C 0.3 ppm	n (0.6 mg/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm =	$= 2.52 \text{ mg/m}^3$	
Physical Description Colorless gas or liquid (be Forms cyanide in the bod		g odor. [Note: Shipped as a	a liquefied gas. A solid below 20°F.	
MW: 61.5	BP: 55°F	FRZ: 20°F	Sol: 7%	
VP: 1010 mmHg	IP: 12.49 eV	RGasD: 2.16	Sp.Gr: 1.22 (Liquid at 32°F)	
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Gas	·	·		
Incompatibilities & Rea Water, acids, alkalis, amn stabilized to prevent polymers Measurement Methods None available	nonia, alcohols [Note: Can re	eact very slowly with wate	er to form hydrogen cyanide. May b	
		Et Atl (Comme	. 4)	
Personal Protection & S Skin: Prevent skin contact			First Aid (See procedures) Eye: Irrigate immediately	
Eyes: Prevent eye contact	(liquid)	Skin: Water wash im	Skin: Water wash immediately (liquid)	
Wash skin: When contam			Breathing: Respiratory support	
Remove: When wet or contaminated (liquid) Change: No recommendation		Swallow: Medical at	tention immediately (liquid)	
Provide: Eyewash (liquid)				
Respirator Recommenda				

Exposure Routes inhalation, skin absorption (liquid), ingestion (liquid), skin and/or eye contact (liquid)

Symptoms Irritation eyes, upper respiratory system; cough, delayed pulmonary edema; lassitude (weakness, exhaustion), headache, dizziness, confusion, nausea, vomiting; irregular heartbeat; irritation skin (liquid)

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system

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Cyclohexane			CAS 110-82-7
C_6H_{12}			RTECS GU6300000
			DOT ID & Guide 1145 128
Exposure	NIOSH REL: TWA 300 ppn	n (1050 mg/m ³)	
Limits	OSHA PEL: TWA 300 ppm	(1050 mg/m ³)	
IDLH 1300 ppm [10%LEL]		Conversion 1 ppm = 3.44 m	ng/m ³
Physical Description Colorless liquid with a sweet, chloroform-like odor. [Note: A solid below 44°F.]			
MW: 84.2	BP: 177°F	FRZ: 44°F	Sol: Insoluble
VP: 78 mmHg	IP: 9.88 eV		Sp.Gr: 0.78
Fl.P: 0°F	UEL: 8%	LEL: 1.3%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.	
Incompatibilities & Reactive Oxidizers	vities		
Measurement Methods NIOSH 1500; OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory suppo	

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 1300 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; drowsiness; dermatitis; narcosis, coma

Target Organs Eyes, skin, respiratory system, central nervous system

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Cyclohexanethiol			CAS 1569-69-3
C ₆ H ₁₁ SH			RTECS GV7525000
			DOT ID & Guide 3054 131
Exposure	NIOSH REL: C 0.5 ppm (2.4	4 mg/m ³) [15-minute]	
Limits	OSHA PEL: none		
IDLH N.D.		Conversion 1 ppm = 4.75 m	g/m ³
Physical Description Colorless liquid with a strong, offensive odor.			
MW: 116.2	BP: 316°F FRZ: -181°F		Sol: Insoluble
VP: 10 mmHg	IP: ?	IP: ?	
Fl.P: 110°F	UEL: ?	LEL: ?	
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.	
Incompatibilities & Reactivities Oxidizers, reducing agents, strong acids, alkali metals			
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory supports Swallow: Medical attention in	ort

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; headache, dizziness, lassitude (weakness, exhaustion), nausea, vomiting, convulsions; cough, wheezing, laryngitis, dyspnea (breathing difficulty)

Target Organs Eyes, skin, respiratory system, central nervous system

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Cyclohexanol			CAS 108-93-0
С ₆ Н ₁₁ ОН			RTECS GV7875000
Anol, Cyclohexyl alcohol, Hexahydrophenol, Hexalin, Hydralin, Hydroxycyclohexane			DOT ID & Guide 1993 128 (combustible liquid, n.o.s.)
Exposure	Exposure NIOSH REL: TWA 50 ppm (200 mg/m ³) [skin]		
Limits	OSHA PEL†: TWA 50 ppm	(200 mg/m ³)	
IDLH 400 ppm Conversion 1 ppm = 4.10 m			ng/m ³
Physical Description Sticky solid or colorless to light-yellow liquid (above 77°F) with a camphor-like odor.			
MW: 100.2	BP: 322°F	MLT: 77°F	Sol: 4%
VP: 1 mmHg	IP: 10.00 eV		Sp.Gr: 0.96
Fl.P: 154°F	UEL: ?	LEL: ?	
Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.			
Incompatibilities & Reactivities Strong oxidizers (such as hydrogen peroxide & nitric acid)			
Measurement Methods			

Personal Protection & Sanitation

NIOSH 1402: OSHA 7

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Kemove. When wet of contaminated

Change: Daily

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 400 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; narcosis

Target Organs Eyes, skin, respiratory system

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Cyclohexanone			CAS 108-94-1	
$C_6H_{10}O$			RTECS GW1050000	
			DOT ID & Guide 1915 127	
Exposure	NIOSH REL: TWA 25 ppm	(100 mg/m ³) [skin]		
Limits	OSHA PEL†: TWA 50 ppm	(200 mg/m ³)		
IDLH 700 ppm		Conversion 1 ppm = 4.02 m	g/m ³	
Physical Description Water-white to pale-yellow l	Physical Description Water-white to pale-yellow liquid with a peppermint- or acetone-like odor.			
MW: 98.2	BP: 312°F	FRZ: -49°F	Sol: 15%	
VP: 5 mmHg	IP: 9.14 eV		Sp.Gr: 0.95	
Fl.P: 146°F	UEL: 9.4%	LEL(212°F): 1.1%		
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.		
Incompatibilities & Reactivities Oxidizers, nitric acid				
Measurement Methods NIOSH 1300; OSHA 1				
Personal Protection & Sani Skin: Prevent skin contact	tation	First Aid (See procedures) Eye: Irrigate immediately		
Eyes: Prevent eye contact		Skin: Water flush promptly		
Wash skin: When contaminated		Breathing: Respiratory support Swallow: Medical attention immediately		
Remove: When wet or conta Change: No recommendation		Swanow: Medical attention i	inneuratery	

Respirator Recommendations NIOSH

Up to 625 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$

Up to 700 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50)

Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; headache; narcosis, coma; dermatitis; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

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Cyclohexene			CAS 110-83-8
C_6H_{10}			RTECS GW2500000
			DOT ID & Guide 2256 130
Exposure	NIOSH REL: TWA 300 ppn	n (1015 mg/m ³)	
Limits	OSHA PEL: TWA 300 ppm	(1015 mg/m^3)	
IDLH 2000 ppm		Conversion 1 ppm = 3.36 m	ng/m ³
Physical Description Colorless liquid with a sweet odor.			
MW: 82.2	BP: 181°F	FRZ: -154°F	Sol: Insoluble
VP: 67 mmHg	IP: 8.95 eV		Sp.Gr: 0.81
Fl.P: 11°F	UEL: ?		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.	
Incompatibilities & Reactivities Strong oxidizers [Note: Forms explosive peroxides with oxygen upon storage.]			
Measurement Methods NIOSH 1500; OSHA 7			
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo	

Respirator Recommendations NIOSH/OSHA

Up to 2000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; drowsiness

Target Organs Eyes, skin, respiratory system, central nervous system

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Cyclohexylamine			CAS 108-91-8
$C_6H_{11}NH_2$			RTECS GX0700000
Synonyms & Trade Names Aminocyclohexane, Aminohexahydrobenzene, Hexahydroaniline, Hexahydrobenzenamine		paniline,	DOT ID & Guide 2357 132
Exposure	NIOSH REL: TWA 10 ppm	(40 mg/m^3)	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 4.06 m	ng/m ³
Physical Description Colorless or yellow liquid w	ith a strong, fishy, amine-like	odor.	
MW: 99.2	BP: 274°F	FRZ: 0°F	Sol: Miscible
VP: 11 mmHg	IP: 8.37 eV		Sp.Gr: 0.87
Fl.P: 88°F	UEL: 9.4%	LEL: 1.5%	
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	elow 100°F.	
Incompatibilities & Reactivities Oxidizers, organic compounds, acid anhydrides, acid chlorides, acids, lead [Note: Corrosive to copper, aluminum, zinc & galvanized steel.]			
Measurement Methods NIOSH 2010; OSHA PV201	6		
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort
Respirator Recommendations To be added later			
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, skin, mucous membrane, respiratory system; eye, skin burns; skin sensitization; cough, pulmonary edema; drowsiness, dizziness; diarrhea, nausea, vomiting			

Target Organs Eyes, skin, respiratory system, central nervous system

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Cyclonite			CAS 121-82-4
$C_3H_6N_6O_6$			RTECS XY9450000
Synonyms & Trade Names Cyclotrimethylenetrinitramine; Hexahydro-1,3,5-trinitro-s-triazine; RDX; Trimethylenetrinitramine; 1,3,5-Trinitro-1,3,5-triazacyclohexane			DOT ID & Guide
Exposure	NIOSH REL: TWA 1.5 mg/	m ³ ST 3 mg/m ³ [skin]	
Limits	OSHA PEL†: none		
IDLH N.D.	1	Conversion	
Physical Description White, crystalline powder. [I	Note: A powerful high explos	ive.]	
MW: 222.2	BP: ?	MLT: 401°F	Sol: Insoluble
VP(230°F): 0.0004 mmHg	IP: ?		Sp.Gr: 1.82
Fl.P: Explodes	UEL: ?	LEL: ?	
Combustible Solid [EXPLOS	SIVE!]		
Incompatibilities & Reactive Strong oxidizers, combustible		nates on contact with mercury	fulminate.]
Measurement Methods NIOSH 0500			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort
Respirator Recommendations To be added later			
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, sl vomiting, insomnia, convuls		itude (weakness, exhaustion),	tremor, nausea, dizziness,
Target Organs Eyes, skin, o	central nervous system		

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Cyclopentadiene			CAS 542-92-7
C_5H_6			RTECS GY1000000
Synonyms & Trade Names 1,3-Cyclopentadiene			DOT ID & Guide
Exposure	NIOSH REL: TWA 75 ppm	(200 mg/m ³)	
Limits	OSHA PEL: TWA 75 ppm (200 mg/m ³)	
IDLH 750 ppm		Conversion 1 ppm = 2.70 m	ng/m ³
Physical Description Colorless liquid with an irritating, terpene-like odor.			
MW: 66.1	BP: 107°F	FRZ: -121°F	Sol: Insoluble
VP: 400 mmHg	IP: 8.56 eV		Sp.Gr: 0.80
Fl.P(oc): 77°F	UEL: ?	LEL: ?	
Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.			
Incompatibilities & Reactivities Strong oxidizers, fuming nitric acid, sulfuric acid [Note: Polymerizes to dicyclopentadiene upon standing.]			
Measurement Methods NIOSH 2523			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo	

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 750 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 50) Any airpurifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose

Target Organs Eyes, respiratory system

See also: <u>INTRODUCTION</u>

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Cyclopentane			CAS 287-92-3	
C_5H_{10}		RTECS GY2390000		
Synonyms & Trade Names Pentamethylene		DOT ID & Guide 1146 128		
Exposure	NIOSH REL: TWA 600 ppn	NIOSH REL: TWA 600 ppm (1720 mg/m ³)		
Limits	OSHA PEL†: none	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 2.87 m	g/m ³	
Physical Description Colorless liquid with a mild,	sweet odor.			
MW: 70.2	BP: 121°F	FRZ: -137°F	Sol: Insoluble	
VP(88°F): 400 mmHg	IP: 10.52 eV		Sp.Gr: 0.75	
Fl.P: -35°F	UEL: 8.7%	LEL: 1.1%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.		
Incompatibilities & Reactivities Strong oxidizers (e.g., chlorine, bromine, fluorine)				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, nose, throat; dizziness, euphoria, incoordination, nausea, vomiting, stupor; dry, cracking skin				
Target Organs Eyes, skin, respiratory system, central nervous system				
See also: INTRODUCTION				

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Cyhexatin			CAS 13121-70-5	
$(C_6H_{11})_3SnOH$			RTECS WH8750000	
Synonyms & Trade Names TCHH, Tricyclohexylhydroxystannane, Tricyclohexylhydroxytin, Tricyclohexylstannium hydroxide, Tricyclohexyltin hydroxide			DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 mg/m	1 ³		
Limits	OSHA PEL†: TWA 0.32 m	g/m ³ [0.1 mg/m ³ (as Sn)]		
IDLH 80 mg/m ³ [25 mg/m ³	(as Sn)]	Conversion		
Physical Description Colorless to white, nearly od	orless, crystalline powder. [in	nsecticide]		
MW: 385.2	BP: 442°F (Decomposes)	MLT: 383°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: ?	
Fl.P: NA	UEL: NA	LEL: NA		
Incompatibilities & Reactive Strong oxidizers, ultraviolet				
Measurement Methods NIOSH 5504				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: No recommendation Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendation	ons OSHA			

Up to 3.2 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with

Up to 16 mg/m³: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas

Up to 8 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter

a dust and mist filter/(APF = 10) Any supplied-air respirator

mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 80 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; headache, dizziness; sore throat, cough; abdominal pain, vomiting; skin burns, pruritus; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, liver, kidneys

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		RTECS AG6825000	
		KIECS A00023000	
2,4-Dichlorophenoxyacetic a	Cl ₂ C ₆ H ₃ OCH ₂ COOH Synonyms & Trade Names Dichlorophenoxyacetic acid; 2,4-Dichlorophenoxyacetic acid		
NIOSH REL: TWA 10 mg/m	n ³		
OSHA PEL: TWA 10 mg/m ²	3		
	Conversion		
Physical Description White to yellow, crystalline, odorless powder. [herbicide]			
BP: Decomposes	MLT: 280°F	Sol: 0.05%	
IP: ?		Sp.Gr: 1.57	
UEL: NA	LEL: NA		
ay be dissolved in flammable	liquids.		
ities			
Measurement Methods NIOSH 5001			
Personal Protection & Sanitation First Aid (See procedures)			
Eyes: Prevent eye contact Wash skin: When contaminated		Breathing: Respiratory support	
ninated	Swallow: Medical attention immediately		
	NIOSH REL: TWA 10 mg/m OSHA PEL: TWA 10 mg/m odorless powder. [herbicide] BP: Decomposes IP: ? UEL: NA ay be dissolved in flammable ities tation ed	NIOSH REL: TWA 10 mg/m³ OSHA PEL: TWA 10 mg/m³ Conversion Dedorless powder. [herbicide] BP: Decomposes MLT: 280°F IP: ? UEL: NA LEL: NA ay be dissolved in flammable liquids. Letter of the procedures of the procedures of the procedures of the procedures of the procedure of the procedur	

Respirator Recommendations NIOSH/OSHA

Up to 100 mg/m³: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chinstyle, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter/(APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Lassitude (weakness, exhaustion), stupor, hyporeflexia, muscle twitching; convulsions; dermatitis; in animals: liver, kidney injury

Target Organs Skin, central nervous system, liver, kidneys

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DDT		CAS 50-29-3	
(C ₆ H ₄ Cl) ₂ CHCCl ₃		RTECS KJ3325000	
Synonyms & Trade Names p,p'-DDT; Dichlorodiphenyltrichloroethane; 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane		DOT ID & Guide 2761 151	
Exposure	NIOSH REL: Ca TWA 0.5	mg/m ³ See Appendix A	
Limits	OSHA PEL: TWA 1 mg/m ³	skin]	
IDLH Ca [500 mg/m ³]		Conversion	
Physical Description Colorless crystals or off-whi	te powder with a slight, arom	natic odor. [pesticide]	
MW: 354.5	BP: 230°F (Decomposes)	MLT: 227°F	Sol: Insoluble
VP: 0.0000002 mmHg	IP: ?		Sp.Gr: 0.99
Fl.P: 162-171°F	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reactivities Strong oxidizers, alkalis			
Measurement Methods NIOSH S274 (II-3)			
Personal Protection & Sanitation First Aid (See procedures)			

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

Eye: Irrigate immediately

Skin: Soap wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]

Target Organs Eyes, skin, central nervous system, kidneys, liver, peripheral nervous system

Cancer Site [in animals: liver, lung & lymphatic tumors]

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Decaborane			CAS 17702-41-9
$B_{10}H_{14}$			RTECS HD1400000
Synonyms & Trade Names Decaboron tetradecahydride			DOT ID & Guide 1868 134
Exposure	NIOSH REL: TWA 0.	3 mg/m ³ (0.05 ppm) ST 0.9	mg/m ³ (0.15 ppm) [skin]
Limits	OSHA PEL†: TWA 0.	3 mg/m ³ (0.05 ppm) [skin]	
IDLH 15 mg/m ³			= 5.00 mg/m ³
Physical Description Colorless to white crystalline	e solid with an intense, l	bitter, chocolate-like odor.	
MW: 122.2	BP: 415°F	MLT: 211°F	Sol: Slight
VP: 0.2 mmHg	IP: 9.88 eV		Sp.Gr: 0.94
Fl.P: 176°F	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reactivities Oxidizers, water, halogenated compounds (especially carbon tetrachloride) [Note: May ignite SPONTANEOUSLY on exposure to air. Decomposes slowly in hot water.]			
Measurement Methods None available			

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 3 mg/m^3 : (APF = 10) Any supplied-air respirator

Up to 7.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 15 mg/m^3 : (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Dizziness, headache, nausea, drowsiness; incoordination, localized muscle spasm, tremor, convulsions; lassitude (weakness, exhaustion); in animals: dyspnea (breathing difficulty); lassitude (weakness, exhaustion); liver, kidney damage

Target Organs central nervous system, liver, kidneys

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1-Decanethiol			CAS 143-10-2
CH ₃ (CH ₂) ₉ SH			RTECS
Synonyms & Trade Names Decylmercaptan, n-Decylmer			DOT ID & Guide 1228 131
Exposure	NIOSH REL: C 0.5 ppm (3.0	6 mg/m ³) [15-minute]	
Limits	OSHA PEL: none		
IDLH N.D.		Conversion 1 ppm = 7.13 m	ng/m ³
Physical Description Colorless liquid with a strong odor.			
MW: 174.4	BP: 465°F	FRZ: -15°F	Sol: Insoluble
VP: ?	IP: ?		Sp.Gr: 0.84
Fl.P: 209°F	UEL: ?		
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.		
Incompatibilities & Reactive Oxidizers, strong acids & base			
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory suppo	

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; confusion, dizziness, headache, drowsiness, nausea, vomiting, lassitude (weakness, exhaustion), convulsions

Target Organs Eyes, skin, respiratory system, central nervous system

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Demeton			CAS 8065-48-3
$(C_2H_5O)_2PSOC_2H_4SC_2H_5$			RTECS TF3150000
Synonyms & Trade Names O-O-Diethyl-O(and S)-2-(ethylthio)ethyl phosphorothioate mixture, Systox®			DOT ID & Guide
Exposure	NIOSH REL: TWA 0.1 mg/	m ³ [skin]	
Limits	OSHA PEL: TWA 0.1 mg/n	n ³ [skin]	
IDLH 10 mg/m ³		Conversion	
Physical Description Amber, oily liquid with a sulfur-like odor. [insecticide]			
MW: 258.3	BP: Decomposes	FRZ: <-13°F	Sol: 0.01%
VP: 0.0003 mmHg	IP: ?		Sp.Gr: 1.12
Fl.P: 113°F	UEL: ?	LEL: ?	
Class II Combustible Liquid	Fl.P. at or above 100°F and	below 140°F.	
Incompatibilities & Reactive Strong oxidizers, alkalis, was			
Measurement Methods NIOSH 5514			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash, Quick drench

Up to 1 mg/m^3 : (APF = 10) Any supplied-air respirator

Up to 2.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 5 mg/m^3 : (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 10 mg/m^3 : (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-

pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; miosis, ache eyes, rhinorrhea (discharge of thin mucus), headache; chest tightness, wheezing, laryngeal spasm, salivation, cyanosis; anorexia, nausea, vomiting, abdominal cramps, diarrhea; localized sweating; muscle fasciculation, lassitude (weakness, exhaustion), paralysis; dizziness, confusion, ataxia; convulsions, coma; low blood pressure; cardiac irregularities

Target Organs Eyes, skin, respiratory system, cardiovascular system, central nervous system, blood cholinesterase

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Diacetone alcohol CAS 123-42-2			
CH ₃ COCH ₂ C(CH ₃) ₂ OH			RTECS SA9100000
			DOT ID & Guide 1148 129
Exposure	NIOSH REL: TWA 50 ppm	(240 mg/m ³)	
Limits	OSHA PEL: TWA 50 ppm (240 mg/m ³)	
IDLH 1800 ppm [10%LEL]		Conversion 1 ppm = 4.75 m	g/m ³
Physical Description Colorless liquid with a faint,	minty odor.		
MW: 116.2	BP: 334°F	FRZ: -47°F	Sol: Miscible
VP: 1 mmHg	IP: ?		Sp.Gr: 0.94
Fl.P: 125°F	UEL: 6.9% LEL: 1.8%		
Class II Combustible Liquid	Fl.P. at or above 100°F and	below 140°F.	
Incompatibilities & Reactive Strong oxidizers, strong alka			
Measurement Methods NIOSH 1402; OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory supports Swallow: Medical attention is	

Respirator Recommendations NIOSH/OSHA

Up to 1250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$

Up to 1800 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50)

Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; corneal damage; in animals: narcosis, liver damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver

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2,4-Diaminoanisole (and its salts)			CAS 615-05-4
$(NH_2)_2C_6H_3OCH_3$			RTECS BZ8580500
Synonyms & Trade Names 1,3-Diamino-4-methoxybenzene; 4-Methoxy-1,3-benzene-diamine; 4-Methoxy-m- phenylene-diamine Synonyms of salts vary depending upon the specific compound.			m- DOT ID & Guide
Exposure Limits	Appendix A	Minimize occupational exposure	(especially skin exposures) <u>See</u>
	OSHA PEL: none		
IDLH Ca [N.D.]		Conversion	
component of hair & fu	ir dye formulations.]	e (including its salts such as 2,4-	,
MW: 138.2	BP: ?	MLT: 153°F	Sol: ?
VP: ?	IP: ?		Sp.Gr: ?
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & R Strong oxidizers	eactivities		
Measurement Method None available	ls		
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See proced Eye: Irrigate immedia Skin: Soap wash imm Breathing: Respirator Swallow: Medical atte	ntely ediately y support

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

Respirator Recommendations NIOSH

pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms In animals: irritation skin; thyroid, liver changes; teratogenic effects; [potential occupational carcinogen]

Target Organs Skin, thyroid, liver, reproductive system

Cancer Site [in animals: thyroid, liver, skin & lymphatic system tumors]

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o-Dianisidine			CAS 119-90-4
$(NH_2C_6H_3OCH_3)_2$			RTECS DD0875000
Synonyms & Trade Names Dianisidine; 3,3'-Dianisidine; 3,3'-Dimethoxybenzidine			DOT ID & Guide
Exposure	NIOSH REL: Ca See Appen	dix A See Appendix C	
Limits	OSHA PEL: See Appendix	<u>C</u>	
IDLH Ca [N.D.]		Conversion	
Physical Description Colorless crystals that turn a violet color on standing. [Note: Used as a basis for many dyes.]			yes.]
MW: 244.3	BP: ?	MLT: 279°F	Sol: Insoluble
VP: ?	IP: ?		Sp.Gr: ?
Fl.P: 403°F	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reaction Oxidizers	vities		
Measurement Methods NIOSH 5013; OSHA 71			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support	
Remove: When wet or contaminated		Swallow: Medical attention immediately	

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-

contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation skin; in animals: kidney, liver damage; thyroid, spleen changes; [potential occupational carcinogen]

Target Organs Skin, kidneys, liver, thyroid, liver

Cancer Site [in animals: bladder, liver, stomach & mammary gland tumors]

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Diazinon®		CAS 333-41-5		
$\boxed{C_{12}H_{21}N_2O_3PS}$			RTECS TF3325000	
• • •		DOT ID & Guide 2783 152		
Exposure	NIOSH REL: TWA 0.1 mg/s	m ³ [skin]		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Colorless liquid with a faint e	ester-like odor. [insecticide]	Note: Technical grade is pale	to dark brown.]	
MW: 304.4	BP: Decomposes	FRZ: ?	Sol: 0.004%	
VP: 0.0001 mmHg	IP: ?		Sp.Gr: 1.12	
Fl.P: 180°F	UEL: ?	LEL: ?		
Class IIIA Combustible Liqui	id: Fl.P. at or above 140°F ar	nd below 200°F.		
Incompatibilities & Reactive Strong acids & alkalis, coppe		te: Hydrolyzes slowly in wate	r & dilute acid.]	
Measurement Methods NIOSH 5600; OSHA 62				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms Irritation eyes; miosis, blurred vision; dizziness, confusion, lassitude (weakness, exhaustion), convulsions; dyspnea (breathing difficulty); salivation, abdominal cramps, nausea, vomiting				
Target Organs Eyes, respiratory system, central nervous system, cardiovascular system, blood cholinesterase				

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Diazomethane			CAS 334-88-3
CH_2N_2			RTECS PA7000000
Synonyms & Trade Names Azimethylene, Azomethylene, Diazirine			DOT ID & Guide
Exposure	NIOSH REL: TWA 0.2	ppm (0.4 mg/m ³)	
Limits	OSHA PEL: TWA 0.2 I	opm (0.4 mg/m ³)	
IDLH 2 ppm Conversion 1 ppm = 1.72 mg			= 1.72 mg/m ³
Physical Description Yellow gas with a musty ode	or. [Note: Shipped as a li	quefied compressed gas.]	
MW: 42.1	BP: -9°F	FRZ: -229°F	Sol: Reacts
VP: >1 atm	IP: 9.00 eV	RGasD: 1.45	
Fl.P: NA (Gas)	UEL: ?	LEL: ?	
Flammable Gas [EXPLOSIV	E!]		
Incompatibilities & Reactivities Alkali metals, water, drying agents such as calcium arsenate [Note: May explode violently on heating, exposure to sunlight, or contact with rough edges such as ground glass.]			
Measurement Methods			

Personal Protection & Sanitation

Skin: Frostbite Eyes: Frostbite

NIOSH 2515

Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation

Provide: Frostbite

First Aid (See procedures)

Eye: Frostbite Skin: Frostbite

Breathing: Respiratory support

Respirator Recommendations NIOSH/OSHA

Up to 2 ppm: (APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Irritation eyes; cough, shortness breath; headache, lassitude (weakness, exhaustion); flush skin, fever; chest pain, pulmonary edema, pneumonitis; asthma; liquid: frostbite

Target Organs Eyes, respiratory system

See also: <u>INTRODUCTION</u>

Diborane

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CAS 19287-45-7

Dibbiane			
B_2H_6			RTECS HQ9275000
			DOT ID & Guide 1911 119
Exposure	NIOSH REL: TWA 0.1 ppm	(0.1 mg/m^3)	
Limits	OSHA PEL: TWA 0.1 ppm	(0.1 mg/m^3)	
IDLH 15 ppm		Conversion 1 ppm = 1.13 m	g/m ³
Physical Description Colorless gas with a repulsive, sweet odor. [Note: Usually shipped in pressurized cylinders diluted with hydrogen, argon, nitrogen, or helium.]			
MW: 27.7	BP: -135°F	FRZ: -265°F	Sol: Reacts
VP(62°F): 39.5 atm	IP: 11.38 eV	RGasD: 0.97	
Fl.P: NA (Gas)	UEL: 88%	LEL: 0.8%	
Flammable Gas			
		zed surfaces, acids [Note: Will nydrogen & boric acid.]	l ignite spontaneously in
Measurement Methods NIOSH 6006			
Personal Protection & Sani Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation	ion n	First Aid (See procedures) Breathing: Respiratory suppo	ort

Up to 2.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 5 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a

continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

Respirator Recommendations NIOSH/OSHA

supplied-air respirator with a full facepiece

Up to 1 ppm: (APF = 10) Any supplied-air respirator

Up to 15 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation

Symptoms Chest tightness, precordial pain, shortness breath, nonproductive cough, nausea; headache, dizziness, chills, fever, lassitude (weakness, exhaustion), tremor, muscle fasciculation; in animals: liver, kidney damage; pulmonary edema; hemorrhage

Target Organs respiratory system, central nervous system, liver, kidneys

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1,2-Dibromo-3-chloropropane			CAS 96-12-8
CH ₂ BrCHBrCH ₂ Cl			RTECS TX8750000
			DOT ID & Guide 2872 159
Exposure	NIOSH REL: Ca See Appen	dix A	
Limits	OSHA PEL: [1910.1044] TV	WA 0.001 ppm	
IDLH Ca [N.D.]		Conversion 1 ppm = 9.67 m	ng/m ³
Physical Description Dense yellow or amber liquid with a pungent odor at high concentrations. [pesticide] [Note: A solid below 43°F.]			
MW: 236.4	BP: 384°F	FRZ: 43°F	Sol: 0.1%
VP: 0.8 mmHg	IP: ?		Sp.Gr: 2.05
Fl.P(oc): 170°F	UEL: ?	LEL: ?	
Class IIIA Combustible Liqu	nid: Fl.P. at or above 140°F and	nd below 200°F.	
Incompatibilities & Reactive Chemically-active metals su		& tin alloys [Note: Corrosive	to metals.]
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eye: Irrigate immediately Eyes: Prevent eye contact Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-

contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; drowsiness; nausea, vomiting; pulmonary edema; liver, kidney injury; sterility; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys, spleen, reproductive system, digestive system

Cancer Site [in animals: cancer of the nasal cavity, tongue, pharynx, lungs, stomach, adrenal & mammary glands]

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NIOSH Pocket Guide to Chemical Hazards

2-N-Dibutylaminoethanol			CAS 102-81-8
(C ₄ H ₉) ₂ NCH ₂ CH ₂ OH			RTECS KK3850000
Synonyms & Trade Names Dibutylaminoethanol; 2-Di-N-butylaminoethanol; 2-Di-N-butylaminoethyl alcohol; N,N-Dibutylethanolamine		DOT ID & Guide 2873 153	
Exposure	NIOSH REL: TWA 2 ppm (14 mg/m ³) [skin]		
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 7.09 m	ng/m ³
Physical Description Colorless liquid with a faint,	amine-like odor.		
MW: 173.3	BP: 446°F	FRZ: ?	Sol: 0.4%
VP: 0.1 mmHg	IP: ?		Sp.Gr: 0.86
Fl.P: 195°F	UEL: ?	LEL: ?	
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.	
Incompatibilities & Reactive Oxidizers	rities		
Measurement Methods NIOSH 2007			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be added later			
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact			
Symptoms In animals: irritation eyes, skin, nose; dermatitis; skin, corneal necrosis; weight loss			
Target Organs Eyes, skin, respiratory system			
See also: INTRODUCTION			

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Up to 10 ppm: (APF = 10) Any supplied-air respirator

supplied-air respirator with a full facepiece

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Dibutyl phosphate		CAS 107-66-4	
$(C_4H_9O)_2(OH)PO$		RTECS TB9605000	
Synonyms & Trade Names Dibutyl acid o-phosphate, Di-n-butyl hydrogen phosphate, Dibutyl phosphoric acid		DOT ID & Guide	
NIOSH REL: TWA 1 ppm (5 mg/m ³) ST 2 ppm (10 mg		(m^3)	
OSHA PEL†: TWA 1 ppm (5 mg/m ³)			
Conversion 1 ppm = 8.60 mg/m^3		ng/m ³	
Physical Description Pale-amber, odorless liquid.			
BP: 212°F (Decomposes)	FRZ: ?	Sol: Insoluble	
IP: ?		Sp.Gr: 1.06	
UEL: ?	LEL: ?		
rities			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	
	n-butyl hydrogen phosphate NIOSH REL: TWA 1 ppm (OSHA PEL†: TWA 1 ppm (BP: 212°F (Decomposes) IP: ? UEL: ? ities tation ted minated	n-butyl hydrogen phosphate, Dibutyl phosphoric acid NIOSH REL: TWA 1 ppm (5 mg/m³) ST 2 ppm (10 mg/m³) OSHA PEL†: TWA 1 ppm (5 mg/m³) Conversion 1 ppm = 8.60 m BP: 212°F (Decomposes) FRZ: ? IP: ? UEL: ? LEL: ? tation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supp Swallow: Medical attention	

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breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

Up to 30 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; headache

Target Organs Eyes, skin, respiratory system

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Dibutyl phthalate			CAS 84-74-2
$C_6H_4(COOC_4H_9)_2$			RTECS TI0875000
Synonyms & Trade Names DBP; Dibutyl 1,2-benzene-dicarboxylate; Di-n-butyl phthalate		DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 mg/m ³		
Limits	OSHA PEL: TWA 5 mg/m ³		
IDLH 4000 mg/m ³		Conversion 1 ppm = 11.57 mg/m^3	
Physical Description Colorless to faint-yellow, oily liquid with a slight, aromatic odor.			
MW: 278.3	BP: 644°F	FRZ: -31°F	Sol(77°F): 0.001%
VP: 0.00007 mmHg	IP: ?		Sp.Gr: 1.05
Fl.P: 315°F	UEL: ?	LEL(456°F): 0.5%	
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.		
Incompatibilities & Reactivities Nitrates; strong oxidizers, alkalis & acids; liquid chlorine			
Measurement Methods NIOSH 5020; OSHA 104			
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Wash regularly Breathing: Respiratory suppo	

Respirator Recommendations NIOSH/OSHA

Up to 50 mg/m^3 : (APF = 10) Any dust and mist respirator with a full facepiece

Up to 125 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with a dust and mist filter $^{\pounds}$

Up to 250 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 4000 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, upper respiratory system, stomach

Target Organs Eyes, respiratory system, gastrointestinal tract

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Dichloroacetylene			CAS 7572-29-4	
C_2Cl_2			RTECS AP1080000	
Synonyms & Trade Names DCA, Dichloroethyne [Note: DCA is a possible decomposition product of trichloroethylene or trichloroethane.]			DOT ID & Guide	
Exposure NIOSH REL: Ca C 0.1 ppm (0.4 mg/m ³) See Appendix A			1	
Limits	OSHA PEL†: none			
IDLH Ca [N.D.] Conversion 1 ppm = 3.88		Conversion 1 ppm = 3.88 m	ng/m ³	
Physical Description Volatile oil with a disagreeable, sweetish odor. [Note: A gas above 90°F. DCA is not produced commercially.]				
MW: 94.9	BP: 90°F (Explodes)	BP: 90°F (Explodes) FRZ: -58 to -87°F Sol: ?		
VP: ?	IP: ?		Sp.Gr: 1.26	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Liquid				
Incompatibilities & Reactivities Oxidizers, heat, shock				
Measurement Methods None available				
		First Aid (See procedures) Eye: Irrigate immediately		

Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation

Provide: Eyewash, Quick drench

Skin: Soap flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Headache, loss of appetite, nausea, vomiting, intense jaw pain, cranial nerve palsy; in animals: kidney, liver, brain injury; weight loss; [potential occupational carcinogen]

Target Organs central nervous system

Cancer Site [in animals: kidney tumors]

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o-Dichlorobenzene			CAS 95-50-1
$C_6H_4Cl_2$		RTECS CZ4500000	
		DOT ID & Guide 1591 152	
Exposure	NIOSH REL: C 50 ppm (300 mg/m ³)		
Limits	OSHA PEL: C 50 ppm (300 mg/m ³)		
IDLH 200 ppm	DLH 200 ppm Conversion 1 ppr		ng/m ³
Physical Description Colorless to pale-yellow liquid with a pleasant, aromatic odor. [herbicide]			
MW: 147.0	BP: 357°F	FRZ: 1°F	Sol: 0.01%
VP: 1 mmHg	IP: 9.06 eV		Sp.Gr: 1.30
Fl.P: 151°F	UEL: 9.2%	LEL: 2.2%	
Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.			
Incompatibilities & Reactivities Strong oxidizers, aluminum, chlorides, acids, acid fumes			
Measurement Methods NIOSH 1003; OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 200 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{£}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; liver, kidney damage; skin blisters

Target Organs Eyes, skin, respiratory system, liver, kidneys

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p-Dichlorobenzene			CAS 106-46-7
$C_6H_4Cl_2$			RTECS CZ4550000
			DOT ID & Guide 1592 152
Exposure	Exposure NIOSH REL: Ca See Appendix A		
Limits	OSHA PEL†: TWA 75 ppm (450 mg/m ³)		
IDLH Ca [150 ppm]	Conversion 1 ppm = 6.01 mg/m^3		ng/m ³
Physical Description Colorless or white crystalline solid with a mothball-like odor. [insecticide]			
MW: 147.0	BP: 345°F	MLT: 128°F	Sol: 0.008%
VP: 1.3 mmHg	IP: 8.98 eV		Sp.Gr: 1.25
Fl.P: 150°F	UEL: ?	LEL: 2.5%	
Combustible Solid, but may take some effort to ignite.			
Incompatibilities & Reactivities Strong oxidizers (such as chlorine or permanganate)			
Measurement Methods NIOSH 1003; OSHA 7			
Eyes: Prevent eye contact Wash skin: When contaminated/Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately	

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Eye irritation, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]

Target Organs Liver, respiratory system, eyes, kidneys, skin

Cancer Site [in animals: liver & kidney cancer]

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3,3'-Dichlorobenzidine (and its salts)			CAS 91-94-1
NH ₂ ClC ₆ H ₃ C ₆ H ₃ ClNH ₂			RTECS DD0525000
Synonyms & Trade Names 4,4'-Diamino-3,3'-dichlorobiphenyl; Dichlorobenzidine base; o,o'-Dichlorobenzidine; 3,3'-Dichlorobiphenyl-4,4'-diamine; 3,3'-Dichloro-4,4'-biphenyldiamine; 3,3'-Dichloro-4,4'-diaminobiphenyl			DOT ID & Guide
Exposure	NIOSH REL: Ca See Appendix A		
Limits	OSHA PEL: [1910.1007] See Appendix B		
IDLH Ca [N.D.]	DLH Ca [N.D.] Conversion		
Physical Description Gray to purple, crystalline solid.			
MW: 253.1	BP: 788°F	MLT: 271°F	Sol(59°F): 0.07%
VP: ?	IP: ?		Sp.Gr: ?
Fl.P: ?	UEL: ?	LEL: ?	
Incompatibilities & Reactive None reported	vities		
Measurement Methods NIOSH 5509; OSHA 65			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediatel Breathing: Respiratory supposed Swallow: Medical attention	ort

Respirator Recommendations NIOSH At concentrations above the NIOSH REI

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any

appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Skin sensitization, dermatitis; headache, dizziness; caustic burns; frequent urination, dysuria; hematuria (blood in the urine); gastrointestinal upset; upper respiratory infection; [potential occupational carcinogen]

Target Organs Bladder, liver, lung, skin, gastrointestinal tract

Cancer Site [in animals: liver & bladder cancer]

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Dichlorodifluoromethane			CAS 75-71-8	
CCl_2F_2			RTECS PA8200000	
			DOT ID & Guide 1028 126	
Exposure	NIOSH REL: TWA 100	0 ppm (4950 mg/m ³)		
Limits	OSHA PEL: TWA 1000) ppm (4950 mg/m ³)		
IDLH 15,000 ppm	,	Conversion 1 ppm = 4.95	mg/m ³	
Physical Description Colorless gas with an ethe gas.]	r-like odor at extremely hig	h concentrations. [Note: Shipped	l as a liquefied compressed	
MW: 120.9	BP: -22°F	FRZ: -252°F	Sol(77°F): 0.03%	
VP: 5.7 atm	IP: 11.75 eV	RGasD: 4.2		
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Gas	·	·	<u>'</u>	
Incompatibilities & Read Chemically-active metals		calcium, powdered aluminum, z	inc & magnesium	
Measurement Methods NIOSH 1018				
Personal Protection & Sa	anitation	First Aid (See procedures)		
Skin: Frostbite		Eye: Frostbite		
Eyes: Frostbite	1.4	III	Skin: Frostbite	
Wash skin: No recommen Remove: No recommenda		Breathing: Respiratory supp	port	
Change: No recommendat				
change. 140 recommendat	1011			

Respirator Recommendations NIOSH/OSHA

Provide: Frostbite

Up to 10,000 ppm: (APF = 10) Any supplied-air respirator

Up to 15,000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Dizziness, tremor, asphyxia, unconsciousness, cardiac arrhythmias, cardiac arrest; liquid: frostbite

Target Organs cardiovascular system, peripheral nervous system

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1,3-Dichloro-5,5-dimethylhydantoin			CAS 118-52-5	
$C_5H_6Cl_2N_2O_2$			RTECS MU0700000	
Synonyms & Trade Names Dactin, DDH, Halane			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.2 mg/	m ³ ST 0.4 mg/m ³		
Limits	OSHA PEL†: TWA 0.2 mg/	m ³		
IDLH 5 mg/m ³		Conversion		
Physical Description White powder with a chlorine-like odor.				
MW: 197.0	BP: ?	MLT: 270°F	Sol: 0.2%	
VP: ?	IP: ?		Sp.Gr: 1.5	
Fl.P: 346°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reacti Water, strong acids, easily of	vities oxidized materials such as amr	nonia salts & sulfides		
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supports Swallow: Medical attention		

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash

Up to 2 mg/m^3 : (APF = 10) Any supplied-air respirator

Up to 5 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern and having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, mucous membrane, respiratory system

Target Organs Eyes, respiratory system

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1,1-Dichloroethane			CAS 75-34-3
CHCl ₂ CH ₃			RTECS KI0175000
		DOT ID & Guide 2362 130	
Exposure	NIOSH REL: TWA 100 ppn	n (400 mg/m ³) See Appendix	C (Chloroethanes)
Limits	OSHA PEL: TWA 100 ppm	(400 mg/m ³)	
IDLH 3000 ppm		Conversion 1 ppm = 4.05 m	ng/m ³
Physical Description Colorless, oily liquid with a	chloroform-like odor.		
MW: 99.0	BP: 135°F	FRZ: -143°F	Sol: 0.6%
VP: 182 mmHg	IP: 11.06 eV		Sp.Gr: 1.18
Fl.P: 2°F	UEL: 11.4%	LEL: 5.4%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.	
Incompatibilities & Reactive Strong oxidizers, strong cause			
Measurement Methods NIOSH 1003; OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendation	ons NIOSH/OSHA		

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

Up to 3000 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

Up to 2500 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 1000 ppm: (APF = 10) Any supplied-air respirator

supplied-air respirator with a full facepiece

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation skin; central nervous system depression; liver, kidney, lung damage

Target Organs Skin, liver, kidneys, lungs, central nervous system

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1,2-Dichloroethylene			CAS 540-59-0		
CICH=CHCl			RTECS KV9360000		
			DOT ID & Guide 1150 132P		
Exposure	NIOSH REL: TWA 200 ppm	n (790 mg/m ³)			
Limits	OSHA PEL: TWA 200 ppm	(790 mg/m ³)			
IDLH 1000 ppm		Conversion 1 ppm = 3.97 m	ng/m ³		
Physical Description Colorless liquid (usually a n	Physical Description Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor.				
MW: 97.0	BP: 118-140°F	FRZ: -57 to -115°F	Sol: 0.4%		
VP: 180-265 mmHg	IP: 9.65 eV		Sp.Gr(77°F): 1.27		
Fl.P: 36-39°F	UEL: 12.8%	LEL: 5.6%			
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.			
Incompatibilities & Reacti Strong oxidizers, strong alka polymerization.]	vities llis, potassium hydroxide, copp	per [Note: Usually contains in	hibitors to prevent		
Measurement Methods NIOSH 1003; OSHA 7					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo			

Respirator Recommendations NIOSH/OSHA

Up to 2000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{£}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{£}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, respiratory system; central nervous system depression

Target Organs Eyes, respiratory system, central nervous system

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Dichloroethyl ether			CAS 111-44-4	
(ClCH ₂ CH ₂) ₂ O			RTECS KN0875000	
			DOT ID & Guide 1916 152	
Exposure NIOSH REL: Ca TWA 5 ppm (30 mg/m ³) ST 10 ppm (60 Appendix A		m (30 mg/m ³) ST 10 ppm (60	mg/m ³) [skin] <u>See</u>	
Limits	OSHA PEL†: TWA 15 ppm	(90 mg/m ³) [skin]		
IDLH Ca [100 ppm]			ng/m ³	
Physical Description Colorless liquid with a chlor	inated solvent-like odor.			
MW: 143.0	BP: 352°F	FRZ: -58°F	Sol: 1%	
VP: 0.7 mmHg	IP: ?		Sp.Gr: 1.22	
Fl.P: 131°F	UEL: ?	LEL: 2.7%		
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.		
Incompatibilities & Reactivities Strong oxidizers [Note: Decomposes in presence of moisture to form hydrochloric acid.]				
Measurement Methods NIOSH 1004: OSHA 7				

Personal Protection & SanitationSkin: Prevent skin contact

Eyes: Prevent skill contact

Wash skin: When contaminated

Remove: When wet or contaminated

Change: No recommendation

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately

Skin: Soap wash

Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation nose, throat, respiratory system; lacrimation (discharge of tears); cough; nausea, vomiting; in animals: pulmonary edema; liver damage; [potential occupational carcinogen]

Target Organs Eyes, respiratory system, liver

Cancer Site [in animals: liver tumors]

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Dichloromonofluoromethane			CAS 75-43-4
CHCl ₂ F			RTECS PA8400000
		DOT ID & Guide 1029 126	
Exposure	NIOSH REL: TWA 10 ppm	(40 mg/m^3)	
Limits	OSHA PEL†: TWA 1000 pp	om (4200 mg/m ³)	
IDLH 5000 ppm		Conversion 1 ppm = 4.21 m	g/m ³
Physical Description Colorless gas with a slight, e	ether-like odor. [Note: A liqui	d below 48°F. Shipped as a li	quefied compressed gas.]
MW: 102.9	BP: 48°F	FRZ: -211°F	Sol(86°F): 0.7%
VP(70°F): 1.6 atm	IP: 12.39 eV	RGasD: 3.57	
Fl.P: NA	UEL: NA	LEL: NA	
Nonflammable Gas			
Incompatibilities & Reactive Chemically-active metals sugfumes		ium, powdered aluminum, zir	ac & magnesium; acid; acid
Measurement Methods NIOSH 2516			
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: No recommendation Change: No recommendation Provide: Frostbite First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory support			ort
Respirator Recommendations NIOSH Up to 100 ppm: (APF = 10) Any supplied-air respirator Up to 250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode Up to 500 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Up to 5000 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-			

pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Asphyxia, cardiac arrhythmias, cardiac arrest; liquid: frostbite

Target Organs respiratory system, cardiovascular system

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1,1-Dichloro-1-nitroethane CAS 594-72-9				
CH ₃ CCl ₂ NO ₂			RTECS KI1050000	
			DOT ID & Guide 2650 153	
Exposure	NIOSH REL: TWA 2 ppm (10 mg/m ³)		
Limits	OSHA PEL†: C 10 ppm (60	mg/m^3)		
IDLH 25 ppm		Conversion 1 ppm = 5.89 m	ng/m ³	
Physical Description Colorless liquid with an unpleasant odor. [fumigant]				
MW: 143.9	BP: 255°F	FRZ: ?	Sol: 0.3%	
VP: 15 mmHg	IP: ?		Sp.Gr: 1.43	
Fl.P: 136°F	UEL: ?	LEL: ?		
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.		
Incompatibilities & Reactive Strong oxidizers [Note: Corr	vities osive to iron in presence of m	oisture.]		
Measurement Methods NIOSH 1601; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort	

Respirator Recommendations NIOSH

Up to 20 ppm: (APF = 10) Any supplied-air respirator

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes, skin; liver, heart, kidney damage; pulmonary edema, hemorrhage

Target Organs Eyes, skin, respiratory system, liver, kidneys, cardiovascular system

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1,3-Dichloropropene			CAS 542-75-6		
CIHC=CHCH ₂ Cl			RTECS UC8310000		
			DOT ID & Guide 2047 132		
Exposure	NIOSH REL: Ca TWA 1 ppi	m (5 mg/m ³) [skin] See Appe	endix A		
Limits	OSHA PEL†: none				
IDLH Ca [N.D.]		Conversion 1 ppm = 4.54 m	ng/m ³		
	Physical Description Colorless to straw-colored liquid with a sharp, sweet, irritating, chloroform-like odor. [insecticide] [Note: Exists as mixture of cis- & trans-isomers.]				
MW: 111.0	BP: 226°F	FRZ: -119°F	Sol: 0.2%		
VP: 28 mmHg	IP: ?		Sp.Gr: 1.21		
Fl.P: 77°F	UEL: 14.5%	LEL: 5.3%			
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	low 100°F.			
Incompatibilities & Reactivities Aluminum, magnesium, halogens, oxidizers [Note: Epichlorohydrin may be added as a stabilizer.]					
Measurement Methods None available					
Personal Protection & Sanitation Skin: Prevent skin contact First Aid (See procedures) Eye: Irrigate immediately					

Respirator Recommendations NIOSH

Eyes: Prevent eye contact

Wash skin: When contaminated

Remove: When wet (flammable)

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Skin: Soap flush immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; eye, skin burns; lacrimation (discharge of tears); headache, dizziness; in animals; liver, kidney damage; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

Cancer Site [in animals: cancer of the bladder, liver, lung & forestomach]

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2,2-Dichloropropionic acid			CAS 75-99-0		
CH ₃ CCl ₂ COOH			RTECS UF0690000		
			DOT ID & Guide 1760 154		
Exposure	NIOSH REL: TWA 1 ppm (6 mg/m ³)			
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion 1 ppm = 5.85 m	ng/m ³		
Physical Description Colorless liquid with an acrid odor. [herbicide] [Note: A white to tan powder below 46°F. The sodium salt, a white powder, is often used.]					
MW: 143.0	BP: 374°F	FRZ: 46°F	Sol: 50%		
VP: ?	IP: ?		Sp.Gr: 1.40		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Liquid					
Incompatibilities & Reacti Metals [Note: Very corrosiv acids.]	i vities re to aluminum & copper alloy	s. Reacts slowly in water to for	orm hydrochloric & pyruvic		
Measurement Methods OSHA PV2017					
Personal Protection & San	nitation	First Aid (See procedures)			
Skin: Prevent skin contact		Eye: Irrigate immediately			
Eyes: Prevent eye contact Wash skin: When contamin	atad	Skin: Water wash immediately			
Remove: When wet or cont		Breathing: Respiratory support Swallow: Medical attention immediately			
Change: No recommendation		5 manow. Producar attention	iiiiiio diatory		

Symptoms Irritation eyes, skin, upper respiratory system; skin burns; lassitude (weakness, exhaustion), loss of

Target Organs Eyes, skin, respiratory system, gastrointestinal tract, central nervous system

appetite, diarrhea, vomiting, slowing of pulse; central nervous system depression

Provide: Eyewash, Quick drench

Respirator Recommendations To be added later

Exposure Routes inhalation, ingestion, skin and/or eye contact

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Dichlorotetrafluoroethane			CAS 76-14-2
CCIF ₂ CCIF ₂			RTECS KI1101000
			DOT ID & Guide 1958 126
Exposure	NIOSH REL: TWA 100	00 ppm (7000 mg/m ³)	
Limits	OSHA PEL: TWA 1000	0 ppm (7000 mg/m ³)	
IDLH 15,000 ppm	,	Conversion 1 ppm = 6.99 r	mg/m ³
Physical Description Colorless gas with a faint liquefied compressed gas		ncentrations. [Note: A liquid below	v 38°F. Shipped as a
MW: 170.9	BP: 38°F	FRZ: -137°F	Sol: 0.01%
VP(70°F): 1.9 atm	IP: 12.20 eV	RGasD: 5.93	
Fl.P: NA	UEL: NA	LEL: NA	
Nonflammable Gas			
Incompatibilities & Rea Chemically-active metals fumes		, calcium, powdered aluminum, zi	nc & magnesium; acids; acid
Measurement Methods NIOSH 1018			
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: No recommendation Change: No recommendation Provide: Frostbite		First Aid (See procedures) Eye: Frostbite Skin: Frostbite	

Up to 15,000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 50) Any

self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full

Up to 10,000 ppm: (APF = 10) Any supplied-air respirator

facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Irritation respiratory system; asphyxia; cardiac arrhythmias, cardiac arrest; liquid: frostbite

Target Organs respiratory system, cardiovascular system

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Dichlorvos			CAS 62-73-7	
(CH ₃ O) ₂ P(O)OCH=CCl ₂			RTECS TC0350000	
		DOT ID & Guide 2783 152		
Exposure	NIOSH REL: TWA 1 mg/m	³ [skin]		
Limits	OSHA PEL: TWA 1 mg/m ³	[skin]		
IDLH 100 mg/m ³		Conversion 1 ppm = 9.04 m	ng/m ³	
Physical Description Colorless to amber liquid with	th a mild, chemical odor. [No	te: Insecticide that may be abo	sorbed on a dry carrier.]	
MW: 221.0	BP: Decomposes	FRZ: ?	Sol: 0.5%	
VP: 0.01 mmHg	IP: ?		Sp.Gr(77°F): 1.42	
Fl.P: >175°F	UEL: ?	LEL: ?		
Class III Combustible Liquid				
Incompatibilities & Reactive Strong acids, strong alkalis	vities Note: Corrosive to iron & mil	d steel.]		
Measurement Methods NIOSH P&CAM295 (II-5); OSHA 62				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo	ort	

Respirator Recommendations NIOSH/OSHA

Up to 10 mg/m^3 : (APF = 10) Any supplied-air respirator

Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 50 mg/m^3 : (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 mg/m^3 : (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-

pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; miosis, ache eyes; rhinorrhea (discharge of thin mucus); headache; chest tightness, wheezing, laryngeal spasm, salivation; cyanosis; anorexia, nausea, vomiting, diarrhea; sweating; muscle fasciculation, paralysis, dizziness, ataxia; convulsions; low blood pressure, cardiac irregularities

Target Organs Eyes, skin, respiratory system, cardiovascular system, central nervous system, blood cholinesterase

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Dicrotophos			CAS 141-66-2	
C ₈ H ₁₆ NO ₅ P			RTECS TC3850000	
Synonyms & Trade Names Bidrin®, Carbicron®, 2-Dimethyl cis-2-dimethylcarbamoyl-1-methylvinylphosphate			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.25 mg	/m ³ [skin]		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 9.70 m	g/m ³	
Physical Description Yellow-brown liquid with a	mild, ester odor. [insecticide]			
MW: 237.2	BP: 752°F	FRZ: ?	Sol: Miscible	
VP: 0.0001 mmHg	IP: ?		Sp.Gr(59°F): 1.22	
F1.P: >200°F	UEL: ?	LEL: ?		
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.			
Incompatibilities & Reactive Metals [Note: Corrosive to co	rities ast iron, mild steel, brass & st	ainless steel.]		
Measurement Methods NIOSH 5600				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				

Symptoms Headache, nausea, dizziness, anxiety, restlessness, muscle twitching, lassitude (weakness, exhaustion), tremor, incoordination, vomiting, abdominal cramps, diarrhea; salivation, sweating, lacrimation (discharge of tears),

rhinitis; anorexia, malaise (vague feeling of discomfort)

Target Organs central nervous system, blood cholinesterase

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Dicyclopentadiene			CAS 77-73-6
$C_{10}H_{12}$			RTECS PC1050000
Synonyms & Trade Names Bicyclopentadiene; DCPD; 1,3-Dicyclopentadiene dimer; 3a,4 methanoindene [Note: Exists in two stereoisomeric forms.]			DOT ID & Guide 2048 129
Exposure	NIOSH REL: TWA 5 ppm (30 mg/m ³)		
Limits	OSHA PEL†: none		
IDLH N.D.	N.D. Conversion 1 ppm = 5.41 m		g/m ³
Physical Description Colorless, crystalline solid with a disagreeable, camphor-like odor. [Note: A liquid above 90°F.]			
MW: 132.2	BP: 342°F	FRZ: 90°F	Sol: 0.02%
VP: 1.4 mmHg	IP: ?		Sp.Gr: 0.98 (Liquid at 95°F)
Fl.P(oc): 90°F	UEL: 6.3%	LEL: 0.8%	
Class IC Flammable Liquid Combustible Solid			
Incompatibilities & Reactivities Oxidizers [Note: Depolymerizes at boiling point and forms two molecules of cyclopentadiene. Must be inhibited and maintained under an inert atmosphere to prevent polymerization.]			
Measurement Methods None available			
Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be added later			
Exposure Routes inhalation, ingestion, skin and/or eye contact			

Symptoms Irritation eyes, skin, nose, throat; incoordination, headache; sneezing, cough; skin blisters; in animals:

kidney, lung damage

Target Organs Eyes, skin, respiratory system, central nervous system, kidneys

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Dicyclopentadienyl iron			CAS 102-54-5
$(C_5H_5)_2$ Fe		RTECS LK0700000	
Synonyms & Trade Names bis(Cyclopentadienyl)iron, Ferrocene, Iron dicyclopentadienyl		DOT ID & Guide	
Exposure			
Limits			
IDLH N.D.	1	Conversion	
Physical Description Orange, crystalline solid with a camphor-like odor.			
MW: 186.1	BP: 480°F	MLT: 343°F	Sol: Insoluble
VP: ?	IP: 6.88 eV		Sp.Gr: ?
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reactivities Ammonium perchlorate, tetranitromethane, mercury(II) nitrate			
Measurement Methods OSHA ID125G			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be added later			
Exposure Routes inhalation, ingestion, skin and/or eye contact			
Symptoms Possible irritation eyes, skin, respiratory system; in animals: liver, red blood cell, testicular changes			
Target Organs Eyes, skin, respiratory system, liver, blood, reproductive system			
See also: INTRODUCTION			

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Dieldrin			CAS 60-57-1	
C ₁₂ H ₈ Cl ₆ O			RTECS IO1750000	
Synonyms & Trade Names HEOD; 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo,exo-5,8-dimethanonaphthalene			DOT ID & Guide 2761 151	
Exposure	re NIOSH REL: Ca TWA 0.25 mg/m ³ [skin] See Appendix A			
Limits	OSHA PEL: TWA 0.25 mg/m ³ [skin]			
IDLH Ca [50 mg/m ³] Conve		Conversion		
Physical Description Colorless to light-tan crystals with a mild, chemical odor. [insecticide]				
MW: 380.9	BP: Decomposes MLT: 349°F Sol: 0.02%			
VP(77°F): 8 x 10-7 mmHg	IP: ?		Sp.Gr: 1.75	
Fl.P: NA	UEL: NA LEL: NA			
Noncombustible Solid				
Incompatibilities & Reactivities Strong oxidizers, active metals such as sodium, strong acids, phenols				
Measurement Methods NIOSH S283 (II-3)				

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort), sweating; myoclonic limb jerks; clonic, tonic convulsions; coma; [potential occupational carcinogen]; in animals: liver, kidney damage

Target Organs central nervous system, liver, kidneys, skin

Cancer Site [in animals: lung, liver, thyroid & adrenal gland tumors]

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Diesel exhaust			CAS
			RTECS
Synonyms & Trade Names Synonyms vary depending upon the specific diesel exhaust component.			DOT ID & Guide
Exposure	NIOSH REL: Ca See Appendix A		
Limits	OSHA PEL: none		
IDLH Ca [N.D.]		Conversion	
Physical Description Appearance and odor vary d	epending upon the specific di	esel exhaust component.	
Properties vary depending upon the specific component diesel exhaust component.			
Incompatibilities & Reacti Varies	vities		
Measurement Methods NIOSH 5040			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Respiratory support	
Respirator Recommendation	ons NIOSH		

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

pressure breathing apparatus

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Eye irritation, pulmonary function changes; [potential occupational carcinogen]

Target Organs Eyes, respiratory system

Cancer Site [in animals: lung tumors]

See also: <u>INTRODUCTION</u>

tears), cough, sneezing

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Diethanolamine			CAS 111-42-2	
(HOCH ₂ CH ₂) ₂ NH			RTECS KL2975000	
Synonyms & Trade Names DEA; Di(2-hydroxyethyl)amine; 2,2'-Dihydroxydiethyamine; Diolamine; bis(2-Hydroxyethyl)amine; 2,2'-Iminodiethanol			DOT ID & Guide	
Exposure	NIOSH REL: TWA 3 ppm (15 mg/m ³)			
Limits	OSHA PEL†: none			
IDLH N.D.	Conversion 1 ppm = 4.30 mg/m^3		ng/m ³	
Physical Description Colorless crystals or a syrupy, white liquid (above 82°F) with a mild, ammonia-like odor.				
MW: 105.2	BP: 516°F (Decomposes)	MLT: 82°F	Sol: 95%	
VP: <0.01 mmHg	IP: ?		Sp.Gr: 1.10	
Fl.P: 279°F	UEL: 9.8%	LEL: 1.6%		
Class IIIB Combustible Liquid Combustible Solid				
Incompatibilities & Reactivities Oxidizers, strong acids, acid anhydrides, halides [Note: Reacts with CO ₂ in the air. Hygroscopic (i.e., absorbs moisture from the air). Corrosive to copper, zinc & galvanized iron.]				
Measurement Methods NIOSH 3509; OSHA PV2018				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, nose, throat; eye burns, corneal necrosis; skin burns; lacrimation (discharge of				

Target Organs Eyes, skin, respiratory system

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Diethylamine			CAS 109-89-7
$(C_2H_5)_2NH$			RTECS HZ8750000
V V		DOT ID & Guide 1154 132	
Exposure	NIOSH REL: TWA 10 ppm (30 mg/m ³) ST 25 ppm (75 m		ng/m ³)
Limits	OSHA PEL†: TWA 25 ppm (75 mg/m ³)		
IDLH 200 ppm	Conversion 1 ppm = 2.99 m		ng/m ³
Physical Description Colorless liquid with a fishy, ammonia-like odor.			
MW: 73.1	BP: 132°F	FRZ: -58°F	Sol: Miscible
VP: 192 mmHg	IP: 8.01 eV		Sp.Gr: 0.71
Fl.P: -15°F	UEL: 10.1%	LEL: 1.8%	
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.			
Incompatibilities & Reactivities Strong oxidizers, strong acids, cellulose nitrate			
Measurement Methods NIOSH 2010; OSHA 41			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supports Swallow: Medical attention is	ort

Respirator Recommendations NIOSH

Provide: Eyewash (>0.5%), Quick drench (liquid)

Change: No recommendation

Up to 200 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{£}$ /(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern $^{£}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front-or back-mounted canister providing protection against the compound of concern/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; in animals; myocardial degeneration

Target Organs Eyes, skin, respiratory system, cardiovascular system

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2-Diethylaminoethanol			CAS 100-37-8		
(C ₂ H ₅) ₂ NCH ₂ CH ₂ OH			RTECS KK5075000		
			DOT ID & Guide 2686 132		
Exposure	NIOSH REL: TWA 10 ppi				
Limits	OSHA PEL: TWA 10 ppm (50 mg/m ³) [skin]				
IDLH 100 ppm Conversion 1 ppm = 4.79 mg			mg/m ³		
Physical Description Colorless liquid with a nause	Physical Description Colorless liquid with a nauseating, ammonia-like odor.				
MW: 117.2	BP: 325°F	BP: 325°F FRZ: -94°F Sol: Miscible			
VP: 1 mmHg	IP: ?		Sp.Gr: 0.89		
Fl.P: 126°F	UEL: ?				
Class II Combustible Liquid: Fl.P. at or above 100°F and below 140°F.					
Incompatibilities & Reactivities Strong oxidizers, strong acids					
Measurement Methods NIOSH 2007					

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated

Change: No recommendation

Provide: Eyewash (>5%), Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 100 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 50) Any airpurifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; nausea, vomiting

Target Organs Eyes, skin, respiratory system

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Diethylenetriamine			CAS 111-40-0		
(NH ₂ CH ₂ CH ₂) ₂ NH			RTECS IE1225000		
Synonyms & Trade Names N-(2-Aminoethyl)1,2-ethanediamine; bis(2-Aminoethyl)amine; DETA; 2,2'- Diaminodiethylamine			DOT ID & Guide 2079 154		
Exposure	NIOSH REL: TWA 1 ppm (4 mg/m ³) [skin]			
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion 1 ppm = 4.22 m	ng/m ³		
Physical Description Colorless to yellow liquid wi air).]	th a strong, ammonia-like od	or. [Note: Hygroscopic (i.e., a	bsorbs moisture from the		
MW: 103.2	BP: 405°F	FRZ: -38°F	Sol: Miscible		
VP: 0.4 mmHg	IP: ?		Sp.Gr: 0.96		
Fl.P: 208°F	UEL: 6.7%	LEL: 2%			
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.				
		explosive complexes with silv	ver, cobalt, or chromium		
Measurement Methods NIOSH 2540; OSHA 60					
Personal Protection & Sani Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or contact Change: No recommendation Provide: Eyewash, Quick dree	ted minated	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendation	Respirator Recommendations To be added later				
Exposure Routes inhalation,	, skin absorption, ingestion, sl	kin and/or eye contact			
Symptoms Irritation eyes, sk	in, mucous membrane, upper	respiratory system; dermatiti	s, skin sensitization; eye,		

skin necrosis; cough, dyspnea (breathing difficulty), pulmonary sensitization

Target Organs Eyes, skin, respiratory system

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Diethyl ketone			CAS 96-22-0
CH ₃ CH ₂ COCH ₂ CH ₃			RTECS SA8050000
Synonyms & Trade Names DEK, Dimethylacetone, Ethy	l ketone, Metacetone, 3-Penta	anone, Propione	DOT ID & Guide 1156 127
Exposure	NIOSH REL: TWA 200 ppn	n (705 mg/m ³)	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 3.53 m	ng/m ³
Physical Description Colorless liquid with an acet	one-like odor.		
MW: 86.2	BP: 215°F	FRZ: -44°F	Sol: 5%
VP(77°F): 35 mmHg	IP: 9.32 eV		Sp.Gr: 0.81
Fl.P(oc): 55°F	UEL: 6.4%	LEL: 1.6%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.	
Incompatibilities & Reactive Strong oxidizers, alkalis, min	vities neral acids, (hydrogen peroxid	e + nitric acid)	
Measurement Methods None available			
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: Daily Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be added later			
Exposure Routes inhalation, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, skin, mucous membrane, respiratory system; cough, sneezing			
Target Organs Eyes, skin, respiratory system			
See also: INTRODUCTION			

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Diethyl phthalate			CAS 84-66-2
$C_6H_4(COOC_2H_5)_2$			RTECS TI1050000
Synonyms & Trade Names DEP, Diethyl ester of phthalic acid, Ethyl phthalate		DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 mg/m	3	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description Colorless to water-white, oi	ly liquid with a very slight, an	romatic odor. [pesticide]	
MW: 222.3	BP: 563°F	FRZ: -41°F	Sol(77°F): 0.1%
VP(77°F): 0.002 mmHg	IP: ?		Sp.Gr: 1.12
Fl.P(oc): 322°F	UEL: ?	LEL(368°F): 0.7%	
Class IIIB Combustible Liqu	uid; however, ignition is diffic	cult.	•
Incompatibilities & Reacti Strong oxidizers, strong acid	vities ls, nitric acid, permanganates,	water	
Measurement Methods OSHA 104			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Wash regularly Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendati	ons To be added later		
Exposure Routes inhalation	, ingestion, skin and/or eye c	ontact	
Symptoms Irritation eyes, s	kin, nose, throat; headache, d	zziness, nausea; lacrimation	(discharge of tears); possible

polyneuropathy, vestibular dysfunc; pain, numbness, lassitude (weakness, exhaustion), spasms in arms & legs; in

Target Organs Eyes, skin, respiratory system, central nervous system, peripheral nervous system, reproductive

animals: reproductive effects

system

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Difluorodibromomethane			CAS 75-61-6	
CBr ₂ F ₂			RTECS PA7525000	
Synonyms & Trade Names Dibromodifluoromethane, Fr			DOT ID & Guide 1941 171	
Exposure	NIOSH REL: TWA 100 pp	om (860 mg/m ³)		
Limits	OSHA PEL: TWA 100 ppi	m (860 mg/m ³)		
IDLH 2000 ppm	IDLH 2000 ppm			
Physical Description Colorless, heavy liquid or ga	s (above 76°F) with a chara	cteristic odor.		
MW: 209.8	BP: 76°F	FRZ: -231°F	Sol: Insoluble	
VP: 620 mmHg	IP: 11.07 eV		Sp.Gr(59°F): 2.29	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid Nonflammable Gas				
Incompatibilities & Reactivities Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium				
Measurement Methods				

NIOSH 1012: OSHA 7

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: No recommendation Remove: When wet or contaminated Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 1000 ppm: (APF = 10) Any supplied-air respirator

Up to 2000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 50) Any selfcontained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation respiratory system; central nervous system symptoms; liver damage

Target Organs respiratory system, central nervous system, liver

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Diglycidyl ether			CAS 2238-07-5	
$\overline{\mathrm{C_6H_{10}O_3}}$			RTECS KN2350000	
Synonyms & Trade Name Diallyl ether dioxide; DGE; Epoxypropyl) ether	DOT ID & Guide			
Exposure	NIOSH REL: Ca TWA 0.	1 ppm (0.5 mg/m ³) See Append	lix A	
Limits	OSHA PEL†: C 0.5 ppm (2.8 mg/m ³)		
IDLH Ca [10 ppm]		Conversion 1 ppm = 5.33 n	ng/m ³	
Physical Description Colorless liquid with a stron	ng, irritating odor.			
MW: 130.2	BP: 500°F	FRZ: ?	Sol: ?	
VP(77°F): 0.09 mmHg	IP: ?		Sp.Gr: 1.12	
Fl.P: 147°F	UEL: ?	LEL: ?		
Class IIIA Combustible Liq	uid: Fl.P. at or above 140°F	and below 200°F.		
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods None available				
Personal Protection & Sanitation First Aid (See procedures)				

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact

Wash skin: When contaminated/Daily Remove: When wet or contaminated

Remove: when wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; skin burns; in animals: hematopoietic system, lung, liver, kidney damage; reproductive effects; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, reproductive system

Cancer Site [in animals: skin tumors]

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Diisobutyl ketone			CAS 108-83-8	
[(CH ₃) ₂ CHCH ₂] ₂ CO			RTECS MJ5775000	
Synonyms & Trade Names DIBK; sym-Diisopropyl acet	one; 2,6-Dimethyl-4-heptano	ne; Isovalerone; Valerone	DOT ID & Guide 1157 127	
Exposure	NIOSH REL: TWA 25 ppm	(150 mg/m ³)		
Limits	OSHA PEL†: TWA 50 ppm	(290 mg/m ³)		
IDLH 500 ppm		Conversion 1 ppm = 5.82 m	g/m ³	
Physical Description Colorless liquid with a mild, sweet odor.				
MW: 142.3	BP: 334°F	FRZ: -43°F	Sol: 0.05%	
VP: 2 mmHg	IP: 9.04 eV		Sp.Gr: 0.81	
Fl.P: 120°F	UEL(200°F): 7.1%	LEL(200°F): 0.8%		
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.		
Incompatibilities & Reactive Strong oxidizers	vities			
Measurement Methods NIOSH 1300; OSHA 7				
Personal Protection & Sanitation First Aid (See procedures)				
Skin: Prevent skin contact		Eye: Irrigate immediately		
Eyes: No recommendation		Skin: Soap wash promptly		
Wash skin: When contaminated		Breathing: Respiratory support		
Remove: When wet or contain		Swallow: Medical attention i	mmediately	
Change: No recommendation				

Respirator Recommendations NIOSH

Up to 500 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode \(\frac{\psi}{\psi} / (APF = 25) \) Any powered, air-purifying respirator with organic vapor cartridge(s) \(\frac{\psi}{\psi} / (APF = 50) \) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) \(\frac{\psi}{\psi} / (APF = 50) \) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; headache, dizziness; dermatitis; liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

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Diisopropylamine			CAS 108-18-9	
[(CH ₃) ₂ CH] ₂ NH			RTECS IM4025000	
			DOT ID & Guide 1158 132	
Exposure	NIOSH REL: TWA 5 ppm (20 mg/m ³) [skin]		
Limits	OSHA PEL: TWA 5 ppm (2	0 mg/m ³) [skin]		
IDLH 200 ppm See: <u>108189</u>		Conversion 1 ppm = 4.14 m	ng/m ³	
Physical Description Colorless liquid with an ammonia- or fish-like odor.				
MW: 101.2	BP: 183°F	FRZ: -141°F	Sol: Miscible	
VP: 70 mmHg	IP: 7.73 eV		Sp.Gr: 0.72	
Fl.P: 20°F	UEL: 7.1%	LEL: 1.1%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.		
Incompatibilities & Reactive Strong oxidizers, strong acid				
Measurement Methods NIOSH S141 (II-4)				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact (>5%) Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash immediate Breathing: Respiratory suppo	ort	

Respirator Recommendations NIOSH/OSHA

Change: No recommendation Provide: Eyewash (>5%)

Up to 125 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow $\text{mode}^{\pounds}/(\text{APF} = 25)$ Any powered, air-purifying respirator with organic vapor cartridge(s).

Up to 200 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50)

Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; nausea, vomiting; headache; visual disturbance

Target Organs Eyes, skin, respiratory system

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NIOSH Pocket Guide to Chemical Hazards

Dimethyl acetamide			CAS 127-19-5	
CH ₃ CON(CH ₃) ₂			RTECS AB7700000	
Synonyms & Trade Names N,N-Dimethyl acetamide; D			DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 ppm	(35 mg/m ³) [skin]		
Limits	OSHA PEL: TWA 10 ppm (35 mg/m ³) [skin]		
IDLH 300 ppm		Conversion 1 ppm = 3.56 m	ng/m ³	
Physical Description Colorless liquid with a weak, ammonia- or fish-like odor.				
MW: 87.1	BP: 329°F	FRZ: -4°F	Sol: Miscible	
VP: 2 mmHg	IP: 8.81 eV		Sp.Gr: 0.94	
Fl.P(oc): 158°F	UEL(320°F): 11.5%	LEL(212°F): 1.8%		
Class IIIA Combustible Liqu	nid: Fl.P. at or above 140°F ar	nd below 200°F.		
Incompatibilities & Reactive Carbon tetrachloride, other h		in contact with iron, oxidizers	S	
Measurement Methods NIOSH 2004				
Personal Protection & Sanitation First Aid (See procedures)				
Skin: Prevent skin contact		Eye: Irrigate immediately		
Eyes: Prevent eye contact Wash skin: When contaminated		Skin: Water flush immediately Breathing: Respiratory support		
Remove: When wet or contaminated		Swallow: Medical attention immediately		
Change: No recommendation				
Provide: Quick drench				

Respirator Recommendations NIOSH/OSHA

Up to 100 ppm: (APF = 10) Any supplied-air respirator

Up to 250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 300 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-

air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation skin; jaundice, liver damage; depression, drowsiness, hallucinations, delusions

Target Organs Skin, liver, central nervous system

Frostbite

Respirator Recommendations NIOSH/OSHA

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NIOSH Pocket Guide to Chemical Hazards

Dimethylamine			CAS 124-40-3	
$(CH_3)_2NH$			RTECS IP8750000	
Dimethylamine (anhydrous), N-Methylmethanamine			DOT ID & Guide 1032 118 (anhydrous) 1160 129 (solution)	
Exposure	NIOSH REL: TWA 10 ppm	(18 mg/m^3)		
Limits	OSHA PEL: TWA 10 ppm ((18 mg/m^3)		
IDLH 500 ppm		Conversion 1 ppm = 1.85 m	ng/m ³	
Physical Description Colorless gas with an ammonia- or fish-like odor. [Note: A liquid below 44°F. Shipped as a liquefied compressed gas.]				
MW: 45.1	BP: 44°F	FRZ: -134°F	Sol(140°F): 24%	
VP: 1.7 atm	IP: 8.24 eV	RGasD: 1.56	Sp.Gr: 0.67 (Liquid at 44°F)	
Fl.P: NA (Gas) 20°F (Liquid)	UEL: 14.4%	LEL: 2.8%		
Flammable Gas Class IA Fla	ammable Liquid			
Incompatibilities & Reacti Strong oxidizers, chlorine, n		s, maleic anhydride, aluminun	n, brass, copper, zinc	
Measurement Methods NIOSH 2010; OSHA 34				
Personal Protection & Sanitation Skin: Prevent skin contact (liquid)/Frostbite Eyes: Prevent eye contact (liquid)/Frostbite Wash skin: When contaminated (liquid) Remove: When wet (flammable) Change: No recommendation Provide: Eyewash (liquid), Quick drench (liquid),		First Aid (See procedures) Eye: Irrigate immediately (li Skin: Water flush immediate Breathing: Respiratory suppo	ely (liquid)/Frostbite	

Up to 250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]

Up to 500 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-

air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Irritation nose, throat; sneezing, cough, dyspnea (breathing difficulty); pulmonary edema; conjunctivitis; dermatitis; liquid: frostbite

Target Organs Eyes, skin, respiratory system

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NIOSH Pocket Guide to Chemical Hazards

4-Dimethylaminoazobenzene			CAS 60-11-7
$C_6H_5NNC_6H_4N(CH_3)_2$			RTECS BX7350000
Synonyms & Trade Names Butter yellow; DAB; p-Dimethylaminoazobenzene; N,N-Dimethyl-4- aminoazobenzene; Methyl yellow			DOT ID & Guide
Exposure	NIOSH REL: Ca See Apper	ndix A	
Limits	OSHA PEL: [1910.1015] <u>S</u>	ee Appendix B	
IDLH Ca [N.D.]		Conversion	
Physical Description Yellow, leaf-shaped crystals			
MW: 225.3	BP: Sublimes	MLT: 237°F	Sol: 0.001%
VP: 0.0000003 mmHg (est.)	IP: ?		Sp.Gr: ?
Fl.P: ?	UEL: ?	LEL: ?	
Incompatibilities & Reactive None reported	vities		
Measurement Methods NIOSH P&CAM284 (II-4)			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration. (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

pressure breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Enlarged liver; liver, kidney disturbance; contact dermatitis; cough, wheezing, dyspnea (breathing difficulty); bloody sputum; bronchial secretions; frequent urination, hematuria (blood in the urine), dysuria; [potential occupational carcinogen]

Target Organs Skin, respiratory system, liver, kidneys, bladder

Cancer Site [in animals: liver & bladder tumors]

See also: <u>INTRODUCTION</u>

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NIOSH Pocket Guide to Chemical Hazards

bis(2-(Dimethylamino)ethyl)ether			CAS 3033-62-3	
$C_8H_{20}N_2O$			RTECS KR9460000	
Synonyms & Trade Na NIAX® A99; NIAX® (component (5%) of NIA (95%).]				
Exposure	NIOSH REL: See	Appendix C (NIAX® Catalyst	ESN)	
Limits	OSHA PEL: See A	ppendix C (NIAX® Catalyst I	ESN)	
IDLH N.D.		Conversion		
Physical Description Liquid.				
MW: 160.3	BP: 372°F	FRZ: ?	Sol: ?	
VP: ?	IP: ?		Sp.Gr: ?	
Fl.P: ?	UEL: ?	LEL: ?		
Incompatibilities & Re	eactivities			
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See proc Eye: Irrigate immed Skin: Water flush in Breathing: Respirate Swallow: Medical a	liately nmediately	

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Possible urinary disturbance, neurological disorders; in animals: irritation eyes, skin

Target Organs Eyes, skin, urinary tract, peripheral nervous system

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Dimethylaminanronionitrila

NIOSH Pocket Guide to Chemical Hazards

CAS 1738-25-6

Dimethylaminopropionitrile			CAS 1730-23-0		
(CH ₃) ₂ NCH ₂ CH ₂ CN	RTECS UG1575000				
Synonyms & Trade Names 3-(Dimethylamino)propionity component (95%) of NIAX® ether (5%).]	DOT ID & Guide				
Exposure	NIOSH REL: See Appendix	C (NIAX® Catalyst ESN)			
Limits	OSHA PEL: See Appendix (C (NIAX® Catalyst ESN)			
IDLH N.D.		Conversion			
Physical Description Colorless liquid.					
MW: 98.2	BP: 342°F	FRZ: -48°F	Sol: Miscible		
VP(135°F): 10 mmHg	IP: ?		Sp.Gr(86°F): 0.86		
Fl.P: 147°F	UEL: ?	LEL: ?			
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.			
· · · · · · · · · · · · · · · · · · ·	Incompatibilities & Reactivities Oxidizers [Note: Emits toxic oxides of nitrogen and cyanide fumes when heated to decomposition.]				
Measurement Methods None available					
Personal Protection & Sant Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory suppo			

Respirator Recommendations NIOSH

Remove: When wet or contaminated

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Swallow: Medical attention immediately

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; urinary disturbance; neurological disorders; pins & needles in hands & feet; muscle weakness, lassitude (weakness, exhaustion), nausea, vomiting; decreased nerve conduction in lower legs

Target Organs Eyes, skin, central nervous system, urinary tract

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N,N-Dimethylaniline			CAS 121-69-7	
$C_6H_5N(CH_3)_2$			RTECS BX4725000	
Synonyms & Trade Names N,N-Dimethylbenzeneamine; N,N-Dimethylphenylamine [Note: Also known as Dimethylaniline which is a correct synonym for Xylidine.]			DOT ID & Guide 2253 153	
Exposure NIOSH REL: TWA 5 ppm (25 mg/m ³) ST 10 ppm (50 m			g/m ³) [skin]	
Limits	OSHA PEL†: TWA 5 ppm (25 mg/m ³) [skin]			
IDLH 100 ppm		Conversion 1 ppm = 4.96 mg/m ³		
Physical Description Pale yellow, oily liquid with an amine-like odor. [Note: A solid below 36°F.]				
MW: 121.2	BP: 378°F FRZ: 36°F Sol: 2%			
VP: 1 mmHg	IP: 7.14 eV		Sp.Gr: 0.96	
Fl.P: 142°F	UEL: ?			
Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.				
Incompatibilities & Reactivities Strong oxidizers, strong acids, benzoyl peroxide				
Measurement Methods NIOSH 2002; OSHA PV2064				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

Change: No recommendation Provide: Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 50 ppm: (APF = 10) Any supplied-air respirator

Up to 100 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Anoxia symptoms: cyanosis, lassitude (weakness, exhaustion), dizziness, ataxia; methemoglobinemia

Target Organs Blood, kidneys, liver, cardiovascular system

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NIOSH Pocket Guide to Chemical Hazards

Dimethyl carbamoyl chloride			CAS 79-44-7	
(CH ₃) ₂ NCOCl			RTECS FD4200000	
Synonyms & Trade Names Chloroformic acid dimethyla Dimethylcarbamoyl chloride	amide; Dimethylcarbamic ch	lloride; N,N-	DOT ID & Guide 2262 156	
Exposure NIOSH REL: Ca See Appendix A				
Limits	OSHA PEL: none			
IDLH Ca [N.D.]		Conversion		
Physical Description Clear, colorless liquid.				
MW: 107.6	BP: 329°F	FRZ: -27°F	Sol: Reacts	
VP: ?	IP: ?		Sp.Gr: 1.17	
Fl.P: 155°F	UEL: ?	LEL: ?		
Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.				
Incompatibilities & Reactivities Acids, water [Note: Rapidly hydrolyzes in water to dimethylamine, carbon dioxide, and hydrogen chloride.]				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact First Aid (See procedures) Eye: Irrigate immediately				

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation

Provide: Eyewash, Quick drench

Eye: Irrigate immediately

Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat, respiratory system; eye, skin burns; cough, wheezing, larnygitis, dyspnea (breathing difficulty); headache, nausea, vomiting; liver injury; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, liver

Cancer Site [in animals: nasal cancer]

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Dimethyl-1,2-dibromo-2,2-dichlorethyl phosphate CAS 300-76-5				
(CH ₃ O) ₂ P(O)OCHBrCBrCl ₂			RTECS TB9450000	
Synonyms & Trade Names Dibrom®; 1,2-Dibromo-2,2-dichloroethyl dimethyl phosphate; Naled			DOT ID & Guide	
Exposure	NIOSH REL: TWA 3 mg/n	n ³ [skin]		
Limits	OSHA PEL†: TWA 3 mg/n	OSHA PEL†: TWA 3 mg/m ³		
IDLH 200 mg/m ³		Conversion		
Physical Description Colorless to white solid or straw-colored liquid (above 80°F) with a slightly pungent odor. [insecticide]				
MW: 380.8	BP: Decomposes	MLT: 80°F	Sol: Insoluble	
VP: 0.0002 mmHg	IP: ?		Sp.Gr(77°F): 1.96	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactivities Strong oxidizers, acids, sunlight, water [Note: Corrosive to metals. Hydrolyzed in presence of water.]				
Measurement Methods None available				
Personal Protection & Sanitation First Aid (See procedures)				
Skin: Prevent skin contact		Eye: Irrigate immediately		
Eyes: Prevent eye contact Wash skin: When contaminated		Skin: Soap wash immediately Breathing: Respiratory support		
Remove: When wet or contaminated		Swallow: Medical attention immediately		

Respirator Recommendations NIOSH/OSHA

Change: Daily Provide: Eyewash

Up to 30 mg/m^3 : (APF = 10) Any dust, mist, and fume respirator/(APF = 10) Any air-purifying respirator with a high-efficiency particulate filter/(APF = 10) Any supplied-air respirator

Up to 75 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust, mist, and fume filter

Up to 150 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow

mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 200 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; miosis, lacrimation (discharge of tears); headache; chest tightness, wheezing, laryngeal spasm; salivation; cyanosis; anorexia, nausea, vomiting, abdominal cramp, diarrhea; lassitude (weakness, exhaustion), twitching, paralysis; dizziness, ataxia, convulsions; low blood pressure; cardiac irregularities

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system, blood cholinesterase

See also: <u>INTRODUCTION</u>

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Dimethylformamide			CAS 68-12-2		
HCON(CH ₃) ₂			RTECS LQ2100000		
Synonyms & Trade Names Dimethyl formamide; N,N-Dimethylformamide; DMF			DOT ID & Guide 2265 129		
Exposure	NIOSH REL: TWA 10 ppm (30 mg/m ³) [skin]				
Limits	OSHA PEL: TWA 10 ppm (30 mg/m ³) [skin]				
IDLH 500 ppm		Conversion 1 ppm = 2.99 mg/m^3			
Physical Description Colorless to pale-yellow liqu	Physical Description Colorless to pale-yellow liquid with a faint, amine-like odor.				
MW: 73.1	BP: 307°F	BP: 307°F FRZ: -78°F Sol: Miscible			
VP: 3 mmHg	IP: 9.12 eV		Sp.Gr: 0.95		
Fl.P: 136°F	UEL: 15.2%	LEL(212°F): 2.2%			
Class II Combustible Liquid: Fl.P. at or above 100°F and below 140°F.					
Incompatibilities & Reactivities Carbon tetrachloride; other halogenated compounds when in contact with iron; strong oxidizers; alkyl aluminums; inorganic nitrates					
Measurement Methods NIOSH 2004; OSHA 66					

Respirator Recommendations NIOSH

Personal Protection & Sanitation

Remove: When wet or contaminated

Skin: Prevent skin contact

Eyes: Prevent eye contact Wash skin: When contaminated

Change: No recommendation

Up to 100 ppm: (APF = 10) Any supplied-air respirator*

Up to 250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 500 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

First Aid (See procedures)
Eye: Irrigate immediately

Skin: Water flush promptly

Breathing: Respiratory support

Swallow: Medical attention immediately

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; nausea, vomiting, colic; liver damage, enlarged liver; high blood pressure; face flush; dermatitis; in animals: kidney, heart damage

Target Organs Eyes, skin, respiratory system, liver, kidneys, cardiovascular system

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1,1-Dimethylhydrazine			CAS 57-14-7	
$(CH_3)_2NNH_2$			RTECS MV2450000	
			DOT ID & Guide 1163 131	
Exposure	ure NIOSH REL: Ca C 0.06 ppm (0.15 mg/m ³) [2-hr] See Appendix A			
Limits	OSHA PEL: TWA 0.5 ppm (1 mg/m ³) [skin]			
IDLH Ca [15 ppm]		Conversion 1 ppm =	Conversion 1 ppm = 2.46 mg/m^3	
Physical Description Colorless liquid with an ammonia- or fish-like odor.				
MW: 60.1	BP: 147°F FRZ: -72°F Sol: Miscible			
VP: 103 mmHg	IP: 8.05 eV		Sp.Gr: 0.79	
Fl.P: 5°F	UEL: 95% LEL: 2%			
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.				
Incompatibilities & Reactivities Oxidizers, halogens, metallic mercury, fuming nitric acid, hydrogen peroxide [Note: May ignite SPONTANEOUSLY in contact with oxidizers.]				
Measurement Methods				

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NIOSH 3515

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; choking, chest pain, dyspnea (breathing difficulty); drowsiness; nausea; anoxia; convulsions; liver injury; [potential occupational carcinogen]

Target Organs central nervous system, liver, gastrointestinal tract, blood, respiratory system, eyes, skin

Cancer Site [in animals: tumors of the lungs, liver, blood vessels & intestines]

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Dimethylphthalate		CAS 131-11-3		
C ₆ H ₄ (COOCH ₃) ₂			RTECS TI1575000	
Synonyms & Trade Names Dimethyl ester of 1,2-benzenedicarboxylic acid; DMP			DOT ID & Guide 9188 171 (hazardous substance, n.o.s.)	
Exposure	xposure NIOSH REL: TWA 5 mg/m ³			
Limits	OSHA PEL: TWA 5 mg/m ³			
IDLH 2000 mg/m ³		Conversion	Conversion	
Physical Description Colorless, oily liquid with a slight, aromatic odor. [Note: A solid below 42°F.]				
MW: 194.2	BP: 543°F			
VP: 0.01 mmHg	IP: 9.64 eV		Sp.Gr: 1.19	
Fl.P: 295°F	UEL: ?	LEL(358°F): 0.9%		
Class IIIB Combustible Liquid; however, ignition is difficult.				
Incompatibilities & Reactivities Nitrates; strong oxidizers, alkalis & acids				
Measurement Methods OSHA 104				
Personal Protection & San	itation	First Aid (See procedu	ires)	

Personal Protection & Sanitation

Skin: No recommendation
Eyes: Prevent eye contact
Wash skin: No recommendation
Remove: No recommendation
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate promptly Skin: Wash regularly

Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 50 mg/m^3 : (APF = 10) Any dust and mist respirator with a full facepiece

Up to 125 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter[£]

Up to 250 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air

respirator with a full facepiece

Up to 2000 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, upper respiratory system; stomach pain

Target Organs Eyes, respiratory system, gastrointestinal tract

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Dimethyl sulfate			CAS 77-78-1
$(CH_3)_2SO_4$			RTECS WS8225000
			DOT ID & Guide 1595 156
Exposure NIOSH REL: Ca TWA 0.1 ppm (0.5 mg/m ³) [skin] See A			Appendix A
Limits	OSHA PEL†: TWA 1 ppm (5 mg/m ³) [skin]		
IDLH Ca [7 ppm]		Conversion 1 ppm = 5.16 mg/m^3	
Physical Description Colorless, oily liquid with a faint, onion-like odor.			
MW: 126.1	BP: 370°F (Decomposes)	FRZ: -25°F	Sol(64°F): 3%
VP: 0.1 mmHg	IP: ?		Sp.Gr: 1.33
Fl.P: 182°F	UEL: ?	LEL: ?	
Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.			
Incompatibilities & Reactivities Strong oxidizers, ammonia solutions [Note: Decomposes in water to sulfuric acid; corrosive to metals.]			
Measurement Methods NIOSH 2524			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory suppo	ort

Respirator Recommendations NIOSH

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-

contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; headache; dizziness; conjunctivitis; photophobia (abnormal visual intolerance to light); periorbital (situated around the eye) edema; dysphonia, aphonia, dysphagia, productive cough; chest pain; dyspnea (breathing difficulty), cyanosis; vomiting, diarrhea; dysuria; analgesia; fever; proteinuria, hematuria (blood in the urine); eye, skin burns; delirium; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, liver, kidneys, central nervous system

Cancer Site [in animals: nasal & lung cancer]

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Dinitolmide			CAS 148-01-6	
$(NO_2)_2C_6H_2(CH_3)CONH_2$			RTECS XS4200000	
Synonyms & Trade Names 3,5-Dinitro-o-toluamide; 2-N	Methyl-3,5-dinitrobenzamide;	Zoalene	DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 mg/m	3		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Yellowish, crystalline solid.				
MW: 225.2	BP: ?	MLT: 351°F	Sol: Slight	
VP: ?	IP: ?		Sp.Gr: ?	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive None reported	rities			
Measurement Methods NIOSH 0500				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Contact eczema; in animals: methemoglobinemia, liver changes				
Target Organs Skin, liver, blood				
See also: INTRODUCTION				

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o-Dinitrobenzene			CAS 528-29-0		
$C_6H_4(NO_2)_2$			RTECS CZ7450000		
			DOT ID & Guide 1597 152		
Exposure	NIOSH REL: TWA 1 m	g/m ³ [skin]			
Limits	OSHA PEL: TWA 1 mg	y/m ³ [skin]			
IDLH 50 mg/m ³		Conversion			
Physical Description Pale-white or yellow solid.					
MW: 168.1	BP: 606°F	MLT: 244°F	Sol: 0.05%		
VP: ?	IP: 10.71 eV		Sp.Gr: 1.57		
Fl.P: 302°F	UEL: ?	LEL: ?			
Combustible Solid	Combustible Solid				
Incompatibilities & Reactivities Strong oxidizers, caustics, metals such as tin & zinc [Note: Prolonged exposure to fire and heat may result in an explosion due to SPONTANEOUS decomposition.]					
Measurement Methods NIOSH S214 (II-4)					

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated

Remove: When wet or contaminated

Change: Daily

Provide: Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 5 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 10 mg/m^3 : (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any air-purifying respirator with a high-efficiency particulate filter/(APF = 10) Any supplied-air respirator Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter

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Up to 50 mg/m: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Anoxia, cyanosis; visual disturbance, central scotomas; bad taste, burning mouth, dry throat, thirst; yellowing hair, eyes, skin; anemia; liver damage

Target Organs Eyes, skin, blood, liver, cardiovascular system, central nervous system

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m-Dinitrobenzene			CAS 99-65-0	
$C_6H_4(NO_2)_2$			RTECS CZ7350000	
Synonyms & Trade Names meta-Dinitrobenzene; 1,3-Dinitrobenzene			DOT ID & Guide 1597 152	
Exposure	NIOSH REL: TWA 1	mg/m ³ [skin]		
Limits	OSHA PEL: TWA 1 r	mg/m ³ [skin]		
IDLH 50 mg/m ³ Conversion				
Physical Description Pale-white or yellow solid.				
MW: 168.1	BP: 572°F	MLT: 192°F	Sol: 0.02%	
VP: ?	IP: 10.43 eV		Sp.Gr: 1.58	
Fl.P: 302°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactivities Strong oxidizers, caustics, metals such as tin & zinc [Note: Prolonged exposure to fire and heat may result in an explosion due to SPONTANEOUS decomposition.]				
Measurement Methods NIOSH S214 (II-4)				

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated

Change: Daily

Provide: Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 5 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 10 mg/m^3 : (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any air-purifying respirator with a high-efficiency particulate filter/(APF = 10) Any supplied-air respirator Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter

Up to 50 mg/m: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Anoxia, cyanosis; visual disturbance, central scotomas; bad taste, burning mouth, dry throat, thirst; yellowing hair, eyes, skin; anemia; liver damage

Target Organs Eyes, skin, blood, liver, cardiovascular system, central nervous system

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p-Dinitrobenzene			CAS 100-25-4
$C_6H_4(NO_2)_2$			RTECS CZ7525000
•	Synonyms & Trade Names para-Dinitrobenzene; 1,4-Dinitrobenzene		
Exposure	NIOSH REL: TWA 1 mg/m	³ [skin]	
Limits	OSHA PEL: TWA 1 mg/m ³	[skin]	
IDLH 50 mg/m ³		Conversion	
Physical Description Pale-white or yellow solid.			
MW: 168.1	BP: 570°F	MLT: 343°F	Sol: 0.01%
VP: ?	IP: 10.50 eV		Sp.Gr: 1.63
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reactivities Strong oxidizers, caustics, metals such as tin & zinc [Note: Prolonged exposure to fire and heat may result in an explosion due to SPONTANEOUS decomposition.]			
Measurement Methods NIOSH S214 (II-4)			

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Pemove: When yet or contaminated

Remove: When wet or contaminated

Change: Daily

Provide: Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 5 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 10 mg/m^3 : (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any air-purifying respirator with a high-efficiency particulate filter/(APF = 10) Any supplied-air respirator Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter

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Up to 50 mg/m: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Anoxia, cyanosis; visual disturbance, central scotomas; bad taste, burning mouth, dry throat, thirst; yellowing hair, eyes, skin; anemia; liver damage

Target Organs Eyes, skin, blood, liver, cardiovascular system, central nervous system

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Dinitro-o-cresol			CAS 534-52-1
CH ₃ C ₆ H ₂ OH(NO ₂) ₂	RTECS GO9625000		
Synonyms & Trade Names 4,6-Dinitro-o-cresol; 3,5-Dinitro-2-hydroxytoluene; 4,6-Dinitro-2-methyl phenol; DNC; DNOC			DOT ID & Guide 1598 153
Exposure	NIOSH REL: TWA 0.2 mg/	m ³ [skin]	
Limits	OSHA PEL: TWA 0.2 mg/n	n ³ [skin]	
IDLH 5 mg/m ³		Conversion	
Physical Description Yellow, odorless solid. [inse	cticide]		
MW: 198.1	BP: 594°F	MLT: 190°F	Sol: 0.01%
VP: 0.00005 mmHg	IP: ?		Sp.Gr: 1.1 (estimated)
Fl.P: NA	UEL: NA	LEL: NA	MEC: 30 g/m ³
Noncombustible Solid			
Incompatibilities & Reactive Strong oxidizers	vities		
Measurement Methods NIOSH S166 (II-5)			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH/OSHA			

Up to 2 mg/m^3 : (APF = 10) Any dust and mist respirator with a full facepiece

Up to 5 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter[£]/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Sense of well being; headache, fever, lassitude (weakness, exhaustion), profuse sweating, excess thirst, tachycardia, hyperpnea, cough, shortness breath, coma

Target Organs cardiovascular system, endocrine system

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Dinitrotoluene	CAS 25321-14-6			
$CH_3C_6H_3(NO_2)_2$			RTECS XT1300000	
Dinitrotoluol, DNT, Methyldinitrobenzene [Note: Various isomers of DNT exist.]			DOT ID & Guide 1600 152 (molten) 2038 152 (solid)	
Exposure	NIOSH REL: Ca TWA 1.5 r	ng/m ³ [skin] <u>See Appendix A</u>		
Limits	OSHA PEL: TWA 1.5 mg/m	1 ³ [skin]		
IDLH Ca [50 mg/m ³]		Conversion		
Physical Description Orange-yellow crystalline solid with a characteristic odor. [Note: Often shipped molten.]				
MW: 182.2	BP: 572°F	MLT: 158°F	Sol: Insoluble	
VP: 1 mmHg	IP: ?		Sp.Gr: 1.32	
Fl.P: 404°F	UEL: ?	LEL: ?		
Combustible Solid, but diffic	rult to ignite.			
Incompatibilities & Reactive Strong oxidizers, caustics, musustaining decomposition at a	etals such as tin & zinc [Note	: Commercial grades will dec	ompose at 482°F, with self-	
Measurement Methods OSHA 44				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention is	ort	

Respirator Recommendations NIOSH

Change: Daily

Provide: Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Anoxia, cyanosis; anemia, jaundice; reproductive effects; [potential occupational carcinogen]

Target Organs Blood, liver, cardiovascular system, reproductive system

Cancer Site [in animals: liver, skin & kidney tumors]

See also: <u>INTRODUCTION</u>

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Di-sec octyl phthalate			CAS 117-81-7	
$C_{24}H_{38}O_4$			RTECS TI0350000	
Synonyms & Trade Names DEHP, Di(2-ethylhexyl)phthalate, DOP, bis-(2-Ethylhexyl)phthalate, Octyl phthalate			DOT ID & Guide	
Exposure	NIOSH REL: Ca TWA 5 m	g/m ³ ST 10 mg/m ³ See Appe	ndix A	
Limits	OSHA PEL†: TWA 5 mg/n	n ³		
IDLH Ca [5000 mg/m ³]		Conversion		
Physical Description Colorless, oily liquid with a slight odor.				
MW: 390.5	BP: 727°F	FRZ: -58°F	Sol(75°F): 0.00003%	
VP: <0.01 mmHg	IP: ?		Sp.Gr: 0.99	
Fl.P(oc): 420°F	UEL: ?	LEL(474°F): 0.3%		
Class IIIB Combustible Lic	uid: Fl.P. at or above 200°F.			
Incompatibilities & React Nitrates; strong oxidizers, a				
Measurement Methods NIOSH 5020				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Respiratory supposultow: Medical attention		

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, mucous membrane; in animals: liver damage; teratogenic effects; [potential occupational carcinogen]

Target Organs Eyes, respiratory system, central nervous system, liver, reproductive system, gastrointestinal tract

Cancer Site [in animals: liver tumors]

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Dioxane			CAS 123-91-1	
$C_4H_8O_2$			RTECS JG8225000	
			DOT ID & Guide 1165 127	
Exposure	NIOSH REL: Ca C 1 ppm (3	3.6 mg/m ³) [30-minute] See A	Appendix A	
Limits	OSHA PEL†: TWA 100 ppr	m (360 mg/m ³) [skin]		
IDLH Ca [500 ppm]		Conversion 1 ppm = 3.60 m	ng/m ³	
Physical Description Colorless liquid or solid (below 53°F) with a mild, ether-like odor.				
MW: 88.1	BP: 214°F	FRZ: 53°F	Sol: Miscible	
VP: 29 mmHg	IP: 9.13 eV		Sp.Gr: 1.03	
Fl.P: 55°F	UEL: 22%	LEL: 2.0%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.		
Incompatibilities & Reacti Strong oxidizers, decaborance				
Measurement Methods NIOSH 1602; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash promptly Breathing: Respiratory supports Swallow: Medical attention		

Respirator Recommendations NIOSH

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; drowsiness, headache; nausea, vomiting; liver damage; kidney failure; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, liver, kidneys

Cancer Site [in animals: lung, liver & nasal cavity tumors]

confusion, drowsiness

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CAS 78-34-2

Dioxathion			CAS 76-34-2	
$C_4H_6O_2[SPS(OC_2H_5)_2]_2$			RTECS TE3350000	
Synonyms & Trade Names Delnav®; p-Dioxane-2,3-diyl ethyl phosphorodithioate; Dioxane phosphate; 2,3-p-Dioxanethiol S,S-bis(O,O-diethyl phosphoro-dithioate); Navadel®			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.2 mg/s	NIOSH REL: TWA 0.2 mg/m ³ [skin]		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Viscous, brown, tan, or dark isomers.]	-amber liquid. [insecticide] [N	Note: Technical product is a m	nixture of cis- & trans-	
MW: 456.6	BP: ?	FRZ: -4°F	Sol: Insoluble	
VP: ?	IP: ?		Sp.Gr(79°F): 1.26	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid				
Incompatibilities & Reactive Alkalis, iron or tin surfaces,				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendation	ons To be added later			
Exposure Routes inhalation	, skin absorption, ingestion, sl	kin and/or eye contact		

Symptoms Irritation eyes, skin; headache, dizziness, lassitude (weakness, exhaustion); rhinorrhea (discharge of thin mucus), chest tightness; miosis; nausea, vomiting, abdominal cramps, diarrhea, salivation; muscle fasciculation;

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system, blood cholinesterase

See also: <u>INTRODUCTION</u>

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Diphenyl			CAS 92-52-4	
$C_6H_5C_6H_5$			RTECS DU8050000	
Synonyms & Trade Names Biphenyl, Phenyl benzene			DOT ID & Guide	
Exposure	NIOSH REL: TWA 1 mg/m	³ (0.2 ppm)		
Limits	OSHA PEL: TWA 1 mg/m ³	(0.2 ppm)		
IDLH 100 mg/m ³		Conversion 1 ppm = 6.31 m	ng/m ³	
Physical Description Colorless to pale-yellow solid with a pleasant, characteristic odor. [fungicide]				
MW: 154.2	BP: 489°F	MLT: 156°F	Sol: Insoluble	
VP: 0.005 mmHg	IP: 7.95 eV		Sp.Gr: 1.04	
Fl.P: 235°F	UEL(311°F): 5.8%	LEL(232°F): 0.6%		
Combustible Solid				
Incompatibilities & Reactive Oxidizers	vities			
Measurement Methods NIOSH 2530; OSHA PV202	22			
Personal Protection & Sanitation First Aid (See procedures)				
Skin: Prevent skin contact		Eye: Irrigate immediately		
Eyes: Prevent eye contact Wash skin: When contaminated		Skin: Water flush immediately Breathing: Respiratory support		
Remove: When wet or contaminated		Swallow: Medical attention		
Change: Daily		Swanow. Wedicar attention	immodiatory	
Provide: Eyewash (molten),	Quick drench (molten)			

Respirator Recommendations NIOSH/OSHA

Up to 10 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust and mist filter/(APF = 10) Any supplied-air respirator

Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter*

Up to 50 mg/m³: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas

mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, throat; headache, nausea, lassitude (weakness, exhaustion), numb limbs; liver damage

Target Organs Eyes, respiratory system, liver, central nervous system

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Diphenylamine			CAS 122-39-4
$(C_6H_5)_2NH$			RTECS JJ7800000
Synonyms & Trade Names Anilinobenzene, DPA, Phen The carcinogen 4-Aminodip product.]	DOT ID & Guide		
Exposure	NIOSH REL: TWA 10 mg/r	m^3	
Limits	OSHA PEL†: none		
IDLH N.D.	JL	Conversion	
Physical Description Colorless, tan, amber, or bro	wn crystalline solid with a plo	easant, floral odor. [fungicide]
MW: 169.2	BP: 576°F	MLT: 127°F	Sol: 0.03%
VP(227°F): 1 mmHg	IP: 7.40 eV		Sp.Gr: 1.16
Fl.P: 307°F	UEL: ?	LEL: ?	
Combustible Solid; explosiv	e if a cloud of dust is exposed	to a source of ignition.	
Incompatibilities & Reactive Oxidizers, hexachloromelam			
Measurement Methods OSHA 22, 78			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contaminated Change: Daily First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supp Swallow: Medical attention			
Respirator Recommendations To be added later			

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

in animals: teratogenic effects

Symptoms Irritation eyes, skin, mucous membrane; eczema; tachycardia, hypertension; cough, sneezing;

methemoglobinemia; increased blood pressure, heart rate; proteinuria, hematuria (blood in the urine), bladder injury;

Target Organs Eyes, skin, respiratory system, cardiovascular system, blood, bladder, reproductive system

See also: <u>INTRODUCTION</u>

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Dipropylene glycol methyl ether			CAS 34590-94-8	
CH ₃ OC ₃ H ₆ OC ₃ H ₆ OH			RTECS JM1575000	
Synonyms & Trade Names Dipropylene glycol monomet	thyl ether, Dowanol® 50B		DOT ID & Guide	
Exposure	NIOSH REL: TWA 100 ppn	n (600 mg/m ³) ST 150 ppm (9	900 mg/m ³) [skin]	
Limits	OSHA PEL†: TWA 100 ppn	n (600 mg/m ³) [skin]		
IDLH 600 ppm		Conversion 1 ppm = 6.06 m	g/m ³	
Physical Description Colorless liquid with a mild, ether-like odor.				
MW: 148.2	BP: 408°F	FRZ: -112°F	Sol: Miscible	
VP: 0.5 mmHg	IP: ?		Sp.Gr: 0.95	
Fl.P: 180°F	UEL: 3.0% LEL(392°F): 1.1%			
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.		
Incompatibilities & Reactive Strong oxidizers	rities			
Measurement Methods NIOSH S69 (II-2)				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Up to 600 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; lassitude (weakness, exhaustion), dizziness, headache

Target Organs Eyes, respiratory system, central nervous system

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Dipropyl ketone			CAS 123-19-3
(CH ₃ CH ₂ CH ₂) ₂ CO			RTECS MJ5600000
Synonyms & Trade Names Butyrone, DPK, 4-Heptanone	e, Heptan-4-one, Propyl keto	ne	DOT ID & Guide 2710 127
Exposure	NIOSH REL: TWA 50 ppm	(235 mg/m ³)	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 4.67 m	ng/m ³
Physical Description Colorless liquid with a pleasa	ant odor.		
MW: 114.2	BP: 291°F	FRZ: -27°F	Sol: Insoluble
VP: 5 mmHg	IP: 9.10 eV		Sp.Gr: 0.82
Fl.P: 120°F	UEL: ?	LEL: ?	
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.	
Incompatibilities & Reactive Oxidizers	rities		
Measurement Methods OSHA 7			
Personal Protection & Sani Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contact Change: No recommendation	minated	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory suppo	
Respirator Recommendation	ns To be added later		
Exposure Routes inhalation,	•		
Symptoms Irritation eyes, sk animals: liver injury; narcosi		pression, dizziness, drowsine	ss, decreased breathing; in
Target Organs Eyes, skin, c	entral nervous system, liver		
See also: INTRODUCTION			

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Diquat (Diquat di	bromide)		CAS 85-00-7
$C_{12}H_{12}N_2Br_2$			RTECS JM5690000
Synonyms & Trade Names Diquat dibromide; 1,1'-Ethy cation $(C_{12}H_{12}N_2^{++}; 1,1'-Ethy)$ commercially available.]	lene-2,2'-bipyridyllium dibr	<u>-</u>	DOT ID & Guide 2781 151 (solid) 2782 131 (liquid)
Exposure	NIOSH REL: TWA 0.5 m	g/m ³	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description Dibromide salt: Yellow crys solution.]	tals. [herbicide] [Note: Com	nmercial product may be found	l in a liquid concentrate or a
MW: 344.1	BP: Decomposes	MLT: 635°F	Sol: 70%
VP: <0.00001 mmHg	IP: ?		Sp.Gr: 1.22-1.27
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Solid, but does	not readily ignite and burns	s with difficulty.	
Incompatibilities & Reacti Alkalis, UV light, basic solu		iquat solutions corrode alumin	um.]
Measurement Methods None available			
Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or conta Change: Daily Provide: Quick drench	nted	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory supply Swallow: Medical attention	tely port
	ons To be added later		

Symptoms Irritation eyes, skin, mucous membrane, respiratory system; rhinorrhea (discharge of thin mucus), epistaxis (nosebleed); skin burns; nausea, vomiting, diarrhea, malaise (vague feeling of discomfort); kidney, liver

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

injury; cough, chest pain, dyspnea (breathing difficulty), pulmonary edema; tremor, convulsions; delayed healing of wounds

Target Organs Eyes, skin, respiratory system, kidneys, liver, central nervous system

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Disulfiram			CAS 97-77-8
$[(C_2H_5)_2NCS]_2S_2$			RTECS JO1225000
Synonyms & Trade Names Antabuse®, bis(Diethylthioc Tetraethylthiuram disulfide	arbamoyl) disulfide, Ro-Sulfi	ram®, TETD,	DOT ID & Guide
Exposure Limits	NIOSH REL: TWA 2 mg/m exposure to ethylene dibrom	³ [Precautions should be taken ide.]	n to avoid concurrent
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description White, yellowish, or light-gr	ay powder with a slight odor.	[fungicide]	
MW: 296.6	BP: ?	MLT: 158°F	Sol: 0.02%
VP: ?	IP: ?		Sp.Gr: 1.30
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid			
Incompatibilities & Reactive None reported	vities		
Measurement Methods None available			
Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or conta Change: Daily	ted	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation	, ingestion, skin and/or eye co	ontact	
	kin, respiratory system; sensiti e, dizziness; metallic taste; pe		
Target Organs Eyes, skin, r	respiratory system, central ner	vous system, peripheral nervo	ous system, liver

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Disulfoton			CAS 298-04-4
C ₈ H ₁₉ O ₂ PS ₃			RTECS TD9275000
Synonyms & Trade Names O,O-Diethyl S-2-(ethylthio)	-ethyl phosphorodithioate; Di-	-Syston®; Thiodemeton	DOT ID & Guide 2783 152
Exposure	NIOSH REL: TWA 0.1 mg/	m ³ [skin]	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description Oily, colorless to yellow liquiquid.]	uid with a characteristic, sulfu	r odor. [insecticide] [Note: Te	echnical product is a brown
MW: 274.4	BP: ?	FRZ: >-13°F	Sol(73°F): 0.003%
VP: 0.0002 mmHg	IP: ?		Sp.Gr: 1.14
Fl.P: >180°F	UEL: ?	LEL: ?	
Combustible Liquid, but will	not ignite easily.		
Incompatibilities & Reactive Alkalis	vities		
Measurement Methods NIOSH 5600			
Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or conta	ited	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory supports Swallow: Medical attention	ort

Respirator Recommendations To be added later

Provide: Eyewash, Quick drench

Change: Daily

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; nausea, vomiting, abdominal cramps, diarrhea, salivation; headache, dizziness, lassitude (weakness, exhaustion); rhinorrhea (discharge of thin mucus), chest tightness; blurred vision, miosis; cardiac irregularities; muscle fasciculation; dyspnea (breathing difficulty); eye, skin burns

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system, blood cholinesterase

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2,6-Di-tert-butyl-p	o-cresol		CAS 128-37-0
$\boxed{ [C(CH_3)_3]_2CH_3C_6H_2OH }$			RTECS GO7875000
Synonyms & Trade Names BHT; Butylated hydroxytolu butyl phenol	ene; Dibutylated hydroxytolu	ene; 4-Methyl-2,6-di-tert-	DOT ID & Guide
Exposure	NIOSH REL: TWA 10 mg/r	n^3	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description White to pale-yellow, crystal	lline solid with a slight, phen	olic odor. [food preservative]	
MW: 220.4	BP: 509°F	MLT: 158°F	Sol: 0.00004%
VP: 0.01 mmHg	IP: ?		Sp.Gr: 1.05
Fl.P: 261°F	UEL: ?	LEL: ?	
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.		
Incompatibilities & Reactive Oxidizers	vities		
Measurement Methods NIOSH P&CAM226 (II-1)			
Personal Protection & Sani Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or conta Change: Daily	ited	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air Swallow: Medical attention immediately	
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation	, ingestion, skin and/or eye co	ontact	
Symptoms Irritation eyes, sk	xin; in animals: decreased gro	wth rate, increased liver weig	ht
Target Organs Eyes, skin			
See also: INTRODUCTION			

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Diuron			CAS 330-54-1
C ₆ H ₃ Cl ₂ NHCON(CH ₃) ₂			RTECS YS8925000
Synonyms & Trade Names 3-(3,4-Dichlorophenyl)-1,1-0		ex®	DOT ID & Guide
Exposure	NIOSH REL: TWA 10 mg/s	m^3	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description White, odorless, crystalline s	olid. [herbicide]		
MW: 233.1	BP: 356°F (Decomposes)	MLT: 316°F	Sol: 0.004%
VP: 0.000000002 mmHg	IP:?		Sp.Gr: ?
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid			
Incompatibilities & Reactive Strong acids	vities		
Measurement Methods NIOSH 5601			
Personal Protection & Sani Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supports Swallow: Medical attention in	ort
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation,	, ingestion, skin and/or eye co	ontact	
Symptoms Irritation eyes, sk	tin, nose, throat; in animals:	anemia, methemoglobinemia	
Target Organs Eyes, skin, r	espiratory system, blood		
See also: INTRODUCTION			

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Divinyl benzene			CAS 1321-74-0 (mixed isomers)
C ₆ H ₄ (HC=CH ₂) ₂			RTECS CZ9370000
1	s ylstyrene [Note: Commercial pominates. Usually contains an		DOT ID & Guide 2049 130
Exposure	NIOSH REL: TWA 10 ppm	(50 mg/m^3)	
Limits	OSHA PEL†: none		
IDLH N.D.	,	Conversion 1 ppm = 5.33 m	ng/m ³
Physical Description Pale, straw-colored liquid.			
MW: 130.2	BP: 392°F	FRZ: -88°F	Sol: 0.005%
VP: 0.7 mmHg	IP: ?		Sp.Gr: 0.93
Fl.P(oc): 169°F	UEL: 6.2%	LEL: 1.1%	
Class IIIA Combustible Liqu	uid: Fl.P. at or above 140°F a	nd below 200°F.	
Incompatibilities & Reacti None reported	vities		
Measurement Methods OSHA 89			
Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or contact Change: No recommendation Provide: Eyewash, Quick dr	ated aminated n	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendati	ons To be added later		
Exposure Routes inhalation	n, ingestion, skin and/or eye co	ontact	
Symptoms Irritation eyes, s	kin, respiratory system; skin b	ourns; in animals: central nervo	ous system depression
Target Organs Eyes, skin,	respiratory system, central ner	rvous system	

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1-Dodecanethiol			CAS 112-55-0
CH ₃ (CH ₂) ₁₁ SH			RTECS JR3155000
Synonyms & Trade Names Dodecyl mercaptan, 1-Dodec n-Lauryl mercaptan, 1-Merca	•	ercaptan, Lauryl mercaptan,	DOT ID & Guide 1228 131
Exposure	NIOSH REL: C 0.5 ppm (4	.1 mg/m ³) [15-minute]	
Limits	OSHA PEL: none		
IDLH N.D.		Conversion 1 ppm = 8.28 n	ng/m ³
Physical Description Colorless, water-white, or pa	le-yellow, oily liquid with a	mild, skunk-like odor. [Note:	A solid below 15°F.]
MW: 202.4	BP: 441-478°F	FRZ: 15°F	Sol: Insoluble
VP(77°F): 3 mmHg	IP: ?		Sp.Gr: 0.85
Fl.P(oc): 190°F	UEL: ?	LEL: ?	
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F a	and below 200°F.	
Incompatibilities & Reactive Strong oxidizers & acids, strong		ılkali metals, water, steam	
Measurement Methods None available			

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Change: No recommendation

Provide: Eyewash

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor

cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; cough; dizziness, dyspnea (breathing difficulty), lassitude (weakness, exhaustion), confusion, cyanosis; abdominal pain, nausea; skin sensitization

Target Organs Eyes, skin, respiratory system, central nervous system, blood

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Emery			CAS 1302-74-5 (corundum)
Al ₂ O ₃			RTECS GN0231000 (corundum)
aluminum oxide [Note: Emer	trioxide, Corundum, Impure ry is an impure variety of Al ₂ m & silica Corundum is natur	O ₃ which may contain small	DOT ID & Guide
Exposure	NIOSH REL: See Appendix	D	
Limits	OSHA PEL†: TWA 15 mg/r	m ³ (total) TWA 5 mg/m ³ (res	p)
IDLH N.D.		Conversion	
Physical Description Odorless, white, crystalline p	owder.		
See alpha-Alumina for physical & chemical properties.			
Incompatibilities & Reactive	vities		
Measurement Methods NIOSH 0500, 0600			
Personal Protection & San Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation	tion n	First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air Swallow: Medical attention in	mmediately
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation	, ingestion, skin and/or eye co	ontact	
Symptoms Irritation eyes, sl	cin, respiratory system		

Target Organs Eyes, skin, respiratory system

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Endosulfan			CAS 115-29-7
C ₉ H ₆ Cl ₆ O ₃ S			RTECS RB9275000
Synonyms & Trade Names Benzoepin; Endosulphan; 6, methano- 2,4,3-benzo-dioxa	7,8,9,10-Hexachloro-1,5,5a,6	,9,9a-hexachloro-6,9-	DOT ID & Guide 2761 151
Exposure	NIOSH REL: TWA 0.1 mg	/m ³ [skin]	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description Brown crystals with a slight mixture.]	, sulfur dioxide odor. [insecti	cide] [Note: Technical produ	act is a tan, waxy, isomer
MW: 406.9	BP: Decomposes	MLT: 223°F	Sol: 0.00001%
VP(77°F): 0.00001 mmHg	IP: ?		Sp.Gr: 1.74
	IP: ? UEL: NA	LEL: NA	Sp.Gr: 1.74
Fl.P: NA			Sp.Gr: 1.74
Noncombustible Solid, but r Incompatibilities & Reacti	UEL: NA nay be dissolved in flammable vities Corrosive to iron. Hydrolyzes	e liquids.	Sp.Gr: 1.74 er or decomposes in presence
Fl.P: NA Noncombustible Solid, but r Incompatibilities & Reacti Alkalis, acids, water [Note:	UEL: NA nay be dissolved in flammable vities Corrosive to iron. Hydrolyzes	e liquids.	
Fl.P: NA Noncombustible Solid, but r Incompatibilities & Reacti Alkalis, acids, water [Note: of alkalis and acids to form Measurement Methods	UEL: NA nay be dissolved in flammable vities Corrosive to iron. Hydrolyzes sulfur dioxide.] itation ated aminated	e liquids.	er or decomposes in presence
Fl.P: NA Noncombustible Solid, but r Incompatibilities & Reacti Alkalis, acids, water [Note: of alkalis and acids to form Measurement Methods OSHA PV2023 Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or contact Change: Daily	UEL: NA nay be dissolved in flammable vities Corrosive to iron. Hydrolyzes sulfur dioxide.] itation ated aminated ench	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediate Breathing: Respiratory sup	er or decomposes in presence

animals: kidney, liver injury; decreased testis weight

Target Organs Skin, central nervous system, liver, kidneys, reproductive system

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Endrin			CAS 72-20-8
C ₁₂ H ₈ Cl ₆ O			RTECS 101575000
Synonyms & Trade Names 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro- 1,4-endo,endo-5,8-dimethanonaphthalene; Hexadrin®			DOT ID & Guide 2761 151 (mixture)
Exposure	NIOSH REL: TWA 0.1 mg/r	m ³ [skin]	
Limits	OSHA PEL: TWA 0.1 mg/m	³ [skin]	
IDLH 2 mg/m ³		Conversion	
Physical Description Colorless to tan, crystalline s	olid with a mild, chemical od	or. [insecticide]	
MW: 380.9	BP: Decomposes	MLT: 392°F (Decomposes)	Sol: Insoluble
	IP: ? Sp.Gr: 1.70		
VP: Low	IP: ?		Sp.Gr: 1.70
VP: Low Fl.P: NA	IP: ? UEL: NA	LEL: NA	Sp.Gr: 1.70
Fl.P: NA			Sp.Gr: 1.70
Fl.P: NA Noncombustible Solid, but m Incompatibilities & Reactive	UEL: NA ay be dissolved in flammable	e liquids.	

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 1 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter/(APF = 10) Any supplied-air respirator

Up to 2 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Epileptiform convulsions; stupor, headache, dizziness; abdominal discomfort, nausea, vomiting; insomnia; aggressiveness, confusion; drowsiness, lassitude (weakness, exhaustion); anorexia; in animals: liver damage

Target Organs central nervous system, liver

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Enflurane		CAS 13838-16-9		
CHF ₂ OCF ₂ CHCIF			RTECS KN6800000	
Synonyms & Trade Names 2-Chloro-1-(difluoromethoxy)-1,1,2-trifluoroethane; 2-Chloro-1,1,2-trifluoroethyl difluoromethyl ether; Ethrane®			DOT ID & Guide	
Exposure	NIOSH REL*: C 2 ppm (15. anesthetic gas.]	1 mg/m ³) [60-minute] [*Note	e: REL for exposure to waste	
Limits	OSHA PEL: none			
IDLH N.D.		Conversion 1 ppm = 7.55 m	ng/m^3	
Physical Description Clear, colorless liquid with a	mild, sweet odor. [inhalation	anesthetic]		
MW: 184.5	BP: 134°F	FRZ: ?	Sol: Low	
VP: 175 mmHg	IP: ?		Sp.Gr(77°F): 1.52	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid				
Incompatibilities & Reactive None reported	vities			
Measurement Methods OSHA 29, 103				
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: No recommendation Remove: No recommendation Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately				
Respirator Recommendations To be added later				
Exposure Routes inhalation,	Exposure Routes inhalation, ingestion, skin and/or eye contact			
Symptoms Irritation eyes; central nervous system depression, analgesia, anesthesia, convulsions, respiratory depression				
Target Organs Eyes, central	l nervous system			

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Epichlorohydrin			CAS 106-89-8
C ₃ H ₅ OCl	C ₃ H ₅ OCl		
"	Synonyms & Trade Names 1-Chloro-2,3-epoxypropane; 2-Chloropropylene oxide; gamma-Chloropropylene oxide		
Exposure	NIOSH REL: Ca See Appen	dix A	
Limits	OSHA PEL†: TWA 5 ppm (19 mg/m ³) [skin]	
IDLH Ca [75 ppm]	IDLH Ca [75 ppm] Conversion 1 ppm = 3.78 mg/m ³		
Physical Description Colorless liquid with a slight	tly irritating, chloroform-like	odor.	
MW: 92.5	BP: 242°F	FRZ: -54°F	Sol: 7%
VP: 13 mmHg	IP: 10.60 eV		Sp.Gr: 1.18
Fl.P: 93°F	UEL: 21.0%	LEL: 3.8%	
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	elow 100°F.	
Incompatibilities & Reactivities Strong oxidizers, strong acids, certain salts, caustics, zinc, aluminum, water [Note: May polymerize in presence of strong acids and bases, particularly when hot.]			
Measurement Methods NIOSH 1010; OSHA 7			
Personal Protection & San	itation	First Aid (See procedures)	

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor and acid gas canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin with deep pain; nausea, vomiting; abdominal pain; respiratory distress, cough; cyanosis; reproductive effects; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, kidneys, liver, reproductive system

Cancer Site [in animals: nasal cancer]

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EPN		CAS 2104-64-5		
C ₁₄ H ₁₄ O ₄ NSP			RTECS TB1925000	
Synonyms & Trade Names Ethyl p-nitrophenyl benzenethionophosphonate, O-Ethyl O-(4-nitrophenyl) phenylphosphonothioate			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.5 mg/	m ³ [skin]		
Limits	OSHA PEL: TWA 0.5 mg/n	n ³ [skin]		
IDLH 5 mg/m ³		Conversion		
Physical Description Yellow solid with an aromatic odor. [pesticide] [Note: A brown liquid above 97°F.]				
MW: 323.3	BP: ?	MLT: 97°F	Sol: Insoluble	
VP(212°F): 0.0003 mmHg	IP: ?		Sp.Gr(77°F): 1.27	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reacti Strong oxidizers	vities			
Measurement Methods NIOSH 5012				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediatel Breathing: Respiratory supp Swallow: Medical attention	ort	

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash, Quick drench

Change: Daily

Up to 5 mg/m^3 : (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; miosis, lacrimation (discharge of tears); rhinorrhea (discharge of thin mucus); headache; chest tightness, wheezing, laryngeal spasm; salivation; cyanosis; anorexia, nausea, abdominal cramps, diarrhea; paralysis, convulsions; low blood pressure, cardiac irregularities

Target Organs Eyes, skin, respiratory system, cardiovascular system, central nervous system, blood cholinesterase

See also: <u>INTRODUCTION</u>

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Ethanolamine			CAS 141-43-5	
NH ₂ CH ₂ CH ₂ OH			RTECS KJ5775000	
			DOT ID & Guide 2491 153	
Exposure	NIOSH REL: TWA 3 ppm (8 mg/m ³) ST 6 ppm (15 mg/r	n ³)	
Limits	OSHA PEL†: TWA 3 ppm (6 mg/m ³)		
IDLH 30 ppm		Conversion 1 ppm = 2.50 m	ng/m ³	
Physical Description Colorless, viscous liquid or s	olid (below 51°F) with an un	pleasant, ammonia-like odor.		
MW: 61.1	BP: 339°F	FRZ: 51°F	Sol: Miscible	
VP: 0.4 mmHg	IP: 8.96 eV		Sp.Gr: 1.02	
Fl.P: 186°F				
Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.				
Incompatibilities & Reactivities Strong oxidizers, strong acids, iron [Note: May attack copper, brass, and rubber.]				
Measurement Methods				

Wieasui ement Wiemous

NIOSH 2007

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Change: Daily Provide: Eyewash

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Water flush promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 30 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front-or back-mounted canister providing protection against the compound of concern/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; drowsiness

Target Organs Eyes, skin, respiratory system, central nervous system

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Ethion		CAS 563-12-2	
$[(C_2H_5O)_2P(S)S]_2CH_2$		RTECS TE4550000	
		DOT ID & Guide 2783 152	
Exposure	NIOSH REL: 0.4 mg/m ³ [sk	in]	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description Colorless to amber-colored, odorless liquid. [insecticide] [Note: A solid below 10°F. The technical product has a very disagreeable odor.]			ne technical product has a
MW: 384.5	BP: >302°F (Decomposes)	FRZ: 10°F	Sol: 0.0001%
VP: 0.0000015 mmHg	IP: ?		Sp.Gr: 1.22
Fl.P: 349°F	UEL: ?	LEL: ?	
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.		
Incompatibilities & Reactive Acids, alkalis	vities		
Measurement Methods NIOSH 5600			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	

Respirator Recommendations To be added later

Provide: Eyewash, Quick drench

Change: Daily

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; nausea, vomiting, abdominal cramps, diarrhea, salivation; headache, dizziness, lassitude (weakness, exhaustion); rhinorrhea (discharge of thin mucus), chest tightness; blurred vision, miosis; cardiac irregularities; muscle fasciculation; dyspnea (breathing difficulty)

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system, blood cholinesterase

See also: <u>INTRODUCTION</u>

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2-Ethoxyethanol			CAS 110-80-5
C ₂ H ₅ OCH ₂ CH ₂ OH			RTECS KK8050000
Synonyms & Trade Names Cellosolve®, EGEE, Ethylen	e glycol monoethyl ether		DOT ID & Guide 1171 127
Exposure	NIOSH REL: TWA 0.5 ppm	(1.8 mg/m ³) [skin]	
Limits	OSHA PEL: TWA 200 ppm	(740 mg/m ³) [skin]	
IDLH 500 ppm		Conversion 1 ppm = 3.69 m	ng/m ³
Physical Description Colorless liquid with a sweet, pleasant, ether-like odor.			
MW: 90.1	BP: 275°F	FRZ: -130°F	Sol: Miscible
VP: 4 mmHg	IP: ?		Sp.Gr: 0.93
Fl.P: 110°F	UEL(200°F): 15.6%	LEL(200°F): 1.7%	
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.	
Incompatibilities & Reactive Strong oxidizers	vities		
Measurement Methods NIOSH 1403; OSHA 53, 79			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory supports Swallow: Medical attention in	

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 10) Any supplied-air respirator*

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 25 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode*

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes, respiratory system; blood changes; liver, kidney, lung damage; reproductive, teratogenic effects

Target Organs Eyes, respiratory system, blood, kidneys, liver, reproductive system, hematopoietic system

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2-Ethoxyethyl acetate			CAS 111-15-9
CH ₃ COOCH ₂ CH ₂ OC ₂ H ₅			RTECS KK8225000
			DOT ID & Guide 1172 129
Exposure	NIOSH REL: TWA 0.5 ppm	(2.7 mg/m ³) [skin]	
Limits	OSHA PEL: TWA 100 ppm	(540 mg/m ³) [skin]	
IDLH 500 ppm Conversion 1 ppm = 5.41 mg/s			ng/m ³
Physical Description Colorless liquid with a mild odor.			
MW: 132.2	BP: 313°F	FRZ: -79°F	Sol: 23%
VP: 2 mmHg	IP: ?		Sp.Gr: 0.98
Fl.P: 124°F	UEL: ?	LEL: 1.7%	
Class II Combustible Liquid	: Fl.P. at or above 100°F and	below 140°F.	
Incompatibilities & Reactivities Nitrates; strong oxidizers, alkalis & acids			
Measurement Methods NIOSH 1450; OSHA 53			
Personal Protection & Sanitation Skin: Prevent skin contact First Aid (See procedures) Eve: Irrigate immediately			

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

Eye: Irrigate immediately
Skin: Water flush promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor

cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode*

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; vomiting; kidney damage; paralysis; in animals: reproductive, teratogenic effects

Target Organs Eyes, respiratory system, gastrointestinal tract, reproductive system, hematopoietic system

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Ethyl acetate			CAS 141-78-6
CH ₃ COOC ₂ H ₅			RTECS AH5425000
Synonyms & Trade Names Acetic ester, Acetic ether, Eth	hyl ester of acetic acid, Ethyl	ethanoate	DOT ID & Guide 1173 129
Exposure	NIOSH REL: TWA 400 ppn	n (1400 mg/m ³)	
Limits	OSHA PEL: TWA 400 ppm	(1400 mg/m ³)	
IDLH 2000 ppm [10%LEL]		Conversion 1 ppm = 3.60 m	g/m ³
Physical Description Colorless liquid with an ether-like, fruity odor.			
MW: 88.1	BP: 171°F	FRZ: -117°F	Sol(77°F): 10%
VP: 73 mmHg	IP: 10.01 eV		Sp.Gr: 0.90
Fl.P: 24°F	UEL: 11.5% LEL: 2.0%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.	
Incompatibilities & Reactive Nitrates; strong oxidizers, alk			
Measurement Methods NIOSH 1457; OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory suppo	

Respirator Recommendations NIOSH/OSHA

Up to 2000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; narcosis; dermatitis

Target Organs Eyes, skin, respiratory system

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Ethyl acrylate			CAS 140-88-5
CH ₂ =CHCOOC ₂ H ₅			RTECS AT0700000
, , ,			DOT ID & Guide 1917 129P (inhibited)
Exposure	NIOSH REL: Ca See Appen	dix A	
Limits	OSHA PEL†: TWA 25 ppm	(100 mg/m ³) [skin]	
IDLH Ca [300 ppm]		Conversion 1 ppm = 4.09 m	ng/m ³
Physical Description Colorless liquid with an acrie	d odor.		
MW: 100.1	BP: 211°F	FRZ: -96°F	Sol: 2%
VP: 29 mmHg	IP: 10.30 eV		Sp.Gr: 0.92
Fl.P: 48°F	UEL: 14%	LEL: 1.4%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.	
Incompatibilities & Reactivities Oxidizers, peroxides, polymerizers, strong alkalis, moisture, chlorosulfonic acid [Note: Polymerizes readily unless an inhibitor such as hydroquinone is added.]			
Measurement Methods NIOSH 1450; OSHA 92			

Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Water flush immediately
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system

Cancer Site [in animals: tumors of the forestomach]

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Ethyl alcohol			CAS 64-17-5
CH ₃ CH ₂ OH	CH ₃ CH ₂ OH		RTECS KQ6300000
Synonyms & Trade Names Alcohol, Cologne spirit, Etha			DOT ID & Guide 1170 127
Exposure	NIOSH REL: TWA 1000 pp	m (1900 mg/m ³)	
Limits	OSHA PEL: TWA 1000 ppn	n (1900 mg/m ³)	
IDLH 3300 ppm [10%LEL]		Conversion 1 ppm = 1.89 m	ng/m ³
Physical Description Clear, colorless liquid with a weak, ethereal, vinous odor.			
MW: 46.1	BP: 173°F	FRZ: -173°F	Sol: Miscible
VP: 44 mmHg	IP: 10.47 eV		Sp.Gr: 0.79
Fl.P: 55°F	UEL: 19%	LEL: 3.3%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.	
Incompatibilities & Reactive Strong oxidizers, potassium of		e, acetyl bromide, acetyl chlo	ride, platinum, sodium
Measurement Methods NIOSH 1400; OSHA 100			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Fresh air Swallow: Medical attention i	mmediately

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 3300 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose; headache, drowsiness, lassitude (weakness, exhaustion), narcosis; cough; liver damage; anemia; reproductive, teratogenic effects

Target Organs Eyes, skin, respiratory system, central nervous system, liver, blood, reproductive system

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Ethylamine			CAS 75-04-7
CH ₃ CH ₂ NH ₂			RTECS KH2100000
Synonyms & Trade Names Aminoethane, Ethylamine (a		mine	DOT ID & Guide 1036 118
Exposure	NIOSH REL: TWA 10) ppm (18 mg/m ³)	
Limits	OSHA PEL: TWA 10	ppm (18 mg/m ³)	
IDLH 600 ppm		Conversion 1 ppm =	- 1.85 mg/m ³
Physical Description Colorless gas or water-white compressed gas.]	e liquid (below 62°F) wi	th an ammonia-like odor. [1	Note: Shipped as a liquefied
MW: 45.1	BP: 62°F	FRZ: -114°F	Sol: Miscible
VP: 874 mmHg	IP: 8.86 eV	RGasD: 1.61	Sp.Gr: 0.69 (Liquid)
Fl.P: 1°F	UEL: 14.0%	LEL: 3.5%	
Flammable Gas Class IA Fla	mmable Liquid		
Incompatibilities & Reactivities Strong acids; strong oxidizers; copper, tin & zinc in presence of moisture; cellulose nitrate; chlorine; hypochlorites			
Measurement Methods NIOSH S144 (II-3); OSHA	36		

Personal Protection & Sanitation

Skin: Prevent skin contact (liquid) Eyes: Prevent eye contact (liquid) Wash skin: When contaminated (liquid) Remove: When wet or contaminated (liquid)

Change: No recommendation

Provide: Eyewash (liquid), Quick drench (liquid)

First Aid (See procedures)

Eye: Irrigate immediately (liquid) Skin: Water flush immediately (liquid)

Breathing: Respiratory support

Swallow: Medical attention immediately (liquid)

Respirator Recommendations NIOSH/OSHA

Up to 250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}/(APF = 25)$ Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern[£] Up to 500 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full

facepiece

Up to 600 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption (liquid), ingestion (liquid), skin and/or eye contact (liquid)

Symptoms Irritation eyes, skin, respiratory system; skin burns, dermatitis

Target Organs Eyes, skin, respiratory system

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Ethyl benzene			CAS 100-41-4	
CH ₃ CH ₂ C ₆ H ₅			RTECS DA0700000	
			DOT ID & Guide 1175 129	
Exposure	NIOSH REL: TWA 100 ppn	545 mg/m ³)		
Limits	OSHA PEL†: TWA 100 ppm (435 mg/m ³)			
IDLH 800 ppm [10%LEL]	Conversion 1 ppm = 4.34 m		ng/m ³	
Physical Description Colorless liquid with an aromatic odor.				
MW: 106.2	BP: 277°F	FRZ: -139°F	Sol: 0.01%	
VP: 7 mmHg	IP: 8.76 eV		Sp.Gr: 0.87	
Fl.P: 55°F	UEL: 6.7%	LEL: 0.8%		
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.				
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH 1501; OSHA 7, 1002				
Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately		

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 800 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 50) Any airpurifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma

Target Organs Eyes, skin, respiratory system, central nervous system

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Ethyl bromide			CAS 74-96-4	
CH ₃ CH ₂ Br			RTECS KH6475000	
		DOT ID & Guide 1891 131		
Exposure	NIOSH REL: See Appendix D			
Limits	OSHA PEL†: TWA 200 ppm (890 mg/m ³)			
IDLH 2000 ppm	Conversion 1 ppm = 4.46 m		g/m ³	
Physical Description Colorless to yellow liquid with an ether-like odor. [Note: A gas above 101°F.]				
MW: 109.0	BP: 101°F	FRZ: -182°F	Sol: 0.9%	
VP: 375 mmHg	IP: 10.29 eV		Sp.Gr: 1.46	
Fl.P: <4°F	UEL: 8.0%	LEL: 6.8%		
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.				
Incompatibilities & Reactivities Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium				
Measurement Methods NIOSH 1011; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately		

Respirator Recommendations OSHA

Change: No recommendation

Up to 2000 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; central nervous system depression; pulmonary edema; liver, kidney disease; cardiac arrhythmias, cardiac arrest

Target Organs Eyes, skin, respiratory system, liver, kidneys, cardiovascular system, central nervous system

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Ethyl butyl ketone			CAS 106-35-4	
CH ₃ CH ₂ CO[CH ₂] ₃ CH ₃			RTECS MJ5250000	
			DOT ID & Guide 1224 127	
Exposure	NIOSH REL: TWA 50 ppm (230 mg/m ³)			
Limits	OSHA PEL: TWA 50 ppm (230 mg/m ³)			
IDLH 1000 ppm	Conversion 1 ppm = 4.67 m		ng/m ³	
Physical Description Colorless liquid with a powerful, fruity odor.				
MW: 114.2	BP: 298°F	FRZ: -38°F	Sol: 1%	
VP: 4 mmHg	IP: 9.02 eV		Sp.Gr: 0.82	
Fl.P(oc): 115°F	UEL: ?	LEL: ?		
Class II Combustible Liquid: Fl.P. at or above 100°F and below 140°F.				
Incompatibilities & Reactivities Oxidizers, acetaldehyde, perchloric acid				
Measurement Methods NIOSH 1301; OSHA 7				
		First Aid (See procedures) Eye: Irrigate immediately		
Eyes: Prevent eye contact		Skin: Water flush		
Wash skin: When contaminated		Breathing: Respiratory support		
Remove: When wet or contaminated Change: No recommendation		Swallow: Medical attention	immediately	

Respirator Recommendations NIOSH/OSHA

Up to 500 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 1000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; headache, narcosis, coma; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system

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Ethyl chloride			CAS 75-00-3	
CH ₃ CH ₂ Cl			RTECS KH7525000	
Synonyms & Trade Names Chloroethane, Hydrochloric ether, Monochloroethane, Muriatic ether		DOT ID & Guide 1037 115		
Exposure NIOSH REL: Handle with caution in the workp		caution in the workplace. See	e Appendix C (Chloroethanes)	
Limits	OSHA PEL: TWA 1000 p	OSHA PEL: TWA 1000 ppm (2600 mg/m ³)		
IDLH 3800 ppm [10%LE]	L]	Conversion 1 ppm = 2.64 m		
Physical Description Colorless gas or liquid (below 54°F) with a pungent, ether-like odor. [Note: Shipped as a liquefied compressed gas.]				
MW: 64.5	BP: 54°F	FRZ: -218°F	Sol: 0.6%	
VP: 1000 mmHg	IP: 10.97 eV	RGasD: 2.23	Sp.Gr: 0.92 (Liquid at 32°F)	
Fl.P: NA (Gas) -58°F (Liquid)	UEL: 15.4%	LEL: 3.8%		
Flammable Gas Class IA Flammable Liquid				
			zinc & magnesium; oxidizers;	
Measurement Methods NIOSH 2519				
Personal Protection & Sanitation Skin: Prevent skin contact (liquid) Eyes: Prevent eye contact (liquid) Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately (liquid) Skin: Water flush promptly (liquid) Breathing: Respiratory support Swallow: Medical attention immediately (liquid)		

Up to 3800 ppm: (APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

Respirator Recommendations OSHA

a full facepiece

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption (liquid), ingestion (liquid), skin and/or eye contact

Symptoms Incoordination, inebriation; abdominal cramps; cardiac arrhythmias, cardiac arrest; liver, kidney damage

Target Organs Liver, kidneys, respiratory system, cardiovascular system, central nervous system

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Ethylene chlorohydrin			CAS 107-07-3	
CH ₂ ClCH ₂ OH			RTECS KK0875000	
			DOT ID & Guide 1135 131	
Exposure	NIOSH REL: C 1 ppm (3 mg/m ³) [skin]			
Limits	OSHA PEL†: TWA 5 ppm (16 mg/m ³) [skin]			
IDLH 7 ppm	Conversion 1 ppm = 3.29 m		g/m ³	
Physical Description Colorless liquid with a faint, ether-like odor.				
MW: 80.5	BP: 262°F	FRZ: -90°F	Sol: Miscible	
VP: 5 mmHg	IP: 10.90 eV		Sp.Gr: 1.20	
Fl.P: 140°F	UEL: 15.9%	LEL: 4.9%		
Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.				
Incompatibilities & Reactivities Strong oxidizers, strong caustics, water or steam				
Measurement Methods NIOSH 2513; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support		
Remove: When wet or contaminated		Swallow: Medical attention immediately		

Respirator Recommendations NIOSH

Change: No recommendation Provide: Eyewash, Quick drench

Up to 7 ppm: (APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation mucous membrane; nausea, vomiting; dizziness, incoordination; numbness; visual disturbance; headache; thirst; delirium; low blood pressure; collapse, shock, coma; liver, kidney damage

Target Organs respiratory system, liver, kidneys, central nervous system, cardiovascular system, eyes

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Ethylenediamine			CAS 107-15-3	
NH ₂ CH ₂ CH ₂ NH ₂			RTECS KH8575000	
Synonyms & Trade Names 1,2-Diaminoethane; 1,2-Ethanediamine; Ethylenediamine (anhydrous)			DOT ID & Guide 1604 132	
Exposure	NIOSH REL: TWA 10 ppm (25 mg/m ³)			
Limits	OSHA PEL: TWA 10 ppm (25 mg/m ³)			
IDLH 1000 ppm	Conversion 1 ppm = 2.46 m		ng/m ³	
Physical Description Colorless, viscous liquid with an ammonia-like odor. [fungicide] [Note: A solid below 47°F.]				
MW: 60.1	BP: 241°F FRZ: 47°F Sol: Miscible			
VP: 11 mmHg	IP: 8.60 eV		Sp.Gr: 0.91	
Fl.P: 93°F	UEL(212°F): 12%	LEL(212°F): 2.5%		
Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.				
Incompatibilities & Reactivities Strong acids & oxidizers, carbon tetrachloride & other chlorinated organic compounds, carbon disulfide [Note: Corrosive to metals.]				
Measurement Methods				

Measurement Methods

NIOSH 2540; OSHA 60

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact

Wash skin: When contaminated/Daily Remove: When wet (flammable)

Change: No recommendation

Provide: Eyewash (>5%), Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode (APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern by the to 500 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against the

compound of concern $^{£}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1000 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation nose, respiratory system; sensitization dermatitis; asthma; liver, kidney damage

Target Organs Skin, respiratory system, liver, kidneys

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NIOSH Pocket Guide to Chemical Hazards

Ethylene dibromide			CAS 106-93-4
BrCH ₂ CH ₂ Br			RTECS KH9275000
•	Synonyms & Trade Names 1,2-Dibromoethane; Ethylene bromide; Glycol dibromide		
Exposure	NIOSH REL: Ca TWA 0.04	5 ppm C 0.13 ppm [15-minut	e] <u>See Appendix A</u>
Limits	OSHA PEL: TWA 20 ppm (C 30 ppm 50 ppm [5-minute r	naximum peak]
IDLH Ca [100 ppm]	IDLH Ca [100 ppm]		
Physical Description Colorless liquid or solid (below)	ow 50°F) with a sweet odor.	[fumigant]	
MW: 187.9	BP: 268°F	FRZ: 50°F	Sol: 0.4%
VP: 12 mmHg	IP: 9.45 eV		Sp.Gr: 2.17
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Liquid			
Incompatibilities & Reactivities Chemically-active metals such as sodium, potassium, calcium, hot aluminum & magnesium; liquid ammonia; strong oxidizers			
Measurement Methods NIOSH 1008; OSHA 2			

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; dermatitis with vesiculation; liver, heart, spleen, kidney damage; reproductive effects; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, liver, kidneys, reproductive system

Cancer Site [in animals: skin & lung tumors]

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NIOSH Pocket Guide to Chemical Hazards

Ethylene dichlorid	CAS 107-06-2			
CICH ₂ CH ₂ CI			RTECS KI0525000	
•	Synonyms & Trade Names 1,2-Dichloroethane; Ethylene chloride; Glycol dichloride			
Exposure	NIOSH REL: Ca TWA 1 pp. Appendix C (Chloroethanes)	m (4 mg/m ³) ST 2 ppm (8 mg	g/m ³) See Appendix A See	
Limits	OSHA PEL†: TWA 50 ppm hours]	C 100 ppm 200 ppm [5-minu	te maximum peak in any 3	
IDLH Ca [50 ppm]		Conversion 1 ppm = 4.05 m	ng/m ³	
Physical Description Colorless liquid with a please color.]	ant, chloroform-like odor. [No	ote: Decomposes slowly, become	omes acidic & darkens in	
MW: 99.0	BP: 182°F	FRZ: -32°F	Sol: 0.9%	
VP: 64 mmHg	IP: 11.05 eV		Sp.Gr: 1.24	
Fl.P: 56°F	UEL: 16%	LEL: 6.2%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.		
Incompatibilities & Reactivities Strong oxidizers & caustics; chemically-active metals such as magnesium or aluminum powder, sodium & potassium; liquid ammonia [Note: Decomposes to vinyl chloride & HCl above 1112°F.]				
Measurement Methods NIOSH 1003; OSHA 3				
Personal Protection & Sanitation First Aid (See procedures)				

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench

Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin absorption, skin and/or eye contact

Symptoms Irritation eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; [potential occupational carcinogen]

Target Organs Eyes, skin, kidneys, liver, central nervous system, cardiovascular system

Cancer Site [in animals: forestomach, mammary gland & circulatory system cancer]

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Ethylene glycol			CAS 107-21-1	
HOCH ₂ CH ₂ OH			RTECS KW2975000	
Synonyms & Trade Names 1,2-Dihydroxyethane; 1,2-Ethanediol; Glycol; Glycol alcohol; Monoethylene glycol		DOT ID & Guide		
Exposure	NIOSH REL: See Appendi	NIOSH REL: See Appendix D		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Clear, colorless, syrupy, odor	rless liquid. [antifreeze] [No	te: A solid below 9°F.]		
MW: 62.1	BP: 388°F	FRZ: 9°F	Sol: Miscible	
VP: 0.06 mmHg	IP: ?		Sp.Gr: 1.11	
Fl.P: 232°F	UEL: 15.3%	LEL: 3.2%		
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.			
Incompatibilities & Reactive Strong oxidizers, chromium to moisture from the air).]		anate, sodium peroxide [Note:	Hygroscopic (i.e., absorbs	
Measurement Methods NIOSH 5523; OSHA PV202	4			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort	
Respirator Recommendations To be added later				
Exposure Routes inhalation				
Symptoms Irritation eyes, sk dizziness, stupor, convulsion		niting, abdominal pain, lassitu pression; skin sensitization	de (weakness, exhaustion);	
Target Organs Eyes, skin, r	respiratory system, central ne	ervous system		

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Ethylene glycol dinitrate			CAS 628-96-6	
O ₂ NOCH ₂ CH ₂ ONO ₂			RTECS KW5600000	
Synonyms & Trade Names EGDN; 1,2-Ethanediol dinitrate; Ethylene dinitrate; Ethylene nitrate; Glycol dinitrate; Nitroglycol			nitrate; DOT ID & Guide	
Exposure	NIOSH REL: ST 0.	1 mg/m ³ [skin]		
Limits	OSHA PEL†: C 0.2	ppm (1 mg/m ³) [skin]		
IDLH 75 mg/m ³		Conversion 1 ppm	$= 6.22 \text{ mg/m}^3$	
Physical Description Colorless to yellow, oily, o nitroglycerine (40-20%).]	dorless liquid. [Note: A	An explosive ingredient (60-8	30%) in dynamite along with	
MW: 152.1	BP: 387°F	FRZ: -8°F	Sol: Insoluble	
VP: 0.05 mmHg	IP: ?		Sp.Gr: 1.49	
Fl.P: 419°F	UEL: ?	LEL: ?		
Explosive Liquid		·	·	
Incompatibilities & React Acids, alkalis	tivities			
Measurement Methods NIOSH 2507; OSHA 43				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: Daily Provide: Quick drench		Eye: Irrigate immed Skin: Soap wash im Breathing: Respirate	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendat	tions NIOSH	,		

Up to 2.5 mg/m 3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 5 mg/m^3 : (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

Up to 1 mg/m^3 : (APF = 10) Any supplied-air respirator*

supplied-air respirator with a full facepiece

Up to 75 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Throbbing headache; dizziness; nausea, vomiting, abdominal pain; hypotension, flush, palpitations, angina; methemoglobinemia; delirium, central nervous system depression; irritation skin; in animals: anemia; liver, kidney damage

Target Organs Skin, cardiovascular system, blood, liver, kidneys

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Ethyleneimine			CAS 151-56-4	
C_2H_5N			RTECS KX5075000	
			DOT ID & Guide 1185 131P (inhibited)	
Exposure	NIOSH REL: Ca See Appen	dix A		
Limits	OSHA PEL: [1910.1012] <u>Se</u>	e Appendix B		
IDLH Ca [100 ppm]	1	Conversion 1 ppm = 1.76 m	ng/m ³	
Physical Description Colorless liquid with an ammonia-like odor. [Note: Usually contains inhibitors to prevent polymerization.]				
MW: 43.1	BP: 133°F	FRZ: -97°F	Sol: Miscible	
VP: 160 mmHg	IP: 9.20 eV		Sp.Gr: 0.83	
Fl.P: 12°F	UEL: 54.8%	LEL: 3.3%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at of	or above 100°F.		
Incompatibilities & Reactivities Polymerizes explosively in presence of acids [Note: Explosive silver derivatives may be formed with silver alloys (e.g., silver solder).]				
Measurement Methods NIOSH 3514				
Personal Protection & Sanitation Skin: Prevent skin contact		First Aid (See procedures) Eye: Irrigate immediately		
Eyes: Prevent eye contact Wash skin: When contaminated/Daily		Skin: Soap wash immediately Breathing: Respiratory support		
Remove: When wet or contaminated		Swallow: Medical attention immediately		

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; nausea, vomiting; headache, dizziness; pulmonary edema; liver, kidney damage; eye burns; skin sensitization; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, liver, kidneys

Cancer Site [in animals: lung & liver tumors]

See also: <u>INTRODUCTION</u>

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Ethylene oxide			CAS 75-21-8		
C_2H_4O			RTECS KX2450000		
			DOT ID & Guide 1040 119		
Exposure NIOSH REL: Ca TWA <0.1 ppm (0.18 mg/m³) C 5 ppm (Appendix A			5 ppm (9 mg/m ³) [10-min/day] <u>See</u>		
Limits	OSHA PEL: [1910.1	047] TWA 1 ppm 5 ppm [15-1	minute Excursion]		
IDLH Ca [800 ppm]		Conversion 1 ppm =	1.80 mg/m ³		
Physical Description Colorless gas or liquid (b	Physical Description Colorless gas or liquid (below 51°F) with an ether-like odor.				
MW: 44.1	BP: 51°F	FRZ: -171°F	Sol: Miscible		
VP: 1.46 atm	IP: 10.56 eV	IP: 10.56 eV RGasD: 1.49 Sp			
Fl.P: NA (Gas) -20°F					
Flammable Gas Class IA Flammable Liquid					
Incompatibilities & Reactivities Strong acids, alkalis & oxidizers; chlorides of iron, aluminum & tin; oxides of iron & aluminum; water					
Measurement Methods					

NIOSH 1614, 3800; OSHA 30, 49, 50

Personal Protection & Sanitation Skin: Prevent skin contact (liquid) Eyes: Prevent eye contact (liquid) Wash skin: When contaminated (liquid) Remove: When wet (flammable) Change: No recommendation Provide: Quick drench (liquid)

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately (liquid)

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted canister providing protection against the compound of concern $^{\dagger}/(APF = 50)$ Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern[†]/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion (liquid), skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; peculiar taste; headache; nausea, vomiting, diarrhea; dyspnea (breathing difficulty), cyanosis, pulmonary edema; drowsiness, lassitude (weakness, exhaustion), incoordination; EKG abnormalities; eye, skin burns (liquid or high vapor concentration); liquid: frostbite; reproductive effects; [potential occupational carcinogen]; in animals: convulsions; liver, kidney damage

Target Organs Eyes, skin, respiratory system, liver, central nervous system, blood, kidneys, reproductive system

Cancer Site [peritoneal cancer, leukemia]

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NIOSH Pocket Guide to Chemical Hazards

Ethylene thiourea			CAS 96-45-7		
$C_3H_6N_2S$			RTECS NI9625000		
Synonyms & Trade Names 1,3-Ethylene-2-thiourea; N,N	I-Ethylenethiourea; ETU; 2	2-Imidazolidine-2-thione	DOT ID & Guide		
Exposure	NIOSH REL: Ca Use enca	apsulated form. See Appendix	A		
Limits	OSHA PEL: none				
IDLH Ca [N.D.]		Conversion			
1	Physical Description White to pale-green, crystalline solid with a faint, amine odor. [Note: Used as an accelerator in the curing of polychloroprene & other elastomers.]				
MW: 102.2	BP: 446-595°F	MLT: 392°F	Sol(86°F): 2%		
VP: 16 mmHg	IP: 8.15 eV		Sp.Gr: ?		
Fl.P: 486°F	UEL: ?	LEL: ?			
Combustible Solid					
Incompatibilities & Reactivities Acrolein					
Measurement Methods NIOSH 5011; OSHA 95					

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact

Wash skin: When contaminated/Daily Remove: When wet or contaminated

Change: Daily

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes; in animals: thickening of the skin; goiter; teratogenic effects; [potential occupational carcinogen]

Target Organs Eyes, skin, thyroid, reproductive system

Cancer Site [in animals: liver, thyroid & lymphatic system tumors]

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Ethyl ether			CAS 60-29-7	
$C_2H_5OC_2H_5$			RTECS KI5775000	
			DOT ID & Guide 1155 127	
Exposure	NIOSH REL: See Appendix	: <u>D</u>		
Limits	OSHA PEL†: TWA 400 ppr	$m (1200 \text{ mg/m}^3)$		
IDLH 1900 ppm [10%LEL]	IDLH 1900 ppm [10%LEL]			
Physical Description Colorless liquid with a pung	ent, sweetish odor. [Note: A	gas above 94°F.]		
MW: 74.1	BP: 94°F	FRZ: -177°F	Sol: 8%	
VP: 440 mmHg	IP: 9.53 eV		Sp.Gr: 0.71	
Fl.P: -49°F	UEL: 36.0%	LEL: 1.9%		
Class IA Flammable Liquid:	Fl.P. below 73°F and BP bel	low 100°F.		
Incompatibilities & Reactivities Strong oxidizers, halogens, sulfur, sulfur compounds [Note: Tends to form explosive peroxides under influence of air and light.]				
Measurement Methods NIOSH 1610; OSHA 7				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: No recommendation
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations OSHA

Up to 1900 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; dizziness, drowsiness, headache, excited, narcosis; nausea, vomiting

Target Organs Eyes, skin, respiratory system, central nervous system

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Ethyl formate			CAS 109-94-4		
CH ₃ CH ₂ OCHO			RTECS LQ8400000		
			DOT ID & Guide 1190 129		
Exposure	NIOSH REL: TWA 100	ppm (300 mg/m ³)			
Limits	OSHA PEL: TWA 100 I	opm (300 mg/m ³)			
IDLH 1500 ppm		Conversion 1 ppm =	= 3.03 mg/m ³		
Physical Description Colorless liquid with a fruity	Physical Description Colorless liquid with a fruity odor.				
MW: 74.1	BP: 130°F	FRZ: -113°F	Sol(64°F): 9%		
VP: 200 mmHg	IP: 10.61 eV		Sp.Gr: 0.92		
Fl.P: -4°F	UEL: 16.0%	LEL: 2.8%			
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.					
Incompatibilities & Reactivities Nitrates; strong oxidizers, alkalis & acids [Note: Decomposes slowly in water to form ethyl alcohol and formic acid.]					
Measurement Methods					

Personal Protection & Sanitation

NIOSH 1452: OSHA 7

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 1500 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{£}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{£}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, upper respiratory system; in animals: narcosis

Target Organs Eyes, respiratory system, central nervous system

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NIOSH Pocket Guide to Chemical Hazards

Ethylidene norbornene			CAS 16219-75-3	
C_9H_{12}			RTECS RB9450000	
Synonyms & Trade Names ENB, 5-Ethylidenebicyclo(2.2.1)-hept-2-ene, 5-Ethylidene-2-norbornene [Note: Due to its reactivity, ENB may be stabilized with tert-butyl catechol.]			DOT ID & Guide	
Exposure	NIOSH REL: C 5 ppm (25 n	ng/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D. $\mathbf{Conversion} \ 1 \ \mathrm{ppm} = 4.92 \ \mathrm{mg/m^3}$			ng/m ³	
Physical Description Colorless to white liquid with a turpentine-like odor.				
MW: 120.2	BP: 298°F	FRZ: -112°F	Sol: ?	
VP: 4 mmHg	IP: ?		Sp.Gr: 0.90	
Fl.P(oc): 101°F	UEL: ?	LEL: ?		
Class II Combustible Liquid	: Fl.P. at or above 100°F and	below 140°F.		
Incompatibilities & Reactivities Oxygen [Note: ENB should be stored in a nitrogen atmosphere since it reacts with oxygen.]				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eye: Irrigate immediately Skin: Prevent skin contact				

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily

Remove: When wet or contaminated

Change: No recommendation

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations To be added later

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; headache; cough, dyspnea (breathing difficulty); nausea, vomiting; olfactory, taste changes; chemical pneumonitis (aspiration liquid); in animals: liver, kidney, urogenital injury; bone marrow effects

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys, urogenital system, bone

marrow

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Ethyl mercaptan CAS 75-08-1			CAS 75-08-1	
CH ₃ CH ₂ SH			RTECS K19625000	
Synonyms & Trade Names Ethanethiol, Ethyl sulfhydrat			DOT ID & Guide 2363 130	
Exposure	NIOSH REL: C 0.5 ppm (1.3	3 mg/m ³) [15-minute]		
Limits	OSHA PEL†: C 10 ppm (25	mg/m^3)		
IDLH 500 ppm		Conversion 1 ppm = 2.54 m	g/m ³	
Physical Description Colorless liquid with a strong, skunk-like odor. [Note: A gas above 95°F.]				
MW: 62.1	BP: 95°F	FRZ: -228°F	Sol: 0.7%	
VP: 442 mmHg	IP: 9.29 eV		Sp.Gr: 0.84	
Fl.P: -55°F	UEL: 18.0%	LEL: 2.8%		
Class IA Flammable Liquid:	Fl.P. below 73°F and BP below	ow 100°F.		
Incompatibilities & Reactive Strong oxidizers [Note: Reactive Property of the	vities ts violently with calcium hyp	ochlorite.]		
Measurement Methods NIOSH 2542				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention is	ort	

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is

operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation mucous membrane; headache, nausea; in animals: incoordination, lassitude (weakness, exhaustion); liver, kidney damage; cyanosis; narcosis

Target Organs Eyes, respiratory system, liver, kidneys, blood

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N-Ethylmorpholine			CAS 100-74-3	
C ₄ H ₈ ONCH ₂ CH ₃			RTECS QE4025000	
Synonyms & Trade Names 4-Ethylmorpholine			DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 ppm (23 mg/m ³) [skin]		
Limits	OSHA PEL†: TWA 20 ppm	(94 mg/m ³) [skin]		
IDLH 100 ppm		Conversion 1 ppm = 4.71 m	ng/m ³	
Physical Description Colorless liquid with an ammonia-like odor.				
MW: 115.2	BP: 281°F	FRZ: -81°F	Sol: Miscible	
VP: 6 mmHg	IP: ?		Sp.Gr: 0.90	
Fl.P(oc): 90°F	UEL: ?	LEL: ?		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	elow 100°F.		
Incompatibilities & Reactive Strong acids, strong oxidizer				
Measurement Methods NIOSH S146 (II-3)				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory suppo Swallow: Medical attention i		

Respirator Recommendations NIOSH

Provide: Eyewash (>15%), Quick drench

Up to 50 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 100 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; visual disturbance: corneal edema, blue-gray vision, colored haloes

Target Organs Eyes, respiratory system

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Ethyl silicate			CAS 78-10-4	
$(C_2H_5)_4SiO_4$			RTECS VV9450000	
			DOT ID & Guide 1292 132	
Exposure	NIOSH REL: TWA 10 p			
Limits	OSHA PEL†: TWA 100 ppm (850 mg/m ³)			
IDLH 700 ppm Conversion 1 ppm = 8.52 mg/m^3			3.52 mg/m ³	
Physical Description Colorless liquid with a sharp, alcohol-like odor.				
MW: 208.3	BP: 336°F	FRZ: -117°F	Sol: Reacts	
VP: 1 mmHg	IP: 9.77 eV		Sp.Gr: 0.93	
Fl.P: 99°F	UEL: ?	LEL: ?		
Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.				
Incompatibilities & Reactivities Strong oxidizers, water [Note: Reacts with water to form a silicone adhesive (a milky-white mass).]				
Measurement Methods NIOSH S264 (II-3)				

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 100 ppm: (APF = 10) Any supplied-air respirator*

Up to 250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 500 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any suppliedair respirator with a full facepiece

Up to 700 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressuredemand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion skin, and/or eye contact

Symptoms Irritation eyes, nose; in animals: lacrimation (discharge of tears); dyspnea (breathing difficulty), pulmonary edema; tremor, narcosis; liver, kidney damage; anemia

Target Organs Eyes, respiratory system, liver, kidneys, blood, skin

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Fenamiphos			CAS 22224-92-6	
$C_{13}H_{22}NO_3PS$			RTECS TB3675000	
Synonyms & Trade Names Ethyl 3-methyl-4-(methylthio)phenyl-(1-methylethyl)phosphoramidate, Nemacur®, Phenamiphos			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.1 mg/	NIOSH REL: TWA 0.1 mg/m ³ [skin]		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Off-white to tan, waxy solid. [insecticide] [Note: Found commercially as a granular ingredient (5-15%) or in an emulsifiable concentrate (400 g/l).]				
MW: 303.4	BP: ?	MLT: 121°F	Sol: 0.03%	
VP: 0.00005 mmHg	IP: ?	IP: ? Sp.G		
Fl.P: ?	UEL: ?	UEL: ?		
Incompatibilities & Reactivities None reported [Note: May hydrolyze under alkaline conditions.]				
Measurement Methods NIOSH 5600				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		

Symptoms Nausea, vomiting, abdominal cramps, diarrhea, salivation; headache, dizziness, lassitude (weakness, exhaustion); rhinorrhea (discharge of thin mucus), chest tightness; blurred vision, miosis; cardiac irregularities;

Target Organs respiratory system, central nervous system, cardiovascular system, blood cholinesterase

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Respirator Recommendations To be added later

muscle fasciculation; dyspnea (breathing difficulty)

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Fensulfothion			CAS 115-90-2	
$\mathbf{C_{11}H_{17}O_4PS_2}$		RTECS TF3850000		
Synonyms & Trade Names Dasanit®; O,O-Diethyl O-(p-methylsulfinyl)phenyl)phosphorothioate; Terracur P®		DOT ID & Guide		
Exposure	NIOSH REL: TWA 0.1 mg/	NIOSH REL: TWA 0.1 mg/m ³		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Brown liquid or yellow oil. [pesticide]				
MW: 308.4	BP: ?	FRZ: ?	Sol(77°F): 0.2%	
VP: ?	IP: ?		Sp.Gr: 1.20	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Liquid				
Incompatibilities & Reactive Alkalis	vities			
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately				
Respirator Recommendation	ons To be added later			
Exposure Routes inhalation	, skin absorption, ingestion, s	kin and/or eye contact		
Symptoms Irritation skin; na	nusea, vomiting, abdominal cr	ramps, diarrhea, salivation; he	adache, dizziness, lassitude	

(weakness, exhaustion); rhinorrhea (discharge of thin mucus), chest tightness; blurred vision, miosis; cardiac

Target Organs Skin, respiratory system, central nervous system, cardiovascular system, blood cholinesterase

irregular; muscle fasciculation; dyspnea (breathing difficulty)

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Fenthion			CAS 55-38-9	
$C_{10}H_{15}O_3PS$		RTECS TF9625000		
Synonyms & Trade Names Baytex; Entex; O,O-Dimethyl O-3-methyl-4-methylthiophenyl phosphorothioate		DOT ID & Guide		
Exposure	NIOSH REL: See Appendix D			
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Colorless to brown liquid with a slight, garlic-like odor. [insecticide]				
MW: 278.3	BP: ?			
VP: 0.0003 mmHg	IP: ?		Sp.Gr: 1.25	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid				
Incompatibilities & Reactivities Oxidizers				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately				
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms Nausea, vomiting, abdominal cramps, diarrhea, salivation; headache, dizziness, lassitude (weakness, exhaustion); rhinorrhea (discharge of thin mucus), chest tightness; blurred vision, miosis; cardiac irregularities; muscle fasciculation; dyspnea (breathing difficulty)				

Target Organs respiratory system, central nervous system, cardiovascular system, plasma cholinesterase

See also: <u>INTRODUCTION</u>

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Ferbam		CAS 14484-64-1		
[(CH ₃) ₂ NCS ₂] ₃ Fe			RTECS NO8750000	
Synonyms & Trade Names tris(Dimethyldithiocarbamato)iron, Ferric dimethyl dithiocarbamate		DOT ID & Guide		
Exposure	NIOSH REL: TWA 10 mg/m ³			
Limits	OSHA PEL†: TWA 15 mg	$/m^3$		
IDLH 800 mg/m ³ Conversion		Conversion		
Physical Description Dark brown to black, odorless solid. [fungicide]				
MW: 416.5	BP: Decomposes MLT: >356°F (Decomposes) Sol: 0.0		Sol: 0.01%	
VP: 0 mmHg (approx)	IP: 7.72 eV		Sp.Gr: ?	
Fl.P: ?	UEL: ?	LEL: ?	MEC: 55 g/m ³	
Combustible Solid				
Incompatibilities & Reactivities Strong oxidizers, moisture				
Measurement Methods NIOSH 0500				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendation	ons NIOSH			

Up to 100 mg/m³: (APF = 10) Any dust respirator except single-use and quarter-mask respirators*/(APF = 10) Any

Up to 250 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any

air-purifying respirator with a high-efficiency particulate filter*/(APF = 10) Any supplied-air respirator*

Up to 50 mg/m^3 : (APF = 5) Any dust respirator

powered, air-purifying respirator with a dust filter*

Up to 500 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 800 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, respiratory tract; dermatitis; gastrointestinal disturbance

Target Organs Eyes, skin, respiratory system, gastrointestinal tract

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Ferrovanadium dust		CAS 12604-58-9	
FeV			RTECS LK2900000
Synonyms & Trade Names Ferrovanadium		DOT ID & Guide	
Exposure	NIOSH REL*: TWA 1 mg/m ³ ST 3 mg/m ³ [*Note: The REL also applies to Vanadium metal and Vadium carbide.]		
Limits	OSHA PEL†: TWA 1 mg/n	n ³	
IDLH 500 mg/m ³	Conversion		
Physical Description Dark, odorless particulate divanadium.]	ispersed in air. [Note: Ferrova	nadium metal is an alloy us	sually containing 50-80%
MW: 106.8	BP: ?	BP: ? MLT: 2696-2768°F Sol: I	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: ?
Fl.P: NA	UEL: NA LEL: NA MEC:		MEC: 1.3 g/m ³
Metal: Noncombustible Soli	d, but dust may be an explosi	on hazard.	
Incompatibilities & Reacti Strong oxidizers	ivities		
Measurement Methods OSHA ID121, ID125G			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Respiratory support	

Up to 10 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators*/(APF =

Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any

Respirator Recommendations NIOSH/OSHA

10) Any supplied-air respirator*

Up to 5 mg/m^3 : (APF = 5) Any dust and mist respirator*

powered, air-purifying respirator with a dust and mist filter*

Up to 50 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, respiratory system; in animals: bronchitis, pneumonitis

Target Organs Eyes, respiratory system

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Fibrous glass dust		CAS	
			RTECS LK3651000
Synonyms & Trade Names Fiber glas®, Fiberglass, Glass fibers, Glass wool [Note: Usually produced from borosilicate & low alkali silicate glasses.]		DOT ID & Guide	
Exposure Limits	- Img/m² (total)		2 & 10 m in length) TWA 5
Lillits	OSHA PEL: TWA 15 mg/m	³ (total) TWA 5 mg/m ³ (resp))
IDLH N.D.		Conversion	
Physical Description Typically, glass filaments >3 m in diameter or glass "wool" with diameters down to 0.05 m & >1 m in length.			
MW: NA	BP: NA	MLT: ?	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA	IP: NA	
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Fibers			
Incompatibilities & Reactivities None reported			
Measurement Methods NIOSH 7400			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air	
Respirator Recommendation Up to 5X REL: (APF = 5) A			

Up to 10X REL: (APF = 10) Any dust respirator except single-use and quarter-mask respirators/(APF = 10) Any

Up to 25X REL: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

air-purifying respirator with a high-efficiency particulate filter/(APF = 10) Any supplied-air respirator

Up to 50X REL: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

powered, air-purifying respirator with a dust filter

filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1000X REL: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; dyspnea (breathing difficulty)

Target Organs Eyes, skin, respiratory system

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Fluorine		CAS 7782-41-4		
$\overline{\mathbf{F}_2}$			RTECS LM6475000	
Synonyms & Trade Names Fluorine-19		DOT ID & Guide 9192 167 (cryogenic liquid) 1045 124 (compressed)		
Exposure	Exposure NIOSH REL: TWA 0.1 ppm (0.2 mg/m ³)			
Limits	OSHA PEL: TWA 0.1 ppm	OSHA PEL: TWA 0.1 ppm (0.2 mg/m ³)		
IDLH 25 ppm		Conversion 1 ppm = 1.55 mg/m^3		
Physical Description Pale-yellow to greenish gas with a pungent, irritating odor.				
MW: 38.0	BP: -307°F	BP: -307°F		
VP: >1 atm	IP: 15.70 eV	RGasD: 1.31		
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Gas, but a	n extremely strong oxidizer.			
Incompatibilities & Reactivities Water, nitric acid, oxidizers, organic compounds [Note: Reacts violently with all combustible materials, except the metal containers in which it is shipped. Reacts with H ₂ O to form hydrofluoric acid.]				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact (liquid) Eyes: Prevent eye contact (liquid) Wash skin: When contaminated (liquid)		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support		

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash (liquid), Quick drench (liquid)

Remove: When wet or contaminated (liquid)

Up to 1 ppm: (APF = 10) Any supplied-air respirator*

Up to 2.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 5 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-

air respirator with a full facepiece

Change: No recommendation

Up to 25 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-

demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concernⁱ/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, nose, respiratory system; laryngeal spasm, wheezing; pulmonary edema; eye, skin burns; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, liver, kidneys

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Fluorotrichloromethane			CAS 75-69-4
CCl ₃ F			RTECS PB6125000
Synonyms & Trade Names Freon® 11, Monofluorotrichloromethane, Refrigerant 11, Trichlorofluoromethane, Trichloromonofluoromethane		DOT ID & Guide	
Exposure	NIOSH REL: C 1000 ppm (5600 mg/m ³)	
Limits	OSHA PEL†: TWA 1000 pp	om (5600 mg/m ³)	
IDLH 2000 ppm		Conversion 1 ppm = 5.62 m	ng/m ³
Physical Description Colorless to water-white, nearly odorless liquid or gas (above 75°F).			
MW: 137.4	BP: 75°F	FRZ: -168°F	Sol(75°F): 0.1%
VP: 690 mmHg	IP: 11.77 eV	P: 11.77 eV RGasD: 4.74	
Fl.P: NA	UEL: NA LEL: NA		
Noncombustible Liquid Non	flammable Gas		
II	Incompatibilities & Reactivities Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc, magnesium & lithium shavings; granular barium		
Measurement Methods NIOSH 1006			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: No recommendation Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		ort	

Up to 2000 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

Respirator Recommendations NIOSH/OSHA

full facepiece

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Incoordination, tremor; dermatitis; cardiac arrhythmias, cardiac arrest; asphyxia; liquid: frostbite

Target Organs Skin, respiratory system, cardiovascular system

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Fluoroxene		CAS 406-90-6	
CF ₃ CH ₂ OCH=CH ₂		RTECS KO4250000	
Synonyms & Trade Names 2,2,2-Trifluoroethoxyethene;	2,2,2-Trifluoroethyl vinyl etl	her	DOT ID & Guide
Exposure	NIOSH REL*: C 2 ppm (10 anesthetic gas.]	.3 mg/m ³) [60-minute] [*Note	e: REL for exposure to waste
Limits	OSHA PEL: none		
IDLH N.D.		Conversion 1 ppm = 5.16 m	ng/m ³
Physical Description Liquid. [inhalation anesthetic	e] [Note: A gas above 109°F.]		
MW: 126.1	BP: 109°F	FRZ: ?	Sol: ?
VP: 286 mmHg	IP: ?		Sp.Gr: 1.14
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Liquid [potential	ally EXPLOSIVE!]		
Incompatibilities & Reactive None reported	rities		
Measurement Methods None available			
First Aid (See procedures) Skin: No recommendation Eyes: Prevent eye contact Skin: No recommendation Skin: No recommendation Breathing: Respiratory support Swallow: Medical attention immediately Swallow: Medical attention Swallow:			
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation,	, ingestion, skin and/or eye co	ontact	
Symptoms Irritation eyes; ce depression	entral nervous system depress	ion, analgesia, anesthesia, con	vulsions, respiratory
Target Organs Eyes, central	l nervous system		

See also: <u>INTRODUCTION</u>

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Fonofos CAS 944-22-9			CAS 944-22-9
$C_{10}H_{15}OPS_2$		RTECS TA5950000	
Synonyms & Trade Names Dyfonate®, Dyphonate, O-E	thyl-S-phenyl ethylphosphoro	othioate, Fonophos	DOT ID & Guide
Exposure	NIOSH REL: TWA 0.1 mg/s	m ³ [skin]	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 10.07 i	ng/m ³
Physical Description Light-yellow liquid with an aromatic odor. [insecticide]			
MW: 246.3	BP: ?	SP: ? FRZ: ? Sol: 0.001%	
VP(77°F): 0.0002 mmHg	IP: ?		Sp.Gr: 1.15
Fl.P: >201°F	UEL: ?	LEL: ?	
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.		
Incompatibilities & Reactive None reported	rities		
Measurement Methods NIOSH 5600; OSHA PV202	7		
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation.	, skin absorption, ingestion, sl	kin and/or eye contact	

Symptoms Nausea, vomiting, abdominal cramps, diarrhea, salivation; headache, dizziness, lassitude (weakness, exhaustion); rhinorrhea (discharge of thin mucus), chest tightness; blurred vision, miosis; cardiac irregularities;

Target Organs respiratory system, central nervous system, cardiovascular system, blood cholinesterase

muscle fasciculation; dyspnea (breathing difficulty)

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Formaldehyde		CAS 50-00-0	
НСНО			RTECS LP8925000
Synonyms & Trade Names Methanal, Methyl aldehyde, Methylene oxide		DOT ID & Guide	
Exposure	NIOSH REL: Ca TWA 0	.016 ppm C 0.1 ppm [15-	minute] See Appendix A
Limits	OSHA PEL: [1910.1048]	TWA 0.75 ppm ST 2 pp	m
IDLH Ca [20 ppm]		Conversion 1 ppm =	= 1.23 mg/m ³
Physical Description Nearly colorless gas with a pungent, suffocating odor. [Note: Often used in an aqueous s for Formalin).]		queous solution (see specific listing	
MW: 30.0	BP: -6°F	FRZ: -134°F	Sol: Miscible
VP: >1 atm	IP: 10.88 eV	RGasD: 1.04	
Fl.P: NA (Gas)	UEL: 73%	UEL: 73% LEL: 7.0%	
Flammable Gas			
Incompatibilities & Read Strong oxidizers, alkalis & HCl to form bis-Chlorome	acids; phenols; urea [Note:	Pure formaldehyde has a	tendency to polymerize. Reacts with
Measurement Methods NIOSH 2016, 2541, 3500, 3800; OSHA ID205, 52			
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: No recommendation		First Aid (See proce Eye: Irrigate immedian Breathing: Respirator	ately

Respirator Recommendations NIOSH

Remove: No recommendation Change: No recommendation

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, nose, throat, respiratory system; lacrimation (discharge of tears); cough; wheezing; [potential occupational carcinogen]

Target Organs Eyes, respiratory system

Cancer Site [nasal cancer]

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Formalin (as formaldehyde)		CAS	
			RTECS
Formaldehyde solution [Note: Formalin is an aqueous solution that is 37%		DOT ID & Guide 1198 132 2209 132	
Exposure	NIOSH REL: Ca TWA 0.01	6 ppm C 0.1 ppm [15-minute]	See Appendix A
Limits	OSHA PEL: [1910.1048] TV	VA 0.75 ppm ST 2 ppm	
IDLH Ca [20 ppm]		Conversion	
Physical Description Colorless liquid with a pung	ent odor.		
MW: Varies	BP: 214°F	BP: 214°F FRZ: ? Sol: Miscible	
VP: 1 mmHg	IP: ?		Sp.Gr(77°F): 1.08
Fl.P: 185°F	UEL: 73% LEL: 7%		
Class IIIA Combustible Liqu	nid: Fl.P. at or above 140°F ar	nd below 200°F.	
Incompatibilities & Reaction Strong oxidizers, alkalis & a	vities cids; phenols; urea; oxides; is	ocyanates; caustics; anhydride	es
Measurement Methods NIOSH 2016, 2541, 3500, 3	800; OSHA ID205, 52		
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory suppo	

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat, respiratory system; lacrimation (discharge of tears); cough; wheezing, dermatitis; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system

Cancer Site [nasal cancer]

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Formamide		CAS 75-12-7	
HCONH ₂		RTECS LQ0525000	
Synonyms & Trade Names Carbamaldehyde, Methanam			DOT ID & Guide
Exposure	NIOSH REL: TWA 10 ppm	(15 mg/m ³) [skin]	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 1.85 m	ng/m ³
Physical Description Colorless, oily liquid. [Note:	A solid below 37°F.]		
MW: 45.1	BP: 411°F (Decomposes)	FRZ: 37°F	Sol: Miscible
VP(86°F): 0.1 mmHg	IP: 10.20 eV		Sp.Gr: 1.13
Fl.P(oc): 310°F	UEL: ?	LEL: ?	
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.		-
Incompatibilities & Reactive Oxidizers, iodine, pyridine, sair).]		lead [Note: Hygroscopic (i.e.,	absorbs moisture from the
Measurement Methods None available			
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: No recommendation Remove: No recommendation Change: No recommendation Skin: Water wash Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendations To be added later			
Exposure Routes inhalation	, ingestion, skin and/or eye c	ontact	
Symptoms Irritation eyes, sl skin eruptions; in animals: re		siness, lassitude (weakness, ex	chaustion); nausea; acidosis;

Target Organs Eyes, skin, respiratory system, central nervous system, reproductive system

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Formic acid		CAS 64-18-6	
НСООН			RTECS LQ4900000
		DOT ID & Guide 1779 153	
Exposure	NIOSH REL: TWA 5 ppm ((9 mg/m ³)	
Limits	OSHA PEL: TWA 5 ppm (9	0 mg/m^3)	
IDLH 30 ppm $\mathbf{Conversion} \ 1 \ \text{ppm} = 1.88 \ \text{mg/m}^3$			ng/m ³
Physical Description Colorless liquid with a pungent, penetrating odor. [Note: Often used in an aqueous solution.]			
MW: 46.0	BP: 224°F (90% solution)	FRZ: 20°F (90% solution)	Sol: Miscible
VP: 35 mmHg	IP: 11.05 eV		Sp.Gr: 1.22 (90% solution)
Fl.P(oc): 122°F (90% solution)	UEL: 57% (90% solution)	LEL: 18% (90% solution)	
Class II Combustible Liquid (90% solution)			
Incompatibilities & Reactivities Strong oxidizers, strong caustics, concentrated sulfuric acid [Note: Corrosive to metals.]			
Measurement Methods			

NIOSH 2011; OSHA ID186SG

Personal Protection & Sanitation	First Aid (See procedures)
Skin: Prevent skin contact	Eye: Irrigate immediately
Eyes: Prevent eye contact	Skin: Water flush immediately
Wash skin: When contaminated	Breathing: Respiratory support
Remove: When wet or contaminated	Swallow: Medical attention immediately
Change: No recommendation	
Provide: Eyewash, Quick drench	

Respirator Recommendations NIOSH/OSHA

Up to 30 ppm: (APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes; skin, throat; skin burns, dermatitis; lacrimation (discharge of tears); rhinorrhea (discharge of thin mucus); cough, dyspnea (breathing difficulty); nausea

Target Organs Eyes, skin, respiratory system

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Furfural		CAS 98-01-1	
$C_5H_4O_2$	$C_5H_4O_2$		RTECS LT7000000
Synonyms & Trade Names Fural, 2-Furancarboxaldehyd	le, Furfuraldehyde, 2-Furfural	dehyde	DOT ID & Guide 1199 132P
Exposure	NIOSH REL: See Appendix	D	
Limits	OSHA PEL†: TWA 5 ppm (20 mg/m ³) [skin]	
IDLH 100 ppm		Conversion 1 ppm = 3.93 m	ng/m ³
Physical Description Colorless to amber liquid with an almond-like odor. [Note: Darkens in light and air.]			
MW: 96.1	BP: 323°F	BP: 323°F	
VP: 2 mmHg	IP: 9.21 eV	IP: 9.21 eV	
Fl.P: 140°F	UEL: 19.3%	LEL: 2.1%	
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.	
Incompatibilities & Reactivities Strong acids, oxidizers, strong alkalis [Note: May polymerize on contact with strong acids or strong alkalis.]			ds or strong alkalis.]
Measurement Methods NIOSH 2529; OSHA 72			
Personal Protection & Sanitation		First Aid (See procedures)	
Skin: Prevent skin contact		Eye: Irrigate immediately	
Eyes: Prevent eye contact		Skin: Water flush promptly	
Wash skin: When contamina		Breathing: Respiratory support	
Remove: When wet or contact Change: No recommendation		Swallow: Medical attention i	mmediately

Respirator Recommendations OSHA

Up to 50 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 100 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; headache; dermatitis

Target Organs Eyes, skin, respiratory system

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Furfuryl alcohol		CAS 98-00-0	
$C_5H_6O_2$			
		DOT ID & Guide 2874 153	
NIOSH REL: TWA 10 ppm	(40 mg/m ³) ST 15 ppm (60 m	ng/m ³) [skin]	
OSHA PEL†: TWA 50 ppm	(200 mg/m ³)		
	Conversion 1 ppm = 4.01 m	ng/m ³	
Physical Description Colorless to amber liquid with a faint, burning odor. [Note: Darkens on exposure to light.]		nt.]	
BP: 338°F	BP: 338°F FRZ: 6°F Sol: Miscible		
IP: ?		Sp.Gr: 1.13	
UEL: 16.3%	LEL: 1.8%		
id: Fl.P. at or above 140°F ar	nd below 200°F.		
rities te: Contact with organic acid	s may lead to polymerization.]	
Measurement Methods NIOSH 2505			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated		ort	
	NIOSH REL: TWA 10 ppm OSHA PEL†: TWA 50 ppm h a faint, burning odor. [Note BP: 338°F IP: ? UEL: 16.3% id: Fl.P. at or above 140°F ar ities te: Contact with organic acid tation	NIOSH REL: TWA 10 ppm (40 mg/m³) ST 15 ppm (60 r OSHA PEL†: TWA 50 ppm (200 mg/m³) Conversion 1 ppm = 4.01 m h a faint, burning odor. [Note: Darkens on exposure to light BP: 338°F IP: ? UEL: 16.3% LEL: 1.8% id: Fl.P. at or above 140°F and below 200°F. rities te: Contact with organic acids may lead to polymerization. First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supported.	

Respirator Recommendations NIOSH

Change: No recommendation

Provide: Quick drench

Up to 75 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 50) Any airpurifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, mucous membrane; dizziness; nausea, diarrhea; diuresis; respiratory, body temperature depression; vomiting; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system

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Gasoline			CAS 8006-61-9
			RTECS LX3300000
Synonyms & Trade Names Motor fuel, Motor spirits, Natural gasoline, Petrol [Note: A complex mixture of volatile hydrocarbons (paraffins, cycloparaffins & aromatics).]		DOT ID & Guide 1203 128	
Exposure	NIOSH REL: Ca See Apper	ndix A	
Limits	OSHA PEL†: none	OSHA PEL†: none	
IDLH Ca [N.D.] Conversion 1 ppm 2.95 mg/m ³ (approx)			/m ³ (approx)
Physical Description Clear liquid with a character	istic odor.		
MW: 72 (approx)	BP: 102°F	FRZ: ?	Sol: Insoluble
VP: 38-300 mmHg	IP: ?		Sp.Gr(60°F): 0.72-0.76
Fl.P: -45°F	UEL: 7.6%	LEL: 1.4%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at of	or above 100°F.	
Incompatibilities & Reactivities Strong oxidizers such as peroxides, nitric acid & perchlorates			
Measurement Methods OSHA PV2028			
Personal Protection & San	itation	First Aid (See procedures)	

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench

Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid); possible liver, kidney damage; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

Cancer Site [in animals: liver & kidney cancer]

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Germanium tetrahydride		CAS 7782-65-2	
Synonyms & Trade Names		RTECS LY4900000	
		DOT ID & Guide 2192 119	
Exposure	NIOSH REL: TWA 0.2 pp	m (0.6 mg/m ³)	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 3.13 n	ng/m ³
Physical Description Colorless gas with a pungen	t odor. [Note: Shipped as a o	compressed gas.]	
MW: 76.6	BP: -127°F	FRZ: -267°F	Sol: Insoluble
VP: >1 atm	IP: 11.34 eV	RGasD: 2.65	
Fl.P: NA (Gas)	UEL: ?	LEL: ?	
Flammable Gas (may ignite	SPONTANEOUSLY in air)	•	•
Incompatibilities & Reacti Bromine	vities		
Measurement Methods None available			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation Change: No recommendation			ort
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation	1		
Symptoms Malaise (vague to nausea, vomiting; kidney inj	· · · · · · · · · · · · · · · · · · ·	iche, dizziness, fainting; dyspn	ea (breathing difficulty);
	ous system, kidneys, blood		

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Glutaraldehyde			CAS 111-30-8	
OCH(CH ₂) ₃ CHO			RTECS MA2450000	
Synonyms & Trade Names Glutaric dialdehyde; 1,5-Pentanedial			DOT ID & Guide	
Exposure	NIOSH REL: C 0.2 ppm (0.8 mg/m ³) See Appendix C (Aldehydes)		Aldehydes)	
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 4.09 r	ng/m ³	
Physical Description Colorless liquid with a punge	ent odor.			
MW: 100.1	BP: 212°F	FRZ: 7°F	Sol: Miscible	
VP: 17 mmHg	IP: ?		Sp.Gr: 1.10	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid				
Incompatibilities & Reactivities Strong oxidizers, strong bases [Note: Alkaline solutions of glutaraldehyde (i.e., activated glutaraldehyde) react with alcohol, ketones, amines, hydrazines & proteins.]			ed glutaraldehyde) react with	
Measurement Methods NIOSH 2532; OSHA 64				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Respirator Recommendation	ins 10 be added fater			
	, skin absorption, ingestion, sl	kin and/or eye contact		
Exposure Routes inhalation			n, asthma; nausea, vomiting	

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Glycerin (mist)			CAS 56-81-5
HOCH ₂ CH(OH)CH ₂ OH			RTECS MA8050000
Synonyms & Trade Names Glycerin (anhydrous); Glycerol; Glycyl alcohol; 1,2,3-Propanetriol; Trihydroxypropane		DOT ID & Guide	
Exposure	NIOSH REL: See Appendix	CD	
Limits	OSHA PEL†: TWA 15 mg/	m ³ (total) TWA 5 mg/m ³ (res	p)
IDLH N.D.		Conversion	
Physical Description Clear, colorless, odorless, syn liquid form freezes at a much		4°F). [Note: The solid form m	elts above 64°F but the
MW: 92.1	BP: 554°F (Decomposes)	MLT: 64°F	Sol: Miscible
VP(122°F): 0.003 mmHg	IP: ?		Sp.Gr: 1.26
Fl.P: 320°F	UEL: ?	LEL: ?	
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.		
Incompatibilities & Reactive Strong oxidizers (e.g., chromabsorbs moisture from the air	ium trioxide, potassium chlo	rate, potassium permanganate)	[Note: Hygroscopic (i.e.,
Measurement Methods NIOSH 0500, 0600			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash Breathing: Fresh air	
Respirator Recommendations To be added later			
Exposure Routes inhalation, skin and/or eye contact			
Symptoms Irritation eyes, skin, respiratory system; headache, nausea, vomiting; kidney injury			
Target Organs Eyes, skin, respiratory system, kidneys			

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Glycidol			CAS 556-52-5
$C_3H_6O_2$			RTECS UB4375000
Synonyms & Trade Names 2,3-Epoxy-1-propanol; Epoxypropyl alcohol; Glycide; Hydroxymethyl ethylene oxide; 2-Hydroxymethyl oxiran; 3-Hydroxypropylene oxide			DOT ID & Guide
Exposure	NIOSH REL: TWA 25 ppm	(75 mg/m^3)	
Limits	OSHA PEL†: TWA 50 ppm	(150 mg/m ³)	
IDLH 150 ppm		Conversion 1 ppm = 3.03 m	ng/m ³
Physical Description Colorless liquid.			
MW: 74.1	BP: 320°F (Decomposes)	FRZ: -49°F	Sol: Miscible
VP(77°F): 0.9 mmHg	IP: ?		Sp.Gr: 1.12
Fl.P: 162°F	UEL: ?	LEL: ?	
Class IIIA Combustible Liqu	nid: Fl.P. at or above 140°F and	nd below 200°F.	
Incompatibilities & Reactivities Strong oxidizers, nitrates			
Measurement Methods NIOSH 1608; OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash promptly	

Respirator Recommendations NIOSH

Wash skin: When contaminated

Change: No recommendation

Remove: When wet or contaminated

Up to 150 ppm: (APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Breathing: Respiratory support

Swallow: Medical attention immediately

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

See also: <u>INTRODUCTION</u>

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Glycolonitrile			CAS 107-16-4	
HOCH ₂ CN			RTECS AM0350000	
Synonyms & Trade Names Cyanomethanol, Formaldehyde cyanohydrin, Glycolic nitrile, Glyconitrile, Hydroxyacetonitrile			DOT ID & Guide	
Exposure	NIOSH REL: C 2 ppm (5 n	ng/m ³) [15-minute]		
Limits	OSHA PEL: none			
IDLH N.D. $\mathbf{Conversion} \ 1 \ \mathrm{ppm} = 2.34 \ \mathrm{mg/m}^3$		mg/m^3		
Physical Description Colorless, odorless, oily liquid. [Note: Forms cyanide in the body.]				
MW: 57.1	BP: 361°F (Decomposes)	FRZ: <-98°F	Sol: Soluble	
VP(145°F): 1 mmHg	IP: ?		Sp.Gr(66°F): 1.10	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Liquid				
Incompatibilities & Reactivities Traces of alkalis (promote violent polymerization)				
Measurement Methods None available				
		First Aid (See procedures) Eye: Irrigate immediately		

Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

Respirator Recommendations NIOSH

Up to 20 ppm: (APF = 10) Any supplied-air respirator

Up to 50 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 100 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any suppliedair respirator with a full facepiece

Skin: Water wash immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

Up to 250 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressuredemand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; headache, dizziness, lassitude (weakness, exhaustion), confusion, convulsions; dyspnea (breathing difficulty); abdominal pain, nausea, vomiting

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system

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Grain dust (oat, wheat, barley)			CAS
			RTECS MD7900000
Synonyms & Trade Names None [Note: Grain dust consists of 60-75% organic materials (cereal grains) & 25- 40% inorganic materials (soil), and includes fertilizers, pesticides & microorganisms.]			DOT ID & Guide
Exposure	NIOSH REL: TWA 4 mg/m ³		
Limits	OSHA PEL: TWA 10 mg/m	3	
IDLH N.D.		Conversion	
Physical Description Mixture of grain and all the	other substances associated w	ith its cultivation & harvestin	g.
Properties depend upon the specific component of the grain dust.			
Incompatibilities & Reactive None reported	vities		
Measurement Methods NIOSH 0500			
Personal Protection & San Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: Daily	tion	First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air	
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation	, skin and/or eye contact		
	kin, upper respiratory system; ve pulmonary disease; conjunc		
Target Organs Eyes, skin, r	respiratory system		

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Graphite (natural)			CAS 7782-42-5
C			RTECS MD9659600
Synonyms & Trade Names Black lead, Mineral carbon, Plumbago, Silver graphite, Stove black [Note: Also see specific listing for Graphite (synthetic).]			DOT ID & Guide
Exposure	NIOSH REL: TWA 2.5 mg/s	m ³ (resp)	
Limits	OSHA PEL†: TWA 15 mpp	cf	
IDLH 1250 mg/m ³		Conversion	
Physical Description Steel gray to black, greasy feeling, odorless solid.			
MW: 12.0	BP: Sublimes	MLT: 6602°F (Sublimes)	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.0-2.25
Fl.P: NA	UEL: NA	LEL: NA	
Combustible Solid			
Incompatibilities & Reactive Very strong oxidizers such a	vities s fluorine, chlorine trifluoride	& potassium peroxide	
Measurement Methods NIOSH 0500, 0600			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air	

Up to 25 mg/m^3 : (APF = 10) Any dust respirator except single-use and quarter-mask respirators/(APF = 10) Any

Up to 62.5 mg/m^3 : (APF = 25) Any powered, air-purifying respirator with a dust filter/(APF = 25) Any supplied-

Respirator Recommendations NIOSH

supplied-air respirator

Up to 12.5 mg/m^3 : (APF = 5) Any dust respirator

air respirator operated in a continuous-flow mode

Up to 125 mg/m: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1250 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Cough, dyspnea (breathing difficulty), black sputum, decreased pulmonary function, lung fibrosis

Target Organs respiratory system, cardiovascular system

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Graphite (synthetic)			CAS 7440-44-0 (synthetic)
С			RTECS FF5250100 (synthetic)
Synonyms & Trade Names Activated carbon [Note: Also see specific listing for Graphite (natural).]		DOT ID & Guide 1362 133 (activated carbon)	
Exposure	Exposure NIOSH REL: See Appendix D		
Limits	OSHA PEL†: TWA 15 mg/r	m ³ (total) TWA 5 mg/m ³ (res	p)
IDLH N.D. See: IDLH INDI	EX	Conversion	
Physical Description Steel gray to black, greasy fe	eling, odorless solid.		
MW: 12.0	BP: Sublimes	MLT: 6602°F (Sublimes)	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.5-1.8
Fl.P: NA	UEL: NA	LEL: NA	
Combustible Solid			
Incompatibilities & Reactive Very strong oxidizers such as	rities s fluorine, chlorine trifluoride	& potassium peroxide	
Measurement Methods NIOSH 0500, 0600			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air	
Respirator Recommendations To be added later			
Exposure Routes inhalation,			
Symptoms Cough, dyspnea (breathing difficulty), black sputum, decreased pulmonary function, lung fibrosis			
Target Organs respiratory system, cardiovascular system			

See also: <u>INTRODUCTION</u>

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Gypsum		CAS 13397-24-5	
CaSO ₄ • 2H ₂ O			RTECS MG2360000
Synonyms & Trade Names Calcium(II) sulfate dihydrate, Gypsum stone, Hydrated calcium sulfate, Mineral white [Note: Gypsum is the dihydrate form of calcium sulfate; Plaster of Paris is the hemihydrate form.]		DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 mg/r	n ³ (total) TWA 5 mg/m ³ (resp	p)
Limits	OSHA PEL: TWA 15 mg/m	³ (total) TWA 5 mg/m ³ (resp))
IDLH N.D.		Conversion	
Physical Description White or nearly white, odorlo	ess, crystalline solid.		
MW: 172.2	BP: ?	MLT: 262-325°F (Loses H ₂ O)	Sol(77°F): 0.2%
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.32
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid			
Incompatibilities & Reactive Aluminum (at high temperate			
Measurement Methods NIOSH 0500, 0600			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air	
Respirator Recommendations To be added later			
Exposure Routes inhalation, skin and/or eye contact			
Symptoms Irritation eyes, skin, mucous membrane, upper respiratory system; cough, sneezing, rhinorrhea (discharge of thin mucus)			

Target Organs Eyes, skin, respiratory system

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Hafnium			CAS 7440-58-6
Hf			RTECS MG4600000
Celtium, Elemental hafnium, Hafnium metal			DOT ID & Guide 1326 170 (powder, wet) 2545 135 (powder, dry)
Exposure	NIOSH REL*: TWA 0.5 m compounds (as Hf).]	ng/m ³ [*Note: The REL also a	pplies to other hafnium
Limits	OSHA PEL*: TWA 0.5 mg compounds (as Hf).]	g/m ³ [*Note: The PEL also ap	plies to other hafnium
IDLH 50 mg/m ³ (as Hf)		Conversion	
Physical Description Highly lustrous, ductile, gr	ayish solid.		
MW: 178.5	BP: 8316°F	MLT: 4041°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 13.31
Fl.P: NA	UEL: NA	LEL: NA	
Explosive in powder form or even SPONTANEOUS	•	er); finely divided powder can	be ignited by static electricity
Incompatibilities & Reac Strong oxidizers, chlorine	tivities		
Measurement Methods NIOSH S194 (II-5); OSHA	A ID121		
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supp Swallow: Medical attention	

Up to 5 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF =

Respirator Recommendations NIOSH/OSHA

10) Any supplied-air respirator

Up to 2.5 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 12.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter*

Up to 25 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes, skin, mucous membrane; liver damage

Target Organs Eyes, skin, mucous membrane, liver

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Halotnane	Halothane		
CF ₃ CHBrCl			RTECS KH6550000
Synonyms & Trade Names 1-Bromo-1-chloro-2,2,2-trifluoroethane; 2-Bromo-2-chloro-1,1,1-trifluoroethane; 1,1,1-Trifluoro-2-bromo-2-chloroethane; 2,2,2-Trifluoro-1-bromo-1-chloroethane			
Exposure	NIOSH REL*: C 2 p anesthetic gas.]	pm (16.2 mg/m ³) [60-minute]	[*Note: REL for exposure to waste
Limits	OSHA PEL: none		
IDLH N.D.		Conversion 1 ppm =	8.07 mg/m^3
Physical Description Clear, colorless liquid w	ith a sweetish, pleasant od	or. [inhalation anesthetic]	
MW: 197.4	BP: 122°F	FRZ: -180°F	Sol: 0.3%
VP: 243 mmHg	IP: ?		Sp.Gr: 1.87
Fl.P: NA	UEL: NA	LEL: NA	
	OBB. TVII	LEL. NA	
	CDE.TVI	LEL. NA	
Noncombustible Liquid Incompatibilities & Res	activities		position. May be stabilized with
Noncombustible Liquid Incompatibilities & Res May attack rubber & sor	activities ne plastics; sensitive to lig		position. May be stabilized with
Noncombustible Liquid Incompatibilities & Rea May attack rubber & sor 0.01% thymol.] Measurement Methods	activities me plastics; sensitive to lig Sanitation ct ct minated ontaminated		dures) ately aptly y support
Noncombustible Liquid Incompatibilities & Rea May attack rubber & sor 0.01% thymol.] Measurement Methods OSHA 29 Personal Protection & Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contact Remove: When wet or c Change: No recommend Provide: Eyewash	activities me plastics; sensitive to lig Sanitation ct ct minated ontaminated	First Aid (See proced Eye: Irrigate immedia Skin: Soap wash pron Breathing: Respirator	dures) ately aptly y support

cardiac arrhythmias; liver, kidney damage; decreased audio-visual performance; in animals: reproductive effects

Target Organs Eyes, skin, respiratory system, cardiovascular system, central nervous system, liver, kidneys, reproductive system

See also: <u>INTRODUCTION</u>

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Heptachlor			CAS 76-44-8	
$C_{10}H_5Cl_7$			RTECS PC0700000	
Synonyms & Trade Names 1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene		DOT ID & Guide 2761 151 (organochlorine pesticide, solid)		
Exposure	NIOSH REL: Ca TWA 0.5	mg/m ³ [skin] See App	pendix A	
Limits	OSHA PEL: TWA 0.5 mg/s	m ³ [skin]		
IDLH Ca [35 mg/m ³]		Conversion		
Physical Description White to light-tan crystals with a camphor-like odor. [insecticide]				
MW: 373.4	BP: 293°F (Decomposes)	MLT: 203°F	Sol: 0.0006%	
VP(77°F): 0.0003 mmHg	IP: ?		Sp.Gr: 1.66	
Fl.P: NA	UEL: NA	UEL: NA LEL: NA		
Noncombustible Solid, but	may be dissolved in flammab	le liquids.		
Incompatibilities & React	ivities			
Measurement Methods NIOSH S287 (II-5); OSHA	PV2029			

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms In animals: tremor, convulsions; liver damage; [potential occupational carcinogen]

Target Organs central nervous system, liver

Cancer Site [in animals: liver cancer]

See also: <u>INTRODUCTION</u>

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n-Heptane			CAS 142-82-5
CH ₃ [CH ₂] ₅ CH ₃			RTECS MI7700000
Synonyms & Trade Names Heptane, normal-Heptane	Synonyms & Trade Names Heptane, normal-Heptane		
Exposure	NIOSH REL: TWA 85 ppm	(350 mg/m ³) C 440 ppm (180	00 mg/m ³) [15-minute]
Limits	OSHA PEL†: TWA 500 ppn	n (2000 mg/m ³)	
IDLH 750 ppm		Conversion 1 ppm = 4.10 m	ng/m ³
Physical Description Colorless liquid with a gasoline-like odor.			
MW: 100.2	BP: 209°F	FRZ: -131°F	Sol: 0.0003%
VP(72°F): 40 mmHg	IP: 9.90 eV		Sp.Gr: 0.68
Fl.P: 25°F	UEL: 6.7%	LEL: 1.05%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.	
Incompatibilities & Reactive Strong oxidizers	vities		
Measurement Methods NIOSH 1500; OSHA 7			
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Eye: Irrigate immediately Skin: Soap wash promptl Breathing: Respiratory st		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo	

Respirator Recommendations NIOSH

Change: No recommendation

Up to 750 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 50) Any airpurifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Dizziness, stupor, incoordination; loss of appetite, nausea; dermatitis; chemical pneumonitis (aspiration liquid); unconsciousness

Target Organs Skin, respiratory system, central nervous system

See also: <u>INTRODUCTION</u> See ICSC CARD: <u>0657</u>

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1-Heptanethiol			CAS 1639-09-4
CH ₃ [CH ₂] ₆ SH			RTECS MJ1400000
Synonyms & Trade Names Heptyl mercaptan, n-Heptyl			DOT ID & Guide 1228 131
Exposure	NIOSH REL: C 0.5 ppm (2.7	7 mg/m ³) [15-minute]	
Limits	OSHA PEL: none		
IDLH N.D.		Conversion 1 ppm = 5.41 m	g/m ³
Physical Description Colorless liquid with a strong odor.			
MW: 132.3	BP: 351°F	FRZ: -46°F	Sol: Insoluble
VP: ?	IP: ?		Sp.Gr: 0.84
Fl.P: 115°F	UEL: ?	LEL: ?	
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.	
Incompatibilities & Reactive Oxidizers, reducing agents, s	vities trong acids & bases, alkali me	etals	
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory suppo	

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; lassitude (weakness, exhaustion), cyanosis, increased respiration, nausea, drowsiness, headache, vomiting

Target Organs Eyes, skin, respiratory system, central nervous system, blood

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Hexachlorobutadiene			CAS 87-68-3
Cl ₂ C=CClCCl=CCl ₂			RTECS EJ0700000
		DOT ID & Guide 2279 151	
Exposure	NIOSH REL: Ca TW	A 0.02 ppm (0.24 mg/m ³) [sl	kin] See Appendix A
Limits	OSHA PEL†: none		
IDLH Ca [N.D.]		Conversion 1 ppm =	10.66 mg/m ³
Physical Description Clear, colorless liquid with	a mild, turpentine-like	odor.	
MW: 260.7	BP: 419°F	FRZ: -6°F	Sol: Insoluble
VP: 0.2 mmHg	IP: ?		Sp.Gr: 1.55
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Liquid			
Incompatibilities & Reac Oxidizers	tivities		
Measurement Methods NIOSH 2543			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See proced Eye: Irrigate immedia Skin: Soap wash imm Breathing: Respirator Swallow: Medical att	ately nediately ry support

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes, skin, respiratory system; kidney damage; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, kidneys

Cancer Site [in animals: kidney tumors]

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Hexachlorocyclopentadiene			CAS 77-47-4	
C ₅ Cl ₆			RTECS GY1225000	
		DOT ID & Guide 2646 151		
Exposure	NIOSH REL: TWA 0.01 pp	m (0.1 mg/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 11.16	mg/m ³	
Physical Description Pale-yellow to amber-colore	d liquid with a pungent, unpl	easant odor. [Note: A solid be	elow 16°F.]	
MW: 272.8	BP: 462°F	FRZ: 16°F	Sol(77°F): 0.0002% (Reacts)	
VP(77°F): 0.08 mmHg	IP: ?		Sp.Gr: 1.71	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid				
	owly with water to form hydr	rochloric acid; will corrode irosed spaces in the presence of		
Measurement Methods NIOSH 2518				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort	
Respirator Recommendation	ons To be added later			
Exposure Routes inhalation	, skin absorption, ingestion, s	kin and/or eye contact		
Symptoms Irritation eyes, sl	kin, respiratory system; eye, s	kin burns; lacrimation (discha	arge of tears); sneezing,	

cough, dyspnea (breathing difficulty), salivation, pulmonary edema; nausea, vomiting, diarrhea; in animals: liver,

kidney injury

Target Organs Eyes, skin, respiratory system, liver, kidneys

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Hexachloroethane			CAS 67-72-1	
Cl ₃ CCCl ₃			RTECS KI4025000	
Synonyms & Trade Names Carbon hexachloride, Ethane	hexachloride, Perchloroeth	ane	DOT ID & Guide 9037 151	
Exposure	(Choroenanes)			
Limits	OSHA PEL: TWA 1 ppm (OSHA PEL: TWA 1 ppm (10 mg/m ³) [skin]		
IDLH Ca [300 ppm]			ng/m ³	
Physical Description Colorless crystals with a cam	phor-like odor.			
MW: 236.7	BP: Sublimes	MLT: 368°F (Sublimes)	Sol(72°F): 0.005%	
VP: 0.2 mmHg	IP: 11.22 eV		Sp.Gr: 2.09	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactivities Alkalis; metals such as zinc, cadmium, aluminum, hot iron & mercury				
Measurement Methods NIOSH 1003; OSHA 7				

Personal Protection &	& Sanitation
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Skin: Prevent skin contact Eyes: Prevent eye contact

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; in animals: kidney damage; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, kidneys

Cancer Site [in animals: liver cancer]

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Hexachloronaphtl	nalene		CAS 1335-87-1	
$C_{10}H_2Cl_6$			RTECS QJ7350000	
Synonyms & Trade Names Halowax® 1014			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.2 mg/	m ³ [skin]		
Limits	OSHA PEL: TWA 0.2 mg/n	n ³ [skin]		
IDLH 2 mg/m ³		Conversion		
Physical Description White to light-yellow solid with an aromatic odor.				
MW: 334.9	BP: 650-730°F	MLT: 279°F	Sol: Insoluble	
VP: <1 mmHg	IP: ?		Sp.Gr: 1.78	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reaction Strong oxidizers	vities			
Measurement Methods NIOSH S100 (II-2)				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Up to 2 mg/m^3 : (APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Acne-form dermatitis, nausea, confusion, jaundice, coma

Target Organs Skin, liver

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1-Hexadecanethiol CAS 2917-26-2			
CH ₃ [CH ₂] ₁₅ SH			RTECS
			DOT ID & Guide 1228 131 (liquid)
Exposure	NIOSH REL: C 0.5 ppm (5	3 mg/m ³) [15-minute]	
Limits	OSHA PEL: none		
IDLH N.D.		Conversion 1 ppm = 10.59 i	mg/m ³
Physical Description Colorless liquid or solid (bel-	ow 64-68°F) with a strong od	or.	
MW: 258.5	BP: ?	FRZ: 64-68°F	Sol: Insoluble
VP: 0.1 mmHg	IP: ?		Sp.Gr: 0.85
Fl.P: 215°F	UEL: ?	LEL: ?	
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.		
Incompatibilities & Reactive Oxidizers, strong acids & base	vities ses, alkali metals, reducing ag	ents	
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo	ort

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; headache, dizziness, lassitude (weakness, exhaustion), cyanosis, nausea, convulsions

Target Organs Eyes, skin, respiratory system, central nervous system, blood

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Hexafluoroacetone			CAS 684-16-2	
(CF ₃) ₂ CO			RTECS UC2450000	
Synonyms & Trade Names Hexafluoro-2-propanone; 1,1,1,3,3,3-Hexafluoro-2-propanone; HFA; Perfluoroacetone		DOT ID & Guide 2420 125		
Exposure	NIOSH REL: TWA 0.1 ppm	(0.7 mg/m ³) [skin]		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 6.79 m	ng/m ³	
Physical Description Colorless gas with a musty o	odor. [Note: Shipped as a liqu	efied compressed gas.]		
MW: 166.0	BP: -18°F	FRZ: -188°F	Sol: Reacts	
VP: 5.8 atm	IP: 11.81 eV	RGasD: 5.76		
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Gas, but high	ly reactive with water & other	r substances, releasing heat.		
Incompatibilities & Reactive Water, acids [Note: Hygrosconsesquihydrate.]		om the air); reacts with moistu	are to form a highly acidic	
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact/Frostbite Eyes: Prevent eye contact/Frostbite Wash skin: No recommendation Remove: No recommendation Change: No recommendation Provide: Frostbite		First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory suppo	ort	
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, skin and/or eye contact				
Symptoms Irritation eyes, sk animals: teratogenic, reprodu	* · · · · · · · · · · · · · · · · · · ·	atory system; pulmonary eder	ma; liquid: frostbite; in	
Powert Owene Ever skin reminetery system kidneys remoductive system				

Target Organs Eyes, skin, respiratory system, kidneys, reproductive system

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Hexamethylene diisocyanate			
OCN[CH ₂] ₆ NCO			
Synonyms & Trade Names 1,6-Diisocyanatohexane; HDI; Hexamethylene-1,6-diisocyanate; 1,6-Hexamethylene diisocyanate; HMDI			
NIOSH REL: TWA 0.005 ppm (0.035 mg/m ³) C 0.020 ppm (0.140 mg/m ³) [10-minute]			
OSHA PEL: none	OSHA PEL: none		
IDLH N.D. $\mathbf{Conversion} \ 1 \ \mathrm{ppm} = 6.88 \ \mathrm{mg/m^3}$			
Physical Description Clear, colorless to slightly yellow liquid with a sharp, pungent odor.			
BP: 415°F	FRZ: -89°F	Sol: Low (Reacts)	
IP:?		Sp.Gr(77°F): 1.04	
UEL: ?	UEL: ?		
id: Fl.P. at or above 2	200°F.		
Incompatibilities & Reactivities Water, alcohols, strong bases, amines, carboxylic acids, organotin catalysts [Note: Reacts slowly with water to form carbon dioxide. Avoid heating above 392°F (polymerizes).]			
	NIOSH REL: TWA minute] OSHA PEL: none ellow liquid with a sh BP: 415°F IP:? UEL: ? vities s, amines, carboxylic	NIOSH REL: TWA 0.005 ppm (0.035 mg/m³) C 0.0 minute OSHA PEL: none Conversion 1 ppm = 6 ellow liquid with a sharp, pungent odor. BP: 415°F IP:? UEL: ? Id: Fl.P. at or above 200°F. vities s, amines, carboxylic acids, organotin catalysts [Note:	

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap flush immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 0.05 ppm: (APF = 10) Any supplied-air respirator*

Up to 0.125 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 0.25 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

supplied-air respirator with a full facepiece

Up to 1 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-

demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; cough, dyspnea (breathing difficulty), bronchitis, wheezing, pulmonary edema, asthma; corneal damage, skin blisters

Target Organs Eyes, skin, respiratory system

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Hexamethyl phosphoramide			CAS 680-31-9		
$[(CH_3)_2N]_3PO$			RTECS TD0875000		
Synonyms & Trade Names Hexamethylphosphoric triamide, Hexamethylphosphorotriamide, HMPA, Tris(dimethylamino)phosphine oxide			DOT ID & Guide		
Exposure	NIOSH REL: Ca See Apper	ndix A			
Limits	OSHA PEL: none	OSHA PEL: none			
IDLH Ca [N.D.]	Conversion				
Physical Description Clear, colorless liquid with a	n aromatic or mild, amine-lil	ke odor. [Note: A solid below	43°F.]		
MW: 179.2	BP: 451°F	FRZ: 43°F	Sol: Miscible		
VP: 0.03 mmHg	IP: ?		Sp.Gr: 1.03		
Fl.P: 220°F	UEL: ?	UEL: ?			
Class IIIB Combustible Liqu	Class IIIB Combustible Liquid: Fl.P. at or above 200°F.				
Incompatibilities & Reactivities Oxidizers, strong acids, chemically-active metals (e.g., potassium, sodium, magnesium, zinc)					
Measurement Methods None available					

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; dyspnea (breathing difficulty); abdominal pain; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal tract

Cancer Site [in animals: cancer of the nasal cavity]

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n-Hexane			CAS 110-54-3
CH ₃ [CH ₂] ₄ CH ₃			RTECS MN9275000
Synonyms & Trade Names Hexane, Hexyl hydride, norm	nal-Hexane		DOT ID & Guide 1208 128
Exposure	NIOSH REL: TWA 50 ppm	(180 mg/m ³)	
Limits	OSHA PEL†: TWA 500 ppm	n (1800 mg/m ³)	
IDLH 1100 ppm [10%LEL]		Conversion 1 ppm = 3.53 m	g/m ³
Physical Description Colorless liquid with a gasoline-like odor.			
MW: 86.2	BP: 156°F	FRZ: -219°F	Sol: 0.002%
VP: 124 mmHg	IP: 10.18 eV		Sp.Gr: 0.66
Fl.P: -7°F	UEL: 7.5% LEL: 1.1%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.	
Incompatibilities & Reactive Strong oxidizers	rities		
Measurement Methods NIOSH 1500, 3800; OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo	ort

Respirator Recommendations NIOSH

Up to 500 ppm: (APF = 10) Any supplied-air respirator*

Up to 1100 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; nausea, headache; peripheral neuropathy: numb extremities, muscle weakness; dermatitis; dizziness; chemical pneumonitis (aspiration liquid)

Target Organs Eyes, skin, respiratory system, central nervous system, peripheral nervous system

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Hexane isomers (excluding n-Hexane)			CAS
C_6H_{14}			RTECS
Synonyms & Trade Names Diethylmethylmethane; Diisopropyl; 2,2-Dimethylbutane; 2,3-Dimethylbutane; Isohexane; 2-Methylpentane; 3-Methylpentane [Note: Also see specific listing for n-Hexane.]			DOT ID & Guide 1208 128
Exposure	NIOSH REL: TWA 100 ppr	m (350 mg/m ³) C 510 ppm (18	800 mg/m ³) [15-minute]
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 3.53 m	g/m ³
Physical Description Clear liquids with mild, gasoline-like odors. [Note: Includes all the isomers of hexane except n-hexane.]			
MW: 86.2	BP: 122-145°F	FRZ: -245 to -148°F	Sol: Insoluble
VP: ?	IP: ?	IP: ? Sp.Gr: 0.	
Fl.P: -54 to 19°F	UEL: ?		
Class IB Flammable Liquids	S		
Incompatibilities & Reacti Strong oxidizers	vities		
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately			
	ons NIOSH O) Any supplied-air respirator* O) Any supplied-air respirator		mode*

Up to 5000 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; headache, dizziness; nausea; chemical pneumonitis (aspiration liquid); dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system

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n-Hexanethiol			CAS 111-31-9
CH ₃ [CH ₂] ₅ SH			RTECS MO4550000
		DOT ID & Guide 1228 131	
Exposure	NIOSH REL: C 0.5 ppm (2.7	7 mg/m ³) [15-minute]	
Limits	OSHA PEL: none		
IDLH N.D.		Conversion 1 ppm = 4.83 m	g/m ³
Physical Description Colorless liquid with an unpleasant odor.			
MW: 118.2	BP: 304°F	FRZ: -113°F Sol: Insoluble	
VP: ?	IP: ?		Sp.Gr: 0.84
Fl.P: 68°F	UEL: ?	LEL: ?	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.	
Incompatibilities & Reactivities Oxidizers, reducing agents, strong acids & bases, alkali metals			
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention is	ort

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; lassitude (weakness, exhaustion), cyanosis, increased respiration, nausea, drowsiness, headache, vomiting

Target Organs Eyes, skin, respiratory system, central nervous system, blood

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2-Hexanone		CAS 591-78-6	
CH ₃ CO[CH ₂] ₃ CH ₃		RTECS MP1400000	
Synonyms & Trade Names Butyl methyl ketone, MBK, Methyl butyl ketone, Methyl n-butyl ketone		DOT ID & Guide	
Exposure	NIOSH REL: TWA 1 ppm (4 mg/m ³)	
Limits	OSHA PEL†: TWA 100 ppn	n (410 mg/m ³)	
IDLH 1600 ppm		Conversion 1 ppm = 4.10 m	ng/m ³
Physical Description Colorless liquid with an acetone-like odor.			
MW: 100.2	BP: 262°F		
VP: 11 mmHg	IP: 9.34 eV		Sp.Gr: 0.81
Fl.P: 77°F	UEL: 8%	LEL: ?	
Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.			
Incompatibilities & Reactive Strong oxidizers	vities		
Measurement Methods NIOSH 1300; OSHA PV203	1		
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendation	ons NIOSH		

Up to 10 ppm: (APF = 10) Any supplied-air respirator

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 50 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1600 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; peripheral neuropathy: lassitude (weakness, exhaustion), paresthesia; dermatitis; headache, drowsiness

Target Organs Eyes, skin, respiratory system, central nervous system, peripheral nervous system

See also: <u>INTRODUCTION</u>

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Hexone			CAS 108-10-1
CH ₃ COCH ₂ CH(CH ₃) ₂			RTECS SA9275000
		DOT ID & Guide 1245 127	
Exposure	NIOSH REL: TWA 50 ppm	(205 mg/m ³) ST 75 ppm (300) mg/m ³)
Limits	OSHA PEL†: TWA 100 ppn	n (410 mg/m ³)	
IDLH 500 ppm		Conversion 1 ppm = 4.10 m	g/m ³
Physical Description Colorless liquid with a pleasant odor.			
MW: 100.2	BP: 242°F FRZ: -120°F Sol: 2%		Sol: 2%
VP: 16 mmHg	IP: 9.30 eV Sp.G		Sp.Gr: 0.80
Fl.P: 64°F	UEL(200°F): 8.0%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.	
Incompatibilities & Reactivities Strong oxidizers, potassium tert-butoxide			
Measurement Methods NIOSH 1300; OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory suppo	

Respirator Recommendations NIOSH

Up to 500 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 50) Any airpurifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; headache, narcosis, coma; dermatitis; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

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sec-Hexyl acetate			CAS 108-84-9
$\overline{\mathrm{C_8H_{16}O_2}}$			RTECS SA7525000
		DOT ID & Guide 1233 129	
Exposure	NIOSH REL: TWA 50 ppm	(300 mg/m ³)	
Limits	OSHA PEL: TWA 50 ppm (300 mg/m ³)	
IDLH 500 ppm Conversion 1 p		Conversion 1 ppm = 5.90 m	ng/m ³
Physical Description Colorless liquid with a mild, pleasant, fruity odor.			
MW: 144.2	BP: 297°F FRZ: -83°F		Sol: 0.08%
VP: 3 mmHg	IP: ?		Sp.Gr: 0.86
Fl.P: 113°F	UEL: ?	LEL: ?	
Class II Combustible Liquid: Fl.P. at or above 100°F and below 140°F.			
Incompatibilities & Reactivities Nitrates; strong oxidizers, alkalis & acids			
Measurement Methods NIOSH 1450; OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately	

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 500 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 50) Any airpurifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; headache; in animals: narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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2,4-Dihydroxy-2-methylpenta			RTECS SA0810000
2,4-Dihydroxy-2-methylpenta	nne; 2-Methyl-2,4-pentanedic		<u> </u>
	e-2,4-diol	Synonyms & Trade Names 2,4-Dihydroxy-2-methylpentane; 2-Methyl-2,4-pentanediol; 4-Methyl-2,4-pentanediol; 2-Methylpentane-2,4-diol	
Exposure	NIOSH REL: C 25 ppm (125 mg/m ³)		
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 4.83 m	ng/m ³
Physical Description Colorless liquid with a mild, sweetish odor.			
MW: 118.2	BP: 388°F	FRZ: -58°F (Sets to glass)	Sol: Miscible
VP: 0.05 mmHg	IP: ?		Sp.Gr: 0.92
Fl.P: 209°F	UEL(est): 7.4%	LEL(calc): 1.3%	
Class IIIB Combustible Liquid	d: Fl.P. at or above 200°F.		
Incompatibilities & Reactivi Strong oxidizers, strong acids		orbs moisture from the air).]	
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash immediately Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendation	ns To be added later		
Exposure Routes inhalation,	ingestion, skin and/or eye co	ntact	
Symptoms Irritation eyes, ski system depression; dermatitis,		che, dizziness, nausea, incoore	dination, central nervous
Target Organs Eyes, skin, re	espiratory system, central ner	vous system	

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Hydrazine			CAS 302-01-2
H ₂ NNH ₂		RTECS MU7175000	
Diamine, Hydrazine (anhydrous), Hydrazine base		DOT ID & Guide 2029 132 (anhydrous) 3293 152 (=37% solution)<br 2030 153 (37-64% solution) 2029 132 (>64% solution)	
Exposure	NIOSH REL: Ca C 0.03 pp	Appendix A	
Limits	OSHA PEL†: TWA 1 ppm (1.3 mg/m ³) [skin]		
IDLH Ca [50 ppm]			ng/m ³
Physical Description Colorless, fuming, oily liquid with an ammonia-like odor. [Note: A solid below 36°F.]			
MW: 32.1	BP: 236°F FRZ: 36°F Sol:		Sol: Miscible
VP: 10 mmHg	IP: 8.93 eV		Sp.Gr: 1.01
Fl.P: 99°F	UEL: 98% LEL: 2.9%		
Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.			
Incompatibilities & Reactivities Oxidizers, hydrogen peroxide, nitric acid, metallic oxides, acids [Note: Can ignite SPONTANEOUSLY on contact with oxidizers or porous materials such as earth, wood & cloth.]			
Measurement Methods NIOSH 3503; OSHA 20, 108			

Respirator Recommendations NIOSH

Personal Protection & Sanitation

Wash skin: When contaminated

Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench

Skin: Prevent skin contact

Eyes: Prevent eye contact

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

First Aid (See procedures)
Eye: Irrigate immediately

Skin: Water flush immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; temporary blindness; dizziness, nausea; dermatitis; eye, skin burns; in animals: bronchitis, pulmonary edema; liver, kidney damage; convulsions; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

Cancer Site [in animals: tumors of the lungs, liver, blood vessels & intestine]

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Hydrogenated	terphenyls		CAS 61788-32-7	
$(C_6H_n)_3$			RTECS WZ6535000	
	ames penzenes, Hydrogenated phen ex mixture of terphenyl ison		DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.:	5 ppm (5 mg/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D.	71	Conversion 1 ppm =	12.19 mg/m ³ (40% hydrogenated)	
Physical Description Clear, oily, pale-yellow	liquids with a faint odor. [pl	asticizer/heat-transfer media	ı]	
MW: 298 (40% hydrogenated)	BP: 644°F (40% hydrogenated)	· ·		
VP: ?	IP: ?		Sp.Gr(77°F): 1.003-1.009 (40% hydrogenated)	
Fl.P: 315°F (40% hydrogenated)	UEL: ?	LEL: ?		
Class IIIB Combustible	Liquids		·	
Incompatibilities & Re None reported [Note: W	cactivities Then heated, irritating vapors	will be released.]		
Measurement Methods None available	S			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		Eye: Irrigate immedia Skin: Soap wash imm Breathing: Respirator	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommen	dations To be added later			
Exposure Routes inhala	ation, ingestion, skin and/or	eye contact		

Symptoms Irritation eyes, skin, respiratory system; liver, kidney, hematopoietic damage

Target Organs Eyes, skin, respiratory system, liver, kidneys, hematopoietic system

See also: <u>INTRODUCTION</u>

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Hydrogen bromi	CAS 10035-10-6				
HBr			RTECS MW3850000		
Anhydrous hydrogen bromide; Aqueous hydrogen bromide (i.e., Hydrobromic acid)			DOT ID & Guide 1048 125 (anhydrous) 1788 154 (solution)		
Exposure	NIOSH REL: C 3 ppm (10 p	mg/m ³)			
Limits	OSHA PEL†: TWA 3 ppm	(10 mg/m ³)			
IDLH 30 ppm		Conversion 1 ppm = 3.31 m	ng/m ³		
Physical Description Colorless gas with a sharp, irritating odor. [Note: Shipped as a liquefied compressed gas. Often used in an aqueous solution.]					
MW: 80.9	BP: -88°F	FRZ: -124°F	Sol: 49%		
VP: 20 atm	IP: 11.62 eV	RGasD: 2.81			
Fl.P: NA	UEL: NA	LEL: NA			
Nonflammable Gas					
Incompatibilities & Read Strong oxidizers, strong cametals.]	tivities ustics, moisture, copper, brass,	zinc [Note: Hydrobromic acid	l is highly corrosive to most		
Measurement Methods NIOSH 7903; OSHA ID10	Measurement Methods NIOSH 7903; OSHA ID165SG				
Personal Protection & Sanitation Skin: Prevent skin contact (solution)/Frostbite Eyes: Prevent eye contact (solution)/Frostbite Wash skin: When contaminated (solution) Remove: When wet or contaminated (solution)		First Aid (See procedures) Eye: Irrigate immediately (s Skin: Water flush immediate Breathing: Respiratory supp Swallow: Medical attention	ely (solution)/Frostbite ort		

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash (liquid), Quick drench (solution),

Change: No recommendation

Frostbite

Up to 30 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with acid gas cartridge(s) $^{\pounds}$ /(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister/(APF = 50) Any self-contained breathing

apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion (solution), skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; solution: eye, skin burns; liquid: frostbite

Target Organs Eyes, skin, respiratory system

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NIOSH Pocket Guide to Chemical Hazards

Hydrogen chloride			CAS 7647-01-0	
HCl			RTECS MW4025000	
Synonyms & Trade Names Anhydrous hydrogen chloride; Aqueous hydrogen chloride (i.e., Hydrochlori Muriatic acid) [Note: Often used in an aqueous solution.]			DOT ID & Guide 1050 125 (anhydrous) 1789 157 (solution)	
Exposure	NIOSH REL: C 5 ppm (7 m	g/m^3)		
Limits	OSHA PEL: C 5 ppm (7 mg	$/m^3$)		
IDLH 50 ppm		Conversion 1 ppm = 1.49 m	ng/m ³	
Physical Description Colorless to slightly yellow gas with a pungent, irritating odor. [Note: Shipped as a liquefied compressed gas.]			nefied compressed gas.]	
MW: 36.5	BP: -121°F	FRZ: -174°F	Sol(86°F): 67%	
VP: 40.5 atm	IP: 12.74 eV	RGasD: 1.27		
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Gas				
Incompatibilities & Reactive Hydroxides, amines, alkalis,	vities copper, brass, zinc [Note: Hy	drochloric acid is highly corre	osive to most metals.]	
Measurement Methods NIOSH 7903; OSHA ID174SG				
Personal Protection & Sanitation Skin: Prevent skin contact (solution)/Frostbite Eyes: Prevent eye contact/Frostbite Wash skin: When contaminated (solution) Remove: When wet or contaminated (solution) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately (so Skin: Water flush immediate Breathing: Respiratory supposuallow: Medical attention	ely (solution)/Frostbite ort	

Respirator Recommendations NIOSH/OSHA

Frostbite

Provide: Eyewash (solution), Quick drench (solution),

Up to 50 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front-or back-mounted canister providing protection against the compound of concern/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion (solution), skin and/or eye contact

Symptoms Irritation nose, throat, larynx; cough, choking; dermatitis; solution: eye, skin burns; liquid: frostbite; in animals: laryngeal spasm; pulmonary edema

Target Organs Eyes, skin, respiratory system

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Hydrogen cyanide		CAS 74-90-8	
HCN			RTECS MW6825000
Synonyms & Trade Names Formonitrile, Hydrocyanic acid, Prussic acid		DOT ID & Guide 1051 117 (>20% solution) 1051 117 (anhydrous) 1613 154 (=20% solution)</th	
Exposure	posure NIOSH REL: ST 4.7 ppm (5 mg/m ³) [skin]		
Limits	OSHA PEL†: TWA 10) ppm (11 mg/m ³) [skin]	
IDLH 50 ppm		Conversion 1 ppm =	1.10 mg/m ³
solution in water.]		th a bitter, almond-like odor.	
MW: 27.0	BP: 78°F (96%)	FRZ: 7°F (96%)	Sol: Miscible
VP: 630 mmHg	IP: 13.60 eV		Sp.Gr: 0.69
Fl.P: 0°F (96%)	UEL: 40.0%	LEL: 5.6%	
Class IA Flammable Liquid	l Flammable Gas		
Incompatibilities & React Amines, oxidizers, acids, so polymerize at 122-140°F.]		n hydroxide, sodium carbonat	e, caustics, ammonia [Note: Can
Measurement Methods NIOSH 6010			
Personal Protection & Sa	nitation	First Aid (See proced)	ures)

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

Provide: Eyewash, Quick drench

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 47 ppm: (APF = 10) Any supplied-air respirator

Up to 50 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Asphyxia; lassitude (weakness, exhaustion), headache, confusion; nausea, vomiting; increased rate and depth of respiration or respiration slow and gasping; thyroid, blood changes

Target Organs central nervous system, cardiovascular system, thyroid, blood

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Hydrogen fluoride			CAS 7664-39-3	
HF			RTECS MW7875000	
			DOT ID & Guide 1052 125 (anhydrous) 1790 157 (solution)	
Exposure	NIOSH REL: TWA 3 ppm (2.5 mg/m ³) C 6 ppm (5 mg/m	n ³) [15-minute]	
Limits	OSHA PEL†: TWA 3 ppm			
IDLH 30 ppm		Conversion 1 ppm = 0.82 m	ng/m ³	
Physical Description Colorless gas or fuming liquid (below 67°F) with a strong, irritating odor. [Note: Shipped in cylinders.]				
MW: 20.0	BP: 67°F	FRZ: -118°F	Sol: Miscible	
VP: 783 mmHg	IP: 15.98 eV	RGasD: 1.86	Sp.Gr: 1.00 (Liquid at 67°F)	
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Gas				
Incompatibilities & Reactive Metals, water or steam [Note	vities e: Corrosive to metals. Will at	tack glass and concrete.]		
Measurement Methods NIOSH 7902, 7903, 7906; OSHA ID110				
Personal Protection & Sanitation Skin: Prevent skin contact (liquid) Eyes: Prevent eye contact (liquid) Wash skin: When contaminated (liquid) Remove: When wet or contaminated (liquid)		First Aid (See procedures) Eye: Irrigate immediately (so Skin: Water flush immediate Breathing: Respiratory supposwallow: Medical attention i	ly (solution/liquid) ort	

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash (liquid), Quick drench (liquid)

Change: No recommendation

Up to 30 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern*/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption (liquid), ingestion (solution), skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; pulmonary edema; eye, skin burns; rhinitis; bronchitis; bone changes

Target Organs Eyes, skin, respiratory system, bones

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Hydrogen peroxid	e		CAS 7722-84-1	
H_2O_2			RTECS MX0900000	
High-strength hydrogen peroxide, Hydrogen dioxide, Hydrogen peroxide (aqueous), Hydroperoxide, Peroxide			DOT ID & Guide 2984 140 (8-20% solution) 2014 140 (20-60% solution) 2015 143 (>60% solution)	
Exposure	NIOSH REL: TWA 1 p	pm (1.4 mg/m ³)		
Limits	OSHA PEL: TWA 1 pp	om (1.4 mg/m ³)		
IDLH 75 ppm		Conversion 1 ppm = 1.39	9 mg/m ³	
Physical Description Colorless liquid with a slight in an aqueous solution.]	ly sharp odor. [Note: Th	e pure compound is a crystalling	e solid below 12°F. Often used	
MW: 34.0	BP: 286°F	FRZ: 12°F	Sol: Miscible	
VP(86°F): 5 mmHg	IP: 10.54 eV		Sp.Gr: 1.39	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid, but a powerful oxidizer.				
Incompatibilities & Reactive Oxidizable materials, iron, concombustible material may respect to the combustible materials and the combustible materials are combustible materials.	opper, brass, bronze, chro	omium, zinc, lead, silver, manga combustion.]	nese. [Note: Contact with	

Personal Protection & Sanitation

Provide: Eyewash, Quick drench

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

Breathing: Respiratory support Swallow: Medical attention immediately

First Aid (See procedures)
Eye: Irrigate immediately

Skin: Water flush immediately

Respirator Recommendations NIOSH/OSHA

Up to 10 ppm: (APF = 10) Any supplied-air respirator*

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 50 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-

air respirator with a full facepiece

Up to 75 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; corneal ulcer; erythema (skin redness), skin vesiculation; bleaching hair

Target Organs Eyes, skin, respiratory system

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Hydrogen selenide CAS 7783-07-5				
H ₂ Se			RTECS MX1050000	
			DOT ID & Guide 2202 117 (anhydrous)	
Exposure	NIOSH REL: TWA 0.05 pp	m (0.2 mg/m ³)		
Limits	OSHA PEL: TWA 0.05 ppn	n (0.2 mg/m ³)		
IDLH 1 ppm		Conversion 1 ppm = 3.31 m	ng/m ³	
Physical Description Colorless gas with an odor resembling decayed horse radish. [Note: Shipped as a liquefied compressed gas.]				
MW: 81.0	BP: -42°F	FRZ: -87°F	Sol(73°F): 0.9%	
VP(70°F): 9.5 atm	IP: 9.88 eV	RGasD: 2.80		
Fl.P: NA (Gas)	UEL: ?	LEL: ?		
Flammable Gas				
Incompatibilities & Reacti Strong oxidizers, acids, water	vities er, halogenated hydrocarbons			
Measurement Methods None available				
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: When wet (flammable)		First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory suppo	ort	

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Provide: Frostbite

Up to 0.5 ppm: (APF = 10) Any supplied-air respirator

Up to 1 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern $^{\dot{c}}$ /Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; nausea, vomiting, diarrhea; metallic taste, garlic breath; dizziness, lassitude (weakness, exhaustion); liquid: frostbite; in animals: pneumonitis; liver damage

Target Organs Eyes, respiratory system, liver

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Hydrogen sulfide			CAS 7783-06-4	
H ₂ S			RTECS MX1225000	
			DOT ID & Guide 1053 117	
Exposure	NIOSH REL: C 10 ppm (15	mg/m ³) [10-minute]		
Limits	OSHA PEL†: C 20 ppm 50	ppm [10-minute maximum pe	ak]	
IDLH 100 ppm		Conversion 1 ppm = 1.40 m	ng/m ³	
Physical Description Colorless gas with a strong odor of rotten eggs. [Note: Sense of smell becomes rapidly fatigued & can NOT be relied upon to warn of the continuous presence of H ₂ S. Shipped as a liquefied compressed gas.]				
MW: 34.1	BP: -77°F	FRZ: -122°F	Sol: 0.4%	
VP: 17.6 atm	IP: 10.46 eV	RGasD: 1.19		
Fl.P: NA (Gas)	UEL: 44.0%	LEL: 4.0%		
Flammable Gas				
Incompatibilities & Reactivities Strong oxidizers, strong nitric acid, metals				
Measurement Methods NIOSH 6013; OSHA ID141				
Parsanal Protection & Sanitation First Aid (San procedures)				

Personal Protection & Sanitation

Skin: Frostbite Eyes: Frostbite

Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation

Provide: Frostbite

First Aid (See procedures)

Eye: Frostbite Skin: Frostbite

Breathing: Respiratory support

Respirator Recommendations NIOSH

Up to 100 ppm: (APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front-or back-mounted canister providing protection against the compound of concern/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, respiratory system; apnea, coma, convulsions; conjunctivitis, eye pain, lacrimation (discharge of tears), photophobia (abnormal visual intolerance to light), corneal vesiculation; dizziness, headache, lassitude (weakness, exhaustion), irritability, insomnia; gastrointestinal disturbance; liquid: frostbite

Target Organs Eyes, respiratory system, central nervous system

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Hydroquinone	CAS 123-31-9			
$C_6H_4(OH)_2$			RTECS MX3500000	
			DOT ID & Guide 2662 153	
Exposure	NIOSH REL: C 2 mg/m ³ [1:	5-minute]		
Limits	OSHA PEL: TWA 2 mg/m ³			
IDLH 50 mg/m ³		Conversion		
Physical Description Light-tan, light-gray, or colorless crystals.				
MW: 110.1	BP: 545°F	MLT: 338°F	Sol: 7%	
VP: 0.00001 mmHg	IP: 7.95 eV		Sp.Gr: 1.33	
Fl.P: 329°F (Molten)	UEL: ?	LEL: ?		
Combustible Solid; dust clou	d may explode if ignited in a	n enclosed area.		
Incompatibilities & Reactive Strong oxidizers, alkalis	rities			
Measurement Methods NIOSH 5004				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory supports Swallow: Medical attention is		

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash (>7%)

Up to 50 mg/m³: (APF = 25) Any powered, air-purifying respirator with a dust filter [£]/(APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode [£]/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes: conjunctivitis; keratitis (inflammation of the cornea); central nervous system excitement; colored urine, nausea, dizziness, suffocation, rapid breathing; muscle twitching, delirium; collapse; skin irritation, sensitization, dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system

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2-Hydroxypropyl acrylate			CAS 999-61-1	
CH ₂ =CHCOOCH ₂ CHOHCH ₃			RTECS AT1925000	
Synonyms & Trade Names HPA, beta-Hydroxypropyl acrylate, Propylene glycol monoacrylate			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.5 ppm	1 (3 mg/m ³) [skin]		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 5.33 m	ng/m ³	
Physical Description Clear to light-yellow liquid	wiith a sweetish, solvent odor			
MW: 130.2	BP: 376°F	FRZ: ?	Sol: ?	
VP: ?	IP: ?		Sp.Gr: 1.05	
Fl.P: 149°F	UEL: ?	LEL: 1.8%		
Class IIIA Combustible Liqu	uid: Fl.P. at or above 140°F an	nd below 200°F.		
Incompatibilities & Reacti Water [Note: Can become unenergy, but not violently.]	vities nstable at high temperatures &	z pressures or may react with	water with some release of	
Measurement Methods None available				
Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or conta Change: No recommendation Provide: Eyewash, Quick dr	nted nminated n	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation	, skin absorption, ingestion, sl	kin and/or eye contact		
Symptoms Irritation eyes, s	kin, respiratory system; eye, s	kin burns; cough, dyspnea (br	eathing difficulty)	
Target Organs Eyes, skin,	respiratory system			
See also: INTRODUCTION				

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Indene			CAS 95-13-6
C ₉ H ₈			RTECS NK8225000
Synonyms & Trade Names Indonaphthene			DOT ID & Guide
Exposure	NIOSH REL: TWA 10 ppm	(45 mg/m ³)	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 4.75 m	g/m ³
Physical Description Colorless liquid. [Note: A solid below 29°F.]			
MW: 116.2	BP: 359°F	FRZ: 29°F	Sol: Insoluble
VP: ?	IP: 8.81 eV		Sp.Gr: 0.997
Fl.P: 173°F	UEL: ?	LEL: ?	
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.	
Incompatibilities & Reactive None reported [Note: Polyme		. It has exploded during nitrat	ion with $(H_2SO_4 + HNO_3)$.]
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory suppo	

Symptoms In animals: irritation eyes, skin, mucous membrane; dermatitis, skin sensitization; chemical pneumonitis

Respirator Recommendations To be added later

(aspiration liquid); liver, kidney, spleen injury

See also: **INTRODUCTION**

Exposure Routes inhalation, ingestion, skin and/or eye contact

Target Organs Eyes, skin, respiratory system, liver, kidneys, spleen

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Indium		CAS 7440-74-6			
In		RTECS NL1050000			
Synonyms & Trade Names Indium metal		DOT ID & Guide			
Exposure Limits	NIOSH REL*: TWA 0.1 mg/m ³ [*Note: The REL also applies to other indicompounds (as In).]				
	OSHA PEL†: none				
IDLH N.D.		Conversion			
Physical Description Ductile, shiny, silver-white	e metal that is softer than lead	1.			
MW: 114.8	BP: 3767°F	MLT: 314°F	Sol: Insoluble		
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 7.31		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid in b	ulk form, but may ignite in p	owdered or dust form.			
Incompatibilities & React (Dinitrogen tetraoxide + ac oxidizes readily at higher to	etonitrile), mercury(II) brom	ide (at 662°F), sulfur (m	nixtures ignite when heated) [Note:		
Measurement Methods NIOSH P&CAM173 (II-5)	; OSHA ID121				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendat	Respirator Recommendations To be added later				
Exposure Routes inhalation	on, ingestion, skin and/or eye	contact			
Symptoms Irritation eyes,	skin, respiratory system; pos	sible liver, kidney, heart	t, blood effects; pulmonary edema		
Target Organs Eyes, skin.	, respiratory system, liver, ki	dneys, heart, blood			
		<u> </u>			

See also: <u>INTRODUCTION</u>

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Iodine			CAS 7553-56-2	
$\overline{\mathrm{I}_2}$			RTECS NN1575000	
Synonyms & Trade Names Iodine crystals, Molecular iodine			DOT ID & Guide	
Exposure	NIOSH REL: C 0.1 ppm (1	mg/m ³)		
Limits	OSHA PEL: C 0.1 ppm (1 m	ng/m ³)		
IDLH 2 ppm		Conversion 1 ppm = 10.38	mg/m ³	
Physical Description Violet solid with a sharp, characteristic odor.				
MW: 253.8	BP: 365°F	MLT: 236°F	Sol: 0.01%	
VP(77°F): 0.3 mmHg	IP: 9.31 eV		Sp.Gr: 4.93	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive Ammonia, acetylene, acetald	vities ehyde, powdered aluminum, a	active metals, liquid chlorine		
Measurement Methods NIOSH 6005; OSHA ID212				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort	

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash (>7%), Quick drench (>7%)

Up to 1 ppm: (APF = 10) Any supplied-air respirator*

Up to 2 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose; lacrimation (discharge of tears); headache; chest tightness; skin burns, rash; cutaneous hypersensitivity

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system

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Iodoform			CAS 75-47-8	
CHI ₃			RTECS PB7000000	
Synonyms & Trade Names Triiodomethane			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.6 ppm	n (10 mg/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 16.10	mg/m ³	
Physical Description Yellow to greenish-yellow powder or crystalline solid with a pungent, disagreeable odor. [antiseptic for external use]				
MW: 393.7	BP: 410°F (Decomposes)	MLT: 246°F	Sol: 0.01%	
VP: ?	IP: ?		Sp.Gr: 4.01	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive Strong oxidizers, lithium, me		ide, silver nitrate), strong base	s, calomel, tannin	
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				

Symptoms Irritation eyes, skin; lassitude (weakness, exhaustion), dizziness, nausea, incoordination, central nervous

system depression; dyspnea (breathing difficulty); liver, kidney, heart damage; visual disturbance

Target Organs Eyes, skin, respiratory system, liver, kidneys, heart

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Iron oxide dust and fume (as Fe)			CAS 1309-37-1	
Fe ₂ O ₃			RTECS NO7400000 NO7525000 (fume)	
Synonyms & Trade Names Ferric oxide, Iron(III) oxide			DOT ID & Guide 1376 135 (spent)	
Exposure	NIOSH REL: TWA 5 mg/n	n ³		
Limits	OSHA PEL: TWA 10 mg/r	m^3		
IDLH 2500 mg/m ³ (as Fe)		Conversion		
Physical Description Reddish-brown solid. [Note: Exposure to fume may occur during the arc-welding of iron.]				
MW: 159.7	BP: ?	MLT: 2664°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 5.24	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive Calcium hypochlorite	vities			
Measurement Methods NIOSH 7300; OSHA ID121, ID125G				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Respiratory support		
Respirator Recommendations NIOSH				

Respirator Recommendations NIOSH

Up to 50 mg/m^3 : (APF = 10) Any dust, mist, and fume respirator/(APF = 10) Any supplied-air respirator Up to 125 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust, mist, and fume filter

Up to 250 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency

particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 2500 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation

Symptoms Benign pneumoconiosis with X-ray shadows indistinguishable from fibrotic pneumoconiosis (siderosis)

Target Organs respiratory system

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Iron pentacarbonyl (as Fe)			CAS 13463-40-6	
Fe(CO) ₅			RTECS NO4900000	
		DOT ID & Guide 1994 131		
Exposure	NIOSH REL: TWA 0.1 pp	om (0.23 mg/m ³) ST 0.2	2 ppm (0.45 mg/m ³)	
Limits	OSHA PEL†: none	OSHA PEL†: none		
IDLH N.D. $ $ Conversion 1 ppm = 2.28 mg/m ³ (as Fe)			= 2.28 mg/m ³ (as Fe)	
Physical Description Colorless to yellow to dark-red, oily liquid.				
MW: 195.9	BP(749 mmHg): 217°F	FRZ: -6°F	Sol: Insoluble	
VP(87°F): 40 mmHg	IP: ?		Sp.Gr: 1.46-1.52	
Fl.P: 5°F	UEL: ?	LEL: ?		
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.				
Incompatibilities & Reactivities Oxidizers, nitrogen oxide, (zinc + cobalt halides) [Note: Pyrophoric (i.e., ignites spontaneously in air). Decomposed by light or air, releasing carbon monoxide.]				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately		

Respirator Recommendations To be added later

Wash skin: When contaminated

Remove: When wet (flammable) Change: No recommendation

Provide: Quick drench

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, mucous membrane, respiratory system; headache, dizziness, nausea, vomiting; fever, cyanosis, cough, dyspnea (breathing difficulty); liver, kidney, lung injury; degenerative changes in central nervous system

Breathing: Respiratory support

Swallow: Medical attention immediately

Target Organs Eyes, respiratory system, central nervous system, liver, kidneys

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Iron salts (soluble, as Fe)			CAS		
			RTECS		
Synonyms & Trade Names FeSO ₄ : Ferrous sulfate, Iron FeCl ₂ : Ferrous chloride, Iron Fe(NO ₃) ₃ : Ferric nitrate, Iron Fe(SO ₄) ₃ : Ferric sulfate, Iron FeCl ₃ : Ferric chloride, Iron	n(II) chloride n(III) nitrate n(III) sulfate		DOT ID & Guide		
Exposure	NIOSH REL: TWA 1 mg/m ²	3			
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion			
Physical Description Appearance and odor vary depending upon the specific soluble iron salt.					
Properties vary depending upon the specific soluble iron salt.					
Varies					
Noncombustible Solids	Noncombustible Solids				
Incompatibilities & Reactive	vities				
Measurement Methods NIOSH 7300; OSHA ID121, ID125G					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendations To be added later					
Exposure Routes inhalation, ingestion, skin and/or eye contact					

Symptoms Irritation eyes, skin, mucous membrane; abdominal pain, diarrhea, vomiting; possible liver damage

Target Organs Eyes, skin, respiratory system, liver, gastrointestinal tract

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Isoamyl acetate			CAS 123-92-2	
CH ₃ COOCH ₂ CH ₂ CH(CH ₃) ₂			RTECS NS9800000	
Synonyms & Trade Names Banana oil, Isopentyl acetate, 3-Methyl-1-butanol acetate, 3-Methylbutyl ester of acetic acid, 3-Methylbutyl ethanoate			DOT ID & Guide 1104 129	
Exposure NIOSH REL: TWA 100 ppm (525 mg/m ³)				
Limits	OSHA PEL: TWA 100 ppm (525 mg/m ³)			
IDLH 1000 ppm		Conversion 1 ppm = 5.33 m	ng/m ³	
Physical Description Colorless liquid with a banar	na-like odor.			
MW: 130.2	BP: 288°F	FRZ: -109°F	Sol: 0.3%	
VP: 4 mmHg	IP: ?		Sp.Gr: 0.87	
Fl.P: 77°F	UEL: 7.5% LEL(212°F): 1.0%			
Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.				
Incompatibilities & Reactivities Nitrates; strong oxidizers, alkalis & acids				
Measurement Methods NIOSH 1450; OSHA 7				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 1000 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; dermatitis; in animals: narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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Isoamyl alcohol (primary)			CAS 123-51-3	
(CH ₃) ₂ CHCH ₂ CH ₂ OH	(CH ₃) ₂ CHCH ₂ CH ₂ OH			
			DOT ID & Guide 1105 129	
Exposure	450 mg/m ³)			
Limits	OSHA PEL†: TWA 100 ppn	n (360 mg/m ³)		
IDLH 500 ppm	IDLH 500 ppm Conversion 1 ppm = 3.61 m			
Physical Description Colorless liquid with a disagn	Physical Description Colorless liquid with a disagreeable odor.			
MW: 88.2	BP: 270°F	FRZ: -179°F	Sol(57°F): 2%	
VP: 28 mmHg	IP: ?		Sp.Gr(57°F): 0.81	
Fl.P: 109°F	UEL(212°F): 9.0%	LEL: 1.2%		
Class II Combustible Liquid: Fl.P. at or above 100°F and below 140°F.				
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH 1402				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Water flush promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 500 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; headache, dizziness; cough, dyspnea (breathing difficulty), nausea, vomiting, diarrhea; skin cracking; in animals: narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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Isoamyl alcohol (secondary) CAS 6032-29-7			CAS 6032-29-7	
(CH ₃) ₂ CHCH(OH)CH ₃			RTECS	
			DOT ID & Guide 1105 129	
Exposure	NIOSH REL: TWA 100 ppn	n (360 mg/m ³) ST 125 ppm (4	450 mg/m ³)	
Limits	OSHA PEL†: TWA 100 ppn	n (360 mg/m ³)		
IDLH 500 ppm		Conversion 1 ppm = 3.61 m	ng/m ³	
Physical Description Colorless liquid with a disagreeable odor.				
MW: 88.2	BP: 234°F	FRZ: ?	Sol: ?	
VP: 1 mmHg	IP: ?		Sp.Gr: 0.82	
Fl.P(oc): 95°F	UEL: ?	LEL: ?		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	elow 100°F.		
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH 1402				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Up to 500 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode \(^\frac{\psi}{\psi}/(APF = 50)\) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)\(^\frac{\psi}{\psi}/(APF = 50)\) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; headache, dizziness; cough, dyspnea (breathing difficulty), nausea, vomiting, diarrhea; skin cracking; in animals: narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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Isobutane			CAS 75-28-5	
CH ₃ CH(CH ₃) ₂			RTECS TZ4300000	
Synonyms & Trade Names 2-Methylpropane [Note: Also see specific listing for n-Butane.]		DOT ID & Guide 1075 115 1969 115		
Exposure	NIOSH REL: TWA 800 ppn	n (1900 mg/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 2.38 m	ng/m ³	
Physical Description Colorless gas with a gasoline-like or natural gas odor. [Note: Shipped as a liquefied compressed gas. A liquid below 11°F.]				
MW: 58.1	BP: 11°F	FRZ: -255°F	Sol: Slight	
VP(70°F): 3.1 atm	IP: 10.74 eV	RGasD: 2.06		
Fl.P: NA (Gas)	UEL: 8.4%	LEL: 1.6%		
Flammable Gas Class IA Fla	mmable Liquid			
Incompatibilities & Reactive Strong oxidizers (e.g., nitrate	vities es & perchlorates), chlorine, fl	luorine, (nickel carbonyl + ox	ygen)	
Measurement Methods None available				
Skin: Frostbite Eyes: Frostbite		First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory support		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact (liquid)				
Symptoms Drowsiness, narcosis, asphyxia; liquid: frostbite				
Target Organs central nervo	Target Organs central nervous system			
Target Organs central nervous system				

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Isobutyl acetate			CAS 110-19-0		
CH ₃ COOCH ₂ CH(CH ₃) ₂			RTECS AI4025000		
Synonyms & Trade Names Isobutyl ester of acetic acid, 2-Methylpropyl acetate, 2-Methylpropyl ester of acetic acid, beta-Methylpropyl ethanoate			DOT ID & Guide 1213 129		
Exposure	NIOSH REL: TWA 150 ppn	n (700 mg/m ³)			
Limits	OSHA PEL: TWA 150 ppm	OSHA PEL: TWA 150 ppm (700 mg/m ³)			
IDLH 1300 ppm [10%LEL]			ng/m ³		
Physical Description Colorless liquid with a fruity	Physical Description Colorless liquid with a fruity, floral odor.				
MW: 116.2	BP: 243°F	BP: 243°F			
VP: 13 mmHg	IP: 9.97 eV		Sp.Gr: 0.87		
Fl.P: 64°F	UEL: 10.5% LEL: 1.3%				
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.					
Incompatibilities & Reactivities Nitrates; strong oxidizers, alkalis & acids					
Measurement Methods NIOSH 1450; OSHA 7					

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Water flush promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 1300 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{£}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{£}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; headache, drowsiness, anesthesia; in animals: narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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Isobutyl alcohol		CAS 78-83-1	
(CH ₃) ₂ CHCH ₂ OH		RTECS NP9625000	
		DOT ID & Guide 1212 129	
Exposure	NIOSH REL: TWA 50 ppm	(150 mg/m ³)	
Limits	OSHA PEL†: TWA 100 ppn	n (300 mg/m ³)	
IDLH 1600 ppm		Conversion 1 ppm = 3.03 m	ng/m ³
Physical Description Colorless, oily liquid with a sweet, musty odor.			
MW: 74.1	BP: 227°F	FRZ: -162°F	Sol: 10%
VP: 9 mmHg	IP: 10.12 eV		Sp.Gr: 0.80
Fl.P: 82°F	UEL(202°F): 10.6%	LEL(123°F): 1.7%	
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	elow 100°F.	
Incompatibilities & Reactive Strong oxidizers	vities		
Measurement Methods NIOSH 1401; OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately	
Despirator Decommendations MOCU			

Respirator Recommendations NIOSH

Up to 500 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 1250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*

Up to 1600 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, throat; headache, drowsiness; skin cracking; in animals: narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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Isobutyronitrile			CAS 78-82-0	
(CH ₃) ₂ CHCN			RTECS TZ4900000	
		DOT ID & Guide 2284 131		
Exposure	NIOSH REL: TWA 8 ppm ((22 mg/m^3)		
Limits	OSHA PEL: none			
IDLH N.D.		Conversion 1 ppm = 2.83 m	ng/m ³	
Physical Description Colorless liquid with an almond-like odor. [Note: Forms cyanide in the body.]				
MW: 69.1	BP: 219°F	FRZ: -97°F	Sol: Slight	
VP(130°F): 100 mmHg	IP: ?		Sp.Gr: 0.76	
Fl.P: 47°F	UEL: ?	LEL: ?		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at of	or above 100°F.		
Incompatibilities & Reacti Oxidizers, reducing agents,				
Measurement Methods NIOSH 1606 (adapt)				
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory supports Swallow: Medical attention	ort	

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Up to 80 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 200 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 400 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1000 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; headache, dizziness, lassitude (weakness, exhaustion), confusion, convulsions; dyspnea (breathing difficulty); abdominal pain, nausea, vomiting

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system

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Isooctyl alcohol		CAS 26952-21-6			
C ₇ H ₁₅ CH ₂ OH		RTECS NS7700000			
Synonyms & Trade Names Isooctanol, Oxooctyl alcohol [Note: A mixture of closely related isomeric, primary alcohols with branched chains such as 2-Ethylhexanol, CH ₃ (CH ₂) ₃ CH(CH ₂ CH ₃)CH ₂ OH.]			DOT ID & Guide		
Exposure	NIOSH REL: TWA 50 I	opm (270 mg/m ³) [skin]			
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion 1 ppm = 3	5.33 mg/m^3		
Physical Description Clear, colorless liquid.					
MW: 130.3	BP: 367°F	FRZ: <-105°F	Sol: Insoluble		
VP: 0.4 mmHg	IP: ?		Sp.Gr: 0.83		
Fl.P(oc): 180°F	UEL(est.): 5.7%	LEL(calc.): 0.9%			
Class IIIA Combustible Lic	uid: Fl.P. at or above 140°	F and below 200°F.			
Incompatibilities & React None reported	ivities				
Measurement Methods OSHA PV2033					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: No recommendation Provide: Eyewash First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately					
Respirator Recommendat	Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact					
Symptoms Irritation eyes,	Symptoms Irritation eyes, skin, nose, throat; eye, skin burns				
Target Organs Eyes, skin,	respiratory system				

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Isophorone			CAS 78-59-1
C ₉ H ₁₄ O			RTECS GW7700000
Isoacetophorone; 3,5,5-Trimethyl-2-cyclohexenone; 3,5,5-Trimethyl-2-cyclo-hexen-1-			DOT ID & Guide 1993 128 (combustible liquid, n.o.s.)
Exposure	NIOSH REL: TWA 4 ppm (23 mg/m ³)	
Limits	OSHA PEL†: TWA 25 ppm	(140 mg/m ³)	
IDLH 200 ppm	H 200 ppm Conversion 1 ppm = 5.65 m		g/m ³
Physical Description Colorless to white liquid wit	h a peppermint-like odor.		
MW: 138.2	BP: 419°F	FRZ: 17°F	Sol: 1%
VP: 0.3 mmHg	IP: 9.07 eV		Sp.Gr: 0.92
Fl.P: 184°F	UEL: 3.8%	LEL: 0.8%	
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.	
Incompatibilities & Reactivities Oxidizers, strong alkalis, amines			
Measurement Methods NIOSH 2508; OSHA 7			

Π		
	Personal Protection & Sanitation	First Aid (See procedures)
	Skin: Prevent skin contact	Eye: Irrigate immediately
	Eyes: Prevent eye contact	Skin: Soap wash promptly
	Wash skin: When contaminated	Breathing: Respiratory support
	Remove: When wet or contaminated	Swallow: Medical attention immediately
	Change: No recommendation	

Respirator Recommendations NIOSH

Provide: Eyewash

Up to 40 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 100 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*

Up to 200 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)*/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; headache, nausea, dizziness, lassitude (weakness, exhaustion), malaise (vague feeling of discomfort), narcosis; dermatitis; in animals: kidney, liver damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

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Isophorone diisocyanate			CAS 4098-71-9
$\boxed{C_{12}H_{18}N_2O_2}$			RTECS NQ9370000
			DOT ID & Guide 2290 156
Exposure	NIOSH REL: TWA 0.005 pp	om (0.045 mg/m ³) ST 0.02 pp	om (0.180 mg/m ³) [skin]
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 9.09 m	g/m^3
Physical Description Colorless to slightly yellow liquid with a pungent odor.			
MW: 222.3	BP: ?	FRZ: -76°F	Sol: Decomposes
VP: 0.0003 mmHg	IP: ?		Sp.Gr: 1.06
Fl.P: 311°F	UEL: ?	LEL: ?	
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.		
Incompatibilities & Reactive Water, alcohols, phenols, and dioxide.]	v ities nines, mercaptans, amides, ure	thanes, ureas [Note: Reacts w	ith water to form carbon
Measurement Methods OSHA PV2034			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supports Swallow: Medical attention in	ort

Up to 0.125 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 0.25 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

Up to 1 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-

Respirator Recommendations NIOSH

supplied-air respirator with a full facepiece

Up to 0.05 ppm: (APF = 10) Any supplied-air respirator*

demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; chest tightness, dyspnea (breathing difficulty), cough, sore throat; bronchitis, wheezing, pulmonary edema; possible respiratory sensitization, asthma

Target Organs Eyes, skin, respiratory system

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2-Isopropoxyethanol			CAS 109-59-1	
(CH ₃) ₂ CHOCH ₂ CH ₂ OH			RTECS KL5075000	
Synonyms & Trade Names Ethylene glycol isopropyl ether, beta-Hydroxyethyl isopropyl ether, Isopropyl Cellosolve®, Isopropyl glycol		DOT ID & Guide		
Exposure	NIOSH REL: See Appendix	<u>CD</u>		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Colorless liquid with a mild,	ethereal odor.			
MW: 104.2	BP: 283°F	FRZ: ?	Sol: Miscible	
VP: 3 mmHg	IP: ?		Sp.Gr: 0.90	
Fl.P(oc): 92°F	UEL: ?	LEL: ?		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and b	elow 100°F.		
Incompatibilities & Reactiv Oxidizers	vities			
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		ort		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms In animals: irritation eyes, skin; hematuria (blood in the urine), anemia, pulmonary edema				
Target Organs Eyes, skin, respiratory system, blood				
See also: INTRODUCTION				

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	GAG 100 01 4			
Isopropyl acetate			CAS 108-21-4	
CH ₃ COOCH(CH ₃) ₂			RTECS AI4930000	
			DOT ID & Guide 1220 129	
Exposure	NIOSH REL: See Appendix	D		
Limits	OSHA PEL†: TWA 250 ppm	n (950 mg/m ³)		
IDLH 1800 ppm		Conversion 1 ppm = 4.18 m	ng/m ³	
Physical Description Colorless liquid with a fruity odor.				
MW: 102.2	BP: 194°F	FRZ: -92°F	Sol: 3%	
VP: 42 mmHg	IP: 9.95 eV		Sp.Gr: 0.87	
Fl.P: 36°F	UEL: 8%	LEL(100°F): 1.8%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.		
Incompatibilities & Reactive Nitrates; strong oxidizers, all				
Measurement Methods NIOSH 1454; OSHA 7				
Personal Protection & Sani	itation	First Aid (See procedures)		
Skin: Prevent skin contact		Eye: Irrigate immediately		
Eyes: Prevent eye contact		Skin: Water flush promptly		
Wash skin: When contamina		Breathing: Respiratory support		
Remove: When wet (flamma		Swallow: Medical attention immediately		
Change: No recommendation	1			

Respirator Recommendations OSHA

Up to 1800 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose; dermatitis; in animals: narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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NIOSH Pocket Guide to Chemical Hazards

Isopropyl alcohol CAS 67-63-0			CAS 67-63-0
(CH ₃) ₂ CHOH			RTECS NT8050000
Synonyms & Trade Names Dimethyl carbinol, IPA, Isop		pyl alcohol, Rubbing alcohol	DOT ID & Guide 1219 129
Exposure	NIOSH REL: TWA 400 ppn	n (980 mg/m ³) ST 500 ppm (1	1225 mg/m ³)
Limits	OSHA PEL†: TWA 400 ppn	n (980 mg/m ³)	
IDLH 2000 ppm [10%LEL]		Conversion 1 ppm = 2.46 m	g/m ³
Physical Description Colorless liquid with the odor of rubbing alcohol.			
MW: 60.1	BP: 181°F	FRZ: -127°F	Sol: Miscible
VP: 33 mmHg	IP: 10.10 eV		Sp.Gr: 0.79
Fl.P: 53°F	UEL(200°F): 12.7%	LEL: 2.0%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.	
Incompatibilities & Reactive Strong oxidizers, acetaldehyd	vities de, chlorine, ethylene oxide, a	cids, isocyanates	
Measurement Methods NIOSH 1400; OSHA 109			
Personal Protection & Sani	Personal Protection & Sanitation First Aid (See procedures)		
Skin: Prevent skin contact		Eye: Irrigate immediately	
Eyes: Prevent eye contact		Skin: Water flush	
Wash skin: When contamina		Breathing: Respiratory support	
Remove: When wet (flamma Change: No recommendation		Swallow: Medical attention i	mmediately

Respirator Recommendations NIOSH/OSHA

Up to 2000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode *\(\frac{\pmu}{APF} = 50\) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) *\(\frac{\pmu}{APF} = 50\)) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; drowsiness, dizziness, headache; dry cracking skin; in animals: narcosis

Target Organs Eyes, skin, respiratory system

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Isopropylamine			CAS 75-31-0
$(CH_3)_2CHNH_2$			RTECS NT8400000
Synonyms & Trade Names 2-Aminopropane, Monoisopr	Synonyms & Trade Names 2-Aminopropane, Monoisopropylamine, 2-Propylamine, sec-Propylamine 1221 132		
Exposure	NIOSH REL: See Appendix	D	
Limits	OSHA PEL†: TWA 5 ppm (12 mg/m^3)	
IDLH 750 ppm		Conversion 1 ppm = 2.42 m	ng/m ³
Physical Description Colorless liquid with an ammonia-like odor. [Note: A gas above 91°F.]			
MW: 59.1	BP: 91°F	FRZ: -150°F	Sol: Miscible
VP: 460 mmHg	IP: 8.72 eV		Sp.Gr: 0.69
Fl.P(oc): -35°F	UEL: ?	LEL: ?	
Class IA Flammable Liquid:	Fl.P. below 73°F and BP below	ow 100°F.	
Incompatibilities & Reactive Strong acids, strong oxidizers	rities s, aldehydes, ketones, epoxide	es	
Measurement Methods NIOSH S147 (II-3)			
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory suppo	ort

Respirator Recommendations OSHA

Change: No recommendation Provide: Eyewash, Quick drench

Up to 125 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{£}$ /(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern $^{£}$ Up to 250 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against the

compound of concern /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 750 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; pulmonary edema; visual disturbance; eye, skin burns; dermatitis

Target Organs Eyes, skin, respiratory system

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N-Isopropylaniline			CAS 768-52-5
C ₆ H ₅ NHCH(CH ₃) ₂			RTECS BY4190000
Synonyms & Trade Names N-IPA, Isopropylaniline, N-	s (1-Methylethyl)-benzenamine	e, N-Phenylisopropylamine	DOT ID & Guide
Exposure	NIOSH REL: TWA 2 ppm (10 mg/m ³) [skin]	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 5.53 m	ng/m ³
Physical Description Clear, yellowish liquid with	a sweet, aromatic odor.		
MW: 135.2	BP: 397°F	FRZ: -58°F	Sol: ?
VP(77°F): 0.03 mmHg	IP: ?		Sp.Gr(60°F): 0.93
Fl.P(oc): 190°F	UEL: ?	LEL: ?	
Class IIIB Combustible Liqu	uid: Fl.P. at or above 200°F.		
Incompatibilities & Reacti None reported	vities		
Measurement Methods OSHA 78			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendati	ons To be added later		
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, skin; headache, lassitude (weakness, exhaustion), dizziness; cyanosis; ataxia; dyspnea (breathing difficulty) on effort; tachycardia; methemoglobinemia			
Target Organs Eyes, skin,	respiratory system, blood, care	diovascular system, liver, kidr	neys

See also: <u>INTRODUCTION</u>

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Isopropyl ether			CAS 108-20-3
$(CH_3)_2CHOCH(CH_3)_2$			RTECS TZ5425000
		DOT ID & Guide 1159 127	
Exposure	NIOSH REL: TWA 500 ppn	n (2100 mg/m ³)	
Limits	OSHA PEL: TWA 500 ppm	(2100 mg/m ³)	
IDLH 1400 ppm [10%LEL]		Conversion 1 ppm = 4.18 m	ng/m ³
Physical Description Colorless liquid with a sharp, sweet, ether-like odor.			
MW: 102.2	BP: 154°F	FRZ: -76°F	Sol: 0.2%
VP: 119 mmHg	IP: 9.20 eV		Sp.Gr: 0.73
Fl.P: -18°F	UEL: 7.9%	LEL: 1.4%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.	
Incompatibilities & Reactive Strong oxidizers, acids [Note	vities : Unstable peroxides may for	m on long contact with air.]	
Measurement Methods NIOSH 1618; OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support	
Remove: When wet (flammable)		Swallow: Medical attention immediately	

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 1400 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose; respiratory discomfort; dermatitis; in animals: drowsiness, dizziness, unconsciousness, narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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Isopropyl glycidyl ether			CAS 4016-14-2	
$C_6H_{12}O_2$			RTECS TZ3500000	
Synonyms & Trade Names 1,2-Epoxy-3-isopropoxypropane; IGE; Isopropoxymethyl oxirane			DOT ID & Guide	
Exposure	NIOSH REL: C 50 ppm (240	0 mg/m ³) [15-minute]		
Limits	OSHA PEL†: TWA 50 ppm	OSHA PEL†: TWA 50 ppm (240 mg/m ³)		
IDLH 400 ppm		Conversion 1 ppm = 4.75 m	ng/m ³	
Physical Description Colorless liquid.				
MW: 116.2	BP: 279°F	BP: 279°F FRZ: ? Sol: 19%		
VP(77°F): 9 mmHg	IP: ?		Sp.Gr: 0.92	
Fl.P: 92°F	UEL: ?	LEL: ?		
Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.				
Incompatibilities & Reactivities Strong oxidizers, strong caustics [Note: May form explosive peroxides upon exposure to air or light.]				
Measurement Methods NIOSH 1620; OSHA 7				
Personal Protection & Sani	tation	First Aid (See procedures)		
Skin: Prevent skin contact		Eye: Irrigate immediately		
Eyes: Prevent eye contact		Skin: Soap wash immediately		
Wash skin: When contaminated		Breathing: Respiratory support		
Remove: When wet (flamma Change: No recommendation		Swallow: Medical attention i	mmediately	

Respirator Recommendations NIOSH/OSHA

Up to 400 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{£}/(APF = 50)$ Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; skin sensitization; possible hematopoietic, reproductive effects

Target Organs Eyes, skin, respiratory system, blood, reproductive system

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Kaolin			CAS 1332-58-7	
			RTECS GF1670500	
Synonyms & Trade Names China clay, Clay, Hydrated aluminum silicate, Hydrite, Porcelain clay [Note: Main constituent of Kaolin is Kaolinite (Al ₂ Si ₂ O ₅ (OH) ₄).]			DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 mg/r	m ³ (total) TWA 5 mg/m ³ (resp	o)	
Limits	OSHA PEL†: TWA 15 mg/1	m ³ (total) TWA 5 mg/m ³ (res	p)	
IDLH N.D.		Conversion		
Physical Description White to yellowish or grayis	h powder. [Note: When mois	tened, darkens & develops a c	lay-like odor.]	
MW: varies	BP: ?	MLT: ?	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.8-2.6	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive None reported	vities			
Measurement Methods NIOSH 0500, 0600				
Personal Protection & San	itation	First Aid (See procedures)		
Skin: No recommendation Eyes: No recommendation		Eye: Irrigate immediately		
Wash skin: No recommendation	tion	Breathing: Fresh air		
Remove: No recommendation				
Change: No recommendation				
Respirator Recommendations To be added later				
Exposure Routes inhalation	, skin and/or eye contact			
Symptoms Chronic pulmonary fibrosis, stomach granuloma				
Target Organs respiratory s	ystem, stomach			
See also: INTRODUCTION	See also: INTRODUCTION			

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Kepone			CAS 143-50-0	
$C_{10}Cl_{10}O$			RTECS PC8575000	
Synonyms & Trade Names Chlordecone; Decachlorooct Decachlorooctahydro-kepone	DOT ID & Guide			
Exposure	NIOSH REL: Ca TWA 0.00	1 mg/m ³ See Appendix A		
Limits	OSHA PEL: none			
IDLH Ca [N.D.]		Conversion		
Physical Description Tan to white, crystalline, odorless solid. [insecticide]				
MW: 490.6	BP: Sublimes	MLT: 662°F (Sublimes)	Sol(212°F): 0.5%	
VP(77°F): 3 x 10-7 mmHg	IP: ?		Sp.Gr: ?	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactivities Acids, acid fumes				
Measurement Methods NIOSH 5508				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort	

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Headache, anxiety, tremor; liver, kidney damage; visual disturbance; ataxia, chest pain, skin erythema (skin redness); testicular atrophy, low sperm count; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys, reproductive system

Cancer Site [in animal: liver cancer]

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Kerosene			CAS 8008-20-6
			RTECS OA5500000
			DOT ID & Guide 1223 128
Exposure	NIOSH REL: TWA 100 mg/	m^3	
Limits	OSHA PEL: none		
IDLH N.D. Conversion			
Physical Description Colorless to yellowish, oily liquid with a strong, characteristic odor.			
MW: 170 (approx)	BP: 347-617°F	FRZ: -50°F	Sol: Insoluble
VP(100°F): 5 mmHg	IP: ?		Sp.Gr: 0.81
Fl.P: 100-162°F	UEL: 5%	LEL: 0.7%	
Class II Combustible Liquid	Fl.P. at or above 100°F and	below 140°F.	
Incompatibilities & Reactivities Strong oxidizers			
Measurement Methods NIOSH 1550			
Eyes: Prevent eye contact		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory suppo	

Respirator Recommendations NIOSH

Remove: When wet or contaminated

Change: No recommendation

Provide: Quick drench

Up to 1000 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Swallow: Medical attention immediately

Up to 2500 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 5000 mg/m³: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)

Target Organs Eyes, skin, respiratory system, central nervous system

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Ketene			CAS 463-51-4	
CH ₂ =CO			RTECS OA7700000	
Synonyms & Trade Names Carbomethene, Ethenone, Keto-ethylene			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.5 ppm	n (0.9 mg/m ³) ST 1.5 ppm (3 mg/m ³)	mg/m ³)	
Limits	OSHA PEL†: TWA 0.5 ppn	n (0.9 mg/m ³)		
IDLH 5 ppm		Conversion 1 ppm = 1.72 m	g/m ³	
Physical Description Colorless gas with a penetra	ting odor.			
MW: 42.0	BP: -69°F	FRZ: -238°F	Sol: Reacts	
VP: >1 atm	IP: 9.61 eV	RGasD: 1.45		
Fl.P: NA (Gas)	UEL: ?	LEL: ?		
Flammable Gas				
	Incompatibilities & Reactivities Water, alcohols, ammonia [Note: Readily polymerizes. Reacts with water to form acetic acid.]			
Measurement Methods NIOSH S92 (II-2)				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Respiratory suppo	ort	

Respirator Recommendations NIOSH/OSHA

Up to 5 ppm: (APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat, respiratory system; pulmonary edema

Target Organs Eyes, skin, respiratory system

See also: <u>INTRODUCTION</u>

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Lead			CAS 7439-92-1	
Pb			RTECS OF7525000	
Synonyms & Trade Names Lead metal, Plumbum			DOT ID & Guide	
Exposure	NIOSH REL*: TWA 0.050 mg/m ³ See Appendix C [*Note: The REL also applies to other lead compounds (as Pb) see Appendix C.]			
Limits	OSHA PEL*: [1910.1025] TWA 0.050 mg/m ³ See Appendix C [*Note: The PEL also applies to other lead compounds (as Pb) see Appendix C.]			
IDLH 100 mg/m ³ (as Pb)		Conversion		
Physical Description A heavy, ductile, soft, gray s	Physical Description A heavy, ductile, soft, gray solid.			
MW: 207.2	BP: 3164°F	MLT: 621°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 11.34	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid in bul	k form.			
Incompatibilities & Reactivities Strong oxidizers, hydrogen peroxide, acids				
Measurement Methods NIOSH 7082, 7105, 7300, 7700, 7701, 7702; OSHA ID121, ID125G, ID206				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory supports Swallow: Medical attention in		

Respirator Recommendations NIOSH/OSHA Up to 0.5 mg/m³: (APF = 10) Any air-purifying

Up to 0.5 mg/m^3 : (APF = 10) Any air-purifying respirator with a high-efficiency particulate filter/(APF = 10) Any supplied-air respirator

Up to 1.25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter

Up to 2.5 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Up to 100 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypotension

Target Organs Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue

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Limestone			CAS 1317-65-3
CaCO ₃			RTECS EV9580000
Synonyms & Trade Names Calcium carbonate, Natural calcium carbonate [Note: Calcite & aragonite are commercially important natural calcium carbonates.]		DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 mg/s	m ³ (total) TWA 5 mg/m ³ (res	sp)
Limits	OSHA PEL: TWA 15 mg/m	n ³ (total) TWA 5 mg/m ³ (resp))
IDLH N.D.		Conversion	
Physical Description Odorless, white to tan powder	er.		
MW: 100.1	BP: Decomposes	MLT: 1517-2442°F (Decomposes)	Sol: 0.001%
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.7-2.9
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid			
Incompatibilities & Reacti Fluorine, magnesium, acids,			
Measurement Methods NIOSH 0500, 0600			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air	
Respirator Recommendations To be added later			
Exposure Routes inhalation, skin and/or eye contact			
Symptoms Irritation eyes, skin, mucous membrane; cough, sneezing, rhinorrhea (discharge of thin mucus); lacrimation (discharge of tears)			

Target Organs Eyes, skin, respiratory system

See also: <u>INTRODUCTION</u>

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Lindane			CAS 58-89-9	
$C_6H_6Cl_6$			RTECS GV4900000	
Synonyms & Trade Names BHC; HCH; gamma-Hexachlorocyclohexane; gamma isomer of 1,2,3,4,5,6- Hexachlorocyclohexane			DOT ID & Guide 2761 151	
Exposure	NIOSH REL: TWA 0.5 mg/	m ³ [skin]		
Limits	OSHA PEL: TWA 0.5 mg/m ³ [skin]			
IDLH 50 mg/m ³	IDLH 50 mg/m ³ Conversion			
Physical Description White to yellow, crystalline p	Physical Description White to yellow, crystalline powder with a slight, musty odor. [pesticide]			
MW: 290.8	BP: 614°F MLT: 235°F Sol: 0.001%		Sol: 0.001%	
VP: 0.00001 mmHg	IP: ?		Sp.Gr: 1.85	
Fl.P: NA	UEL: NA LEL: NA			
Noncombustible Solid, but may be dissolved in flammable liquids.				
Incompatibilities & Reactivities Corrosive to metals				
Measurement Methods NIOSH 5502				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: No recommendation
Wash skin: When contaminated

Remove: When wet or contaminated

Change: Daily

Provide: Quick drench

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 5 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter/(APF = 10) Any supplied-air respirator

Up to 12.5 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter* Up to 25 mg/m³: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)

in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; headache; nausea; clonic convulsions; respiratory difficulty; cyanosis; aplastic anemia; muscle spasm; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, blood, liver, kidneys

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Lithium hydride			CAS 7580-67-8
LiH			RTECS 0J6300000
Lithium monohydride			DOT ID & Guide 1414 138 2805 138 (fused, solid)
Exposure	NIOSH REL: TWA 0.025 m	ng/m ³	
Limits	OSHA PEL: TWA 0.025 mg	g/m^3	
IDLH 0.5 mg/m ³ Conversion		Conversion	
Physical Description Odorless, off-white to gray, translucent, crystalline mass or white powder.			
MW: 7.95	BP: Decomposes	MLT: 1256°F	Sol: Reacts
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 0.78
Fl.P: NA	UEL: NA	LEL: NA	
Combustible Solid that can f	orm airborne dust clouds whi	ch may explode on contact wi	th flame, heat, or oxidizers.
Incompatibilities & Reactivities Strong oxidizers, halogenated hydrocarbons, acids, water [Note: May ignite SPONTANEOUSLY in air and may reignite after fire is extinguished. Reacts with water to form hydrogen & lithium hydroxide.]			
Measurement Methods OSHA ID121			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Brush (DO NOT WASH) Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Brush (DO NOT WAS Breathing: Respiratory suppo	ort

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash, Quick drench (>0.5 mg/m³)

Change: Daily

Up to 0.25 mg/m^3 : (APF = 10) Any air-purifying respirator with a high-efficiency particulate filter/(APF = 10) Any supplied-air respirator

Up to 0.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus

with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; eye, skin burns; mouth, esophagus burns (if ingested); nausea; muscle twitches; mental confusion; blurred vision

Target Organs Eyes, skin, respiratory system, central nervous system

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L.P.G.			CAS 68476-85-7
C ₃ H ₈ /C ₃ H ₆ /C ₄ H ₁₀ /C ₄ H ₈ Synonyms & Trade Names Bottled gas, Compressed petroleum gas, Liquefied hydrocarbon gas, Liquefied petroleum gas, LPG [Note: A fuel mixture of propane, propylene, butanes & butylenes.]			RTECS SE7545000
			DOT ID & Guide 1075 115
Exposure	NIOSH REL: TWA 1000 pp	m (1800 mg/m ³)	
Limits	OSHA PEL: TWA 1000 ppm	n (1800 mg/m ³)	
IDLH 2000 ppm [10%LEL]		Conversion 1 ppm = $1.72-2$	2.37 mg/m^3
Physical Description Colorless, noncorrosive, odo liquefied compressed gas.]	rless gas when pure. [Note: A	foul-smelling odorant is usu	ally added. Shipped as a
MW: 42-58	BP: >-44°F	FRZ: ?	Sol: Insoluble
VP: >1 atm	IP: 10.95 eV	RGasD: 1.45-2.00	
Fl.P: NA (Gas)	UEL: 9.5% (Propane) 8.5% (Butane)	LEL: 2.1% (Propane) 1.9% (Butane)	
Flammable Gas			'
Incompatibilities & Reactiv Strong oxidizers, chlorine die			
Measurement Methods NIOSH S93 (II-2)			
Personal Protection & San	itation	First Aid (See procedures)	
Skin: Frostbite		Eye: Irrigate immediately (li	▲ '
Eyes: Frostbite		Skin: Water flush immediately (liquid)	

Respirator Recommendations NIOSH/OSHA

Wash skin: No recommendation

Remove: When wet (flammable) Change: No recommendation

Up to 2000 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Breathing: Respiratory support

Tun racepiece

Provide: Frostbite

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Dizziness, drowsiness, asphyxia; liquid: frostbite

Target Organs respiratory system, central nervous system

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Magnesite			CAS 546-93-0	
MgCO ₃			RTECS OM2470000	
Synonyms & Trade Names Carbonate magnesium, Hydromagnesite, Magnesium carbonate, Magnesium(II) carbonate [Note: Magnesite is a naturally-occurring form of magnesium carbonate.]			DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 mg/m	n ³ (total) TWA 5 mg/m ³ (resp	p)	
Limits	OSHA PEL: TWA 15 mg/m	3 (total) TWA 5 mg/m ³ (resp))	
IDLH N.D.		Conversion		
Physical Description White, odorless, crystalline p	owder.			
MW: 84.3	BP: Decomposes	MLT: 662°F (Decomposes)	Sol: 0.01%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.96	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive Acids, formaldehyde	ities			
Measurement Methods NIOSH 0500, 0600				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact				
Symptoms Irritation eyes, skin, respiratory system; cough				
Target Organs Eyes, skin, respiratory system				
See also: INTRODUCTION				

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Magnesium oxide fume			CAS 1309-48-4	
MgO			RTECS OM3850000	
Synonyms & Trade Names Magnesia fume			DOT ID & Guide	
Exposure	NIOSH REL: See Appendix	D		
Limits	OSHA PEL†: TWA 15 mg/r	m^3		
IDLH 750 mg/m ³		Conversion		
Physical Description Finely divided white particulate dispersed in air. [Note: Exposure may occur when magnesium is burned, thermally cut, or welded upon.]				
MW: 40.3	BP: 6512°F	MLT: 5072°F	Sol(86°F): 0.009%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 3.58	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive Chlorine trifluoride, phospho				
Measurement Methods NIOSH 7300; OSHA ID121				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Respiratory suppo	ort	

Up to 150 mg/m^3 : (APF = 10) Any dust, mist, and fume respirator/(APF = 10) Any supplied-air respirator

Up to 750 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

Up to 375 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

powered, air-purifying respirator with a dust, mist, and fume filter

Respirator Recommendations OSHA

supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, nose; metal fume fever: cough, chest pain, flu-like fever

Target Organs Eyes, respiratory system

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Malathion			CAS 121-75-5
$\boxed{\text{C}_{10}\text{H}_{19}\text{O}_6\text{PS}_2}$			RTECS WM8400000
			DOT ID & Guide 2783 152
Exposure	NIOSH REL: TWA 10 mg/r	n ³ [skin]	
Limits	OSHA PEL†: TWA 15 mg/r	m ³ [skin]	
IDLH 250 mg/m ³		Conversion	
Physical Description Deep-brown to yellow liquid	with a garlic-like odor. [inse	cticide] [Note: A solid below	37°F.]
MW: 330.4	BP: 140°F (Decomposes)	FRZ: 37°F	Sol: 0.02%
VP: 0.00004 mmHg	IP: ?		Sp.Gr: 1.21
Fl.P(oc): >325°F	UEL: ?	JEL: ? LEL: ?	
Class IIIB Combustible Liqu	id, but may be difficult to ign	ite.	
Incompatibilities & Reactivities Strong oxidizers, magnesium, alkaline pesticides [Note: Corrosive to metals.]			
Measurement Methods NIOSH 5600; OSHA 62			

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Change: Daily

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 100 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter/(APF = 10) Any supplied-air respirator

Up to 250 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a higherficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 25) Any powered,

air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; miosis, aching eyes, blurred vision, lacrimation (discharge of tears); salivation; anorexia, nausea, vomiting, abdominal cramps, diarrhea, dizziness, confusion, ataxia; rhinorrhea (discharge of thin mucus), headache; chest tightness, wheezing, laryngeal spasm

Target Organs Eyes, skin, respiratory system, liver, blood cholinesterase, central nervous system, cardiovascular system, gastrointestinal tract

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Maleic anhydride	CAS 108-31-6				
$C_4H_2O_3$			RTECS ON3675000		
Synonyms & Trade Names cis-Butenedioic anhydride; 2	DOT ID & Guide 2215 156				
Exposure	NIOSH REL: TWA 1 mg/	m ³ (0.25 ppm)			
Limits	OSHA PEL: TWA 1 mg/n	n ³ (0.25 ppm)			
IDLH 10 mg/m^3			ng/m ³		
Physical Description Colorless needles, white lum	ps, or pellets with an irritat	ing, choking odor.			
MW: 98.1	BP: 396°F	MLT: 127°F	Sol: Reacts		
VP: 0.2 mmHg	IP: 9.90 eV		Sp.Gr: 1.48		
Fl.P: 218°F	Fl.P: 218°F				
Combustible Solid, but may	be difficult to ignite.				
Incompatibilities & Reactivities Strong oxidizers, water, alkalis, metals, caustics & amines above 150°F [Note: Reacts slowly with water (hydrolyzes) to form maleic acid.]					
Measurement Methods	Measurement Methods				

Personal Protection & Sanitation

NIOSH 3512: OSHA 25, 86

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Change: No recommendation

Provide: Eyewash

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 10 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation nose, upper respiratory system; conjunctivitis; photophobia (abnormal visual intolerance to light), double vision; bronchial asthma; dermatitis

Target Organs Eyes, skin, respiratory system

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Malonaldehyde			CAS 542-78-9
CHOCH ₂ CHO			RTECS TX6475000
Synonyms & Trade Names Malonic aldehyde; Malonodialdehyde; Propanedial; 1,3-Propanedial [Note: Pure Malonaldehyde is unstable and may be used as its sodium salt.]			DOT ID & Guide
Exposure	NIOSH REL: Ca See Appen	dix A See Appendix C (Aldel	nydes)
Limits	OSHA PEL: none		
IDLH Ca [N.D.]		Conversion	
Physical Description Solid (needles).			
MW: 72.1	BP: ?	MLT: 161°F	Sol: ?
VP: ?	IP: ?		Sp.Gr: ?
Fl.P: ?	UEL: ?		
Incompatibilities & Reactive Proteins [Note: Pure compou		ditions, but not under acidic of	conditions.]
Measurement Methods None available			
Personal Protection & Sani Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or contact Change: Daily Provide: Eyewash, Quick dre	ted/Daily minated	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory suppo Swallow: Medical attention i	ort

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

pressure breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; central nervous system depression; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system

Cancer Site [in animals: thyroid gland tumors]

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Malononitrile			CAS 109-77-3	
NCCH ₂ CN			RTECS 003150000	
Synonyms & Trade Names Cyanoacetonitrile, Dicyanon		e	DOT ID & Guide 2647 153	
Exposure	NIOSH REL: TWA 3	ppm (8 mg/m ³)		
Limits	OSHA PEL: none			
IDLH N.D. Conversion 1 ppm = 2.70 mg/m			$= 2.70 \text{ mg/m}^3$	
Physical Description White powder or colorless cr	ystals. [Note: Melts abo	ove 90°F. Forms cyanide in	the body.]	
MW: 66.1	BP: 426°F	MLT: 90°F	Sol: 13%	
VP: ?	IP: 12.88 eV		Sp.Gr: 1.19	
Fl.P(oc): 266°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactivities Strong bases [Note: May polymerize violently on prolonged heating at 265°F, or in contact with strong bases at lower temperatures.]				
Measurement Methods NIOSH Nitriles Crit. Doc.				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Remove: when wet or contaminate

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 80 mg/m^3 : (APF = 10) Any supplied-air respirator

Up to 200 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 400 mg/m^3 : (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 667 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-

demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; headache, dizziness, lassitude (weakness, exhaustion), confusion, convulsions; dyspnea (breathing difficulty); abdominal pain, nausea, vomiting

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system

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Manganese comp	CAS 7439-96-5 (metal)		
Vin (metal)			RTECS OO9275000 (metal)
Synonyms & Trade Names Manganese metal: Colloidal manganese, Manganese-55 Synonyms of other compounds vary depending upon the specific manganese compound.			DOT ID & Guide
Exposure		m ³ ST 3 mg/m ³ [*Note: Also I tricarbonyl, Methyl cyclope tetroxide.]	
Limits		Note: Also see specific listing and Methyl cyclopentadieny	
IDLH 500 mg/m ³ (as Mn)		Conversion	
Physical Description A lustrous, brittle, silvery	solid.		
MW: 54.9	BP: 3564°F	MLT: 2271°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 7.20 (metal)
Fl.P: NA	UEL: NA	LEL: NA	
Metal: Combustible Solid			
Incompatibilities & Reac Oxidizers [Note: Will reac	etivities et with water or steam to produc	ce hydrogen.]	
Measurement Methods NIOSH 7300; OSHA ID12	21, ID125G		
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Respiratory supp Swallow: Medical attention	
Respirator Recommenda	tions NIOSH		

Up to 10 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators^/(APF =

10) Any supplied-air respirator

Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter^

Up to 50 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion

Symptoms Parkinson's; asthenia, insomnia, mental confusion; metal fume fever: dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of discomfort); lassitude (weakness, exhaustion); kidney damage

Target Organs respiratory system, central nervous system, blood, kidneys

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Manganese cyclopentadienyl tricarbonyl (as Mn) CAS 12079-65-1					
C ₅ H ₅ Mn(CO) ₃			RTECS 009720000		
Synonyms & Trade Names Cyclopentadienylmanganese MCT	DOT ID & Guide				
Exposure	NIOSH REL: TWA 0.1 mg/	m ³ [skin]			
Limits	OSHA PEL†: C 5 mg/m ³				
IDLH N.D.		Conversion			
Physical Description Yellow, crystalline solid with a characteristic odor. [Note: An antiknock additive for gasoline. May be found in an oil & gaseous solution.]					
MW: 204.1	BP: Sublimes	MLT: 167°F (Sublimes)	Sol: Slight		
VP: ?	IP: ?		Sp.Gr: ?		
Fl.P: ?	UEL: ?	LEL: ?			
Combustible Solid					
Incompatibilities & Reactive Oxygen	vities				
Measurement Methods None available					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily First Aid (See procedur Eye: Irrigate immediate Skin: Soap wash Breathing: Respiratory s Swallow: Medical attention					
Respirator Recommendations To be added later					
Exposure Routes inhalation	, skin absorption, ingestion, sl	kin and/or eye contact			

Symptoms In animals: irritation skin; pulmonary edema; convulsions; central nervous system, respiratory system,

Target Organs Skin, respiratory system, central nervous system, kidneys

kidney changes; decreased resistance to infection

See also: <u>INTRODUCTION</u>

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Manganese tetroxide (as Mn)			CAS 1317-35-7	
Mn ₃ O ₄			RTECS OP0895000	
Synonyms & Trade Names Manganese oxide, Manganomanganic oxide, Trimanganese tetraoxide, Trimanganese tetroxide			DOT ID & Guide	
Exposure	NIOSH REL: See Appendix	D		
Limits	OSHA PEL†: C 5 mg/m ³			
IDLH N.D.		Conversion		
Physical Description Brownish-black powder. [No	ote: Fumes are generated when	never manganese oxides are h	eated strongly in air.]	
MW: 228.8	BP: ?	MLT: 2847°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 4.88	
Fl.P: NA	UEL: NA	LEL: NA		
Incompatibilities & Reactive Soluble in hydrochloric acid				
Measurement Methods NIOSH 7300; OSHA ID121	, ID125G			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendation	ons To be added later			
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Asthenia, insomnia, mental confusion; low-back pain; vomiting; malaise (vague feeling of discomfort), lassitude (weakness, exhaustion); kidney damage; pneumonitis				
Target Organs respiratory system, central nervous system, blood, kidneys				
See also: INTRODUCTION				

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Marble			CAS 1317-65-3	
CaCO ₃			RTECS EV9580000	
Synonyms & Trade Names Calcium carbonate, Natural calcium carbonate [Note: Marble is a metamorphic form of calcium carbonate.]			DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 1	mg/m ³ (total) TWA 5 mg/m ³ (re	sp)	
Limits	OSHA PEL: TWA 15 m	ng/m ³ (total) TWA 5 mg/m ³ (res	p)	
IDLH N.D.	'	Conversion		
Physical Description Odorless, white powder.				
MW: 100.1	BP: Decomposes	MLT: 1517-2442°F (Decomposes)	Sol: 0.001%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.7-2.9	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reac Fluorine, magnesium, acid				
Measurement Methods NIOSH 0500, 0600				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air	Skin: Soap wash	
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact				
Symptoms Irritation eyes, skin, mucous membrane, upper respiratory system; cough, sneezing, rhinorrhea (discharge of thin mucus); lacrimation (discharge of tears)				

Target Organs Eyes, skin, respiratory system

See also: <u>INTRODUCTION</u>

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Mercury compour	nds [except (organo	o) alkyls] (as Hg)	CAS 7439-97-6 (metal)
Hg (metal)			RTECS OV4550000 (metal)
Synonyms & Trade Names Mercury metal: Colloidal me Synonyms of "other" Hg con	DOT ID & Guide 2809 172 (metal)		
Exposure	NIOSH REL: Hg Vapor: TV Other: C 0.1 mg/m ³ [skin]	VA 0.05 mg/m ³ [skin]	
Limits	OSHA PEL†: C 0.1 mg/m ³		
IDLH 10 mg/m ³ (as Hg)		Conversion	
Physical Description Metal: Silver-white, heavy, compounds except (organo)		" Hg compounds include all in	norganic & aryl Hg
MW: 200.6	BP: 674°F	FRZ: -38°F	Sol: Insoluble
VP: 0.0012 mmHg	IP: ?		Sp.Gr: 13.6 (metal)
Fl.P: NA	UEL: NA	LEL: NA	
Metal: Noncombustible Liqu	iid		
Incompatibilities & Reacti Acetylene, ammonia, chlorir copper		nalgam formation), sodium ca	rbide, lithium, rubidium,
Measurement Methods NIOSH 6009; OSHA ID140			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: No recommendation Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo	
Respirator Recommendation	ons Mercury vapor:	JI.	

Up to 0.5 mg/m³: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the

compound of concern†/(APF = 10) Any supplied-air respirator

Up to 1.25 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern†(canister) Up to 2.5 mg/m³: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern†/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern†/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/PAPRTS(canister)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 10 mg/m^3 : (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Other mercury compounds:

NIOSH/OSHA

Up to 1 mg/m^3 : (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern†/(APF = 10) Any supplied-air respirator

Up to 2.5 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern†(canister) Up to 5 mg/m³: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing

protection against the compound of concern \dagger /(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern \dagger /(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/PAPRTS(canister)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 10 mg/m^3 : (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria

Target Organs Eyes, skin, respiratory system, central nervous system, kidneys

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Mercury (organo) alkyl compounds (as Hg)			CAS	
			RTECS	
Synonyms & Trade Names Synonyms vary depending up	pon the specific (organo) alky	d mercury compound.	DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.01 mg	g/m ³ ST 0.03 mg/m ³ [skin]		
Limits	OSHA PEL†: TWA 0.01 mg/m ³ C 0.04 mg/m ³			
IDLH 2 mg/m ³ (as Hg)	Conversion			
Physical Description Appearance and odor vary description	epending upon the specific (o	rgano) alkyl mercury compou	ınd.	
Properties vary depending upon the specific (organo) alkyl mercury compound.				
Incompatibilities & Reactive Strong oxidizers such as chlorological and the strong oxidizers and the strong oxidizers are such as chlorological and the strong oxidizers are such as characteristic and the strong oxidizers are such as characteris				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediatel Breathing: Respiratory supposultow: Medical attention	ort	

Respirator Recommendations NIOSH/OSHA

Up to 0.1 mg/m^3 : (APF = 10) Any supplied-air respirator

Up to 0.25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 0.5 mg/m^3 : (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

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Up to 2 mg/m: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Paresthesia; ataxia, dysarthria; vision, hearing disturbance; spasticity, jerking limbs; dizziness; salivation; lacrimation (discharge of tears); nausea, vomiting, diarrhea, constipation; skin burns; emotional disturbance; kidney injury; possible teratogenic effects

Target Organs Eyes, skin, central nervous system, peripheral nervous system, kidneys

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Mesityl oxide			CAS 141-79-7	
(CH ₃) ₂ C=CHCOCH ₃			RTECS SB4200000	
Synonyms & Trade Names Isobutenyl methyl ketone, Isopropylideneacetone, Methyl isobutenyl ketone, 4- Methyl-3-penten-2-one DOT ID & Guide 1229 129				
Exposure NIOSH REL: TWA 10 ppm (40 mg/m ³)				
Limits	OSHA PEL†: TWA 25 ppm (100 mg/m³)			
IDLH 1400 ppm [10%LEL]			ng/m ³	
Physical Description Oily, colorless to light-yellow liquid with a peppermint- or honey-like odor.				
MW: 98.2	BP: 266°F	FRZ: -52°F	Sol: 3%	
VP: 9 mmHg	IP: 9.08 eV		Sp.Gr(59°F): 0.86	
Fl.P: 87°F	UEL: 7.2% LEL: 1.4%			
Class IC Flammable Liquid:	Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.			
Incompatibilities & Reactivities Oxidizers, acids				
Measurement Methods NIOSH 1301; OSHA 7				

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation

Provide: Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}/(APF = 25)$ Any powered, air-purifying respirator with organic vapor cartridge(s)[£]

Up to 500 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s) /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1400 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; narcosis, coma; in animals: liver, kidney damage; central nervous system effects

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

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	REL: TWA 20 ppm (70 r EL†: none	•	RTECS OZ2975000 DOT ID & Guide 2531 153P (inhibited)
Methacrylic acid (glacial), Methacrylic Methylacrylic acid, 2-Methylpropenoid Exposure NIOSH DOSHA POLH N.D. Physical Description Colorless liquid or solid (below 61°F) MW: 86.1 BP: 325°	REL: TWA 20 ppm (70 r EL†: none	mg/m ³) [skin]	2531 153P (inhibited)
Colorless liquid or solid (below 61°F) MW: 86.1 DSHA F OSHA	EL†: none		ıg/m ³
Physical Description Colorless liquid or solid (below 61°F) MW: 86.1 BP: 325°	Con	nversion 1 ppm = 3.52 m	ıg/m ³
Physical Description Colorless liquid or solid (below 61°F) MW: 86.1 BP: 325°	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	nversion 1 ppm = 3.52 m	ng/m ³
Colorless liquid or solid (below 61°F) MW: 86.1 BP: 325°			
	with an acrid, repulsive	odor.	
/P: 0.7 mmHg	FRZ	Z: 61°F	Sol(77°F): 9%
1.0.7 1111111115			Sp.Gr: 1.02 (Liquid)
Fl.P(oc): 171°F UEL: ?	LEL	L: ?	
Class IIIA Combustible Liquid: Fl.P. a	at or above 140°F and be	elow 200°F.	
ncompatibilities & Reactivities Dxidizers, elevated temperatures, hydroquinone to prevent polymerization Measurement Methods		pically contains 100 ppm	of the monomethyl ether of
OSHA PV2005			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be	added later		
Exposure Routes inhalation, skin absorber	orption, ingestion, skin a	nd/or eye contact	
Symptoms Irritation eyes, skin, muco	us membrane; eye, skin b	ourns	
	system		

See also: <u>INTRODUCTION</u>

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Methomyl			CAS 16752-77-5
CH ₃ C(SCH ₃)NOC(O)NHCH ₃			RTECS AK2975000
Synonyms & Trade Names Lannate®, Methyl N-((methylamino)carbonyl)oxy)ethanimidothioate, S-Methyl-N- (methylcarbamoyloxy)thioacetimidate		DOT ID & Guide 2757 151 (carbamate pesticide, solid, n.o.s.)	
Exposure	NIOSH REL: TWA 2.5 mg/s	m^3	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description White, crystalline solid with a slight, sulfur-like odor. [insecticide]			
MW: 162.2	BP: ?	MLT: 172°F	Sol(77°F): 6%
VP(77°F): 0.00005 mmHg	IP: ?		Sp.Gr(75°F): 1.29
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid, but may be dissolved in flammable liquids.			
Incompatibilities & Reactivities Strong bases			
Measurement Methods NIOSH 5601			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be added later			
Exposure Routes inhalation, ingestion, skin and/or eye contact			
	lurred vision, miosis; salivation de (weakness, exhaustion), m		
Target Organs Eyes, respir cholinesterase	atory system, central nervous	system, cardiovascular system	n, liver, kidneys, blood

See also: <u>INTRODUCTION</u>

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Methoxychlor		CAS 72-43-5		
(C ₆ H ₄ OCH ₃) ₂ CHCCl ₃		RTECS KJ3675000		
	es ichloroethane; DMDT; Metho hloroethane; 1,1,1-Trichloro-2		DOT ID & Guide 2761 151 (organochlorine pesticide, solid, n.o.s.)	
Exposure	NIOSH REL: Ca See Appe	NIOSH REL: Ca See Appendix A		
Limits	OSHA PEL†: TWA 15 mg/	OSHA PEL†: TWA 15 mg/m ³		
IDLH Ca [5000 mg/m ³]		Conversion		
Physical Description Colorless to light-yellow crystals with a slight, fruity odor. [insecticide]				
MW: 345.7	BP: Decomposes	MLT: 171°F Sol: 0.00001%		
VP: Very low	IP: ?		Sp.Gr: 1.41	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Solid, but diff	ficult to burn.			
Incompatibilities & Reac Oxidizers	tivities			
Measurement Methods NIOSH S371 (II-4); OSHA PV2038				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: No recommendation Wash skin: When contaminated/Daily Remove: When wet or contaminated		First Aid (See procedum) Skin: Soap wash Breathing: Fresh air Swallow: Medical atter		

Respirator Recommendations NIOSH

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion

Symptoms In animals: fasciculation, trembling, convulsions; kidney, liver damage; [potential occupational carcinogen]

Target Organs central nervous system, liver, kidneys

Cancer Site [in animals: liver & ovarian cancer]

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Methoxyflurane			CAS 76-38-0		
CHCl ₂ CF ₂ OCH ₃			RTECS KN7820000		
Synonyms & Trade Names 2,2-Dichloro-1,1-difluoroethyl methyl ether; 2,2-Dichloro-1,1-difluoro-1- methoxyethane; Methoflurane; Methoxyfluorane; Penthrane					
Exposure NIOSH REL*: C 2 ppm (13.5 mg/m³) [60-minute] [*Note: REL for exposure to anesthetic gas.]			e: REL for exposure to waste		
Limits	OSHA PEL: none	OSHA PEL: none			
IDLH N.D.		Conversion 1 ppm = 6.75 m	Conversion 1 ppm = 6.75 mg/m^3		
Physical Description Colorless liquid with a fruity odor. [inhalation anesthetic]					
MW: 165.0	BP: 220°F	FRZ: -31°F	Sol: Slight		
VP: 23 mmHg	IP: ?		Sp.Gr(77°F): 1.42		
Fl.P: ?	UEL: ?	LEL(176°F): 7%			
Combustible Liquid					
Incompatibilities & Reactivities None reported					
Measurement Methods None available					
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: No recommendation Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendations To be added later					
Exposure Routes inhalation, ingestion, skin and/or eye contact					
1 -	entral nervous system depress ry; in animals: reproductive,	ion, analgesia, anesthesia, conteratogenic effects	vulsions, respiratory		
Tongot Organs Eves control		1			

Target Organs Eyes, central nervous system, liver, kidneys, reproductive system

See also: <u>INTRODUCTION</u>

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4-Methoxypher	nol		CAS 150-76-5	
CH ₃ OC ₆ H ₄ OH			RTECS SL7700000	
Synonyms & Trade Na Hydroquinone monome Monomethyl ether hydr	thyl ether, p-Hydroxyaniso	ele, Mequinol, p-Methoxyphenol,	DOT ID & Guide	
Exposure	NIOSH REL: TWA	NIOSH REL: TWA 5 mg/m ³		
Limits	OSHA PEL†: none	OSHA PEL†: none		
IDLH N.D.	'	Conversion		
Physical Description Colorless to white, wax	y solid with an odor of car	amel & phenol.		
MW: 124.2	BP: 469°F	MLT: 135°F	Sol(77°F): 4%	
VP: <0.01 mmHg	IP: 7.50 eV		Sp.Gr: 1.55	
Fl.P(oc): 270°F	UEL: ?	LEL: ?		
Combustible Solid; und	er certain conditions, a dus	st cloud can probably explode if ig	gnited by a spark or flame.	
Incompatibilities & Re Strong oxidizers, strong	eactivities bases, acid chlorides, acid	anhydrides		
Measurement Methods None available	S			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		Eye: Irrigate immediately Skin: Soap flush immedi Breathing: Respiratory st	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommen	dations To be added later	,		
Exposure Routes inhal	ation, skin absorption, inge	estion, skin and/or eye contact		
Symptoms Irritation ey depression	es, skin, nose, throat, uppe	r respiratory system; eye, skin bu	rns; central nervous system	
Target Organs Eyes, sl	kin, respiratory system, cei	ntral nervous system		

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Methyl acetate		CAS 79-20-9		
CH ₃ COOCH ₃		RTECS AI9100000		
		DOT ID & Guide 1231 129		
Exposure	NIOSH REL: TWA 200 ppr	m (610 mg/m ³) ST 250 ppm (760 mg/m ³)	
Limits	OSHA PEL†: TWA 200 ppr	m (610 mg/m ³)		
IDLH 3100 ppm [10%LEL]	IDLH 3100 ppm [10%LEL]			
Physical Description Colorless liquid with a fragra	Physical Description Colorless liquid with a fragrant, fruity odor.			
MW: 74.1	BP: 135°F	FRZ: -145°F	Sol: 25%	
VP: 173 mmHg	IP: 10.27 eV		Sp.Gr: 0.93	
Fl.P: 14°F	UEL: 16%	LEL: 3.1%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at of	or above 100°F.		
Incompatibilities & Reactivities Nitrates; strong oxidizers, alkalis & acids; water [Note: Reacts slowly with water to form acetic acid & methanol.]				
Measurement Methods NIOSH 1458; OSHA 7 See: NMAM or OSHA Methods				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Water flush promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 2000 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 3100 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any self-contained breathing

apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; headache, drowsiness; optic nerve atrophy; chest tightness; in animals: narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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Methyl acetylene		CAS 74-99-7		
C ₃ H ₄			RTECS UK4250000	
Synonyms & Trade Names Allylene, Propine, Propyne,			DOT ID & Guide	
Exposure	NIOSH REL: TWA 1000 pp	om (1650 mg/m ³)		
Limits	OSHA PEL: TWA 1000 ppr	m (1650 mg/m ³)		
IDLH 1700 ppm [10%LEL]		Conversion 1 ppm = 1.64 m	ng/m ³	
Physical Description Colorless gas with a sweet or	Physical Description Colorless gas with a sweet odor. [Note: A fuel that is shipped as a liquefied compressed gas.]			
MW: 40.1	BP: -10°F	FRZ: -153°F	Sol: Insoluble	
VP: 5.2 atm	IP: 10.36 eV	RGasD: 1.41		
Fl.P: NA (Gas)	UEL: ?	LEL: 1.7%		
Flammable Gas				
Incompatibilities & Reactivities Strong oxidizers (such as chlorine), copper alloys [Note: Can decompose explosively at 4.5 to 5.6 atmospheres of pressure.]				
Measurement Methods NIOSH S84 (II-5)				

Personal Protection & Sanitation

Skin: Frostbite Eyes: Frostbite

Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation

Provide: Frostbite

First Aid (See procedures)

Eye: Frostbite Skin: Frostbite

Breathing: Respiratory support

Respirator Recommendations NIOSH/OSHA

Up to 1700 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Irritation respiratory system; tremor, hyperexcitability, anesthesia; liquid: frostbite

Target Organs respiratory system, central nervous system

full facepiece

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Methyl acetylene-propadiene mixture		CAS 59355-75-8	
C_3H_4			RTECS UK4920000
		DOT ID & Guide 1060 116P (stabilized)	
Exposure	NIOSH REL: TWA 1000 pp	om (1800 mg/m ³) ST 1250 pp	m (2250 mg/m ³)
Limits	OSHA PEL†: TWA 1000 pp	om (1800 mg/m ³)	
IDLH 3400 ppm [10%LEL]		Conversion 1 ppm = 1.64 m	ng/m ³
Physical Description Colorless gas with a strong,	Physical Description Colorless gas with a strong, characteristic, foul odor. [Note: A fuel that is shipped as a liquefied compressed gas.]		
MW: 40.1	BP: -36 to -4°F	FRZ: -213°F	Sol: Insoluble
VP: >1 atm	IP: ?	RGasD: 1.48	
Fl.P: NA (Gas)	UEL: 10.8%	LEL: 3.4%	
Flammable Gas			
Incompatibilities & Reactive Strong oxidizers, copper allocontaining more than 67% co	ys [Note: Forms explosive co	ompounds at high pressure in o	contact with alloys
Measurement Methods NIOSH S85 (II-6); OSHA 7			
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation Provide: Frostbite First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory support			
Respirator Recommendations NIOSH/OSHA Up to 3400 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a			

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Irritation respiratory system; excitement, confusion, anesthesia; liquid: frostbite

Target Organs respiratory system, central nervous system

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Methyl acrylate			CAS 96-33-3
CH ₂ =CHCOOCH ₃			RTECS AT2800000
			DOT ID & Guide 1919 129P (inhibited)
Exposure	NIOSH REL: TWA 10 ppm	(35 mg/m ³) [skin]	
Limits	OSHA PEL: TWA 10 ppm (35 mg/m ³) [skin]	
IDLH 250 ppm		Conversion 1 ppm = 3.52 m	ng/m ³
Physical Description Colorless liquid with an acrid	d odor.		
MW: 86.1	BP: 176°F	FRZ: -106°F	Sol: 6%
VP: 65 mmHg	IP: 9.90 eV		Sp.Gr: 0.96
Fl.P: 27°F	UEL: 25%	LEL: 2.8%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.	•
Incompatibilities & Reactivities Nitrates, oxidizers such as peroxides, strong alkalis [Note: Polymerizes easily; usually contains an inhibitor such as hydroquinone.]			
Measurement Methods NIOSH 1459; OSHA 92			
Personal Protection & Sanitation First Aid (See procedures)			

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 100 ppm: (APF = 10) Any supplied-air respirator*

Up to 250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any selfcontained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system

Target Organs Eyes, skin, respiratory system

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NIOSH Pocket Guide to Chemical Hazards

Methylacrylonitrile		CAS 126-98-7	
CH ₂ =C(CH ₃)CN			RTECS UD1400000
Synonyms & Trade Names 2-Cyanopropene-1, 2-Cyano-1-propene, Isoprene cyanide, Isopropenylnitrile, Methacrylonitrile, alpha-Methylacrylonitrile, 2-Methylpropenenitrile		DOT ID & Guide 3079 131P (inhibited)	
Exposure	NIOSH REL: TWA 1 ppm (3 mg/m ³) [skin]	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 2.74 n	ng/m ³
Physical Description Colorless liquid with an odo	r like bitter almonds.		
MW: 67.1	BP: 195°F	FRZ: -32°F	Sol: 3%
VP(77°F): 71 mmHg	IP: ?		Sp.Gr: 0.80
Fl.P: 34°F	UEL: 6.8%	LEL: 2%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.	
Incompatibilities & Reaction Strong acids, strong oxidizer light, or contact with a concentration of the strong acids.	rs, alkali, light [Note: Polymer	ization may occur due to elev	vated temperature, visible
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		ort	
Respirator Recommendations To be added later			
Exposure Routes inhalation	, skin absorption, ingestion, s	kin and/or eye contact	
Symptoms Irritation eyes, skin; lacrimation (discharge of tears); in animals: convulsions, loss of motor control in hind limbs			

Target Organs Eyes, skin, central nervous system

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Methylal			CAS 109-87-5
CH ₃ OCH ₂ OCH ₃			RTECS PA8750000
			DOT ID & Guide 1234 127
Exposure	NIOSH REL: TWA 1000 p	pm (3100 mg/m ³)	
Limits	OSHA PEL: TWA 1000 pp	m (3100 mg/m ³)	
IDLH 2200 ppm [10%LEL]		Conversion 1 ppm = 3.11 m	ng/m ³
Physical Description Colorless liquid with a chlor	oform-like odor.		
MW: 76.1	BP: 111°F	FRZ: -157°F	Sol: 33%
VP: 330 mmHg	IP: 10.00 eV		Sp.Gr: 0.86
Fl.P(oc): -26°F	UEL: 13.8%	LEL: 2.2%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at	or above 100°F.	
Incompatibilities & Reactivities Strong oxidizers, acids			
Measurement Methods NIOSH 1611			

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 2200 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; anesthesia

Target Organs Eyes, skin, respiratory system, central nervous system

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NIOSH Pocket Guide to Chemical Hazards

Methyl alcohol			CAS 67-56-1
CH ₃ OH			RTECS PC1400000
			DOT ID & Guide 1230 131
Exposure	NIOSH REL: TWA 200 ppr	m (260 mg/m ³) ST 250 ppm (325 mg/m ³) [skin]
Limits	OSHA PEL†: TWA 200 ppi	m (260 mg/m ³)	
IDLH 6000 ppm	IDLH 6000 ppm Conversion 1 ppm = 1.31 mg/m^3		
Physical Description Colorless liquid with a chara	cteristic pungent odor.		
MW: 32.1	BP: 147°F	FRZ: -144°F	Sol: Miscible
VP: 96 mmHg	IP: 10.84 eV		Sp.Gr: 0.79
Fl.P: 52°F	UEL: 36%	LEL: 6.0%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at of	or above 100°F.	
Incompatibilities & Reactivities Strong oxidizers			
Measurement Methods NIOSH 2000, 3800; OSHA 91			
Personal Protection & Sani	tation	First Aid (See procedures)	

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation

Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 2000 ppm: (APF = 10) Any supplied-air respirator

Up to 5000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 6000 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; headache, drowsiness, dizziness, nausea, vomiting; visual disturbance, optic nerve damage (blindness); dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal tract

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Methylamine		CAS 74-89-5	
CH ₃ NH ₂		RTECS PF6300000	
Aminomethane, Methylamine (anhydrous), Methylamine (aqueous),		DOT ID & Guide 1061 118 (anhydrous) 1235 132 (aqueous)	
Exposure	NIOSH REL: TWA 10 ppm	(12 mg/m ³)	
Limits	OSHA PEL: TWA 10 ppm (12 mg/m ³)	
IDLH 100 ppm		Conversion 1 ppm = 1.27 m	g/m ³
Physical Description Colorless gas with a fish- or ammonia-like odor. [Note: A liquid below 21°F. Shipped as a liquefied compressed gas.]			as a liquefied compressed
MW: 31.1	BP: 21°F	FRZ: -136°F	Sol: Soluble
VP: 3.0 atm	IP: 8.97 eV	RGasD: 1.08	Sp.Gr: 0.70 (Liquid at 13°F)
Fl.P: NA (Gas) 14°F (Liquid)	UEL: 20.7%	LEL: 4.9%	
Flammable Gas Class IA Fla	mmable Liquid		
Incompatibilities & Reactive Mercury, strong oxidizers, ni surfaces.]		to copper & zinc alloys, alum	inum & galvanized
Measurement Methods OSHA 40			
Personal Protection & Sanitation Skin: Prevent skin contact (solution)/Frostbite Eyes: Prevent eye contact (solution)/Frostbite Wash skin: When contaminated (solution) Remove: When wet (flammable) Change: No recommendation Provide: Frostbite		First Aid (See procedures) Eye: Irrigate immediately (so Skin: Water flush immediate Breathing: Respiratory supposwallow: Medical attention i	ly (solution)/Frostbite ort

Up to 100 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing

protection against the compound of concern/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with

Respirator Recommendations NIOSH/OSHA

a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern[£]/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption (solution), ingestion (solution), skin and/or eye contact (solution/liquid)

Symptoms Irritation eyes, skin, respiratory system; cough; skin, mucous membrane burns; dermatitis; conjunctivitis; liquid: frostbite

Target Organs Eyes, skin, respiratory system

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Methyl (n-amyl) ketone			
CH ₃ CO[CH ₂] ₄ CH ₃			
		DOT ID & Guide 1110 127	
NIOSH REL: TWA 100 ppn	n (465 mg/m ³)		
OSHA PEL: TWA 100 ppm	(465 mg/m ³)		
	Conversion 1 ppm = 4.67 m	g/m ³	
Physical Description Colorless to white liquid with a banana-like, fruity odor.			
BP: 305°F	FRZ: -32°F	Sol: 0.4%	
IP: 9.33 eV		Sp.Gr: 0.81	
UEL(250°F): 7.9%	LEL(151°F): 1.1%		
Fl.P. at or above 100°F and	below 140°F.		
ities ers [Note: Will attack some f	forms of plastic.]		
Measurement Methods NIOSH 1301			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated		mmediately	
	methyl ketone, 2-Heptanone NIOSH REL: TWA 100 ppm OSHA PEL: TWA 100 ppm a a banana-like, fruity odor. BP: 305°F IP: 9.33 eV UEL(250°F): 7.9% Fl.P. at or above 100°F and ities ers [Note: Will attack some features]	methyl ketone, 2-Heptanone NIOSH REL: TWA 100 ppm (465 mg/m³) OSHA PEL: TWA 100 ppm (465 mg/m³) Conversion 1 ppm = 4.67 m a banana-like, fruity odor. BP: 305°F IP: 9.33 eV UEL(250°F): 7.9% LEL(151°F): 1.1% FI.P. at or above 100°F and below 140°F. ities ers [Note: Will attack some forms of plastic.] First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air	

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 800 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; headache; narcosis, coma; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system, peripheral nervous system

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Methyl bromide		CAS 74-83-9	
CH ₃ Br			RTECS PA4900000
		DOT ID & Guide 1062 123	
Exposure	NIOSH REL: Ca See Appen	dix A	
Limits	OSHA PEL†: C 20 ppm (80	mg/m ³) [skin]	
IDLH Ca [250 ppm]		Conversion 1 ppm = 3.89 m	ng/m ³
Physical Description Colorless gas with a chloroform-like odor at high concentrations. [Note: A liquid below 38°F. Shipped as a liquefied compressed gas.]			
MW: 95.0	BP: 38°F	FRZ: -137°F	Sol: 2%
VP: 1.9 atm	IP: 10.54 eV	RGasD: 3.36	Sp.Gr: 1.73 (Liquid at 32°F)
Fl.P: NA (Gas)	UEL: 16.0%	LEL: 10%	
Flammable Gas, but only in	presence of a high energy ign	ition source.	
Incompatibilities & Reactivities Aluminum, magnesium, strong oxidizers [Note: Attacks aluminum to form aluminum trimethyl, which is SPONTANEOUSLY flammable.]			
Measurement Methods NIOSH 2520; OSHA PV2040			
Skin: Prevent skin contact (liquid) Eyes: Prevent eye contact (liquid)		First Aid (See procedures) Eye: Irrigate immediately (li Skin: Water flush immediate Breathing: Respiratory support	ly (liquid)

Respirator Recommendations NIOSH

Provide: Quick drench (liquid)

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption (liquid), skin and/or eye contact (liquid)

Symptoms Irritation eyes, skin, respiratory system; muscle weakness, incoordination, visual disturbance, dizziness; nausea, vomiting, headache; malaise (vague feeling of discomfort); hand tremor; convulsions; dyspnea (breathing difficulty); skin vesiculation; liquid: frostbite; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system

Cancer Site [in animals: lung, kidney & forestomach tumors]

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NIOSH Pocket Guide to Chemical Hazards

Methyl Cellosolve®		CAS 109-86-4	
CH ₃ OCH ₂ CH ₂ OH			RTECS KL5775000
		DOT ID & Guide 1188 127	
Exposure	NIOSH REL: TWA 0.1 pp	om (0.3 mg/m ³) [skin]	
Limits	OSHA PEL: TWA 25 ppn	n (80 mg/m ³) [skin]	
IDLH 200 ppm		Conversion 1 ppm = 3.11 r	mg/m ³
Physical Description Colorless liquid with a mild,	ether-like odor.		
MW: 76.1	BP: 256°F	FRZ: -121°F	Sol: Miscible
VP: 6 mmHg	IP: 9.60 eV		Sp.Gr: 0.96
Fl.P: 102°F	UEL: 14%	LEL: 1.8%	
Class II Combustible Liquid:	Fl.P. at or above 100°F and	nd below 140°F.	
Incompatibilities & Reactivities Strong oxidizers, caustics			
Measurement Methods NIOSH 1403; OSHA 53, 79			

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated

Change: No recommendation

Provide: Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 1 ppm: (APF = 10) Any supplied-air respirator*

Up to 2.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 5 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any suppliedair respirator with a full facepiece

Up to 100 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode*

Up to 200 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; headache, drowsiness, lassitude (weakness, exhaustion); ataxia, tremor; anemic pallor; in animals: reproductive, teratogenic effects

Target Organs Eyes, respiratory system, central nervous system, blood, kidneys, reproductive system, hematopoietic system

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NIOSH Pocket Guide to Chemical Hazards

Methyl Cellosolve® acetate			CAS 110-49-6	
CH ₃ COOCH ₂ CH ₂ OCH ₃			RTECS KL5950000	
			DOT ID & Guide 1189 129	
Exposure	NIOSH REL: TWA 0.1 ppm	(0.5 mg/m ³) [skin]		
Limits	OSHA PEL: TWA 25 ppm (120 mg/m ³) [skin]		
IDLH 200 ppm		Conversion 1 ppm = 4.83 m	ng/m ³	
Physical Description Colorless liquid with a mild,	ether-like odor.			
MW: 118.1	BP: 293°F	FRZ: -85°F	Sol: Miscible	
VP: 2 mmHg	IP: ?		Sp.Gr: 1.01	
Fl.P: 120°F	UEL: 8.2%	LEL: 1.7%		
Class II Combustible Liquid: Fl.P. at or above 100°F and below 140°F.				
Incompatibilities & Reactivities Nitrates; strong oxidizers, alkalis & acids				
Measurement Methods NIOSH 1451: OSHA 53, 70				

||NIOSH 1451; OSHA 53, 79

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation

Breathing: Respiratory support Swallow: Medical attention immediately

First Aid (See procedures)

Skin: Water flush promptly

Eye: Irrigate immediately

Respirator Recommendations NIOSH

Up to 1 ppm: (APF = 10) Any supplied-air respirator*

Up to 2.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 5 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any suppliedair respirator with a full facepiece

Up to 100 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode*

Up to 200 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; kidney, brain damage; in animals: narcosis; reproductive, teratogenic effects

Target Organs Eyes, respiratory system, kidneys, brain, central nervous system, peripheral nervous system, reproductive system, hematopoietic system

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Methyl chloride			CAS 74-87-3
CH ₃ Cl			RTECS PA6300000
			DOT ID & Guide 1063 115
Exposure NIOSH REL: Ca See App		dix A	
Limits	OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any hours)		
IDLH Ca [2000 ppm]		Conversion 1 ppm = 2.07 mg/m^3	
Physical Description Colorless gas with a faint, sweet odor which is not noticeable at dangerous concentrations. [Note: Shipped as a liquefied compressed gas.]			
MW: 50.5	BP: -12°F	FRZ: -144°F	Sol: 0.5%
VP: 5.0 atm	IP: 11.28 eV	RGasD: 1.78	
Fl.P: NA (Gas)	UEL: 17.4%	LEL: 8.1%	
Flammable Gas			
Incompatibilities & Reactivities Chemically-active metals such as potassium, powdered aluminum, zinc & magnesium; water [Note: Reacts with water (hydrolyzes) to form hydrochloric acid.]			
Measurement Methods NIOSH 1001			
Personal Protection & Sanitation First Aid (See procedures)			

Respirator Recommendations NIOSH

Wash skin: No recommendation

Remove: When wet (flammable) Change: No recommendation

Skin: Frostbite

Eyes: Frostbite

Provide: Frostbite

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Eye: Frostbite

Skin: Frostbite

Breathing: Respiratory support

Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Dizziness, nausea, vomiting; visual disturbance, stagger, slurred speech, convulsions, coma; liver, kidney damage; liquid: frostbite; reproductive, teratogenic effects; [potential occupational carcinogen]

Target Organs central nervous system, liver, kidneys, reproductive system

Cancer Site [in animals: lung, kidney & forestomach tumors]

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Methyl chloroform			CAS 71-55-6	
CH ₃ CCl ₃			RTECS KJ2975000	
			DOT ID & Guide 2831 160	
Exposure	NIOSH REL: C 350 ppm (1900 mg/m³) [15-minute] See Appendix C (Chloroethanes) OSHA PEL†: TWA 350 ppm (1900 mg/m³)			
Limits				
IDLH 700 ppm Conversion 1 pp		Conversion 1 ppm = 5.46 m	$= 5.46 \text{ mg/m}^3$	
Physical Description Colorless liquid with a mild, chloroform-like odor.				
Colorless liquid with a mild,	chloroform-like odor.			
Colorless liquid with a mild, MW: 133.4	chloroform-like odor. BP: 165°F	FRZ: -23°F	Sol: 0.4%	
1		FRZ: -23°F	Sol: 0.4% Sp.Gr: 1.34	
MW: 133.4	BP: 165°F	FRZ: -23°F LEL: 7.5%		
MW: 133.4 VP: 100 mmHg	BP: 165°F IP: 11.00 eV UEL: 12.5%			

Measurement Methods

NIOSH 1003

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 700 ppm: (APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage

Target Organs Eyes, skin, central nervous system, cardiovascular system, liver

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Methyl-2-cyanoacrylate			CAS 137-05-3	
CH ₂ =C(CN)COOCH ₃			RTECS AS7000000	
Synonyms & Trade Names Mecrylate, Methyl cyanoacrylate, Methyl alpha-cyanoacrylate, Methyl ester of 2- cyanoacrylic acid			DOT ID & Guide	
Exposure	NIOSH REL: TWA 2 ppm (8 mg/m ³) ST 4 ppm (16 mg/m ³)			
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 4.54 m	g/m ³	
Physical Description Colorless liquid with a chara	cteristic odor.			
MW: 111.1	BP: ?	FRZ: ?	Sol: 30%	
VP(77°F): 0.2 mmHg	IP: ?		Sp.Gr(81°F): 1.10	
Fl.P: 174°F	UEL: ?	LEL: ?		
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.		
	Incompatibilities & Reactivities Moisture [Note: Contact with moisture causes rapid polymerization.]			
Measurement Methods OSHA 55				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: No recommendation Change: No recommendation Provide: Eyewash		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, nose; blurred vision, lacrimation (discharge of tears); rhinitis				
Target Organs Eyes, skin, respiratory system				
See also: INTRODUCTION				

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NIOSH Pocket Guide to Chemical Hazards

Methylcyclohexane			CAS 108-87-2	
CH ₃ C ₆ H ₁₁			RTECS GV6125000	
Synonyms & Trade Names Cyclohexylmethane, Hexahydrotoluene		DOT ID & Guide 2296 128		
Exposure	Exposure NIOSH REL: TWA 400 ppm (1600 mg/m ³)			
Limits	OSHA PEL†: TWA 500 ppm (2000 mg/m ³)			
IDLH 1200 ppm [LEL]		Conversion 1 ppm = 4.02 m	ng/m ³	
Physical Description Colorless liquid with a faint, benzene-like odor.				
MW: 98.2	BP: 214°F	FRZ: -196°F	Sol: Insoluble	
VP: 37 mmHg	IP: 9.85 eV		Sp.Gr: 0.77	
Fl.P: 25°F	UEL: 6.7%	LEL: 1.2%		
Class IB Flammable Liquid:	Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.			
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH 1500; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH

Change: No recommendation

Up to 1200 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; dizziness, drowsiness; in animals: narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

See also: <u>INTRODUCTION</u>

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Methylcyclohexanol			CAS 25639-42-3
CH ₃ C ₆ H ₁₀ OH			RTECS GW0175000
			DOT ID & Guide 2617 129
Exposure			
Limits			
IDLH 500 ppm		Conversion 1 ppm = 4.67 m	ng/m ³
Physical Description Straw-colored liquid with a weak odor like coconut oil.			
MW: 114.2	BP: 311-356°F	FRZ: -58°F	Sol: 4%
VP(86°F): 2 mmHg	IP: 9.80 eV		Sp.Gr: 0.92
Fl.P: 149-158°F	UEL: ?		
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.	
Incompatibilities & Reactivities Strong oxidizers			
Measurement Methods NIOSH 1404			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo	

Respirator Recommendations NIOSH

Up to 500 ppm: (APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; headache; in animals: narcosis; liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, kidneys, liver

See also: <u>INTRODUCTION</u>

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o-Methylcyclohexanone			CAS 583-60-8
CH ₃ C ₆ H ₉ O			RTECS GW1750000
Synonyms & Trade Names 2-Methylcyclohexanone			DOT ID & Guide 2297 127
Exposure	NIOSH REL: TWA 50 ppm	(230 mg/m ³) ST 75 ppm (345 mg/m ³) [skin]	
Limits	OSHA PEL†: TWA 100 ppm (460 mg/m ³) [skin]		
IDLH 600 ppm		Conversion 1 ppm = 4.59 mg/m ³	
Physical Description Colorless liquid with a weak, peppermint-like odor.			
MW: 112.2	BP: 325°F	FRZ: 7°F	Sol: Insoluble
VP: 1 mmHg	IP: ?		Sp.Gr: 0.93
Fl.P: 118°F	UEL: ?	LEL: ?	
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.	
Incompatibilities & Reactivities Strong oxidizers			
Measurement Methods NIOSH 2521			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo	

Respirator Recommendations NIOSH

Up to 500 ppm: (APF = 10) Any supplied-air respirator*

Up to 600 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes, mucous membrane; narcosis; dermatitis

Target Organs Skin, respiratory system, liver, kidneys, central nervous system

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Methyl cyclopentadienyl manganese tricarbonyl (as Mn)			CAS 12108-13-3	
CH ₃ C ₅ H ₄ Mn(CO) ₃			RTECS OP1450000	
Synonyms & Trade Names CI-2, Combustion Improver-2, Manganese tricarbonylmethylcyclopentadienyl, 2- Methylcyclopentadienyl manganese tricarbonyl, MMT			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.2 mg/m ³ [skin]			
Limits	OSHA PEL†: C 5 mg/m ³			
IDLH N.D.		Conversion		
Physical Description Yellow to dark-orange liquid	Physical Description Yellow to dark-orange liquid with a faint, pleasant odor. [Note: A solid below 36°F.]			
MW: 218.1	BP: 449°F	FRZ: 36°F	Sol: Insoluble	
VP(212°F): 7 mmHg	IP: ?		Sp.Gr: 1.39	
Fl.P: 230°F	UEL: ?	LEL: ?		
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.			
Incompatibilities & Reactivities Light (decomposes)				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms Irritation eyes; dizziness, nausea, headache; in animals: tremor, severe clonic spasms, lassitude (weakness, exhaustion), slow respiration; liver, kidney injury				

Target Organs Eyes, central nervous system, liver, kidneys

vomiting

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Methyl demeton			CAS 8022-00-2		
$C_6H_{15}O_3PS_2$			RTECS TG1760000		
Synonyms & Trade Names Demeton methyl; O,O-Dimethyl 2-ethylmercaptoethyl thiophosphate; Metasystox®; Methyl mercaptophos; Methyl systox®			DOT ID & Guide		
Exposure	NIOSH REL: TWA 0.5 mg/s	m ³ [skin]			
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion			
Physical Description Oily, colorless to pale-yellow liquid with an unpleasant odor. [insecticide] [Note: Technical grade consists of 2 isomers: thiono & thiolo.]					
MW: 230.3	BP: Decomposes	FRZ: ?	Sol: 0.03-0.3%		
VP: 0.0004 mmHg	IP: ?		Sp.Gr: 1.20		
Fl.P: ?	UEL: ?	LEL: ?			
Combustible Liquid					
Incompatibilities & Reactive Strong oxidizers, alkalis, water					
Measurement Methods None available					
Personal Protection & Sani Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminat Remove: When wet or contant Change: Daily Provide: Eyewash, Quick dre	ted minated	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort		
Respirator Recommendatio	Respirator Recommendations To be added later				
Exposure Routes inhalation,	skin absorption, ingestion, sl	kin and/or eye contact			

Symptoms Irritation eyes, skin; ache eyes, rhinorrhea (discharge of thin mucus); nausea, headache, dizziness,

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system, blood cholinesterase

See also: <u>INTRODUCTION</u>

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4,4'-Methylenebis	CAS 101-14-4			
$CH_2(C_6H_4CINH_2)_2$	RTECS CY1050000			
Synonyms & Trade Names DACPM; 3,3'-Dichloro-4,4'- chloro aniline); 4,4'-Methyle	DOT ID & Guide			
Exposure	NIOSH REL: Ca TWA 0.00	3 mg/m ³ [skin] See Appendix	<u>: A</u>	
Limits	OSHA PEL†: none			
IDLH Ca [N.D.]		Conversion		
Physical Description Tan-colored pellets or flakes with a faint, amine-like odor.				
MW: 267.2	BP: ?	MLT: 230°F	Sol: Slight	
VP(77°F): 0.00001 mmHg	IP: ?		Sp.Gr: 1.44	
Fl.P: ?	UEL: ?	LEL: ?		
Incompatibilities & Reacti Chemically-active metals (e	vities .g., potassium, sodium, magne	esium, zinc)		
Measurement Methods OSHA 24, 71				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory supports Swallow: Medical attention in	ort	

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-

contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Hematuria (blood in the urine), cyanosis, nausea, methemoglobinemia, kidney irritation; [potential occupational carcinogen]

Target Organs Liver, blood, kidneys

Cancer Site [in animals: liver, lung & bladder tumors]

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Methylene his(4-cycloheyylisocyanate)

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CAS 5124-30-1

Methylene dis(4-cyclonexynsocyanate)				
$\boxed{\text{CH}_2[(\text{C}_6\text{H}_{10})\text{NCO}]_2}$			RTECS NQ9250000	
Synonyms & Trade Names Dicyclohexylmethane 4,4'-diisocyanate; DMDI; bis(4-Isocyanatocyclohexyl)methane; HMDI; Hydrogenated MDI; Reduced MDI; Saturated MDI			DOT ID & Guide	
Exposure	NIOSH REL: C 0.01 ppm (0	0.11 mg/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 10.73 1	ng/m ³	
Physical Description Clear, colorless to light-yellow liquid.				
MW: 262.4	BP: ?	FRZ: <14°F	Sol: Reacts	
VP(77°F): 0.001 mmHg	IP: ?		Sp.Gr(77°F): 1.07	
Fl.P: >395°F	UEL: ?	LEL: ?		
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.			
Incompatibilities & Reactive Water, ethanol, alcohols, am 122°F.]	vities ines, bases, acids, organotin c	atalysts [Note: May slowly po	olymerize if heated above	
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory suppo	ort	

Up to 0.25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 0.5 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-

Up to 1 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-

Respirator Recommendations NIOSH

air respirator with a full facepiece

Up to 0.1 ppm: (APF = 10) Any supplied-air respirator*

demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; skin, respiratory sensitization; chest tightness, dyspnea (breathing difficulty), cough, dry throat, wheezing, pulmonary edema; skin blisters

Target Organs Eyes, skin, respiratory system

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Methylene bisphenyl isocyanate			CAS 101-68-8	
CH ₂ (C ₆ H ₄ NCO) ₂			RTECS NQ9350000	
			DOT ID & Guide 2489 156	
Exposure	NIOSH REL: TWA 0.05 mg	g/m ³ (0.005 ppm) C 0.2 mg/m	³ (0.020 ppm) [10-minute]	
Limits	OSHA PEL: C 0.2 mg/m ³ (0).02 ppm)		
IDLH 75 mg/m ³		Conversion 1 ppm = 10.24	mg/m ³	
Physical Description White to light-yellow, odorless flakes. [Note: A liquid above 99°F.]				
MW: 250.3	BP: 597°F	MLT: 99°F	Sol: 0.2%	
VP(77°F): 0.000005 mmHg	IP: ?		Sp.Gr: 1.23 (Solid at 77°F) 1.19 (Liquid at 122°F)	
Fl.P: 390°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactive Strong alkalis, acids, alcohol		.]		
Measurement Methods NIOSH 5521, 5522; OSHA 18				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort	

Up to 1.25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 2.5 mg/m^3 : (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

Respirator Recommendations NIOSH

supplied-air respirator with a full facepiece

Up to 0.5 mg/m^3 : (APF = 10) Any supplied-air respirator*

Up to 75 mg/m: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; respiratory sensitization; cough, pulmonary secretions, chest pain, dyspnea (breathing difficulty); asthma

Target Organs Eyes, respiratory system

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Methylene chloride			CAS 75-09-2		
CH ₂ Cl ₂			RTECS PA8050000		
			DOT ID & Guide 1593 160		
Exposure	NIOSH REL: Ca See A	Appendix A			
Limits	OSHA PEL: [1910.105	52] TWA 25 ppm ST 125 pp	om		
IDLH Ca [2300 ppm]			3.47 mg/m ³		
Physical Description Colorless liquid with a chlore	oform-like odor. [Note:	A gas above 104°F.]			
MW: 84.9	BP: 104°F	FRZ: -139°F	Sol: 2%		
VP: 350 mmHg	IP: 11.32 eV		Sp.Gr: 1.33		
Fl.P: ?	UEL: 23%	LEL: 13%			
Combustible Liquid					
Incompatibilities & Reactivities Strong oxidizers; caustics; chemically-active metals such as aluminum, magnesium powders, potassium & sodium; concentrated nitric acid					
Measurement Methods	Measurement Methods				

NIOSH 1005, 3800; OSHA 59, 80 Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numbness, tingle limbs; nausea; [potential occupational carcinogen]

Target Organs Eyes, skin, cardiovascular system, central nervous system

Cancer Site [in animals: lung, liver, salivary & mammary gland tumors]

Provide: Eyewash, Quick drench

pressure breathing apparatus

Respirator Recommendations NIOSH

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4,4'-Methylenedianiline			CAS 101-77-9		
$CH_2(C_6H_4NH_2)_2$			RTECS BY5425000		
Synonyms & Trade Names 4,4'-Diaminodiphenylmethane; para, para'-Diaminodiphenyl-methane; Dianilinomethane; 4,4'-Diphenylmethanediamine; MDA			DOT ID & Guide		
Exposure	NIOSH REL: Ca See Appen	dix A			
Limits	OSHA PEL: [1910.1050] TV	WA 0.010 ppm ST 0.100 ppm			
IDLH Ca [N.D.]		Conversion			
Physical Description Pale-brown, crystalline solid	Physical Description Pale-brown, crystalline solid with a faint, amine-like odor.				
MW: 198.3	BP: 748°F	MLT: 198°F	Sol: 0.1%		
VP(77°F): 0.0000002 mmHg	IP: 10.70 eV		Sp.Gr: 1.06 (Liquid at 212°F)		
Fl.P: 374°F	UEL: ?	LEL: ?			
Combustible Solid					
Incompatibilities & Reacti Strong oxidizers	vities				
Measurement Methods NIOSH 5029					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo	ort		

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At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes; jaundice, hepatitis; myocardial damage; in animals: heart, liver, spleen damage; [potential occupational carcinogen]

Target Organs Eyes, liver, cardiovascular system, spleen

Cancer Site [in animals: bladder cancer]

See also: INTRODUCTION See ICSC CARD: 1111

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Methyl ethyl ketor	CAS 1338-23-4			
C ₈ H ₁₆ O ₄	RTECS EL9450000			
			DOT ID & Guide 2550 147	
Exposure	NIOSH REL: C 0.2 ppm (1	.5 mg/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 7.21 m	ng/m ³	
Physical Description Colorless liquid with a chara	acteristic odor. [Note: Explosi	ive decomposition occurs at 23	30°F.]	
MW: 176.2	BP: 244°F (Decomposes)	FRZ: ?	Sol: Soluble	
VP: ?	IP: ?		Sp.Gr(59°F): 1.12	
Fl.P(oc): 125-200°F (60% MEKP)	UEL: ?	LEL: ?		
Combustible Liquid				
	nes, sunlight, trace contamina	nts [Note: A strong oxidizing nyl phthalate, cyclohexane per	_	
Measurement Methods NIOSH 3508; OSHA 77				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort	
Respirator Recommendations To be added later				
Exposure Routes inhalation	, ingestion, skin and/or eye c	ontact		
Symptoms Irritation eyes, sl	kin, nose, throat; cough, dysp	nea (breathing difficulty), pul	monary edema; blurred	

vision; blisters, scars skin; abdominal pain, vomiting, diarrhea; dermatitis; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, liver, kidneys

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Methyl formate CAS 107-31-3				
HCOOCH ₃			RTECS LQ8925000	
Synonyms & Trade Names Methyl ester of formic acid,			DOT ID & Guide 1243 129	
Exposure	NIOSH REL: TWA 100 ppm	n (250 mg/m ³) ST 150 ppm (3	375 mg/m ³)	
Limits	OSHA PEL†: TWA 100 ppr	m (250 mg/m ³)		
IDLH 4500 ppm		Conversion 1 ppm = 2.46 m	ng/m ³	
Physical Description Colorless liquid with a pleasant odor. [Note: A gas above 89°F.]				
MW: 60.1	BP: 89°F	FRZ: -148°F	Sol: 30%	
VP: 476 mmHg	IP: 10.82 eV		Sp.Gr: 0.98	
Fl.P: -2°F	UEL: 23%	LEL: 4.5%		
Class IA Flammable Liquid	Fl.P. below 73°F and BP bel	ow 100°F.		
Incompatibilities & Reacti Strong oxidizers [Note: Rea	vities cts slowly with water to form	methanol & formic acid.]		
Measurement Methods NIOSH S291 (II-5); OSHA PV2041				
Personal Protection & Sanitation First Aid (See procedures)				
Skin: Prevent skin contact		Eye: Irrigate immediately		
Eyes: Prevent eye contact	. 1	Skin: Soap wash immediately		
Wash skin: When contaminate of the work of		Breathing: Respiratory support Swallow: Medical attention immediately		
Remove: When wet (flamm Change: No recommendation)		Swanow. Medical attention i	inineuratery	

Respirator Recommendations NIOSH/OSHA

Up to 1000 ppm: (APF = 10) Any supplied-air respirator*

Up to 2500 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 4500 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; chest tightness, dyspnea (breathing difficulty); visual disturbance; central nervous system depression; in animals: pulmonary edema; narcosis

Target Organs Eyes, respiratory system, central nervous system

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5-Methyl-3-heptanone CAS 541-85-5				
C ₂ H ₅ COCH ₂ CH(CH ₃)CH ₂ CH ₃			RTECS MJ7350000	
			DOT ID & Guide 2271 127	
Exposure	NIOSH REL: TWA 25 ppm	(130 mg/m ³)		
Limits	OSHA PEL: TWA 25 ppm (130 mg/m ³)		
IDLH 100 ppm		Conversion 1 ppm = 5.24 m	ng/m ³	
Physical Description Colorless liquid with a punge	Physical Description Colorless liquid with a pungent odor.			
MW: 128.2	BP: 315°F	FRZ: -70°F	Sol: Insoluble	
VP: 2 mmHg	IP: ?		Sp.Gr: 0.82	
Fl.P: 138°F	UEL: ?	LEL: ?		
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.		
Incompatibilities & Reactive Strong oxidizers	vities			
Measurement Methods NIOSH 1301				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Up to 100 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; headache; narcosis, coma; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system

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Methyl hydrazine			CAS 60-34-4	
CH ₃ NHNH ₂			RTECS MV5600000	
			DOT ID & Guide 1244 131	
Exposure	NIOSH REL: Ca C 0.04 ppr	m (0.08 mg/m ³) [2-hr] See Ap	ppendix A	
Limits	OSHA PEL: C 0.2 ppm (0.3	35 mg/m ³) [skin]		
IDLH Ca [20 ppm]		Conversion 1 ppm = 1.89 m	ng/m ³	
Physical Description Fuming, colorless liquid with	an ammonia-like odor.			
MW: 46.1	BP: 190°F	FRZ: -62°F	Sol: Miscible	
VP: 38 mmHg	IP: 8.00 eV		Sp.Gr(77°F): 0.87	
Fl.P: 17°F	UEL: 92%	LEL: 2.5%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at	or above 100°F.		
Incompatibilities & Reactivities Oxides of iron; copper; manganese; lead; copper alloys; porous materials such as earth, asbestos, wood & cloth; strong oxidizers such as fluorine & chlorine; nitric acid; hydrogen peroxide				
Measurement Methods				

1410011 3310

NIOSH 3510

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; vomiting, diarrhea, tremor, ataxia; anoxia, cyanosis; convulsions; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, liver, blood, cardiovascular system

Cancer Site [in animals: lung, liver, blood vessel & intestine tumors]

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Methyl iodide			CAS 74-88-4		
CH ₃ I			RTECS PA9450000		
			DOT ID & Guide 2644 151		
Exposure	NIOSH REL: Ca TV	VA 2 ppm (10 mg/m ³) [skin]	See Appendix A		
Limits	OSHA PEL: TWA 5	5 ppm (28 mg/m ³) [skin]			
IDLH Ca [100 ppm]	·	Conversion 1 ppm =	$= 5.80 \text{ mg/m}^3$		
Physical Description Colorless liquid with a moisture.]	pungent, ether-like odor. [Note: Turns yellow, red, or br	rown on exposure to light &		
MW: 141.9	BP: 109°F	FRZ: -88°F	Sol: 1%		
VP: 400 mmHg	IP: 9.54 eV		Sp.Gr: 2.28		
Fl.P: NA UEL: NA LEL: NA					
Noncombustible Liquid					
Incompatibilities & Reactivities Strong oxidizers [Note: Decomposes at 518°F.]					
Measurement Methods					

Measurement Methods

NIOSH 1014

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

Change: No recommendation Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; nausea, vomiting; dizziness, ataxia; slurred speech, drowsiness; dermatitis; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system

Cancer Site [in animals: lung, kidney & forestomach tumors]

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Methyl isoamyl ke	CAS 110-12-3				
CH ₃ COCH ₂ CH ₂ CH(CH ₃) ₂			RTECS MP3850000		
Synonyms & Trade Names Isoamyl methyl ketone, Isope hexanone, MIAK	DOT ID & Guide 2302 127				
Exposure	NIOSH REL: TWA 50 ppm	(240 mg/m ³)			
Limits	OSHA PEL†: TWA 100 pp	m (475 mg/m ³)			
IDLH N.D.		Conversion 1 ppm = 4.67 n	ng/m ³		
Physical Description Colorless, clear liquid with a	pleasant, fruity odor.				
MW: 114.2	BP: 291°F	FRZ: -101°F	Sol: 0.5%		
VP: 5 mmHg	IP: 9.284 eV		Sp.Gr: 0.81		
Fl.P: 97°F	UEL(200°F): 8.2%	LEL(200°F): 1.0%			
Class IC Flammable Liquid:	Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.				
Incompatibilities & Reactivities Oxidizers					
Measurement Methods OSHA PV2042					

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Soap flush promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 500 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 1250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*

Up to 2500 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor

cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)*/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 5000 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; headache, narcosis, coma; dermatitis; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

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Methyl isobutyl carbinol			CAS 108-11-2	
(CH ₃) ₂ CHCH ₂ CH(OH)CH ₃			RTECS SA7350000	
			DOT ID & Guide 2053 129	
Exposure	NIOSH REL: TWA 25 ppm (100 mg/m ³) ST 40 ppm (165 mg/m ³) [skin]			
Limits	OSHA PEL†: TWA 25 ppm (100 mg/m³) [skin]			
IDLH 400 ppm		Conversion 1 ppm = 4.18 mg/m^3		
Physical Description Colorless liquid with a mild odor.				
MW: 102.2	BP: 271°F	FRZ: -130°F	Sol: 2%	
VP: 3 mmHg	IP: ?		Sp.Gr: 0.81	
Fl.P: 106°F	UEL: 5.5%	LEL: 1.0%		
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.		
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH 1402; OSHA 7				
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory suppo Swallow: Medical attention i		

Respirator Recommendations NIOSH/OSHA

Up to 250 ppm: (APF = 10) Any supplied-air respirator*

Up to 400 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; headache, drowsiness; dermatitis; in animals: narcosis

Target Organs Eyes, skin, central nervous system

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Methyl isocyanate			CAS 624-83-9	
CH ₃ NCO			RTECS NQ9450000	
Synonyms & Trade Names Methyl ester of isocyanic acid, MIC			DOT ID & Guide 2480 155	
Exposure NIOSH REL: TWA 0.02 ppm (0.05 mg/m ³) [skin]				
Limits	OSHA PEL: TWA 0.02 ppm (0.05 mg/m ³) [skin]			
IDLH 3 ppm		Conversion 1 ppm = 2.34 mg/m^3		
Physical Description Colorless liquid with a sharp, pungent odor.				
MW: 57.1	BP: 139°F	BP: 139°F FRZ: -49°F Sol(59°F): 10%		
VP: 348 mmHg	IP: 10.67 eV		Sp.Gr: 0.96	
Fl.P: 19°F	UEL: 26% LEL: 5.3%			
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.				
Incompatibilities & Reactivities Water, oxidizers, acids, alkalis, amines, iron, tin, copper [Note: Usually contains inhibitors to prevent polymerization.]				
Measurement Methods				

OSHA 54

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 0.2 ppm: (APF = 10) Any supplied-air respirator*

Up to 0.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 1 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-

air respirator with a full facepiece

Up to 3 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; respiratory sensitization, cough, pulmonary secretions, chest pain, dyspnea (breathing difficulty); asthma; eye, skin damage; in animals: pulmonary edema

Target Organs Eyes, skin, respiratory system

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Methyl isopropyl ketone			CAS 563-80-4	
CH ₃ COCH(CH ₃) ₂			RTECS EL9100000	
Synonyms & Trade Names 2-Acetyl propane, Isopropyl methyl ketone, 3-Methyl-2-butanone, 3-Methyl butan-2- one, MIPK			DOT ID & Guide 2397 127	
Exposure NIOSH REL: TWA 200 ppm (705 mg/r		m (705 mg/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D. See: IDLH IND	EX	Conversion 1 ppm = 3.53 m	ng/m ³	
Physical Description Colorless liquid with an acet	Physical Description Colorless liquid with an acetone-like odor.			
MW: 86.2	BP: 199°F	FRZ: -134°F	Sol: Very slight	
VP: 42 mmHg	IP: 9.32 eV		Sp.Gr: 0.81	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Liquid				
Incompatibilities & Reactive Oxidizers	vities			
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, mucous membrane, respiratory system; cough				
Target Organs Eyes, skin, respiratory system				
See also: INTRODUCTION				

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NIOSH Pocket Guide to Chemical Hazards

Methyl mercaptan			CAS 74-93-1	
CH ₃ SH			RTECS PB4375000	
Synonyms & Trade Names Mercaptomethane, Methanethiol, Methyl sulfhydrate			DOT ID & Guide 1064 117	
Exposure	NIOSH REL: C 0.5 ppm (1 mg/m ³) [15-minute]			
Limits	OSHA PEL†: C 10 ppm (20	OSHA PEL†: C 10 ppm (20 mg/m ³)		
IDLH 150 ppm		Conversion 1 ppm = 1.97 m	ng/m ³	
Physical Description Colorless gas with a disagreeable odor like garlic or rotten cabbage. [Note: A liquid below 43°F. Shipped as a liquefied compressed gas.]				
MW: 48.1	BP: 43°F	FRZ: -186°F	Sol: 2%	
VP: 1.7 atm	IP: 9.44 eV	RGasD: 1.66	Sp.Gr: 0.90 (Liquid at 32°F)	
Fl.P: NA (Gas) (oc) 0°F (Liquid)	UEL: 21.8%	LEL: 3.9%		
Flammable Gas Class IA Fla	ammable Liquid			
Incompatibilities & Reactivities Strong oxidizers, bleaches, copper, aluminum, nickel-copper alloys				
Measurement Methods NIOSH 2542; OSHA 26				
Personal Protection & Sanitation Skin: Prevent skin contact (liquid)/Frostbite Eyes: Prevent eye contact (liquid)/Frostbite Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation Provide: Eyewash (liquid), Quick drench (liquid),		First Aid (See procedures) Eye: Irrigate immediately (li Skin: Water flush immediate Breathing: Respiratory support	ly (liquid)/Frostbite	

Respirator Recommendations NIOSH

Frostbite

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

powered, air-purifying respirator with organic vapor cartridge(s)

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 150 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Irritation eyes, skin, respiratory system; narcosis; cyanosis; convulsions; liquid: frostbite

Target Organs Eyes, skin, respiratory system, central nervous system, blood

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Methyl methacrylate			CAS 80-62-6
CH ₂ =C(CH ₃)COOCH ₃			RTECS OZ5075000
			DOT ID & Guide 1247 129P (inhibited)
Exposure	NIOSH REL: TWA 100 ppm (410 mg/m ³)		
Limits	OSHA PEL: TWA 100 ppm (410 mg/m ³)		
IDLH 1000 ppm	Conversion 1 ppm = 4.09 mg/m^3		ng/m ³
Physical Description Colorless liquid with an acrid, fruity odor.			
MW: 100.1	BP: 214°F	FRZ: -54°F	Sol: 1.5%
VP: 29 mmHg	IP: 9.70 eV		Sp.Gr: 0.94
Fl.P(oc): 50°F	UEL: 8.2%	LEL: 1.7%	
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.			
Incompatibilities & Reactivities Nitrates, oxidizers, peroxides, strong alkalis, moisture [Note: May polymerize if subjected to heat, oxidizers, or ultraviolet light. Usually contains an inhibitor such as hydroquinone.]			
Measurement Methods NIOSH 2537; OSHA 94			
Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory suppo	

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 1000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; dermatitis

Target Organs Eyes, skin, respiratory system

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Methyl parathion			CAS 298-00-0		
(CH ₃ O) ₂ P(S)OC ₆ H ₄ NO ₂			RTECS TG0175000		
			DOT ID & Guide 2783 152		
Exposure NIOSH REL: TWA 0.2 mg/m ³ [skin]					
Limits	OSHA PEL†: none				
IDLH N.D.	Conversion				
Physical Description White to tan, crystalline solid or powder with a pungent, garlic-like odor. [pesticide] [Note: The commercial product in xylene is a tan liquid.]					
MW: 263.2	BP: 289°F	BP: 289°F			
VP: 0.00001 mmHg	IP: ?		Sp.Gr: 1.36		
Fl.P: ?	UEL: ?	LEL: ?			
Combustible Solid					
Incompatibilities & Reactivities Strong oxidizers, water [Note: Explosive risk when heated above 122°F.]					
M					

Measurement Methods

NIOSH 5600

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 2 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter/(APF = 10) Any supplied-air respirator

Up to 5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter Up to 10 mg/m^3 : (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 200 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; nausea, vomiting, abdominal cramps, diarrhea, salivation; headache, dizziness, lassitude (weakness, exhaustion); rhinorrhea (discharge of thin mucus), chest tightness; blurred vision, miosis; cardiac irregularities; muscle fasciculation; dyspnea (breathing difficulty)

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system, blood cholinesterase

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Methyl silicate			CAS 681-84-5
(CH ₃ O) ₄ Si			RTECS VV9800000
Synonyms & Trade Names Methyl orthosilicate, Tetramethoxysilane, Tetramethyl ester of silicic acid, Tetramethyl silicate		DOT ID & Guide 2606 155	
Exposure	NIOSH REL: TWA 1 ppm (6 mg/m ³) OSHA PEL†: none		
Limits			
IDLH N.D.	Conversion 1 ppm = 6.23 mg/m^3		ng/m ³
Physical Description Clear, colorless liquid. [Note: A solid below 28°F.]			
MW: 152.3	BP: 250°F	FRZ: 28°F	Sol: Soluble
VP(77°F): 12 mmHg	IP: ?		Sp.Gr: 1.02
Fl.P: 205°F	UEL: ?	LEL: ?	
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.		
Incompatibilities & Reactivities Oxidizers; hexafluorides of rhenium, molybdenum & tungsten			
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contaminated Change: No recommendation Provide: Eyewash		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be added later			
Exposure Routes inhalation, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, corneal damage (following even short-term exposure to the vapor); lung, kidney injury; pulmonary edema			
Target Organs Eyes, respiratory system, kidneys			

See also: <u>INTRODUCTION</u>

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alpha-Methyl styr	CAS 98-83-9				
$C_6H_5C(CH_3)=CH_2$			RTECS WL5075300		
Synonyms & Trade Names AMS, Isopropenyl benzene,	DOT ID & Guide				
Exposure	NIOSH REL: TWA 50 ppi	m (240 mg/m ³) ST 100 ppm (4	85 mg/m ³)		
Limits	OSHA PEL†: C 100 ppm ((480 mg/m ³)			
IDLH 700 ppm		Conversion 1 ppm = 4.83 m	ng/m ³		
Physical Description Colorless liquid with a chara	cteristic odor.				
MW: 118.2	BP: 330°F	FRZ: -10°F	Sol: Insoluble		
VP: 2 mmHg	IP: 8.35 eV		Sp.Gr: 0.91		
Fl.P: 129°F	UEL: 6.1%	LEL: 1.9%			
Class II Combustible Liquid:	Class II Combustible Liquid: Fl.P. at or above 100°F and below 140°F.				
Incompatibilities & Reactivities Oxidizers, peroxides, halogens, catalysts for vinyl or ionic polymers; aluminum, iron chloride, copper [Note: Usually contains an inhibitor such as tert-butyl catechol.]					
Measurement Methods	Measurement Methods				

Personal Protection & Sanitation

NIOSH 1501: OSHA 7

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 500 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 700 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any self-contained breathing

apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; drowsiness; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system

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Metribuzin			CAS 21087-64-9	
C ₈ H ₁₄ N ₄ OS			RTECS XZ2990000	
Synonyms & Trade Names 4-Amino-6-(1,1-dimethyleth	nyl)-3-(methylthio)-1,2,4-triaz	zin-5(4H)-one	DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 mg/m	NIOSH REL: TWA 5 mg/m ³		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Colorless, crystalline solid. [herbicide]			
MW: 214.3	BP: ?	MLT: 257°F	Sol: 0.1%	
VP: 0.0000004 mmHg	IP: ?		Sp.Gr: 1.31	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive None reported	vities			
Measurement Methods OSHA PV2044				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms In animals: central nervous system depression; thyroid, liver enzyme changes				
Target Organs central nervous system, thyroid, liver				
See also: INTRODUCTION				

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Mica (containing less than 1% quartz)			CAS 12001-26-2	
			RTECS VV8760000	
Synonyms & Trade Names Biotite, Lepidolite, Margarite, Muscovite, Phlogopite, Roscoelite, Zimmwaldite			DOT ID & Guide	
Exposure	NIOSH REL: TWA 3 mg/m	NIOSH REL: TWA 3 mg/m ³ (resp)		
Limits	OSHA PEL†: TWA 20 mpp	ocf		
IDLH 1500 mg/m ³		Conversion		
Physical Description Colorless, odorless flakes or	sheets of hydrous silicates.			
MW: 797 (approx)	BP: ?	MLT: ?	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.6-3.2	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reaction None reported	vities			
Measurement Methods NIOSH 0600				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air		
Respirator Recommendations NIOSH				
Up to 15 mg/m^3 : (APF = 5)	Any dust and mist respirator			

Up to 30 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF =

Up to 75 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

Up to 150 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

powered, air-purifying respirator with a dust and mist filter

10) Any supplied-air respirator

filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1500 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes; pneumoconiosis, cough, dyspnea (breathing difficulty); lassitude (weakness, exhaustion); weight loss

Target Organs respiratory system

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Mineral wool fiber			CAS
	RTECS PY8070000		
Synonyms & Trade Names Manmade mineral fibers, Ro Produced by blowing steam slags that are by-products of	DOT ID & Guide		
Exposure	NIOSH REL: TWA 3 fibers/mg/m ³ (total)	/cm ³ (fibers 3.5 m diameter &	10 m in length) TWA 5
Limits	OSHA PEL: TWA 15 mg/m	³ (total) TWA 5 mg/m ³ (resp))
IDLH N.D.		Conversion	
Physical Description Typically, a mineral "wool"	with diameters >0.5 m & >1.	5 m in length.	
MW: varies	BP: NA	MLT: ?	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: ?
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Fibers			
Incompatibilities & Reacting None reported	vities		
Measurement Methods NIOSH 0500, 7400			
Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air	
Respirator Recommendation	ons NIOSH		

Up to 10X REL: (APF = 10) Any dust respirator except single-use and quarter-mask respirators/(APF = 10) Any

Up to 25X REL: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

air-purifying respirator with a high-efficiency particulate filter/(APF = 10) Any supplied-air respirator

Up to 5X REL: (APF = 5) Any dust respirator

powered, air-purifying respirator with a dust filter

Up to 50X REL: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1000X REL: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; dyspnea (breathing difficulty)

Target Organs Eyes, skin, respiratory system

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Molybdenum			CAS 7439-98-7	
Mo			RTECS QA4680000	
Synonyms & Trade Names Molybdenum metal		DOT ID & Guide		
Exposure		NIOSH REL*: See Appendix D [*Note: The REL also applies to other insoluble molybdenum compounds (as Mo).]		
Limits	OSHA PEL*†: TWA 15 m molybdenum compounds (ng/m ³ [*Note: The PEL also app (as Mo).]	plies to other insoluble	
IDLH 5000 mg/m ³ (as Mo)		Conversion		
Physical Description Dark gray or black powder	with a metallic luster.			
MW: 95.9	BP: 8717°F	MLT: 4752°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 10.28	
Fl.P: NA	UEL: NA	LEL: NA		
Combustible Solid in form of	of dust or powder.			
Incompatibilities & Reacti Strong oxidizers	vities			
Measurement Methods NIOSH 7300; OSHA ID121	, ID125G			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendati	ons OSHA			

Up to 150 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators^/(APF =

Up to 375 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

Up to 75 mg/m³: (APF = 5) Any dust and mist respirator^{$^{^{^{^{^{3}}}}}$}

powered, air-purifying respirator with a dust and mist filter^

10) Any supplied-air respirator

Up to 750 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 5000 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes, nose, throat; anorexia, diarrhea, weight loss; listlessness; liver, kidney damage

Target Organs Eyes, respiratory system, liver, kidneys

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Molybdenum (solu	CAS			
	RTECS			
Synonyms & Trade Names Synonyms vary depending up	pon the specific soluble molyl	odenum compound.	DOT ID & Guide	
Exposure	NIOSH REL: See Appendix	D		
Limits	OSHA PEL: TWA 5 mg/m ³			
IDLH 1000 mg/m ³ (as Mo)		Conversion		
Physical Description Appearance and odor vary de	epending upon the specific sol	uble molybdenum compound		
Properties vary depending upon the specific soluble molybdenum compound.				
Incompatibilities & Reactiv	vities			
Measurement Methods NIOSH 7300; OSHA ID121,	, ID125G			
Personal Protection & Sant Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamina Remove: When wet or conta Change: No recommendation	ited minated	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory suppo		
Respirator Recommendations OSHA Up to 25 mg/m ³ : (APF = 5) Any dust and mist respirator*				
Up to 50 mg/m^3 : (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators*/(APF =				

Up to 125 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any

powered, air-purifying respirator with a dust and mist filter*

10) Any supplied-air respirator*

Up to 250 mg/m: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1000 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes, nose, throat; anorexia; incoordination; dyspnea (breathing difficulty); anemia

Target Organs Eyes, respiratory system, kidneys, blood

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Monocrotophos			CAS 6923-22-4	
C ₇ H ₁₄ NO ₅ P			RTECS TC4375000	
3-Hydroxy-N-methylcrotonamide dimethylphosphate, Monocron			DOT ID & Guide 2783 152 (organophosphorus pesticide, solid)	
Exposure	NIOSH REL: TWA 0.25 mg	r/m^3		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Colorless to reddish-brown s	olid with a mild, ester odor.	[insecticide]		
MW: 223.2	BP: 257°F	MLT: 129°F	Sol: Miscible	
VP: 0.000007 mmHg	IP: ?		Sp.Gr: ?	
Fl.P: >200°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactive Metals, low molecular weigh brass. Should be stored at 70	t alcohols & glycols [Note: C	Corrosive to black iron, drum s	steel, stainless steel 304 &	
Measurement Methods NIOSH 5600; OSHA PV204	5			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, m	iosis, blurred vision; dizzines	s, convulsions; dyspnea (breat	thing difficulty); salivation,	

abdominal cramps, nausea, diarrhea, vomiting; in animals: possible teratogenic effects

Target Organs Eyes, respiratory system, central nervous system, cardiovascular system, blood cholinesterase, reproductive system

See also: <u>INTRODUCTION</u>

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Monomethyl aniline			CAS 100-61-8		
C ₆ H ₅ NHCH ₃			RTECS BY4550000		
			DOT ID & Guide 2294 153		
Exposure	NIOSH REL: TWA 0.5 ppm	(2 mg/m ³) [skin]			
Limits	OSHA PEL†: TWA 2 ppm (9 mg/m ³) [skin]			
IDLH 100 ppm		Conversion 1 ppm = 4.38 m	g/m ³		
Physical Description Yellow to light-brown liquid	with a weak, ammonia-like of	odor.			
MW: 107.2	BP: 384°F	FRZ: -71°F	Sol: Insoluble		
VP: 0.3 mmHg	IP: 7.32 eV		Sp.Gr: 0.99		
Fl.P: 175°F	UEL: ?	LEL: ?			
Class IIIA Combustible Liqu	Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.				
Incompatibilities & Reactivities Strong acids, strong oxidizers					
Measurement Methods NIOSH 3511					

First Aid (See procedures)
Eye: Irrigate immediately

Skin: Soap wash immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Personal Protection & Sanitation

Remove: When wet or contaminated

Skin: Prevent skin contact

Eyes: Prevent eye contact Wash skin: When contaminated

Change: No recommendation

Up to 5 ppm: (APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 25 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-

demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Lassitude (weakness, exhaustion), dizziness, headache; dyspnea (breathing difficulty), cyanosis; methemoglobinemia; pulmonary edema; liver, kidney damage

Target Organs respiratory system, liver, kidneys, blood, central nervous system

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Morpholine			CAS 110-91-8	
C ₄ H ₉ ON			RTECS QD6475000	
Diethylene imidoxide; Diethylene oximide; Tetrahydro-1,4-oxazine; Tetrahydro-p-			DOT ID & Guide 1760 154 (aqueous) 2054 132	
Exposure	NIOSH REL: TWA 20 ppm	(70 mg/m ³) ST 30 ppm (105	mg/m ³) [skin]	
Limits	OSHA PEL†: TWA 20 ppm	(70 mg/m ³) [skin]		
IDLH 1400 ppm [10%LEL]		Conversion 1 ppm = 3.56 m	ng/m ³	
Physical Description Colorless liquid with a weak	, ammonia- or fish-like odor.	[Note: A solid below 23°F.]		
MW: 87.1	BP: 264°F	FRZ: 23°F	Sol: Miscible	
VP: 6 mmHg	IP: 8.88 eV		Sp.Gr: 1.007	
Fl.P(oc): 98°F	UEL: 11.2%			
Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.				
Incompatibilities & Reactivities Strong acids, strong oxidizers, metals, nitro compounds [Note: Corrosive to metals.]				
Measurement Methods NIOSH S150 (II-3)				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

Provide: Eyewash (>15%), Quick drench (>25%)

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 500 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$

Up to 1000 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

£

organic vapor cartridge(s) /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1400 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, respiratory system; visual disturbance; cough; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, liver, kidneys

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Naphtha (coal tar)			CAS 8030-30-6		
			RTECS DE3030000		
Crude solvent coal tar naphtha, High solvent naphtha, Naphtha			DOT ID & Guide 1256 128 (solvent) 2553 128		
Exposure	NIOSH REL: TWA 100 ppn	n (400 mg/m ³)			
Limits	OSHA PEL: TWA 100 ppm	(400 mg/m ³)			
IDLH 1000 ppm [10%LEL]		Conversion 1 ppm = 4.50 m	ng/m³ (approx)		
Physical Description Reddish-brown, mobile liqui	Physical Description Reddish-brown, mobile liquid with an aromatic odor.				
MW: 110 (approx)	BP: 320-428°F	FRZ: ?	Sol: Insoluble		
VP: <5 mmHg	IP: ?		Sp.Gr: 0.89-0.97		
Fl.P: 100-109°F	UEL: ?	LEL: 1.0%			
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.			
Incompatibilities & Reactive Strong oxidizers	rities				
Measurement Methods NIOSH 1550					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo	ort		

Respirator Recommendations NIOSH/OSHA

Remove: When wet or contaminated

Change: No recommendation

Up to 1000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)[£]/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

Swallow: Medical attention immediately

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose; dizziness, drowsiness; dermatitis; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

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Naphthalene			CAS 91-20-3	
$C_{10}H_8$			RTECS QJ0525000	
Naphthalin, Tar camphor, White tar			DOT ID & Guide 1334 133 (crude or refined) 2304 133 (molten)	
Exposure	NIOSH REL: TWA 10 ppm	(50 mg/m ³) ST 15 ppm (75 r	ng/m ³)	
Limits	OSHA PEL†: TWA 10 ppm	(50 mg/m ³)		
IDLH 250 ppm Conversion 1 ppm = 5.24 mg			ng/m ³	
Physical Description Colorless to brown solid with	h an odor of mothballs. [Note	: Shipped as a molten solid.]		
MW: 128.2	BP: 424°F	MLT: 176°F	Sol: 0.003%	
VP: 0.08 mmHg	IP: 8.12 eV		Sp.Gr: 1.15	
Fl.P: 174°F	P: 174°F UEL: 5.9% LEL: 0.9%			
Combustible Solid, but will take some effort to ignite.				
Incompatibilities & Reactivities Strong oxidizers, chromic anhydride				
Measurement Methods				

Personal Protection & Sanitation

NIOSH 1501; OSHA 35

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Change: Daily

First Aid (See procedures)

Eye: Irrigate immediately

Skin: Molten flush immediately/solid-liquid soap wash

promptly

Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 100 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust and mist filter*/(APF = 10) Any supplied-air respirator*

Up to 250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter*/(APF = 50) Any self-contained breathing apparatus with a full

facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; jaundice; hematuria (blood in the urine), renal shutdown; dermatitis, optical neuritis, corneal damage

Target Organs Eyes, skin, blood, liver, kidneys, central nervous system

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Naphthalene diisocyanate			CAS 3173-72-6	
$C_{10}H_6(NCO)_2$	RTECS NQ9600000			
Synonyms & Trade Names 1,5-Diisocyanatonaphthalene; 1,5-Naphthalene diisocyanate; 1,5-Naphthalene ester of isocyanic acid; NDI			DOT ID & Guide	
Exposure Limits	NIOSH REL: TWA 0.040 mminute] OSHA PEL: none	-		
IDLH N.D.	OSHA LEE. Hole	Conversion 1 ppm = 8.60 m	ng/m ³	
Physical Description White to light-yellow, crystalline flakes.				
MW: 210.2	BP: 505°F	MLT: 261°F	Sol: ?	
VP(75°F): 0.003 mmHg	IP: ?		Sp.Gr: ?	
Fl.P(oc): 311°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reacti None reported	vities			
Measurement Methods OSHA PV2046				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately				
	Any supplied-air respirator*	operated in a continuous-flow	v mode*	

Up to 0.25 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

Up to 1 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-

supplied-air respirator with a full facepiece

demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; respiratory sensitization, cough, pulmonary secretions, chest pain, dyspnea (breathing difficulty); asthma

Target Organs Eyes, respiratory system

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alpha-Naphthylamine			CAS 134-32-7	
$C_{10}H_7NH_2$		RTECS QM1400000		
Synonyms & Trade Names 1-Aminonaphthalene, 1-Naphthylamine		DOT ID & Guide 2077 153		
Exposure	NIOSH REL: Ca See Appendix A OSHA PEL: [1910.1004] See Appendix B			
Limits				
IDLH Ca [N.D.] Conve		Conversion		
Physical Description Colorless crystals with an ammonia-like odor. [Note: Darkens in air to a reddish-purple color.]				
MW: 143.2	BP: 573°F	MLT: 122°F	Sol: 0.002%	
VP(220°F): 1 mmHg	IP: 7.30 eV		Sp.Gr: 1.12	
Fl.P: 315°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactivities Oxidizes in air				
Measurement Methods NIOSH 5518; OSHA 93				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Dermatitis; hemorrhagic cystitis; dyspnea (breathing difficulty), ataxia, methemoglobinemia; hematuria (blood in the urine); dysuria; [potential occupational carcinogen]

Target Organs Bladder, skin

Cancer Site [bladder cancer]

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beta-Naphthylamine			CAS 91-59-8	
$C_{10}H_7NH_2$		RTECS QM2100000		
Synonyms & Trade Names 2-Aminonaphthalene, 2-Naphthylamine		DOT ID & Guide 1650 153		
Exposure	NIOSH REL: Ca See Appendix A			
Limits	OSHA PEL: [1910.1009] See Appendix B			
IDLH Ca [N.D.]		Conversion		
Physical Description Odorless, white to red crystals with a faint, aromatic odor. [Note: Darkens in air to a reddish-purple color.]				
MW: 143.2	BP: 583°F	MLT: 232°F	Sol: Miscible in hot water	
VP(226°F): 1 mmHg	IP: 9.71 eV		Sp.Gr(208°F): 1.06	
Fl.P: 315°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactivities None reported				
Measurement Methods NIOSH 5518; OSHA 93				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Dermatitis; hemorrhagic cystitis; dyspnea (breathing difficulty); ataxia; methemoglobinemia, hematuria (blood in the urine); dysuria; [potential occupational carcinogen]

Target Organs Bladder, skin

Cancer Site [bladder cancer]

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Niax® Catalyst ESN			CAS 62765-93-9	
			RTECS QR3900000	
Synonyms & Trade Names None [Note: A mixture of 95% dimethylaminopropionitrile & 5% bis(2-dimethylamino)ethyl ether.]			DOT ID & Guide	
Exposure	Exposure NIOSH REL: See Appendix C			
Limits	OSHA PEL: See Appendix C			
IDLH N.D. Conversion		Conversion		
Physical Description A liquid mixture. [Note: Used in the past as a catalyst in the manufacture of flexible polyurethane foams.				
MW: mixture	BP: ?	FRZ: ?	Sol: ?	
VP: ?	IP: ?		Sp.Gr: ?	
Fl.P: ?	UEL: ?	LEL: ?		
Incompatibilities & Reactivities Oxidizers				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations NIOSH				

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; urinary disturbance; neurological disorders; pins & needles in hands & feet; muscle weakness, lassitude (weakness, exhaustion), nausea, vomiting; decreased nerve conduction in lower legs

Target Organs Eyes, skin, urinary tract, peripheral nervous system

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Nickel carbonyl			CAS 13463-39-3	
Ni(CO) ₄			RTECS QR6300000	
Synonyms & Trade Names Nickel tetracarbonyl, Tetracarbonyl nickel			DOT ID & Guide 1259 131	
Exposure	NIOSH REL: Ca TWA 0.001 ppm (0.007 mg/m ³) See Appendix A			
Limits	OSHA PEL: TWA 0.001 ppm (0.007 mg/m ³)			
IDLH Ca [2 ppm]		Conversion 1 ppm = 6.98 mg/m ³		
Physical Description Colorless to yellow liquid with a musty odor. [Note: A gas above 110°F.]				
MW: 170.7	BP: 110°F	FRZ: -13°F	Sol: 0.05%	
VP: 315 mmHg	IP: 8.28 eV		Sp.Gr(63°F): 1.32	
Fl.P: <-4°F	UEL: ?	LEL: 2%		
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.				
Incompatibilities & Reactivities Nitric acid, bromine, chlorine & other oxidizers; flammable materials				
Measurement Methods NIOSH 6007				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		

Respirator Recommendations NIOSH

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-

contained breathing apparatus

Exposure Routes inhalation, ingestion, skin absorption, skin and/or eye contact

Symptoms Headache, dizziness; nausea, vomiting, epigastric pain; substernal pain; cough, hyperpnea; cyanosis; lassitude (weakness, exhaustion); leukocytosis (increased blood leukocytes), pneumonitis; delirium, convulsions; [potential occupational carcinogen]; in animals: reproductive, teratogenic effects

Target Organs Lungs, paranasal sinus, central nervous system, reproductive system

Cancer Site [lung & nasal cancer]

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Nickel metal and other compounds (as Ni)			CAS 7440-02-0 (Metal)		
Ni (Metal)			RTECS QR5950000 (Metal)		
Synonyms & Trade Names Nickel metal: Elemental nickel, Nickel catalyst Synonyms of other nickel compounds vary depending upon the specific compound.			DOT ID & Guide		
Exposure	NIOSH REL*: Ca TWA 0.015 mg/m ³ See Appendix A [*Note: The REL does not apply to Nickel carbonyl.]				
Limits	OSHA PEL*†: TWA 1 mg/m³ [*Note: The PEL does not apply to Nickel carbonyl.]				
IDLH Ca [10 mg/m ³ (as Ni)] Conversion					
Physical Description Metal: Lustrous, silvery, odorless solid.					
MW: 58.7	BP: 5139°F	MLT: 2831°F	Sol: Insoluble		
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 8.90 (Metal)		
Fl.P: NA	UEL: NA	LEL: NA			
Metal: Combustible Solid; nickel sponge catalyst may ignite SPONTANEOUSLY in air.					
Incompatibilities & Reactivities Strong acids, sulfur, selenium, wood & other combustibles, nickel nitrate					
Measurement Methods NIOSH 7300; OSHA ID121, ID125G					
Personal Protection & Sanitation First Aid (See procedures)					

Respirator Recommendations NIOSH

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Skin: Prevent skin contact Eyes: No recommendation

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Skin: Water flush immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]

Target Organs Nasal cavities, lungs, skin

Cancer Site [lung and nasal cancer]

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Nicotine			CAS 54-11-5	
C ₅ H ₄ NC ₄ H ₇ NCH ₃			RTECS QS5250000	
Synonyms & Trade Names 3-(1-Methyl-2-pyrrolidyl)pyridine			DOT ID & Guide 1654 151	
Exposure	NIOSH REL: TWA 0.5 mg/m ³ [skin] OSHA PEL: TWA 0.5 mg/m ³ [skin]			
Limits				
IDLH 5 mg/m ³		Conversion		
Physical Description Pale-yellow to dark-brown liquid with a fish-like odor when warm. [insecticide]				
MW: 162.2	BP: 482°F (Decomposes)	FRZ: -110°F	Sol: Miscible	
VP: 0.08 mmHg	IP: 8.01 eV		Sp.Gr: 1.01	
Fl.P: 203°F	UEL: 4.0%	LEL: 0.7%		
Class IIIB Combustible Liquid: Fl.P. at or above 200°F.				
Incompatibilities & Reactivities Strong oxidizers, strong acids				
Measurement Methods NIOSH 2544, 2551				
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		

Respirator Recommendations NIOSH/OSHA

Change: No recommendation Provide: Eyewash, Quick drench

Up to 5 mg/m^3 : (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Nausea, salivation, abdominal pain, vomiting, diarrhea; headache, dizziness, hearing, visual disturbance; confusion, lassitude (weakness, exhaustion), incoordination; cardiac arrhythmias; convulsions, dyspnea (breathing difficulty); in animals: teratogenic effects

Target Organs central nervous system, cardiovascular system, lungs, gastrointestinal tract, reproductive system

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Nitric acid			CAS 7697-37-2	
HNO ₃			RTECS QU5775000	
Aqua fortis, Engravers acid, Hydrogen nitrate, Red fuming nitric acid (RFNA), White fuming nitric acid (WFNA)			DOT ID & Guide 1760 154 (=40% acid)<br 2031 157 (>40% acid) 2032 157 (fuming)	
Exposure	NIOSH REL: TWA 2 ppm (5 mg/m ³) ST 4 ppm (10 mg/n	m^3)	
Limits	OSHA PEL†: TWA 2 ppm (5 mg/m ³)		
IDLH 25 ppm		Conversion 1 ppm = 2.58 m	ng/m ³	
Physical Description Colorless, yellow, or red, fuming liquid with an acrid, suffocating odor. [Note: Often used in an aqueous solution. Fuming nitric acid is concentrated nitric acid that contains dissolved nitrogen dioxide.]				
MW: 63.0	BP: 181°F	FRZ: -44°F	Sol: Miscible	
VP: 48 mmHg	IP: 11.95 eV		Sp.Gr(77°F): 1.50	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid, but	increases the flammability of	combustible materials.		
Incompatibilities & Reactivities Combustible materials, metallic powders, hydrogen sulfide, carbides, alcohols [Note: Reacts with water to produce heat. Corrosive to metals.]				
Measurement Methods NIOSH 7903; OSHA ID165SG				
Personal Protection & Sanitation First Aid (See procedures)				

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash (pH<2.5), Quick drench (pH<2.5)

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated

Change: No recommendation

Remove: When wet or contaminated

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concernⁱ/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

Eye: Irrigate immediately Skin: Water flush immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

mounted canister providing protection against the compound of concernⁱ/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concernⁱ/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; delayed pulmonary edema, pneumonitis, bronchitis; dental erosion

Target Organs Eyes, skin, respiratory system, teeth

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Nitric oxide			CAS 10102-43-9
NO			RTECS QX0525000
Synonyms & Trade Names Mononitrogen monoxide, Nit			DOT ID & Guide 1660 124
Exposure	NIOSH REL: TWA 25 ppm	(30 mg/m^3)	
Limits	OSHA PEL: TWA 25 ppm (30 mg/m ³)	
IDLH 100 ppm		Conversion 1 ppm = 1.23 m	ng/m ³
Physical Description Colorless gas. [Note: Shipped	d as a nonliquefied compresse	ed gas.]	
MW: 30.0	BP: -241°F	FRZ: -263°F	Sol: 5%
VP: 34.2 atm	IP: 9.27 eV	RGasD: 1.04	
Fl.P: NA	UEL: NA LEL: NA		
Nonflammable Gas, but will	accelerate the burning of com	bustible materials.	
Incompatibilities & Reactivities Fluorine, combustible materials, ozone, NH ₃ , chlorinated hydrocarbons, metals, carbon disulfide [Note: Reacts with water to form nitric acid. Rapidly converted in air to nitrogen dioxide.]			
Measurement Methods NIOSH 6014; OSHA ID190			
Personal Protection & Sanitation First Aid (See procedures)			

Respirator Recommendations NIOSH/OSHA

Skin: No recommendation
Eyes: No recommendation
Wash skin: No recommendation

Remove: No recommendation Change: No recommendation

Up to 100 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concernⁱ/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern*i/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front-or back-mounted canister providing protection against the compound of concern*i/(APF = 10) Any supplied-air

Breathing: Respiratory support

respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concernⁱ/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation

Symptoms Irritation eyes, wet skin, nose, throat; drowsiness, unconsciousness; methemoglobinemia

Target Organs Eyes, skin, respiratory system, blood, central nervous system

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p-Nitroaniline			CAS 100-01-6	
NO ₂ C ₆ H ₄ NH ₂			RTECS BY7000000	
			DOT ID & Guide 1661 153	
Exposure	NIOSH REL: TWA 3 mg/m	³ [skin]		
Limits	OSHA PEL†: TWA 6 mg/m	³ (1 ppm) [skin]		
IDLH 300 mg/m ³		Conversion		
Physical Description Bright yellow, crystalline por	wder with a slight ammonia-l	ike odor.		
MW: 138.1	BP: 630°F	MLT: 295°F	Sol: 0.08%	
VP: 0.00002 mmHg	IP: 8.85 eV		Sp.Gr: 1.42	
Fl.P: 390°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactive Strong oxidizers, strong redu moisture.]		ntaneous heating of organic n	naterials in the presence of	
Measurement Methods NIOSH 5033				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory suppo	ort	

Up to 75 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 150 mg/m^3 : (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

Respirator Recommendations NIOSH

supplied-air respirator with a full facepiece

Up to 30 mg/m^3 : (APF = 10) Any supplied-air respirator*

Up to 300 mg/m: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister in combination with a dust, mist, and fume filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation nose, throat; cyanosis, ataxia; tachycardia, tachypnea; dyspnea (breathing difficulty); irritability; vomiting, diarrhea; convulsions; respiratory arrest; anemia; methemoglobinemia; jaundice

Target Organs respiratory system, blood, heart, liver

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NIOSH Pocket Guide to Chemical Hazards

Nitrobenzene			CAS 98-95-3	
C ₆ H ₅ NO ₂			RTECS DA6475000	
Synonyms & Trade Name Essence of mirbane, Nitrob			DOT ID & Guide 1662 152	
Exposure	NIOSH REL: TWA 1 pp	m (5 mg/m ³) [skin]		
Limits	OSHA PEL: TWA 1 ppn	n (5 mg/m ³) [skin]		
IDLH 200 ppm Conversion 1 ppm = 5.04 m			04 mg/m ³	
Physical Description Yellow, oily liquid with a p	ungent odor like paste sho	e polish. [Note: A solid below	w 42°F.]	
MW: 123.1	BP: 411°F	FRZ: 42°F	Sol: 0.2%	
VP(77°F): 0.3 mmHg	IP: 9.92 eV		Sp.Gr: 1.20	
Fl.P: 190°F	UEL: ?	LEL(200°F): 1.8%		
Class IIIA Combustible Liq	uid: Fl.P. at or above 140°	F and below 200°F.		
Incompatibilities & Reactivities Concentrated nitric acid, nitrogen tetroxide, caustics, phosphorus pentachloride, chemically-active metals such as tin or zinc				
Measurement Methods NIOSH 2005, 2017				

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: No recommendation

Remove: When wet or contaminated

Change: Daily

Provide: Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 10 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*

Up to 50 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor

cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 200 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; anoxia; dermatitis; anemia; methemoglobinemia; in animals: liver, kidney damage; testicular effects

Target Organs Eyes, skin, blood, liver, kidneys, cardiovascular system, reproductive system

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4-Nitrobiphenyl			CAS 92-93-3
$C_6H_5C_6H_4NO_2$			RTECS DV5600000
Synonyms & Trade Nam p-Nitrobipheny, p-Nitrodip Phenylnitrobenzene, PNB	es henyl, 4-Nitrodiphenyl, p-Phe	nylnitrobenzene, 4-	DOT ID & Guide
Exposure	NIOSH REL: Ca See Appe	ndix A	
Limits	OSHA PEL: [1910.1003] <u>S</u>	ee Appendix B	
IDLH Ca [N.D.]		Conversion	
Physical Description White to yellow, needle-lil	xe, crystalline solid with a swe	etish odor.	
MW: 199.2	BP: 644°F	MLT: 237°F	Sol: Insoluble
VP: ?	IP: ?		Sp.Gr: ?
Fl.P: 290°F	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reac Strong reducers	tivities		
Measurement Methods NIOSH P&CAM273 (II-4)			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedur Eye: Irrigate immediate Skin: Soap wash immed Breathing: Respiratory s Swallow: Medical attent	ly iately support

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any

appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Headache, drowsiness, dizziness; dyspnea (breathing difficulty); ataxia, lassitude (weakness, exhaustion); methemoglobinemia; urinary burning; acute hemorrhagic cystitis; [potential occupational carcinogen]

Target Organs Bladder, blood

Cancer Site [in animals: bladder tumors]

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p-Nitrochlorobenzene			CAS 100-00-5	
ClC ₆ H ₄ NO ₂			RTECS CZ1050000	
Synonyms & Trade Names p-Chloronitrobenzene, 4-Chloronitrobenzene, 1-Chloro-4-nitrobenzene, 4- Nitrochlorobenzene, PCNB, PNCB			DOT ID & Guide 1578 152	
Exposure	NIOSH REL: Ca See Appe	ndix A [skin]		
Limits	OSHA PEL: TWA 1 mg/m ²	³ [skin]		
IDLH Ca [100 mg/m ³]		Conversion		
Physical Description Yellow, crystalline solid w	vith a sweet odor.			
MW: 157.6	BP: 468°F	MLT: 182°F	Sol: Slight	
VP(86°F): 0.2 mmHg	IP: 9.96 eV		Sp.Gr: 1.52	
Fl.P: 261°F	UEL: ?	LEL: ?		
Solid that does not burn, o	r burns with difficulty.			
Incompatibilities & Reactivities Strong oxidizers, alkalis				
Measurement Methods NIOSH 2005				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately		

Respirator Recommendations NIOSH

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Breathing: Respiratory support

Swallow: Medical attention immediately

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any

appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Anoxia; unpleasant taste; anemia; methemoglobinemia; in animals: hematuria (blood in the urine); spleen, kidney, bone marrow changes; reproductive effects; [potential occupational carcinogen]

Target Organs Blood, liver, kidneys, cardiovascular system, spleen, bone marrow, reproductive system

Cancer Site [in animals: vascular & liver tumors]

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Nitroethane			CAS 79-24-3	
CH ₃ CH ₂ NO ₂			RTECS K15600000	
Synonyms & Trade Names Nitroetan			DOT ID & Guide 2842 129	
Exposure	NIOSH REL: TWA 100 ppn	n (310 mg/m ³)		
Limits	OSHA PEL: TWA 100 ppm	(310 mg/m ³)		
IDLH 1000 ppm		Conversion 1 ppm = 3.07 m	ng/m ³	
Physical Description Colorless, oily liquid with a mild, fruity odor.				
MW: 75.1	BP: 237°F	FRZ: -130°F	Sol: 5%	
VP(77°F): 21 mmHg	IP: 10.88 eV		Sp.Gr: 1.05	
F1.P: 82°F	UEL: ?	LEL: 3.4%		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	low 100°F.		
Incompatibilities & Reactive Amines; strong acids, alkalis	vities & oxidizers; hydrocarbons; c	ombustibles; metal oxides		
Measurement Methods NIOSH 2526				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Up to 1000 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Dermatitis; in animals: lacrimation (discharge of tears); dyspnea (breathing difficulty), pulmonary rales, edema; liver, kidney injury; narcosis

Target Organs Skin, respiratory system, central nervous system, kidneys, liver

Nitrogen dioxide

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CAS 10102-44-0

Nitrogen dioxide				
NO_2			RTECS QW9800000	
			DOT ID & Guide 1067 124	
Exposure	NIOSH REL: ST 1 ppm (1.8	mg/m^3)		
Limits	OSHA PEL†: C 5 ppm (9 m	g/m^3)		
IDLH 20 ppm		Conversion 1 ppm = 1.88 m	ug/m ³	
Physical Description Yellowish-brown liquid or reddish-brown gas (above 70°F) with a pungent, acrid odor. [Note: In solid form (below 15°F) it is found structurally as N ₂ O ₄ .]				
MW: 46.0	BP: 70°F	FRZ: 15°F	Sol: Reacts	
VP: 720 mmHg	IP: 9.75 eV	RGasD: 2.62	Sp.Gr: 1.44 (Liquid at 68°F)	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid/Gas,	but will accelerate the burnin	g of combustible materials.		
Incompatibilities & Reactive Combustible material, water, nitric acid.]	vities chlorinated hydrocarbons, ca	rbon disulfide, ammonia [Not	e: Reacts with water to form	
Measurement Methods NIOSH 6014; OSHA ID182				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory suppo	ort	
Respirator Recommendation	ons NIOSH			

Up to 20 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{£}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concernⁱ/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; cough, mucoid frothy sputum, decreased pulmonary function, chronic bronchitis, dyspnea (breathing difficulty); chest pain; pulmonary edema, cyanosis, tachypnea, tachycardia

Target Organs Eyes, respiratory system, cardiovascular system

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Nitrogen trifluoride		CAS 7783-54-2		
NF ₃			RTECS QX1925000	
Synonyms & Trade Nan Nitrogen fluoride, Trifluor			DOT ID & Guide 2451 122	
Exposure	NIOSH REL: TWA 10 ppr	m (29 mg/m ³)		
Limits	OSHA PEL: TWA 10 ppm	(29 mg/m ³)		
IDLH 1000 ppm		Conversion 1 ppm = 2.90	0 mg/m^3	
Physical Description Colorless gas with a moldy odor. [Note: Shipped as a nonliquefied compressed gas.]				
MW: 71.0	BP: -200°F	FRZ: -340°F	Sol: Slight	
VP: >1 atm	IP: 12.97 eV	RGasD: 2.46		
Fl.P: NA	UEL: NA	UEL: NA LEL: NA		
Nonflammable Gas				
Incompatibilities & Reactivities Water, oil, grease, oxidizable materials, ammonia, carbon monoxide, methane, hydrogen, hydrogen sulfide, activated charcoal, diborane				
Measurement Methods None available				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation		First Aid (See procedure	<u>s</u>)	

Respirator Recommendations NIOSH/OSHA

Wash skin: No recommendation

Remove: No recommendation Change: No recommendation

Up to 100 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern/(APF = 10) Any supplied-air respirator

Up to 250 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern Up to 500 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with

Breathing: Respiratory support

a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against the compound of concern*/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1000 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation

Symptoms In animals: anoxia, cyanosis; methemoglobinemia; lassitude (weakness, exhaustion), dizziness, headache; liver, kidney injury

Target Organs Blood, liver, kidneys

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Nitroglycerine			CAS 55-63-0
CH ₂ NO ₃ CHNO ₃ CH ₂ NO ₃			RTECS QX2100000
Synonyms & Trade Names Glyceryl trinitrate; NG; 1,2,3-Propanetriol trinitrate; Trinitr		roglycerine	DOT ID & Guide 1204 127 (= 1% solution<br in alcohol) 3064 127 (1-5% solution in alcohol)
Exposure	NIOSH REL: ST 0.1 mg/m ³	[skin]	
Limits	OSHA PEL†: C 0.2 ppm (2 1	mg/m ³) [skin]	
IDLH 75 mg/m ³		Conversion 1 ppm = 9.29 m	ng/m ³
Physical Description Colorless to pale-yellow, vis 40%) with ethylene glycol di	cous liquid or solid (below 56 initrate (80-60%).]	5°F). [Note: An explosive ing	redient in dynamite (20-
MW: 227.1	BP: Begins to decompose at 122-140°F	FRZ: 56°F	Sol: 0.1%
VP: 0.0003 mmHg	IP: ?		Sp.Gr: 1.60
Fl.P: Explodes	UEL: ?	LEL: ?	
Explosive Liquid			
Incompatibilities & Reactive Heat, ozone, shock, acids [N	vities ote: An OSHA Class A Explo	osive (1910.109).]	
Measurement Methods NIOSH 2507; OSHA 43			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: Daily Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendation	ons NIOSH		

Up to 2.5 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 1 mg/m^3 : (APF = 10) Any supplied-air respirator*

Up to 5 mg/m^3 : (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 75 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Throbbing headache; dizziness; nausea, vomiting, abdominal pain; hypotension; flush; palpitations; methemoglobinemia; delirium, central nervous system depression; angina; skin irritation

Target Organs cardiovascular system, blood, skin, central nervous system

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Nitromethane			CAS 75-52-5		
CH ₃ NO ₂			RTECS PA9800000		
			DOT ID & Guide 1261 129		
Exposure	NIOSH REL: See App	oendix D			
Limits	OSHA PEL: TWA 10	0 ppm (250 mg/m ³)			
IDLH 750 ppm			$= 2.50 \text{ mg/m}^3$		
Physical Description Colorless, oily liquid with a	Physical Description Colorless, oily liquid with a disagreeable odor.				
MW: 61.0	BP: 214°F	FRZ: -20°F	Sol: 10%		
VP: 28 mmHg	IP: 11.08 eV		Sp.Gr: 1.14		
Fl.P: 95°F	UEL: ?	LEL: 7.3%			
Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.					
Incompatibilities & Reactivities Amines; strong acids, alkalis & oxidizers; hydrocarbons & other combustible materials; metallic oxides [Note: Slowly corrodes steel & copper when wet.]					
Measurement Methods					

NIOSH 2527

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations OSHA

Up to 750 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}/(APF = 50)$ Any selfcontained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Dermatitis; in animals: irritation eyes, respiratory system; convulsions, narcosis; liver damage

Target Organs Eyes, skin, central nervous system, liver

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2-Nitronaphthalene			CAS 581-89-5
$C_{10}H_7NO_2$			RTECS QJ9760000
		DOT ID & Guide 2538 133	
Exposure	NIOSH REL: Ca* See A Naphthylamine.]	ppendix A [*Note: Since	e metabolized to beta-
Limits	OSHA PEL: none		
IDLH Ca [N.D.]		Conversion	
Physical Description Colorless solid.			
MW: 178.2	BP: ?	MLT: 174°F	Sol: Insoluble
VP: ?	IP: 8.67 eV		Sp.Gr: ?
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reacti For "Nitrates" in general: A hypophosphite		phosphorus, tin chlorides	s, thiocyanates, sodium
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See proce Eye: Irrigate immed Skin: Soap wash imm Breathing: Respirato Swallow: Medical at	iately mediately ory support

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation skin, respiratory system; dermatitis; [potential occupational carcinogen]

Target Organs Skin, respiratory system

Cancer Site [bladder cancer]

See also: <u>INTRODUCTION</u>

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1-Nitropropane			CAS 108-03-2	
CH ₃ CH ₂ CH ₂ NO ₂			RTECS TZ5075000	
Synonyms & Trade Names Nitropropane, 1-NP		DOT ID & Guide 2608 129		
Exposure	NIOSH REL: TWA 25 ppm (90 mg/m ³)			
Limits	OSHA PEL: TWA 25 ppm (90 mg/m ³)			
IDLH 1000 ppm	(DLH 1000 ppm		ng/m ³	
Physical Description Colorless liquid with a somewhat disagreeable odor.				
MW: 89.1	BP: 269°F	FRZ: -162°F	Sol: 1%	
VP: 8 mmHg	IP: 10.81 eV		Sp.Gr: 1.00	
Fl.P: 96°F	UEL: ?	LEL: 2.2%		
Class IC Flammable Liquid: 1	Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.			
Incompatibilities & Reactivities Amines; strong acids, alkalis & oxidizers; hydrocarbons & other combustible materials; metal oxides				
Measurement Methods OSHA 46				
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately		

Respirator Recommendations NIOSH/OSHA

Up to 250 ppm: (APF = 10) Any supplied-air respirator*

Up to 625 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 1000 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes; headache, nausea, vomiting, diarrhea; in animals: liver, kidney damage

Target Organs Eyes, central nervous system, liver, kidneys

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2-Nitropropane			CAS 79-46-9	
$(CH_3)_2CH(NO_2)$			RTECS TZ5250000	
		DOT ID & Guide 2608 129		
Exposure	NIOSH REL: Ca See Appendix A			
Limits	OSHA PEL†: TWA 25 ppm (90 mg/m ³)			
IDLH Ca [100 ppm]	Conversion 1 ppm = 3.64 m		ng/m ³	
Physical Description Colorless liquid with a pleasant, fruity odor.				
MW: 89.1	BP: 249°F	FRZ: -135°F	Sol: 2%	
VP: 13 mmHg	IP: 10.71 eV		Sp.Gr: 0.99	
Fl.P: 75°F	UEL: 11.0%	LEL: 2.6%		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	low 100°F.		
Incompatibilities & Reactivities Amines; strong acids, alkalis & oxidizers; metal oxides; combustible materials				
Measurement Methods NIOSH 2528; OSHA 15, 46				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, respiratory system; headache, anorexia, nausea, vomiting, diarrhea; kidney, liver damage; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, kidneys, liver

Cancer Site [in animals: liver tumors]

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N-Nitrosodimethylamine			CAS 62-75-9		
$(CH_3)_2N_2O$			RTECS IQ0525000		
Synonyms & Trade Names Dimethylnitrosamine; N,N-Dimethylnitrosamine; DMNA; N-Methyl-N-nitrosomethanamine; NDMA; N-Nitroso-N,N-dimethylamine			DOT ID & Guide		
Exposure NIOSH REL: Ca See Appendix A					
Limits	OSHA PEL: [1910.1016] See Appendix B				
IDLH Ca [N.D.]		Conversion			
Physical Description Yellow, oily liquid with a faint, characteristic odor.					
MW: 74.1	BP: 306°F	BP: 306°F FRZ: ? Sol: Soluble			
VP: 3 mmHg	IP: 8.69 eV		Sp.Gr: 1.005		
Fl.P: ?	UEL: ?	LEL: ?			
Combustible Liquid					
Incompatibilities & Reactivities Strong oxidizers [Note: Should be stored in dark bottles.]					
Measurement Methods NIOSH 2522; OSHA 38					
		First Aid (See procedures) Eye: Irrigate immediately			

Respirator Recommendations NIOSH

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Provide: Eyewash, Quick drench

Eyes: Prevent eye contact

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Skin: Soap wash immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any

appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Nausea, vomiting, diarrhea, abdominal cramps; headache; fever; enlarged liver, jaundice; decreased liver, kidney, pulmonary function; [potential occupational carcinogen]

Target Organs Liver, kidneys, lungs

Cancer Site [in animals; lung, kidney, liver & nasal cavity tumors]

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o-Nitrotoluene			CAS 88-72-2	
NO ₂ C ₆ H ₄ CH ₃			RTECS XT3150000	
Synonyms & Trade Names o-Methylnitrobenzene, 2-Methylnitrobenzene, ortho-Nitrotoluene, 2-Nitrotoluene			DOT ID & Guide 1664 152	
Exposure NIOSH REL: TWA 2 ppm (11 mg/m³) [skin]				
Limits	OSHA PEL†: TWA 5 ppm (30 mg/m ³) [skin]			
IDLH 200 ppm	DLH 200 ppm		ng/m ³	
Physical Description Yellow liquid with a weak, aromatic odor. [Note: A solid below 25°F.]				
MW: 137.1	BP: 432°F	FRZ: 25°F	Sol: 0.07%	
VP: 0.1 mmHg	IP: 9.43 eV		Sp.Gr: 1.16	
Fl.P: 223°F	UEL: ?	LEL: 2.2%		
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.			
Incompatibilities & Reactivities Strong oxidizers, sulfuric acid				
Measurement Methods NIOSH 2005				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort	

Respirator Recommendations NIOSH

Up to 20 ppm: (APF = 10) Any supplied-air respirator*

Up to 50 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 100 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 200 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Anoxia, cyanosis; headache, lassitude (weakness, exhaustion), dizziness; ataxia; dyspnea (breathing difficulty); tachycardia; nausea, vomiting

Target Organs Blood, central nervous system, cardiovascular system, skin, gastrointestinal tract

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m-Nitrotoluene			CAS 99-08-1	
NO ₂ C ₆ H ₄ CH ₃			RTECS XT2975000	
Synonyms & Trade Names m-Methylnitrobenzene, 3-Methylnitrobenzene, meta-Nitrotoluene, 3-Nitrotoluene			DOT ID & Guide 1664 152	
Exposure	NIOSH REL: TWA 2 ppm (11 mg/m ³) [skin]			
Limits	OSHA PEL†: TWA 5 ppm (30 mg/m ³) [skin]			
(DLH 200 ppm		ng/m ³		
Physical Description Yellow liquid with a weak, aromatic odor. [Note: A solid below 59°F.]				
MW: 137.1	BP: 450°F	FRZ: 59°F	Sol: 0.05%	
VP: 0.1 mmHg	IP: 9.48 eV		Sp.Gr: 1.16	
Fl.P: 223°F	UEL: ?	LEL: 1.6%		
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.			
Incompatibilities & Reactivities Strong oxidizers, sulfuric acid				
Measurement Methods NIOSH 2005				
Personal Protection & Sanitation First Aid (See procedures)				
Skin: Prevent skin contact		Eye: Irrigate immediately		
Eyes: Prevent eye contact		Skin: Soap wash immediately		
Wash skin: When contaminated		Breathing: Respiratory support Swallow: Medical attention immediately		
Remove: When wet or contaminated Change: No recommendation		Swanow. Medical adention i	inineuratery	

Respirator Recommendations NIOSH

Up to 20 ppm: (APF = 10) Any supplied-air respirator*

Up to 50 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 100 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 200 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Anoxia, cyanosis; headache, lassitude (weakness, exhaustion), dizziness; ataxia; dyspnea (breathing difficulty); tachycardia; nausea, vomiting

Target Organs Blood, central nervous system, cardiovascular system, skin, gastrointestinal tract

See also: <u>INTRODUCTION</u>

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p-Nitrotoluene			CAS 99-99-0	
NO ₂ C ₆ H ₄ CH ₃			RTECS XT3325000	
Synonyms & Trade Names p-Methylnitrobenzene, 4-Methylnitrobenzene, para-Nitrotoluene, 4-Nitrotoluene		oluene, 4-Nitrotoluene	DOT ID & Guide 1664 152	
Exposure	Exposure NIOSH REL: TWA 2 ppm (11 mg/m³) [skin]			
Limits	OSHA PEL†: TWA 5 ppm (30 mg/m ³) [skin]			
IDLH 200 ppm		Conversion 1 ppm = 5.61 m	ng/m ³	
Physical Description Crystalline solid with a weak, aromatic odor.				
MW: 137.1	BP: 460°F	MLT: 126°F	Sol: 0.04%	
VP: 0.1 mmHg	IP: 9.50 eV		Sp.Gr: 1.12	
Fl.P: 223°F	UEL: ?	LEL: 1.6%		
Combustible Solid				
Incompatibilities & Reactivities Strong oxidizers, sulfuric acid				
Measurement Methods NIOSH 2005				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendation	ons NIOSH			

Up to 20 ppm: (APF = 10) Any supplied-air respirator*

Up to 50 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 100 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 200 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressuredemand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Anoxia, cyanosis; headache, lassitude (weakness, exhaustion), dizziness; ataxia; dyspnea (breathing difficulty); tachycardia; nausea, vomiting

Target Organs Blood, central nervous system, cardiovascular system, skin, gastrointestinal tract

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Nitrous oxide			CAS 10024-97-2		
N_2O			RTECS QX1350000		
Synonyms & Trade Names Dinitrogen monoxide, Hyponitrous acid anhydride, Laughin		ing gas	DOT ID & Guide 1070 122 2201 122 (refrigerated liquid)		
Exposure Limits	NIOSH REL*: TWA 25 ppn for exposure to waste anesth OSHA PEL: none	n (46 mg/m ³) (TWA over the etic gas.]	time exposed) [*Note: REL		
IDLH N.D.	OSINI 122, None	Conversion 1 ppm = 1.80 m	ng/m ³		
Physical Description Colorless gas with a slightly	sweet odor. [inhalation anest	hetic] [Note: Shipped as a liqu	uefied compressed gas.]		
MW: 44.0	BP: -127°F	FRZ: -132°F	Sol(77°F): 0.1%		
VP: 51.3 atm	IP: 12.89 eV	RGasD: 1.53			
Fl.P: NA	UEL: NA	LEL: NA			
Nonflammable Gas, but supp	orts combustion at elevated to	emperatures.			
Incompatibilities & Reactive Aluminum, boron, hydrazine	vities , lithium hydride, phosphine,	sodium			
Measurement Methods NIOSH 3800, 6600; OSHA I	D166				
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: No recommendation Change: No recommendation Provide: Frostbite		First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Fresh air			
Respirator Recommendation	Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact (liquid)					
Symptoms Dyspnea (breathi	Symptoms Dyspnea (breathing difficulty); drowsiness, headache; asphyxia; reproductive effects; liquid: frostbite				
Target Organs respiratory s	ystem, central nervous systen	n, reproductive system			

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Nonane			CAS 111-84-2		
CH ₃ (CH ₂) ₇ CH ₃			RTECS RA6115000		
Synonyms & Trade Names n-Nonane, Nonyl hydride			DOT ID & Guide 1920 128		
Exposure	NIOSH REL: TWA 200 ppn	n (1050 mg/m ³)			
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion 1 ppm = 5.25 m	g/m ³		
Physical Description Colorless liquid with a gasol	ine-like odor.				
MW: 128.3	BP: 303°F	FRZ: -60°F	Sol: Insoluble		
VP: 3 mmHg	IP: 10.21 eV		Sp.Gr: 0.72		
Fl.P: 88°F	UEL: 2.9%	LEL: 0.8%			
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	low 100°F.			
Incompatibilities & Reactive Strong oxidizers (e.g., peroxi					
Measurement Methods None available					
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: Daily Remove: When wet (flammable) Change: No recommendation Provide: Eyewash		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendations To be added later					
Exposure Routes inhalation.	Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, nose, throat; headache, drowsiness, dizziness, confusion, nausea, tremor, incoordination; chemical pneumonitis (aspiration liquid)					
Target Organs Eyes, skin, respiratory system, central nervous system					

supplied-air respirator

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1-Nonanethiol (CAS 1455-21-6	
CH ₃ (CH ₂) ₈ SH			RTECS	
			DOT ID & Guide 1228 131	
Exposure	NIOSH REL: C 0.	5 ppm (3.3 mg/m ³) [15-minut	te]	
Limits	OSHA PEL: none			
IDLH N.D. See: IDLH	INDEX	Conversion 1 ppm	$n = 6.56 \text{ mg/m}^3$	
Physical Description Liquid.				
MW: 160.3	BP: ?	FRZ: ?	Sol: Insoluble	
VP: ?	IP: ?		Sp.Gr: ?	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Liquid				
Incompatibilities & Re Oxidizers, reducing age	eactivities nts, strong acids & bases	s, alkali metals		
Measurement Method None available	S			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		Eye: Irrigate imme Skin: Soap wash Breathing: Respira	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH				

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

powered, air-purifying respirator with organic vapor cartridge(s)

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; lassitude (weakness, exhaustion), cyanosis, increased respiration, nausea, drowsiness, headache, vomiting

Target Organs Eyes, skin, respiratory system, blood, central nervous system

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Octachloronaphthalene			CAS 2234-13-1	
$C_{10}Cl_8$			RTECS QK0250000	
Synonyms & Trade Names Halowax® 1051; 1,2,3,4,5,6,7,8-Octachloronaphthalene; Perchloronaphthalene			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.1 mg/s	m ³ ST 0.3 mg/m ³ [skin]		
Limits	OSHA PEL†: TWA 0.1 mg/	m ³ [skin]		
IDLH Unknown		Conversion		
Physical Description Waxy, pale-yellow solid with	h an aromatic odor.			
MW: 403.7	BP: 770°F	MLT: 365°F	Sol: Insoluble	
VP: <1 mmHg	IP: ?		Sp.Gr: 2.00	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive Strong oxidizers	Incompatibilities & Reactivities Strong oxidizers			
Measurement Methods NIOSH S97 (II-2)				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Remove: When wet or contaminated

Change: Daily

Up to 1 mg/m^3 : (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Swallow: Medical attention immediately

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Acne-form dermatitis; liver damage, jaundice

Target Organs Skin, liver

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1-Octadecanethiol			CAS 2885-00-9		
CH ₃ (CH ₂) ₁₇ SH			RTECS		
			DOT ID & Guide 1228 131 (liquid)		
Exposure	NIOSH REL: C 0.5 ppm (5.	9 mg/m ³) [15-minute]			
Limits	OSHA PEL: none				
IDLH N.D.		Conversion 1 ppm = 11.72	mg/m ³		
Physical Description Solid or liquid (above 77°F).					
MW: 286.6	BP: ?	MLT: 77°F	Sol: Insoluble		
VP: ?	IP: ?		Sp.Gr: 0.85		
Fl.P: ?	UEL: ?	LEL: ?			
Combustible Solid Combustible Liquid					
	Incompatibilities & Reactivities Oxidizers, reducing agents, strong acids & bases, alkali metals				
Measurement Methods None available					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo			

Respirator Recommendations NIOSH

Remove: When wet or contaminated

Change: Daily

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Swallow: Medical attention immediately

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; headache, dizziness, lassitude (weakness, exhaustion), cyanosis, nausea, convulsions

Target Organs Eyes, skin, respiratory system, central nervous system, blood

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Respirator Recommendations NIOSH

facepiece

Up to 750 ppm: (APF = 10) Any supplied-air respirator*

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Octane			CAS 111-65-9
CH ₃ [CH ₂] ₆ CH ₃			RTECS RG8400000
Synonyms & Trade Names n-Octane, normal-Octane			DOT ID & Guide 1262 128
Exposure	NIOSH REL: TWA 75 ppm	(350 mg/m ³) C 385 ppm (180	00 mg/m ³) [15-minute]
Limits	OSHA PEL†: TWA 500 ppm	n (2350 mg/m ³)	
IDLH 1000 ppm [10%LEL]		Conversion 1 ppm = 4.67 m	ng/m ³
Physical Description Colorless liquid with a gasol	ine-like odor.		
MW: 114.2	BP: 258°F	FRZ: -70°F	Sol(77°F): 0.00007%
VP: 10 mmHg	IP: 9.82 eV		Sp.Gr: 0.70
Fl.P: 56°F	UEL: 6.5%	LEL: 1.0%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.	
Incompatibilities & Reactive Strong oxidizers	rities		
Measurement Methods NIOSH 1500; OSHA 7			
Personal Protection & Sani Skin: Prevent skin contact	tation	First Aid (See procedures) Eye: Irrigate immediately	
Eyes: Prevent eye contact Wash skin: When contamina	ted	Skin: Soap wash promptly Breathing: Respiratory support	
Remove: When wet (flamma Change: No recommendation	ble)	Swallow: Medical attention i	

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breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

Up to 1000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; drowsiness; dermatitis; chemical pneumonitis (aspiration liquid); in animals: narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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1-Octanethiol			CAS 111-88-6	
$CH_3(CH_2)_7SH$			RTECS	
Synonyms & Trade Names 1-Mercaptooctane, n-Octyl n	nercaptan, Octylthiol, 1-Octyl	thiol	DOT ID & Guide 1228 131	
Exposure	NIOSH REL: C 0.5 ppm (3.0) mg/m ³) [15-minute]		
Limits	OSHA PEL: none			
IDLH N.D.		Conversion 1 ppm = 5.98 m	ng/m ³	
Physical Description Water-white liquid with a m	ild odor.			
MW: 146.3	BP: 390°F	FRZ: -57°F	Sol: Insoluble	
VP(212°F): 3 mmHg	IP: ?		Sp.Gr: 0.84	
Fl.P(oc): 115°F	UEL: ?	LEL: ?		
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.		
Incompatibilities & Reactive Oxidizers, reducing agents, s	vities trong acids & bases, alkali me	etals		
Measurement Methods NIOSH 2510				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo	ort	

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; lassitude (weakness, exhaustion), cyanosis, increased respiration, nausea, drowsiness, headache, vomiting

Target Organs Eyes, skin, respiratory system, blood, central nervous system

supplied-air respirator

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Oil mist (mineral)			CAS 8012-95-1
			RTECS PY8030000
Synonyms & Trade Nan Heavy mineral oil mist, Pa	nes araffin oil mist, White miner	al oil mist	DOT ID & Guide
Exposure	NIOSH REL: TWA 5 m	g/m ³ ST 10 mg/m ³	
Limits	OSHA PEL: TWA 5 mg	y/m^3	
IDLH 2500 mg/m ³		Conversion	
Physical Description Colorless, oily liquid aero	sol dispersed in air. [Note: I	Has an odor like burned	lubricating oil.]
MW: Varies	BP: 680°F	FRZ: 0°F	Sol: Insoluble
VP: <0.5 mmHg	IP: ?		Sp.Gr: 0.90
Fl.P(oc): 380°F	UEL: ?	LEL: ?	
Class IIIB Combustible L	iquid: Fl.P. at or above 200°	°F.	
Incompatibilities & Read None reported	ctivities		
Measurement Methods NIOSH 5026			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: No recommendation Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See pro Skin: Soap wash Breathing: Fresh a	
Respirator Recommendations NIOSH/OSHA			

Up to 50 mg/m^3 : (APF = 10) Any air-purifying respirator with a high-efficiency particulate filter/(APF = 10) Any

Up to 125 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow

Up to 250 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency

powered, air-purifying respirator with a high-efficiency particulate filter

particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 2500 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system

Target Organs Eyes, skin, respiratory system

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Osmium tetroxide	CAS 20816-12-0				
$\overline{\mathrm{OsO_4}}$			RTECS RN1140000		
			DOT ID & Guide 2471 154		
Exposure	NIOSH REL: TWA 0.002 m	g/m ³ (0.0002 ppm) ST 0.006	mg/m ³ (0.0006 ppm)		
Limits	OSHA PEL†: TWA 0.002 m	ng/m ³			
IDLH 1 mg/m ³		Conversion 1 ppm = 10.40 r	mg/m ³		
Physical Description Colorless, crystalline solid or 105°F.]	Colorless, crystalline solid or pale-yellow mass with an unpleasant, acrid, chlorine-like odor. [Note: A liquid above				
MW: 254.2	BP: 266°F	MLT: 105°F	Sol(77°F): 6%		
VP: 7 mmHg	IP: 12.60 eV		Sp.Gr: 5.10		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid					
Incompatibilities & Reactivities Hydrochloric acid, easily oxidized organic materials [Note: Begins to sublime below BP. Contact with other materials may cause fire.]					
Measurement Methods None available					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Skin: Soap wash immediately Skin: Soap wash immediately			y		

Respirator Recommendations NIOSH/OSHA

Wash skin: When contaminated

Change: Daily Provide: Eyewash

Remove: When wet or contaminated

Up to 0.1 mg/m³: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern and having a high-efficiency particulate filter/(APF = 50) Any airpurifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern and having a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Breathing: Respiratory support

Swallow: Medical attention immediately

Up to 1 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern and having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, respiratory system; lacrimation (discharge of tears), visual disturbance; conjunctivitis; headache; cough, dyspnea (breathing difficulty); dermatitis

Target Organs Eyes, skin, respiratory system

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Oxalic acid			CAS 144-62-7	
HOOCCOOH • 2H ₂ O			RTECS RO2450000	
Synonyms & Trade Names Ethanedioic acid, Oxalic acid	l (aqueous), Oxalic acid dihyo	lrate	DOT ID & Guide	
Exposure	NIOSH REL: TWA 1 mg/m	³ ST 2 mg/m ³		
Limits	OSHA PEL†: TWA 1 mg/m	3		
IDLH 500 mg/m ³		Conversion		
Physical Description Colorless, odorless powder o	r granular solid. [Note: The a	nhydrous form (COOH)2 is a	nn odorless, white solid.]	
MW: 126.1	BP: Sublimes	MLT: 215°F (Sublimes)	Sol: 14%	
VP: <0.001 mmHg	IP: ?		Sp.Gr: 1.90	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactivities Strong oxidizers, silver compounds, strong alkalis, chlorites [Note: Gives off water of crystallization at 215°F and begins to sublime.]				
Measurement Methods None available				
Personal Protection & Sanitation First Aid (See procedures)				

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated

Change: Daily Provide: Eyewash

Eye: Irrigate immediately

Skin: Water flush promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 25 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with a dust and mist filter[£]

Up to 50 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 mg/m: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; eye burns; localized pain, cyanosis; shock, collapse, convulsions; kidney damage

Target Organs Eyes, skin, respiratory system, kidneys

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Oxygen difluoride			CAS 7783-41-7		
OF ₂			RTECS RS2100000		
			DOT ID & Guide 2190 124		
Exposure	NIOSH REL: C 0.05 pp	om (0.1 mg/m ³)			
Limits	OSHA PEL†: TWA 0.0	05 ppm (0.1 mg/m ³)			
IDLH 0.5 ppm Conversion 1 ppm = 2.21 m			2.21 mg/m ³		
Physical Description Colorless gas with a peculiar	; foul odor. [Note: Shipp	ped as a nonliquefied compr	ressed gas.]		
MW: 54.0	BP: -230°F	FRZ: -371°F	Sol: 0.02%		
VP: >1 atm	IP: 13.11 eV	RGasD: 1.88			
Fl.P: NA	UEL: NA	LEL: NA			
Nonflammable Gas, but a str	Nonflammable Gas, but a strong oxidizer.				
Incompatibilities & Reactivities Combustible materials, chlorine, bromine, iodine, platinum, metal oxides, moist air, hydrogen sulfide, hydrocarbons, water [Note: Reacts very slowly with water to form hydrofluoric acid.]					
Measurement Methods					

Personal Protection & Sanitation

None available

Skin: No recommendation
Eyes: No recommendation
Wash skin: No recommendation
Remove: No recommendation
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Respirator Recommendations NIOSH/OSHA

Up to 0.5 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concernⁱ/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; headache; pulmonary edema; eye, skin burns (from contact with the gas under pressure)

Target Organs Eyes, skin, respiratory system

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Ozone			CAS 10028-15-6
O_3			RTECS RS8225000
Synonyms & Trade Names Triatomic oxygen			DOT ID & Guide
Exposure	NIOSH REL: C 0.1 ppm (0.	2 mg/m ³)	
Limits	OSHA PEL†: TWA 0.1 ppn	n (0.2 mg/m ³)	
IDLH 5 ppm		Conversion 1 ppm = 1.96 m	ng/m ³
Physical Description Colorless to blue gas with a	very pungent odor.		
MW: 48.0	BP: -169°F	FRZ: -315°F	Sol(32°F): 0.001%
VP: >1 atm	IP: 12.52 eV	RGasD: 1.66	
Fl.P: NA	UEL: NA	LEL: NA	
Nonflammable Gas, but a p	owerful oxidizer.		
Incompatibilities & React All oxidizable materials (bo			
Measurement Methods OSHA ID214			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Medical attention Breathing: Fresh air; 100% O ₂	
Respirator Recommendat	ions NIOSH/OSHA		

Up to 1 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the

Up to 2.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern i Up to 5 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing

protection against the compound of concern i /(APF = 50) Any air-purifying, full-facepiece respirator (gas mask)

compound of concerni/(APF = 10) Any supplied-air respirator

with a chin-style, front- or back-mounted canister providing protection against the compound of concern /(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concernⁱ/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, mucous membrane; pulmonary edema; chronic respiratory disease

Target Organs Eyes, respiratory system

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Paraffin wax fume	2		CAS 8002-74-2	
C_nH_{2n+2}			RTECS RV0350000	
Synonyms & Trade Names Paraffin fume, Paraffin scale fume			DOT ID & Guide	
Exposure	NIOSH REL: TWA 2 mg/m	3		
Limits	OSHA PEL†: none			
IDLH N.D.	-	Conversion		
Physical Description Paraffin wax is a white to slighydrocarbons (e.g., C36H74)		d. [Note: Consists of a mixtur	re of high molecular weight	
MW: 350-420	BP: ?	MLT: 115-154°F	Sol: Insoluble	
VP: ?	IP: ?		Sp.Gr: 0.88-0.92	
Fl.P: 390°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactivities None reported				
Measurement Methods OSHA PV2047				
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Respiratory support		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact				
Symptoms Irritation eyes, skin, respiratory system; discomfort, nausea				
Target Organs Eyes, skin, respiratory system				
See also: INTRODUCTION				

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1 ar aquat (1 ar aquat urcinoriue)			CAS 1910-42-5	
			RTECS DW2275000	
Synonyms & Trade Name 1,1'-Dimethyl-4,4'-bipyridin dichloride; Paraquat chlorid (C ₁₂ H ₁₄ N ₂ ++; 1,1-Dimethy dichloride salt of paraquat.]	DOT ID & Guide			
Exposure	NIOSH REL: TWA 0.1 mg	g/m ³ (resp) [skin]		
Limits OSHA PEL†: TWA 0.5 mg/m³ (resp) [skin]				
IDLH 1 mg/m ³		Conversion	Conversion	
Physical Description Yellow solid with a faint, ammonia-like odor. [herbicide] [Note: Paraquat may also be found commercially as a methyl sulfate salt $C_{12}H_{14}N_2 \cdot 2CH_3SO_4$.]				
MW: 257.2	BP: Decomposes	MLT: 572°F (Decomposes)	Sol: Miscible	
VP: <0.0000001 mmHg	IP: ?		Sp.Gr: 1.24	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactivities Strong oxidizers, alkylaryl-sulfonate wetting agents [Note: Corrosive to metals. Decomposes in presence of ultraviolet light.]				
Measurement Methods NIOSH 5003				
Personal Protection & Sar Skin: Prevent skin contact	nitation	First Aid (See procedures) Eye: Irrigate immediately		

Respirator Recommendations NIOSH

Remove: When wet or contaminated

Eyes: Prevent eye contact Wash skin: When contaminated

Provide: Quick drench

Change: No recommendation

Up to 1 mg/m³: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a

Skin: Water flush immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

dust, mist, and fume filter*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat, respiratory system; epistaxis (nosebleed); dermatitis; fingernail damage; irritation gastrointestinal tract; heart, liver, kidney damage

Target Organs Eyes, skin, respiratory system, heart, liver, kidneys, gastrointestinal tract

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Parathion CAS 56-38-2				
$(C_2H_5O)_2P(S)OC_6H_4NO_2$			RTECS TF4550000	
			DOT ID & Guide 2783 152	
Exposure	NIOSH REL: TWA 0.05 mg	t/m ³ [skin]		
Limits	OSHA PEL: TWA 0.1 mg/n	n ³ [skin]		
IDLH 10 mg/m ³		Conversion		
Physical Description Pale-yellow to dark-brown liquid with a garlic-like odor. [Note: A solid below 43°F. Pesticide that may be absorbed on a dry carrier.]				
MW: 291.3	BP: 707°F	FRZ: 43°F	Sol: 0.001%	
VP: 0.00004 mmHg	IP: ?		Sp.Gr: 1.27	
Fl.P(oc): 392°F	UEL: ?	LEL: ?		
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.			
Incompatibilities & Reactivities Strong oxidizers, alkaline materials				
Measurement Methods NIOSH 5600; OSHA 62				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention in	ort	

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Up to 0.5 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter/(APF = 10) Any supplied-air respirator

Up to 1.25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter

Up to 2.5 mg/m: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 10 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; miosis; rhinorrhea (discharge of thin mucus); headache; chest tightness, wheezing, laryngeal spasm, salivation, cyanosis; anorexia, nausea, vomiting, abdominal cramps, diarrhea; sweating; muscle fasciculation, lassitude (weakness, exhaustion), paralysis; dizziness, confusion, ataxia; convulsions, coma; low blood pressure; cardiac irregularities

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system, blood cholinesterase

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Particulates not of	horwico rogulated		CAS
r articulates not of	ener wise regulated		
			RTECS
Synonyms & Trade Names "Inert" dusts, Nuisance dusts, PNOR [Note: Includes all inert or nuisance dusts, whether mineral, inorganic, not listed specifically in 1910.1000.]			DOT ID & Guide
Exposure	NIOSH REL: See Appendix	D	
Limits	OSHA PEL: TWA 15 mg/m	³ (total) TWA 5 mg/m ³ (resp))
IDLH N.D.		Conversion	
Physical Description Dusts from solid substances	without specific occupational	exposure standards.	
Properties vary depending upon the specific solid.			
Incompatibilities & Reactiv	rities		
Measurement Methods NIOSH 0500, 0600			
Personal Protection & Sani Skin: No recommendation	itation	First Aid (See procedures) Eye: Irrigate immediately	
Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		Breathing: Fresh air	
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation	, skin and/or eye contact		
Symptoms Irritation eyes, sk	kin, throat, upper respiratory s	ystem	
Target Organs Eyes, skin, r	espiratory system		
See also: <u>INTRODUCTION</u>			

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Pentaborane			CAS 19624-22-7	
B_5H_9			RTECS RY8925000	
			DOT ID & Guide 1380 135	
Exposure NIOSH REL: TWA 0.005 ppm (0.01 mg/m³) ST 0.015 Limits OSHA PEL†: TWA 0.005 ppm (0.01 mg/m³)			0.015 ppm (0.03 mg/m ³)	
IDLH 1 ppm Conversion 1 ppm			= 2.58 mg/m ³	
Physical Description Colorless liquid with a pungent odor like sour milk.				
MW: 63.1	BP: 140°F FRZ: -52°F Sol: Reacts			
VP: 171 mmHg	IP: 9.90 eV		Sp.Gr: 0.62	
Fl.P: 86°F UEL: ?		LEL: 0.42%		
Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F.				
Incompatibilities & Reactivities Oxidizers, halogens, water, halogenated hydrocarbons [Note: May ignite SPONTANEOUSLY in moist air. Corrosive to natural rubber. Hydrolyzes slowly with heat in water to form boric acid.]				
Measurement Methods				

Measurement Methods

None available

Personal Protection & Sanitation
Skin: Prevent skin contact

Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)

Change: No recommendation Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 0.05 ppm: (APF = 10) Any supplied-air respirator

Up to 0.125 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 0.25 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure

mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; dizziness, headache, drowsiness, incoordination, tremor, convulsions, behavioral changes; tonic spasm face, neck, abdominal, limbs

Target Organs Eyes, skin, central nervous system

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Pentachloroethan	e		CAS 76-01-7
CHCl ₂ CCl ₃			RTECS KI6300000
Synonyms & Trade Names Ethane pentachloride, Pentalin		DOT ID & Guide 1669 151	
Exposure	NIOSH REL: Handle with	care in the workplace.	See Appendix C (Chloroethanes)
Limits	OSHA PEL: none		
IDLH N.D.	1	Conversion	
Physical Description Colorless liquid with a swee	tish, chloroform-like odor.		
MW: 202.3	BP: 322°F	FRZ: -20°F	Sol: 0.05%
VP: 3 mmHg	IP: 11.28 eV		Sp.Gr: 1.68
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Liquid			
Incompatibilities & Reactive (Sodium-potassium alloy + 1) Reaction with alkalis & meta	oromoform), alkalis, metals,	_	sis produces dichloroacetic acid.
Measurement Methods NIOSH 2517			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation	, ingestion, skin and/or eye	contact	
Symptoms In animals: irrita muscle incoordination; liver,		eakness, exhaustion), re	estlessness, irregular respiration,
Target Organs Eyes, skin, 1	respiratory system, central n	ervous system, liver, ki	idneys

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Pentachloronaphthalene CAS 1321-64-8			CAS 1321-64-8	
$C_{10}H_3Cl_5$			RTECS QK0300000	
Synonyms & Trade Names Halowax® 1013; 1,2,3,4,5-Pentachloronaphthalene			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.5 mg/s	m ³ [skin]		
Limits	OSHA PEL: TWA 0.5 mg/m	n ³ [skin]		
IDLH Unknown		Conversion		
Physical Description Pale-yellow or white solid or powder with an aromatic odor.				
MW: 300.4	BP: 636°F	MLT: 248°F	Sol: Insoluble	
VP: <1 mmHg	IP: ?		Sp.Gr: 1.67	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH S96 (II-2)				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap promptly/molten flush immediately Breathing: Respiratory support Swallow: Medical Attention immediately		

Respirator Recommendations NIOSH/OSHA

Change: Daily

Up to 5 mg/m^3 : (APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Headache, lassitude (weakness, exhaustion), dizziness, anorexia; pruritus, acne-form skin eruptions; jaundice, liver necrosis

Target Organs Skin, liver, central nervous system

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Pentachlorophenol CAS 87-86-5			CAS 87-86-5	
C ₆ Cl ₅ OH			RTECS SM6300000	
Synonyms & Trade Name PCP; Penta; 2,3,4,5,6-Penta			DOT ID & Guide 3155 154	
Exposure	NIOSH REL: TWA 0.5 mg	/m ³ [skin]		
Limits	OSHA PEL: TWA 0.5 mg/s	m ³ [skin]		
IDLH 2.5 mg/m ³		Conversion		
Physical Description Colorless to white, crystalline solid with a benzene-like odor. [fungicide]				
MW: 266.4	BP: 588°F (Decomposes)	MLT: 374°F	Sol: 0.001%	
VP(77°F): 0.0001 mmHg	IP: NA		Sp.Gr: 1.98	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactivities Strong oxidizers, acids, alkalis				
Measurement Methods NIOSH 5512				
		First Aid (See procedures)		
Skin: Prevent skin contact Eyes: Prevent eye contact		Eye: Irrigate immediately Skin: Soap wash immediately		
Wash skin: When contaminated		Breathing: Respiratory support		
Remove: When wet or contaminated		Swallow: Medical attention immediately		

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash, Quick drench

Change: Daily

Up to 2.5 mg/m³: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; sneezing, cough; lassitude (weakness, exhaustion), anorexia, weight loss; sweating; headache, dizziness; nausea, vomiting; dyspnea (breathing difficulty), chest pain; high fever; dermatitis

Target Organs Eyes, skin, respiratory system, cardiovascular system, liver, kidneys, central nervous system

See also: <u>INTRODUCTION</u>

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Pentaerythritol			CAS 115-77-5		
C(CH ₂ OH) ₄			RTECS RZ2490000		
Synonyms & Trade Names 2,2-bis(Hydroxymethyl)-1,3-propanediol; Methane tetramethylol; Monopentaerythritol; PE; Tetrahydroxymethylolmethane; Tetramethylolmethane			DOT ID & Guide		
Exposure	NIOSH REL: TWA 10 mg/m	n ³ (total) TWA 5 mg/m ³ (resp	0)		
Limits	OSHA PEL†: TWA 15 mg/r	m ³ (total) TWA 5 mg/m ³ (resp	p)		
IDLH N.D.		Conversion			
Physical Description Colorless to white, crystalline, odorless powder. [Note: Technical grade is 88% monopentaerythritol & 12% dipentaerythritol.]					
	BP: Sublimes	MLT: 500°F (Sublimes)	Sol(59°F): 6%		
VP: 0.00000008 mmHg	IP: ?		Sp.Gr: 1.38		
Fl.P: ?	UEL: ?	LEL: ?			
Combustible Solid					
II	Incompatibilities & Reactivities Organic acids, oxidizers [Note: Explosive compound is formed when a mixture of PE & thiophosphoryl chloride is heated.]				
Measurement Methods NIOSH 0500, 0600					
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash Breathing: Fresh air Swallow: Medical attention immediately			
Respirator Recommendations To be added later					
Exposure Routes inhalation, ingestion, skin and/or eye contact					
Symptoms Irritation eyes, respiratory system					
Target Organs Eyes, respiratory system					

See also: <u>INTRODUCTION</u>

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n-Pentane			CAS 109-66-0	
CH ₃ [CH ₂] ₃ CH ₃			RTECS RZ9450000	
Synonyms & Trade Names Pentane, normal-Pentane			DOT ID & Guide 1265 128	
Exposure	NIOSH REL: TWA 120 ppn	n (350 mg/m ³) C 610 ppm (18	800 mg/m ³) [15-minute]	
Limits	OSHA PEL†: TWA 1000 pp	m (2950 mg/m ³)		
IDLH 1500 ppm [10%LEL]		Conversion 1 ppm = 2.95 m	ng/m ³	
Physical Description Colorless liquid with a gasoline-like odor. [Note: A gas above 97°F. May be utilized as a fuel.]				
MW: 72.2	BP: 97°F	FRZ: -202°F	Sol: 0.04%	
VP: 420 mmHg	IP: 10.34 eV		Sp.Gr: 0.63	
Fl.P: -57°F	UEL: 7.8%	LEL: 1.5%		
Class IA Flammable Liquid:	Fl.P. below 73°F and BP below	ow 100°F.		
Incompatibilities & Reactive Strong oxidizers	vities			
Measurement Methods NIOSH 1500; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH

Up to 1200 ppm: (APF = 10) Any supplied-air respirator

Up to 1500 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose; dermatitis; chemical pneumonitis (aspiration liquid); drowsiness; in animals: narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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1-Pentanethiol			CAS 110-66-7	
CH ₃ (CH ₂) ₄ SH			RTECS SA3150000	
			DOT ID & Guide 1111 130	
Exposure	NIOSH REL: C 0.5 ppm (2.	1 mg/m ³) [15-minute]		
Limits	OSHA PEL: none			
IDLH N.D.		Conversion 1 ppm = 4.26 m	g/m ³	
Physical Description Water-white to yellowish liquid with a strong, garlic-like odor.				
MW: 104.2	BP: 260°F	FRZ: -104°F	Sol: Insoluble	
VP(77°F): 14 mmHg	IP: ?		Sp.Gr: 0.84	
Fl.P(oc): 65°F	UEL: ?	LEL: ?		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.		
Incompatibilities & Reactive Oxidizers, reducing agents, a		orite, concentrated nitric acid		
Measurement Methods None available				
Personal Protection & Sanitation First Aid (See procedures)				
Skin: Prevent skin contact		Eye: Irrigate immediately		
Eyes: Prevent eye contact		Skin: Soap wash immediately		
Remove: When wet (flamma	Wash skin: When contaminated		Breathing: Respiratory support Swallow: Medical attention immediately	
Change: No recommendation		Swanow. Medical aucillion i	inneuratory	

Respirator Recommendations NIOSH

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat, respiratory system; headache, nausea, dizziness; vomiting, diarrhea; dermatitis, skin sensitization

Target Organs Eyes, skin, respiratory system, central nervous system

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2-Pentanone			CAS 107-87-9	
CH ₃ COCH ₂ CH ₂ CH ₃			RTECS SA7875000	
Synonyms & Trade Names Ethyl acetone, Methyl propy			DOT ID & Guide 1249 127	
Exposure	NIOSH REL: TWA 150 ppn	n (530 mg/m ³)		
Limits	OSHA PEL†: TWA 200 ppm	n (700 mg/m ³)		
IDLH 1500 ppm		Conversion 1 ppm = 3.52 m	ng/m ³	
Physical Description Colorless to water-white liquid with a characteristic acetone-like odor.				
MW: 86.1	BP: 215°F	FRZ: -108°F	Sol: 6%	
VP: 27 mmHg	IP: 9.39 eV		Sp.Gr: 0.81	
Fl.P: 45°F	UEL: 8.2% LEL: 1.5%			
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.		
Incompatibilities & Reactive Oxidizers, bromine trifluorid				
Measurement Methods NIOSH 1300				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory suppo		

Respirator Recommendations NIOSH

Up to 1500 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma

Target Organs Eyes, skin, respiratory system, central nervous system

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Perchloromethyl mercaptan CAS 594-42-3				
			RTECS PB0370000	
Synonyms & Trade Names			DOT ID & Guide 1670 157	
Exposure	NIOSH REL: TWA 0.1 ppn	n (0.8 mg/m ³)		
Limits	OSHA PEL: TWA 0.1 ppm	(0.8 mg/m^3)		
IDLH 10 ppm		Conversion 1 ppm = 7.60 m	ng/m ³	
Physical Description Pale-yellow, oily liquid with	an unbearable, acrid odor.			
MW: 185.9	BP: 297°F (Decomposes)	FRZ: ?	Sol: Insoluble	
VP: 3 mmHg	IP: ?		Sp.Gr: 1.69	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid, but	will support combustion.			
Incompatibilities & Reactive Alkalis, amines, hot iron, was		metals. Forms HCl, sulfur & C	CO ₂ on contact with water.]	
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo	ort	

Respirator Recommendations NIOSH/OSHA

Up to 1 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Up to 2.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*

Up to 5 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)*/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 10 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; lacrimation (discharge of tears); cough, dyspnea (breathing difficulty), deep breathing pain, coarse rales; vomiting; pallor, tachycardia; acidosis; anuria; liver, kidney damage

Target Organs Eyes, skin, respiratory system, liver, kidneys

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Perchloryl fluoride			CAS 7616-94-6	
ClO ₃ F			RTECS SD1925000	
			DOT ID & Guide 3083 124	
Exposure	NIOSH REL: TWA 3 ppm (14 mg/m ³) ST 6 ppm (28 mg/s	$/m^3$)	
Limits	OSHA PEL†: TWA 3 ppm (13.5 mg/m ³)		
IDLH 100 ppm		Conversion 1 ppm = 4.19 m	ng/m ³	
Physical Description Colorless gas with a characteristic, sweet odor. [Note: Shipped as a liquefied compressed gas.]				
MW: 102.5	BP: -52°F	FRZ: -234°F	Sol: 0.06%	
VP: 10.5 atm	IP: 13.60 eV	RGasD: 3.64		
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Gas, but will	support combustion.			
Incompatibilities & Reactive Combustibles, strong bases,	vities amines, finely divided metals,	reducing agents, alcohols		
Measurement Methods None available				
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory suppo	ort	

Respirator Recommendations NIOSH/OSHA

Provide: Frostbite

Up to 30 ppm: (APF = 10) Any supplied-air respirator

Up to 75 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 100 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concernⁱ/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Irritation respiratory system; liquid: frostbite; in animals: methemoglobinemia; cyanosis; lassitude (weakness, exhaustion), dizziness, headache; pulmonary edema; pneumonitis; anoxia

Target Organs Skin, respiratory system, blood

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Perlite			CAS 93763-70-3	
			RTECS SO5254000	
Synonyms & Trade Names Expanded perlite [Note: An amorphous material consisting of fused sodium potassium aluminum silicate.]			DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 mg/s	m ³ (total) TWA 5 mg/m ³ (res	p)	
Limits	OSHA PEL: TWA 15 mg/m	n ³ (total) TWA 5 mg/m ³ (resp)	
IDLH N.D.		Conversion		
Physical Description Odorless, light-gray to glassy	y-black solid. [Note: Expande	ed perlite is a fluffy, white par	ticulate.]	
MW: varies	BP: ?	MLT: >2000°F	Sol: <1%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.2-2.4 (crude) 0.05- 0.3 (expanded)	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive None reported	vities			
Measurement Methods NIOSH 0500, 0600				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact				
Symptoms Irritation eyes, skin, throat, upper respiratory system				
Target Organs Eyes, skin, respiratory system				
See also: INTRODUCTION				

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Petroleum distillates (naphtha)			CAS 8002-05-9	
			RTECS SE7449000	
			DOT ID & Guide 1255 128	
Exposure	NIOSH REL: TWA 35	60 mg/m ³ C 1800 mg/m ³ [1	5-minute]	
Limits	OSHA PEL†: TWA 50	00 ppm (2000 mg/m ³)		
IDLH 1100 ppm [10%LEI	[L]	Conversion 1 ppm =	= 4.05 mg/m ³	
Physical Description Colorless liquid with a gasoline- or kerosene-like odor. [Note: A mixture of paraffins (C5 to C13) that may contain a small amount of aromatic hydrocarbons.]				
MW: 99 (approx)	BP: 86-460°F	FRZ: -99°F	Sol: Insoluble	
VP: 40 mmHg (approx)	IP: ?		Sp.Gr: 0.63-0.66	
Fl.P: -40 to -86°F	UEL: 5.9%	UEL: 5.9% LEL: 1.1%		
Flammable Liquid				
Incompatibilities & Reac Strong oxidizers	tivities			
Measurement Methods NIOSH 1550				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See proce Eye: Irrigate immedi Skin: Soap wash pro Breathing: Respirato	iately mptly	

Respirator Recommendations NIOSH

Remove: When wet (flammable) Change: No recommendation

Up to 850 ppm: (APF = 10) Any supplied-air respirator

Up to 1100 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Swallow: Medical attention immediately

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; dizziness, drowsiness, headache, nausea; dry cracked skin; chemical pneumonitis (aspiration liquid)

Target Organs Eyes, skin, respiratory system, central nervous system

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Phenol			CAS 108-95-2	
C ₆ H ₅ OH			RTECS SJ3325000	
Carbolic acid, Hydroxybenzene, Monohydroxybenzene, Phenyl alcohol, Phenyl hydroxide			DOT ID & Guide 1671 153 (solid) 2312 153 (molten) 2821 153 (solution)	
Exposure	NIOSH REL: TWA	5 ppm (19 mg/m ³) C 15.6 ppm	(60 mg/m ³) [15-minute] [skin]	
Limits	OSHA PEL: TWA 5	ppm (19 mg/m ³) [skin]		
IDLH 250 ppm		Conversion 1 ppm =	3.85 mg/m ³	
Physical Description Colorless to light-pink, c water.]	rystalline solid with a sw	eet, acrid odor. [Note: Phenol l	iquefies by mixing with about 8%	
MW: 94.1	BP: 359°F	MLT: 109°F	Sol(77°F): 9%	
VP: 0.4 mmHg	IP: 8.50 eV		Sp.Gr: 1.06	
Fl.P: 175°F	UEL: 8.6%	LEL: 1.8%		
Combustible Solid	·	·	·	
Incompatibilities & Rea Strong oxidizers, calcium	nctivities n hypochlorite, aluminum	chloride, acids		
Measurement Methods NIOSH 2546; OSHA 32				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		Eye: Irrigate immedia Skin: Soap wash imme	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support	
Remove: When wet or contaminated Change: Daily		Swallow: Medical atte		

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash, Quick drench

Up to 50 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust and mist filter/(APF = 10) Any supplied-air respirator

Up to 125 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter

Up to 250 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine; cyanosis; liver, kidney damage; skin burns; dermatitis; ochronosis; tremor, convulsions, twitching

Target Organs Eyes, skin, respiratory system, liver, kidneys

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Phenothiazine			CAS 92-84-2	
$S(C_6H_4)_2NH$			RTECS SN5075000	
Synonyms & Trade Names Dibenzothiazine, Fenothiazine, Thiodiphenylamine		DOT ID & Guide		
Exposure	NIOSH REL: TWA 5 mg/m	NIOSH REL: TWA 5 mg/m ³ [skin]		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Grayish-green to greenish-y	ellow solid. [insecticide]			
MW: 199.3	BP: 700°F	MLT: 365°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: ?		Sp.Gr: ?	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Solid, but not a	high fire risk.			
Incompatibilities & Reaction None reported	vities			
Measurement Methods OSHA PV2048				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: No recommendation Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately				
Respirator Recommendation	ons To be added later			
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms Itching, irritation damage; skin photo sensitiza	n, reddening skin; hepatitis, he ation	emolytic anemia, abdominal ca	ramps, tachycardia; kidney	
Target Organs Skin, cardiovascular system, liver, kidneys				
See also: INTRODUCTION				

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p-Phenylene diamine			CAS 106-50-3	
$\overline{\mathrm{C_6H_4(NH_2)_2}}$			RTECS SS8050000	
Synonyms & Trade Names 4-Aminoaniline; 1,4-Benzenediamine; p-Diaminobenzene; 1,4-Diaminobenzene; 1,4-Phenylene diamine			DOT ID & Guide 1673 153	
Exposure	NIOSH REL: TWA 0.1 mg/	m ³ [skin]		
Limits	OSHA PEL: TWA 0.1 mg/n	n ³ [skin]		
IDLH 25 mg/m ³		Conversion		
Physical Description White to slightly red, crystalline solid.				
MW: 108.2	BP: 513°F	MLT: 295°F	Sol(75°F): 4%	
VP: <1 mmHg	IP: 6.89 eV		Sp.Gr: ?	
Fl.P: 312°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactive Strong oxidizers	vities			
Measurement Methods OSHA 87				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support		
Remove: When wet or conta	minated	Swallow: Medical attention immediately		

Respirator Recommendations NIOSH/OSHA

Change: Daily

Up to 2.5 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]

Up to 5 mg/m³: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 25 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern and having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation pharynx, larynx; bronchial asthma; sensitization dermatitis

Target Organs respiratory system, skin

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Phenyl ether (vapor)			CAS 101-84-8	
$C_6H_5OC_6H_5$			RTECS KN8970000	
Synonyms & Trade Names Diphenyl ether, Diphenyl oxide, Phenoxy benzene, Phenyl oxide			DOT ID & Guide	
Exposure	NIOSH REL: TWA 1 ppm (7 mg/m ³)		
Limits	OSHA PEL: TWA 1 ppm (7	mg/m^3)		
IDLH 100 ppm		Conversion 1 ppm = 6.96 m	g/m ³	
Physical Description Colorless, crystalline solid or liquid (above 82°F) with a geranium-like odor.				
MW: 170.2	BP: 498°F	MLT: 82°F	Sol: Insoluble	
VP(77°F): 0.02 mmHg	IP: 8.09 eV		Sp.Gr: 1.08	
Fl.P: 239°F	UEL: 6.0%	LEL: 0.7%		
Combustible Solid Class IIIB	Combustible Liquid			
Incompatibilities & Reactive Strong oxidizers	rities			
Measurement Methods NIOSH 1617; OSHA PV2022				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo	ort	

Respirator Recommendations NIOSH/OSHA

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter $^{\pounds}$ Up to 50 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, nose, skin; nausea

Target Organs Eyes, skin, respiratory system

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Phenyl ether-biphenyl mixture (vapor)			CAS 8004-13-5	
$C_6H_5OC_6H_5/C_6H_5C_6H_5$			RTECS DV1500000	
Synonyms & Trade Names Diphenyl oxide-diphenyl mix	Synonyms & Trade Names Diphenyl oxide-diphenyl mixture, Dowtherm® A			
Exposure	NIOSH REL: TWA 1 ppm (7 mg/m ³)		
Limits	OSHA PEL: TWA 1 ppm (7	(mg/m^3)		
IDLH 10 ppm		Conversion 1 ppm = 6.79 m	ng/m³ (approx)	
Physical Description Colorless to straw-colored lice typically contains 75% pheny		ith a disagreeable, aromatic oc	lor. [Note: A mixture	
MW: 166 (approx)	BP: 495°F	FRZ: 54°F	Sol: Insoluble	
VP(77°F): 0.08 mmHg	IP: ?		Sp.Gr(77°F): 1.06	
Fl.P: 239°F	UEL: ?	LEL: ?		
Class IIIB Combustible Liqui	id: Fl.P. at or above 200°F.			
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH 2013				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

First Aid (See procedures) Eve: Irrigate immediately

Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support

Respirator Recommendations NIOSH/OSHA

Up to 10 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{£}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter $^{£}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full

facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, nose, skin; nausea

Target Organs Eyes, skin, respiratory system

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Phenyl glycidyl ether			CAS 122-60-1
$C_9H_{10}O_2$			RTECS TZ3675000
Synonyms & Trade Names 1,2-Epoxy-3-phenoxy propane; Glycidyl phenyl ether; PGE; Phenyl 2,3-epoxypropyl ether			
Exposure NIOSH REL: Ca C 1 ppm (6 mg/m ³) [15-minute] See Ap			ppendix A
Limits	OSHA PEL†: TWA 10 ppm (60 mg/m ³)		
IDLH Ca [100 ppm]			ng/m ³
Physical Description Colorless liquid. [Note: A solid below 38°F.]			
MW: 150.1	BP: 473°F		
VP: 0.01 mmHg	IP: ?		Sp.Gr: 1.11
Fl.P: 248°F	UEL: ?	LEL: ?	
Class IIIB Combustible Liquid: Fl.P. at or above 200°F.			
Incompatibilities & Reactivities Strong oxidizers, amines, strong acids, strong bases			
Measurement Methods NIOSH 1619; OSHA 7			

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; upper respiratory system; skin sensitization; narcosis; possible hematopoietic, reproductive effects; [potential occupational carcinogen]

Target Organs Eyes, skin, central nervous system, hematopoietic system, reproductive system

Cancer Site [in animals: nasal cancer]

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Phenylhydrazine C.			CAS 100-63-0
C ₆ H ₅ NHNH ₂			RTECS MW8925000
			DOT ID & Guide 2572 153
Exposure	NIOSH REL: Ca C 0.14 ppr	NIOSH REL: Ca C 0.14 ppm (0.6 mg/m ³) [2-hr] [skin] <u>Se</u>	
Limits	OSHA PEL†: TWA 5 ppm (22 mg/m ³) [skin]		
IDLH Ca [15 ppm] Conversion 1 pp		Conversion 1 ppm = 4.42 m	ng/m ³
Physical Description Colorless to pale-yellow liquid or solid (below 67°F) with a faint, aromatic odor.			
MW: 108.1	BP: 470°F (Decomposes)	FRZ: 67°F	Sol: Slight
VP(77°F): 0.04 mmHg	IP: 7.64 eV		Sp.Gr: 1.10
Fl.P: 190°F	UEL: ?	LEL: ?	
Class IIIA Combustible Liqu	id Combustible Solid		
Incompatibilities & Reactivities Strong oxidizers, lead dioxide			
Measurement Methods NIOSH 3518			
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory supports Swallow: Medical attention is	ort

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Skin sensitization, hemolytic anemia, dyspnea (breathing difficulty), cyanosis; jaundice; kidney damage; vascular thrombosis; [potential occupational carcinogen]

Target Organs Blood, respiratory system, liver, kidneys, skin

Cancer Site [in animals: tumors of the lungs, liver, blood vessels & intestine]

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N-Phenyl-beta-naphthylamine			CAS 135-88-6
C ₁₀ H ₇ NHC ₆ H ₅			RTECS QM4550000
Synonyms & Trade Names 2-Anilinonaphthalene, beta-l Phenyl-beta-naphthylamine	Naphthylphenylamine, PBNA	, 2-Phenylaminonaphthalene,	DOT ID & Guide
Exposure	-		
Limits	OSHA PEL: none		
IDLH Ca [N.D.]		Conversion	
Physical Description White to yellow crystals or gray to tan flakes or powder. [Note: Commercial product may contain 20-30 ppm of beta-Naphthylamine.]			
MW: 219.3	BP: 743°F MLT: 226°F Sol: Insoluble		Sol: Insoluble
VP: ?	IP: ?		Sp.Gr: 1.24
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reactive Oxidizers	vities		
Measurement Methods OSHA 96			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo	ort

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation; leucoplakia; acne, hypersensitivity to sunlight; [potential occupational carcinogen]

Target Organs Eyes, skin, bladder

Cancer Site [bladder cancer]

See also: <u>INTRODUCTION</u>

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Phenylphosphine			CAS 638-21-1	
$C_6H_5PH_2$		RTECS SZ2100000		
Synonyms & Trade Names Fenylfosfin, PF, Phosphaniline		DOT ID & Guide		
Exposure	NIOSH REL: C 0.05 ppm (0.25 mg/m ³)			
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 4.50 m	ng/m ³	
Physical Description Clear, colorless liquid with a foul odor.				
MW: 110.1	BP: 320°F	FRZ: ?	Sol: Insoluble	
VP: ?	IP: ?		Sp.Gr(59°F): 1.001	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Liquid				
Incompatibilities & Reactivities None reported [Note: Spontaneously combustible in high concentrations in air. Potential exposure to gaseous PF when polyphosphinates are heated above 392°F.] Measurement Methods				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms In animals: bloo (discharge of tears), hind leg		degeneration; loss of appetite,	diarrhea, lacrimation	

Target Organs Blood, central nervous system, skin, reproductive system

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Phorate			CAS 298-02-2
$(C_2H_5O)_2P(S)SCH_2SC_2H_5$			RTECS TD9450000
Synonyms & Trade Names O,O-Diethyl S-(ethylthio)methylphosphorodithioate; O,O-Diethyl S- ethylthiomethylthiothionophosphate; Thimet; Timet		DOT ID & Guide 3018 152 (organophosphorus pesticide, liquid)	
Exposure	NIOSH REL: TWA 0.05 mg/m ³ ST 0.2 mg/m ³ [skin]		
Limits	OSHA PEL†: none		
IDLH N.D.	Conversion		
Physical Description Clear liquid with a skunk-like odor. [insecticide]			
MW: 260.4	BP: ? FRZ: -45°F Sol: 0.005%		
VP: 0.0008 mmHg	IP: ?		Sp.Gr(77°F): 1.16
Fl.P(oc): 320°F	UEL: ?	LEL: ?	
Class IIIB Combustible Liquid, but does not readily ignite.			
Incompatibilities & Reactivities Water, alkalis [Note: Hydrolyzed in the presence of moisture and by alkalis.]			
Measurement Methods NIOSH 5600			
Personal Protection & San	itation	First Aid (See procedures)	

Personal Protection & Sanitation
Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Eyewash, Quick drench

First Aid (See procedures)
Eye: Irrigate immediately
Skin: Soap flush immediately
Breathing: Respiratory support
Swallow: Medical attention immediately

Respirator Recommendations To be added later

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; miosis; rhinorrhea (discharge of thin mucus); headache; chest tightness, wheezing, laryngeal spasm, salivation, cyanosis; anorexia, nausea, vomiting, abdominal cramps, diarrhea; sweating; muscle fasciculation, lassitude (weakness, exhaustion), paralysis; dizziness, confusion, ataxia;

convulsions, coma; low blood pressure; cardiac irregularities

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system, blood cholinesterase

See also: <u>INTRODUCTION</u>

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Phosdrin			CAS 7786-34-7
$C_7H_{13}PO_6$		RTECS GQ5250000	
Synonyms & Trade Names 2-Carbomethoxy-1-methylvinyl dimethyl phosphate, Mevinphos [Note: Commercial product is a mixture of the cis- & trans-isomers.]			DOT ID & Guide 2783 152
Exposure NIOSH REL: TWA 0.01 ppm (0.1 mg/m ³) ST 0.03 ppm (0.3 mg/m ³) [skin]			(0.3 mg/m ³) [skin]
Limits	OSHA PEL†: TWA 0.1 mg/m ³ [skin]		
IDLH 4 ppm $ $ Conversion 1 ppm = 9.17 mg/m ³			ng/m ³
Physical Description Pale-yellow to orange liquid with a weak odor. [Note: Insecticide that may be absorbed on a dry carrier.]			
MW: 224.2	BP: Decomposes	FRZ: 44°F (trans-) 70°F (cis-)	Sol: Miscible
VP: 0.003 mmHg	IP: ?		Sp.Gr: 1.25
Fl.P(oc): 347°F	UEL: ?	LEL: ?	
Class IIIB Combustible Liquid: Fl.P. at or above 200°F.			
Incompatibilities & Reactivities Strong oxidizers [Note: Corrosive to cast iron, some stainless steels & brass.]			
Measurement Methods NIOSH 5600			
Personal Protection & Sanitation First Aid (See procedures) Every Irrigate immediately			

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Eyewash, Quick drench

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 0.1 ppm: (APF = 10) Any supplied-air respirator

Up to 0.25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 0.5 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 4 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; miosis; rhinorrhea (discharge of thin mucus); headache; chest tightness, wheezing, laryngeal spasm, salivation, cyanosis; anorexia, nausea, vomiting, abdominal cramps, diarrhea; paralysis; ataxia, convulsions; low blood pressure, cardiac irregularities

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system, blood cholinesterase

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Phosgene			CAS 75-44-5	
COCl ₂			RTECS SY5600000	
Synonyms & Trade Names Carbon oxychloride, Carbonyl chloride, Carbonyl dichloride, Chloroformyl chloride 1076 125			DOT ID & Guide 1076 125	
Exposure	NIOSH REL: TWA 0	NIOSH REL: TWA 0.1 ppm (0.4 mg/m ³) C 0.2 ppm (0.8 mg/m ³) [15-minute]		
Limits	OSHA PEL: TWA 0.	OSHA PEL: TWA 0.1 ppm (0.4 mg/m ³)		
IDLH 2 ppm Conver		Conversion 1 ppm =	= 4.05 mg/m ³	
Physical Description Colorless gas with a suffocating odor like musty hay. [Note: A fuming liquid below 47°F. Shipped as a liquefied compressed gas.]				
MW: 98.9	BP: 47°F	FRZ: -198°F	Sol: Slight	
VP: 1.6 atm	IP: 11.55 eV	RGasD: 3.48	Sp.Gr: 1.43 (Liquid at 32°F)	
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Gas				
Incompatibilities & Reactivities Moisture, alkalis, ammonia, alcohols, copper [Note: Reacts slowly in water to form hydrochloric acid & carbon dioxide.]				
Measurement Methods OSHA 61				
Skin: Prevent skin contact (liquid) Eyes: Prevent eye contact (liquid)		First Aid (See proce Eye: Irrigate immedi Skin: Water flush im Breathing: Respirator	ately (liquid) mediately (liquid)	

Respirator Recommendations NIOSH/OSHA

Up to 1 ppm: (APF = 10) Any supplied-air respirator*

Up to 2 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-

air respirator with a full facepiece

Change: No recommendation Provide: Quick drench (liquid)

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Irritation eyes; dry burning throat; vomiting; cough, foamy sputum, dyspnea (breathing difficulty), chest pain, cyanosis; liquid: frostbite

Target Organs Eyes, skin, respiratory system

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Phosphine			CAS 7803-51-2
PH ₃			RTECS SY7525000
Synonyms & Trade Nan Hydrogen phosphide, Pho trihydride	nes sphorated hydrogen, Phospl	norus hydride, Phosphorus	DOT ID & Guide 2199 119
Exposure	NIOSH REL: TWA 0.3	ppm (0.4 mg/m ³) ST 1 ppr	m (1 mg/m ³)
Limits	OSHA PEL†: TWA 0.3	ppm (0.4 mg/m ³)	
IDLH 50 ppm		Conversion 1 ppm =	1.39 mg/m ³
Physical Description Colorless gas with a fish- compound is odorless.]	or garlic-like odor. [pestici	de] [Note: Shipped as a liqu	uefied compressed gas. Pure
MW: 34.0	BP: -126°F	FRZ: -209°F	Sol: Slight
VP: 41.3 atm	IP: 9.96 eV	RGasD: 1.18	
Fl.P: NA (Gas)	UEL: ?	LEL: 1.79%	
Flammable Gas			
Incompatibilities & Rea Air, oxidizers, chlorine, a on contact with air.]		hydrocarbons, copper [Note	e: May ignite SPONTANEOUSLY
Measurement Methods OSHA 1003, ID180			
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation Provide: Frostbite		First Aid (See proced Eye: Frostbite Skin: Frostbite Breathing: Respirator	·

Up to 7.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 15 ppm: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 50) Any self-contained breathing

Respirator Recommendations NIOSH/OSHA

Up to 3 ppm: (APF = 10) Any supplied-air respirator

apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 50 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Nausea, vomiting, abdominal pain, diarrhea; thirst; chest tightness, dyspnea (breathing difficulty); muscle pain, chills; stupor or syncope; pulmonary edema; liquid: frostbite

Target Organs respiratory system

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Phosphoric acid			CAS 7664-38-2	
H ₃ PO ₄	RTECS TB6300000			
			DOT ID & Guide 1805 154	
Exposure	NIOSH REL: TWA 1 mg	NIOSH REL: TWA 1 mg/m ³ ST 3 mg/m ³		
Limits	OSHA PEL†: TWA 1 m	g/m ³		
IDLH 1000 mg/m ³	,	Conversion		
Physical Description Thick, colorless, odorless,	crystalline solid. [Note: Ofte	en used in an aqueous so	lution.]	
MW: 98.0	BP: 415°F	MLT: 108°F	Sol: Miscible	
VP: 0.03 mmHg	IP: ?		Sp.Gr(77°F): 1.87 (pure) 1.33 (50% solution)	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
WITH SOLUTIONS CON			ble hydrogen gas. DO NOT MIX	
Measurement Methods NIOSH 7903; OSHA ID1	65SG			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash (>1.6%), Quick drench (>1.6%)		First Aid (See proce Eye: Irrigate immed Skin: Water flush in Breathing: Respirate Swallow: Medical a	iately nmediately	
D : 4 D	· · · · · · · · · · · · · · · · · · ·			

Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 50 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air

Respirator Recommendations NIOSH/OSHA

respirator with a full facepiece

Up to 1000 mg/m: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; eye, skin, burns; dermatitis

Target Organs Eyes, skin, respiratory system

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Phosphorus (yello	CAS 7723-14-0			
$\overline{\mathbf{P_4}}$			RTECS TH3500000	
Synonyms & Trade Names Elemental phosphorus, Whit			DOT ID & Guide 1381 136	
Exposure	NIOSH REL: TWA 0.1 mg/	m^3		
Limits	OSHA PEL: TWA 0.1 mg/n	n^3		
IDLH 5 mg/m ³		Conversion		
Physical Description White to yellow, soft, waxy solid with acrid fumes in air. [Note: Usually shipped or stored in water.]				
MW: 124.0	BP: 536°F	MLT: 111°F	Sol: 0.0003%	
VP: 0.03 mmHg	IP: ?		Sp.Gr: 1.82	
Fl.P: ?	UEL: ?	LEL: ?		
Flammable Solid				
Incompatibilities & Reaction Air, oxidizers (including element)	vities mental sulfur & strong caustic	es), halogens [Note: Ignites SP	ONTANEOUSLY in moist	
Measurement Methods NIOSH 7905				
Personal Protection & Sanitation Skin: Prevent skin contact* [*Note: Flame retardant personal protective equipment should be provided.] Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supports Swallow: Medical attention in	ort	

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash, Quick drench

Up to 1 mg/m^3 : (APF = 10) Any supplied-air respirator

Up to 2.5 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]

Up to 5 mg/m³: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, respiratory tract; eye, skin burns; abdominal pain, nausea, jaundice; anemia; cachexia; dental pain, salivation, jaw pain, swelling

Target Organs Eyes, skin, respiratory system, liver, kidneys, jaw, teeth, blood

See also: <u>INTRODUCTION</u>

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Phosphorus oxychloride			CAS 10025-87-3	
POCl ₃			RTECS TH4897000	
Synonyms & Trade Names Phosphorus chloride, Phosph	orus oxytrichloride, Phosphor	ryl chloride	DOT ID & Guide 1810 137	
Exposure	NIOSH REL: TWA 0.1 ppm	(0.6 mg/m ³) ST 0.5 ppm (3 pm	mg/m ³)	
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 6.27 m	ng/m ³	
Physical Description Clear, colorless to yellow, oil	ly liquid with a pungent & m	usty odor. [Note: A solid belo	w 34°F.]	
MW: 153.3	BP: 222°F	FRZ: 34°F	Sol: Decomposes	
VP(81°F): 40 mmHg	IP: ?		Sp.Gr(77°F): 1.65	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid, but	may set fire to combustible m	aterials.		
Incompatibilities & Reactivities Water, combustible materials, carbon disulfide, dimethyl-formamide, metals (except nickel & lead) [Note: Decomposes in water to hydrochloric & phosphoric acids.]				
Measurement Methods None available				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Change: No recommendation Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations To be added later

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; eye, skin burns; dyspnea (breathing difficulty), cough, pulmonary edema; dizziness, headache, lassitude (weakness, exhaustion); abdominal pain, nausea, vomiting; nephritis

Target Organs Eyes, skin, respiratory system, central nervous system, kidneys

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Phosphorus pentachloride			CAS 10026-13-8	
PCl ₅			RTECS TB6125000	
			DOT ID & Guide 1806 137	
Exposure	NIOSH REL: TWA 1 mg/m	3		
Limits	OSHA PEL: TWA 1 mg/m ³			
IDLH 70 mg/m ³		Conversion		
Physical Description White to pale-yellow, crystalline solid with a pungent, unpleasant odor.				
MW: 208.3	BP: Sublimes	MLT: 324°F (Sublimes)	Sol: Reacts	
VP(132°F): 1 mmHg	IP: ?		Sp.Gr: 3.60	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
	ivities hemically-active metals such a to form hydrochloric acid &	•		
Measurement Methods NIOSH S257 (II-5)				
Personal Protection & San Skin: Prevent skin contact	nitation	First Aid (See procedures) Eye: Irrigate immediately		
Eyes: Prevent eye contact		Skin: Water flush immediately		
Wash skin: When contamin		Breathing: Respiratory support		
Remove: When wet or cont Change: Daily	aminated	Swallow: Medical attention	immediately	

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash, Quick drench

Up to 10 mg/m^3 : (APF = 10) Any supplied-air respirator*

Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 50 mg/m^3 : (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 70 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-

demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; bronchitis; dermatitis

Target Organs Eyes, skin, respiratory system

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CAS 1314-80-3

Phosphorus pentasulfide			CAS 1314-60-3	
P_2S_5/P_4S_{10}			RTECS TH4375000	
			DOT ID & Guide 1340 139	
Exposure	NIOSH REL: TWA 1 mg/m	³ ST 3 mg/m ³		
Limits	OSHA PEL†: TWA 1 mg/m	13		
IDLH 250 mg/m ³		Conversion		
Physical Description Greenish-gray to yellow, cr	rystalline solid with an odor of	rotten eggs.		
MW: 222.3/444.6	BP: 957°F	MLT: 550°F	Sol: Reacts	
VP(572°F): 1 mmHg	IP: ?		Sp.Gr: 2.09	
Fl.P: ?	UEL: ?	LEL: ?		
Flammable Solid, which ma	ay SPONTANEOUSLY ignite	in presence of moisture.		
Incompatibilities & Reactivities Water, alcohols, strong oxidizers, acids, alkalis [Note: Reacts with water to form hydrogen sulfide, sulfur dioxide, and phosphoric acid.]				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact		First Aid (See procedures) Eye: Irrigate immediately Skin: Dust off solid; water flush		

Respirator Recommendations NIOSH/OSHA

Wash skin: When contaminated

Change: Daily

Remove: When wet or contaminated

Up to 10 mg/m^3 : (APF = 10) Any supplied-air respirator*

Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 50 mg/m^3 : (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 250 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-

Breathing: Respiratory support

Swallow: Medical attention immediately

demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern and having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; apnea, coma, convulsions; conjunctivitis pain, lacrimation (discharge of tears), photophobia (abnormal visual intolerance to light), kerato-conjunctivity, corneal vesiculation; dizziness; headache; lassitude (weakness, exhaustion); irritability, insomnia; gastrointestinal disturbance

Target Organs Eyes, skin, respiratory system, central nervous system

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Phosphorus trichloride			CAS 7719-12-2		
PCl ₃			RTECS TH3675000		
			DOT ID & Guide 1809 137		
Exposure	NIOSH REL: TWA 0	.2 ppm (1.5 mg/m ³) ST 0.5 p	pm (3 mg/m ³)		
Limits	OSHA PEL†: TWA 0	OSHA PEL†: TWA 0.5 ppm (3 mg/m ³)			
IDLH 25 ppm Conversion 1 ppm = 5.62		5.62 mg/m^3			
Physical Description Colorless to yellow, fuming liquid with an odor like hydrochloric acid.					
MW: 137.4	BP: 169°F	FRZ: -170°F	Sol: Reacts		
VP: 100 mmHg	IP: 9.91 eV		Sp.Gr: 1.58		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Liquid; however, a strong oxidizer that may ignite combustibles upon contact.					
Incompatibilities & Reactivities Water, chemically-active metals such as sodium & potassium, aluminum, strong nitric acid, acetic acid, organic matter [Note: Hydrolyzes in water to form hydrochloric acid and phosphoric acid.]					
Measurement Methods					

Measurement Methods

NIOSH 6402

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Change: No recommendation Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 10 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 25 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concernⁱ/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; pulmonary edema; eye, skin burns

Target Organs Eyes, skin, respiratory system

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Phthalic anhydrid	CAS 85-44-9				
C ₆ H ₄ (CO) ₂ O	RTECS TI3150000				
			DOT ID & Guide 2214 156		
Exposure	NIOSH REL: TWA 6	mg/m ³ (1 ppm)			
Limits	OSHA PEL†: TWA 12	2 mg/m ³ (2 ppm)			
IDLH 60 mg/m ³	IDLH 60 mg/m^3 Conversion 1 ppm = 6.06 mg/m^3				
Physical Description White solid (flake) or a clear, colorless, mobile liquid (molten) with a characteristic, acrid odor.					
MW: 148.1	BP: 563°F	MLT: 267°F	Sol: 0.6%		
VP: 0.0015 mmHg	IP: 10.00 eV	P: 10.00 eV			
Fl.P: 305°F					
Combustible Solid					
Incompatibilities & Reactivities Strong oxidizers, water [Note: Converted to phthalic acid in hot water.]					
Measurement Methods					

NIOSH S179 (II-3); OSHA 90

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated

Change: Daily

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 30 mg/m^3 : (APF = 5) Any dust and mist respirator*

Up to 60 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators*/(APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any selfcontained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; conjunctivitis; nasal ulcer bleeding; bronchitis, bronchial asthma; dermatitis; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, liver, kidneys

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m-Phthalodinitrile			CAS 626-17-5	
$C_6H_4(CN)_2$			RTECS CZ1900000	
Synonyms & Trade Names 1,3-Benzenedicarbonitrile; m-Dicyanobenzene; 1,3-Dicyanobenzene; Isophthalodinitrile; m-PDN			DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 mg/m	3		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Needle-like, colorless to white	te, crystalline, flaky solid wit	h an almond-like odor.		
MW: 128.1	BP: Sublimes	MLT: 324°F (Sublimes)	Sol: Slight	
VP: 0.01 mmHg	IP: ?		Sp.Gr: 4.42	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Solid and a seve	ere explosion hazard.			
Incompatibilities & Reactive Strong oxidizers (e.g., chloring)				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms Headache, nausea, confusion; in animals: irritation eyes, skin				
Target Organs Eyes, skin, c	entral nervous system			
See also: INTRODUCTION				

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Picloram			CAS 1918-02-1		
$C_6H_3Cl_3O_2N_2$			RTECS TJ7525000		
Synonyms & Trade Name 4-Amino-3,5,6-trichloropic ATCP; Tordon®	DOT ID & Guide				
Exposure	NIOSH REL: See Appen	dix D			
Limits	OSHA PEL†: TWA 15 m	ng/m ³ (total) TWA 5 mg/m ³ (res	p)		
IDLH N.D.	'	Conversion			
Physical Description Colorless to white crystals	with a chlorine-like odor. [h	nerbicide]			
MW: 241.5	BP: Decomposes	MLT: 424°F (Decomposes)	Sol: 0.04%		
VP(95°F): 0.0000006 mmHg	IP: ?		Sp.Gr: ?		
Fl.P: ?	UEL: ?	LEL: ?			
Combustible Solid					
Incompatibilities & React Hot concentrated alkali (hydroxymath)					
Measurement Methods NIOSH 0500, 0600					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: No recommendation Change: Daily First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air Swallow: Medical attention immediately					
Respirator Recommendations To be added later					
Exposure Routes inhalation, ingestion, skin and/or eye contact					
<u> </u>		usea; in animals: liver, kidney ch	anges		
Target Organs Eyes, skin,	respiratory system, liver, ki	idneys			

See also: <u>INTRODUCTION</u>

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Picric acid			CAS 88-89-1	
$(NO_2)_3C_6H_2OH$			RTECS TJ7875000	
			DOT ID & Guide 1344 113 (>10% water)	
Exposure	NIOSH REL: TWA 0.1 mg/s	m ³ ST 0.3 mg/m ³ [skin]		
Limits	OSHA PEL: TWA 0.1 mg/m	n ³ [skin]		
IDLH 75 mg/m ³		Conversion 1 ppm = 9.37 m	ng/m ³	
Physical Description Yellow, odorless solid. [Note: Usually used as an aqueous solution.]				
MW: 229.1	BP: Explodes above 572°F	MLT: 252°F	Sol: 1%	
VP(383°F): 1 mmHg	IP: ?		Sp.Gr: 1.76	
Fl.P: 302°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactive Copper, lead, zinc & other mixture results when the aqui	etals; salts; plaster; concrete;	ammonia [Note: Corrosive to	metals. An explosive	
Measurement Methods NIOSH S228 (II-4)				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supports Swallow: Medical attention in		

Respirator Recommendations NIOSH/OSHA

Up to 0.5 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 1 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any supplied-air respirator

Up to 2.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

powered, air-purifying respirator with a dust and mist filter

Up to 5 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 75 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; sensitization dermatitis; yellow-stained hair, skin; lassitude (weakness, exhaustion), myalgia, anuria, polyuria; bitter taste, gastrointestinal disturbance; hepatitis, hematuria (blood in the urine), albuminuria, nephritis

Target Organs Eyes, skin, kidneys, liver, blood

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Pindone			CAS 83-26-1
$C_9H_5O_2C(O)C(CH_3)_3$			RTECS NK6300000
Synonyms & Trade Names tert-Butyl valone; 1,3-Dioxo-2-pivaloy-lindane; Pival®; Pivalyl; 2-Pivalyl-1,3-indandione			DOT ID & Guide
Exposure	NIOSH REL: TWA 0.1	mg/m ³	
Limits	OSHA PEL: TWA 0.1 m	ng/m ³	
IDLH 100 mg/m ³		Conversion	
Physical Description Bright-yellow powder with	almost no odor. [rodenticio	le]	
MW: 230.3	BP: Decomposes	MLT: 230°F	Sol(77°F): 0.002%
VP: Very low	IP: ?		Sp.Gr: 1.06
Fl.P: ?	UEL: ?	LEL: ?	
Incompatibilities & Reacti None reported	vities		
Measurement Methods None available			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendati Up to 0.5 mg/m ³ : (APF = 5		ator	

Up to 1 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF =

Up to 2.5 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

Up to 5 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

powered, air-purifying respirator with a dust and mist filter

10) Any supplied-air respirator

filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion

Symptoms Epistaxis (nosebleed), excess bleeding from minor cuts, bruises; smoky urine, black tarry stools; abdominal, back pain

Target Organs Blood prothrombin

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Piperazine dihydrochloride			CAS 142-64-3
C ₄ H ₁₀ N ₂ • 2HCl			RTECS TL4025000
Synonyms & Trade Names Piperazine hydrochloride [Note: The monochloride, C ₄ H ₁₀ N ₂ HCl, is also commercially available.]		DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 mg/m ³		
Limits	OSHA PEL†: none		
IDLH N.D.	Conversion		
Physical Description White to cream-colored nee	edles or powder.		
MW: 159.1	BP: ?	MLT: 635°F	Sol: 41%
VP: ?	IP: ?		Sp.Gr: ?
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Solid, but does	s not ignite easily.		
Incompatibilities & Reactive Water [Note: Slightly hygro	ivities escopic (i.e., absorbs moisture	from the air).]	
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendati	ons To be added later	-	
Exposure Routes inhalation	n, skin absorption, ingestion,	skin and/or eye contact	
	kin, respiratory system; skin , incoordination, muscle weak		ıma; gastrointestinal upset,
Target Organs Eyes, skin,	respiratory system, central ne	rvous system	

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Plaster of Paris		CAS 26499-65-0			
CaSO ₄ • 0.5H ₂ O			RTECS TP0700000		
Synonyms & Trade Names Calcium sulfate hemihydrate, Dried calcium sulfate, Gypsum hemihydrate, Hemihydrate gypsum [Note: Plaster of Paris is the hemihydrate form of Calcium Sulfate & Gypsum is the dihydrate form.]			DOT ID & Guide		
Exposure	NIOSH REL: TWA 10 mg/r	p)			
Limits	OSHA PEL: TWA 15 mg/m	OSHA PEL: TWA 15 mg/m ³ (total) TWA 5 mg/m ³ (resp)			
IDLH N.D.		Conversion			
Physical Description White or yellowish, finely d	ivided, odorless powder.				
MW: 145.2	BP: ?	MLT: 325°F (Loses H ₂ O)	Sol(77°F): 0.3%		
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.5		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid					
· -	Incompatibilities & Reactivities Moisture, water [Note: Hygroscopic (i.e., absorbs moisture from the air). Reacts with water to form Gypsum.]				
Measurement Methods NIOSH 0500, 0600					
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendations To be added later					
	, ingestion, skin and/or eye co				
Symptoms Irritation eyes, skin, mucous membrane, respiratory system; cough					
Target Organs Eyes, skin, respiratory system					

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Platinum		CAS 7440-06-4			
Pt			RTECS TP2160000		
Synonyms & Trade Names Platinum black, Platinum metal, Platinum sponge		DOT ID & Guide			
Exposure	NIOSH REL: TWA 1 mg/m ³ OSHA PEL†: none				
Limits					
IDLH N.D.	IDLH N.D. Conve		Conversion		
Physical Description Silvery, whitish-gray, malleable, ductile metal.					
MW: 195.1	BP: 6921°F	MLT: 3222°F	Sol: Insoluble		
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 21.45		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid in bull	k form, but finely divided pov	wder can be dangerous to han	dle.		
Incompatibilities & Reactivities Aluminum, acetone, arsenic, ethane, hydrazine, hydrogen peroxide, lithium, phosphorus, selenium, tellurium, various fluorides					
Measurement Methods NIOSH 7300; OSHA ID121					
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendations To be added later					
Exposure Routes inhalation, ingestion, skin and/or eye contact					
Symptoms Irritation skin, respiratory system; dermatitis					
Target Organs Eyes, skin, respiratory system					

See also: <u>INTRODUCTION</u>

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Platinum (soluble salts, as Pt)			CAS
			RTECS
Synonyms & Trade Names Synonyms vary depending upon the specific soluble platinum salt.		DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.002 mg/m ³		
Limits	OSHA PEL: TWA 0.002 mg/m ³		
IDLH 4 mg/m ³ (as Pt)	IDLH 4 mg/m ³ (as Pt) Conversion		
Physical Description Appearance and odor vary de	epending upon the specific so	luble platinum salt.	
Properties vary depending upon the specific soluble platinum salt.			
Incompatibilities & Reactive Varies	ities		
Measurement Methods NIOSH 7300, S191 (II-7)			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory suppo Swallow: Medical attention i	ort

Respirator Recommendations NIOSH/OSHA

Up to 0.05 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]

Up to 0.1 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 4 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; cough, dyspnea (breathing difficulty), wheezing, cyanosis; dermatitis, sensitization skin; lymphocytosis

Target Organs Eyes, skin, respiratory system

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Portland cement			CAS 65997-15-1	
			RTECS VV8770000	
Synonyms & Trade Names Cement, Hydraulic cement, Portland cement silicate [Note: A class of hydraulic cements containing tri- and dicalcium silicate in addition to alumina, tricalcium aluminate, and iron oxide.]			DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 mg/s	p)		
Limits	OSHA PEL†: TWA 50 mpp	OSHA PEL†: TWA 50 mppcf		
IDLH 5000 mg/m ³ Conversion				
Physical Description Gray, odorless powder.				
MW: ?	BP: NA	MLT: NA	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: ?	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactivities None reported				
Measurement Methods NIOSH 0500; OSHA ID207				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Fresh air Swallow: Medical attention	immediately	
Respirator Recommendation	ons NIOSH			

Up to 100 mg/m³: (APF = 10) Any dust respirator except single-use and quarter-mask respirators/(APF = 10) Any

Up to 250 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

Up to 50 mg/m^3 : (APF = 5) Any dust respirator

powered, air-purifying respirator with a dust filter

supplied-air respirator

Up to 500 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 5000 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose; cough, expectoration; exertional dyspnea (breathing difficulty), wheezing, chronic bronchitis; dermatitis

Target Organs Eyes, skin, respiratory system

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Potassium cyanide (as CN)			CAS 151-50-8	
KCN			RTECS TS8750000	
		DOT ID & Guide 1680 157		
Exposure		NIOSH REL*: C 5 mg/m ³ (4.7 ppm) [10-minute] [*Note: The REL also applies to other cyanides (as CN) except Hydrogen cyanide.]		
Limits		OSHA PEL*: TWA 5 mg/m ³ [*Note: The PEL also applies to other cyanides (as CN) except Hydrogen cyanide.]		
IDLH 25 mg/m ³ (as CN)		Conversion	Conversion	
Physical Description White, granular or crystalline solid with a faint, almond-like odor.				
MW: 65.1	BP: 2957°F	MLT: 1173°F	Sol(77°F): 72%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.55	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid, bu	t contact with acids releases	highly flammable hydroge	en cyanide.	
Incompatibilities & Reactivities Strong oxidizers (such as acids, acid salts, chlorates & nitrates) [Note: Absorbs moisture from the air forming a syrup.]				
Measurement Methods NIOSH 6010, 7904				
Personal Protection & S	anitation	First Aid (See proce	dures)	

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 25 mg/m^3 : (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern and having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; asphyxia; lassitude (weakness, exhaustion), headache, confusion; nausea, vomiting; increased respiratory rate, slow gasping respiration; thyroid, blood changes

Target Organs Eyes, skin, respiratory system, cardiovascular system, central nervous system, thyroid, blood

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Potassium hydroxide			CAS 1310-58-3	
КОН			RTECS TT2100000	
Synonyms & Trade Names Caustic potash, Lye, Potassium hydrate			DOT ID & Guide 1813 154 (dry, solid) 1814 154 (solution)	
Exposure	NIOSH REL: C 2 mg/m ³			
Limits	OSHA PEL†: none			
IDLH N.D.	Conversion			
Physical Description Odorless, white or slightly solution.]		icks, or pellets. [Note: May be		
MW: 56.1	BP: 2415°F	MLT: 716°F	Sol(59°F): 107%	
VP(1317°F): 1 mmHg	IP: ?		Sp.Gr: 2.04	
Fl.P: NA	UEL: NA	LEL: NA		
	wever, may react with H ₂ O & t to ignite combustible materia			
Incompatibilities & Descri		ons, maleic anhydride [Note: H	11017011	
Incompatibilities & React Acids, water, metals (when comes in contact with H ₂ C	· · · · · · · · · · · · · · · · · · ·		eat is generated if KOH	
Acids, water, metals (when	· · · · · · · · · · · · · · · · · · ·		eat is generated if KOH	
Acids, water, metals (when comes in contact with H ₂ C) Measurement Methods	nitation nated taminated	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supposwallow: Medical attention	ely	
Acids, water, metals (when comes in contact with H ₂ O Measurement Methods NIOSH 7401 Personal Protection & Sa Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contamin Remove: When wet or con Change: Daily	nitation nated taminated	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supp	ely	

Symptoms Irritation eyes, skin, respiratory system; cough, sneezing; eye, skin burns; vomiting, diarrhea

Target Organs Eyes, skin, respiratory system

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Propane			CAS 74-98-6	
CH ₃ CH ₂ CH ₃			RTECS TX2275000	
Synonyms & Trade Names Bottled gas, Dimethyl methane, n-Propane, Propyl hydride		DOT ID & Guide 1075 115 1978 115		
Exposure	Exposure NIOSH REL: TWA 1000 ppm (1800 mg/m ³)			
Limits	OSHA PEL: TWA 1000 pp	OSHA PEL: TWA 1000 ppm (1800 mg/m ³)		
IDLH 2100 ppm [10%LEL]		Conversion 1 ppm = 1.80 r	ng/m ³	
Physical Description Colorless, odorless gas. [Note: A foul-smelling odorant is often added when used for fuel purposes. Shipped as a liquefied compressed gas.]				
MW: 44.1	BP: -44°F	FRZ: -306°F	Sol: 0.01%	
VP(70°F): 8.4 atm	IP: 11.07 eV	RGasD: 1.55		
Fl.P: NA (Gas)	UEL: 9.5%	LEL: 2.1%		
Flammable Gas				
Incompatibilities & React Strong oxidizers	ivities			
Measurement Methods NIOSH S87 (II-2)				
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory supp	ort	

Respirator Recommendations NIOSH/OSHA

Provide: Frostbite

Up to 2100 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Dizziness, confusion, excitation, asphyxia; liquid: frostbite

Target Organs central nervous system

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Propane sultone			CAS 1120-71-4	
$C_3H_6O_3S$			RTECS RP5425000	
Synonyms & Trade Names 3-Hydroxy-1-propanesulphonic acid sultone; 1,3-Propane sultone			DOT ID & Guide	
Exposure	re NIOSH REL: Ca See Appendix A			
Limits	OSHA PEL: none			
IDLH Ca [N.D.]		Conversion		
Physical Description White, crystalline solid or a colorless liquid (above 86°F). [Note: Releases a foul odor as it melts.]				
MW: 122.2	BP: ?	P: ? MLT: 86°F Sol: 10%		
VP: ?	IP: ?		Sp.Gr: 1.39	
Fl.P: >235°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactivities None reported				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentrationd: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-

contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system

Cancer Site [in animals: skin tumors, leukemia, gliomas]

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1-Propanethiol C			CAS 107-03-9	
CH ₃ CH ₂ CH ₂ SH			RTECS TZ7300000	
			DOT ID & Guide 2402 130	
Exposure	NIOSH REL: C 0.5 ppm (1.6	6 mg/m ³) [15-minute]		
Limits	OSHA PEL: none			
IDLH N.D.		Conversion 1 ppm = 3.12 m	g/m ³	
Physical Description Colorless liquid with an offensive, cabbage-like odor.				
MW: 76.2	BP: 153°F	FRZ: -172°F	Sol: Slight	
VP(77°F): 155 mmHg	IP: 9.195 eV		Sp.Gr: 0.84	
Fl.P: -5°F	UEL: ?	LEL: ?		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.		
Incompatibilities & Reactive Oxidizers, reducing agents, s	vities trong acids & bases, alkali me	etals, calcium hypochlorite		
Measurement Methods None available				
Personal Protection & Sani	Personal Protection & Sanitation First Aid (See procedures)			
Skin: No recommendation		Eye: Irrigate immediately		
Eyes: Prevent eye contact		Skin: Soap wash		
Wash skin: No recommendate		Breathing: Respiratory support Swallow: Medical attention immediately		
Remove: When wet (flamma Change: No recommendation		Swanow. Medical adention i	inineuratery	

Respirator Recommendations NIOSH

Provide: Eyewash

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat, respiratory system; headache, nausea, dizziness, cyanosis; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, blood, liver, kidneys

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NIOSH Pocket Guide to Chemical Hazards

Propargyl alcohol CAS 107-19-7				
C ₃ H ₃ OH			RTECS UK5075000	
		DOT ID & Guide 1986 131		
Exposure	NIOSH REL: TWA 1 ppm (2 mg/m ³) [skin]		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 2.29 m	g/m ³	
Physical Description Colorless to straw-colored lie	quid with a mild, geranium o	dor.		
MW: 56.1	BP: 237°F	FRZ: -62°F Sol: Miscible		
VP: 12 mmHg	IP: 10.51 eV		Sp.Gr: 0.97	
Fl.P(oc): 97°F	UEL: ?	LEL: ?		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	elow 100°F.		
Incompatibilities & Reactive Phosphorus pentoxide, oxidiz				
Measurement Methods OSHA 97				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately				
Respirator Recommendations To be added later				
Exposure Routes inhalation,	Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact			
Symptoms Irritation skin, mucous membrane; central nervous system depression; in animals: liver, kidney damage				
Target Organs Skin, respira	tory system, central nervous	system, liver, kidneys		
T. DUTT OD VICTORY				

See also: <u>INTRODUCTION</u>

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beta-Propiolactone			CAS 57-57-8	
$\overline{\mathrm{C_{3}H_{4}O_{2}}}$			RTECS RQ7350000	
Synonyms & Trade Names BPL; Hydroacrylic acid, beta-lactone; 3-Hydroxy-beta-lactone; 3-Hydroxy-propionic acid; beta-Lactone; 2-Oxetanone; 3-Propiolacetone			DOT ID & Guide	
Exposure	NIOSH REL: Ca See Appen	dix A		
Limits	OSHA PEL: [1910.1013] <u>Se</u>	e Appendix B		
IDLH Ca [N.D]		Conversion		
Physical Description Colorless liquid with a slightly sweet odor.				
MW: 72.1	BP: 323°F (Decomposes)	FRZ: -28°F	Sol: 37%	
VP(77°F): 3 mmHg	IP: ?		Sp.Gr: 1.15	
Fl.P: 165°F	UEL: ? LEL: 2.9%			
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.		
Incompatibilities & Reactivities Acetates, halogens, thiocyanates, thiosulfates [Note: May polymerize upon storage.]				
Measurement Methods None available				
Skin: Prevent skin contact Eye: Irrigate immediatel		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately	у	

Respirator Recommendations NIOSH

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Breathing: Respiratory support

Swallow: Medical attention immediately

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Skin irritation, blistering, burns; corneal opacity; frequent urination; dysuria; hematuria (blood in the urine); [potential occupational carcinogen]

Target Organs Kidneys, skin, lungs, eyes

Cancer Site [in animals: tumors of the liver, skin & stomach]

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Propionic acid			CAS 79-09-4	
CH ₃ CH ₂ COOH			RTECS UE5950000	
Synonyms & Trade Names Carboxyethane, Ethanecarboxylic acid, Ethylformic acid, Metacetonic acid, Methyl acetic acid, Propanoic acid			DOT ID & Guide 1848 132	
Exposure	NIOSH REL: TWA 10 ppm	(30 mg/m ³) ST 15 ppm (45 r	mg/m ³)	
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 3.03 m	ng/m ³	
Physical Description Colorless, oily liquid with a	pungent, disagreeable, rancid	odor. [Note: A solid below 5°	°F.]	
MW: 74.1	BP: 286°F	FRZ: 5°F	Sol: Miscible	
VP: 3 mmHg	IP: 10.24 eV		Sp.Gr: 0.99	
Fl.P: 126°F	UEL: 12.1%	LEL: 2.9%		
Class II Combustible Liquid:	Fl.P. at or above 100°F and	below 140°F.		
Incompatibilities & Reactive Alkalis, strong oxidizers (e.g.	vities ., chromium trioxide) [Note: (Corrosive to steel.]		
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort	
Respirator Recommendation	ons To be added later			
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, nose, throat; blurred vision, corneal burns; skin burns; abdominal pain, nausea, vomiting				
Target Organs Eyes, skin, r	Target Organs Eyes, skin, respiratory system			

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Propionitrile			CAS 107-12-0	
CH ₃ CH ₂ CN			RTECS UF9625000	
Synonyms & Trade Na Cyanoethane, Ethyl cya	DOT ID & Guide 2404 131			
Exposure	NIOSH REL: TWA	6 ppm (14 mg/m ³)		
Limits	OSHA PEL: none			
IDLH N.D.		Conversion 1 ppm =	$= 2.25 \text{ mg/m}^3$	
Physical Description Colorless liquid with a pleasant, sweetish, ethereal odor. [Note: Forms cyanide in the body.]				
MW: 55.1	BP: 207°F	FRZ: -133°F	Sol: 11.9%	
VP: 35 mmHg	IP: 11.84 eV		Sp.Gr: 0.78	
Fl.P: 36°F	UEL: ?	LEL: 3.1%		
Class IB Flammable Lic	quid: Fl.P. below 73°F and	BP at or above 100°F.		
Incompatibilities & Reactivities Strong oxidizers & reducing agents, strong acids & bases [Note: Hydrogen cyanide is produced when propionitrile is heated to decomposition.]				
Measurement Methods NIOSH <u>1606</u> (adapt)				
Personal Protection & Sanitation First Aid (See procedures)				

Skin: Prevent skin contact

Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated

Change: No recommendation

Provide: Quick drench

Respirator Recommendations NIOSH

Up to 60 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Skin: Water flush immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

Up to 150 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 300 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1000 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; nausea, vomiting; chest pain; lassitude (weakness, exhaustion); stupor, convulsions; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, cardiovascular system, central nervous system, liver, kidneys

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Propoxur			CAS 114-26-1	
CH ₃ NHCOOC ₆ H ₄ OCH(CH ₃) ₂			RTECS FC3150000	
Synonyms & Trade Names Aprocarb®, o-Isopropoxyphenyl-N-methylcarbamate, N-Methyl-2-isopropoxyphenyl-carbamate			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.5 mg/	NIOSH REL: TWA 0.5 mg/m ³		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description White to tan, crystalline pow	der with a faint, characteristi	c odor. [insecticide]		
MW: 209.3	BP: Decomposes	MLT: 187-197°F	Sol: 0.2%	
VP: 0.000007 mmHg	IP: ?		Sp.Gr: ?	
Fl.P: >300°F	UEL: ?	LEL: ?		
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.			
Incompatibilities & Reactive Strong oxidizers, alkalis [No		isocyanate fumes when heate	d to decomposition.]	
Measurement Methods NIOSH 5601; OSHA PV200	7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contaminated Change: Daily First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately				
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms Miosis, blurred vision; sweating, salivation; abdominal cramps, nausea, diarrhea, vomiting; headache, lassitude (weakness, exhaustion), muscle twitching				
Target Organs central nervous system, liver, kidneys, gastrointestinal tract, blood cholinesterase				

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n-Propyl acetate CAS 109-60-4				
CH ₃ COOCH ₂ CH ₂ CH ₃			RTECS AJ3675000	
Synonyms & Trade Names Propylacetate, n-Propyl ester			DOT ID & Guide 1276 129	
Exposure	NIOSH REL: TWA 200 ppn	n (840 mg/m ³) ST 250 ppm (1	1050 mg/m ³)	
Limits	OSHA PEL†: TWA 200 ppn	n (840 mg/m ³)		
IDLH 1700 ppm		Conversion 1 ppm = 4.18 m	g/m ³	
Physical Description Colorless liquid with a mild, fruity odor.				
MW: 102.2	BP: 215°F	FRZ: -134°F	Sol: 2%	
VP: 25 mmHg	IP: 10.04 eV		Sp.Gr: 0.84	
Fl.P: 55°F	UEL: 8% LEL(100°F): 1.7%			
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.		
Incompatibilities & Reactive Nitrates; strong oxidizers, alk				
Measurement Methods NIOSH 1450; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Up to 1700 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes, nose, throat; narcosis; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system

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n-Propyl alcohol CAS 71-23-8				
CH ₃ CH ₂ CH ₂ OH			RTECS UH8225000	
			DOT ID & Guide 1274 129	
Exposure	NIOSH REL: TWA 200 ppn	n (500 mg/m ³) ST 250 ppm (6	625 mg/m ³) [skin]	
Limits	OSHA PEL†: TWA 200 ppn	n (500 mg/m ³)		
IDLH 800 ppm		Conversion 1 ppm = 2.46 m	ng/m ³	
Physical Description Colorless liquid with a mild, alcohol-like odor.				
MW: 60.1	BP: 207°F	FRZ: -196°F	Sol: Miscible	
VP: 15 mmHg	IP: 10.15 eV		Sp.Gr: 0.81	
Fl.P: 72°F	UEL: 13.7% LEL: 2.2%			
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.		
Incompatibilities & Reactive Strong oxidizers	vities			
Measurement Methods NIOSH 1401; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Up to 800 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; dry cracking skin; drowsiness, headache; ataxia, gastrointestinal pain; abdominal cramps, nausea, vomiting, diarrhea; in animals: narcosis

Target Organs Eyes, skin, respiratory system, gastrointestinal tract, central nervous system

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Propylene dichloride			CAS 78-87-5	
CH ₃ CHClCH ₂ Cl			RTECS TX9625000	
			DOT ID & Guide 1279 130	
Exposure	NIOSH REL: Ca See Apper	ndix A		
Limits	OSHA PEL†: TWA 75 ppm	(350 mg/m^3)		
IDLH Ca [400 ppm]		Conversion 1 ppm = 4.62 m	ng/m ³	
Physical Description Colorless liquid with a chloroform-like odor. [pesticide]				
MW: 113.0	BP: 206°F	FRZ: -149°F	Sol: 0.3%	
VP: 40 mmHg	IP: 10.87 eV		Sp.Gr: 1.16	
Fl.P: 60°F	UEL: 14.5%	LEL: 3.4%		
Class IB Flammable Liquid	: Fl.P. below 73°F and BP at o	or above 100°F.		
Incompatibilities & React Strong oxidizers, strong acid				
Measurement Methods NIOSH 1013; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supposed Swallow: Medical attention		

Respirator Recommendations NIOSH

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; drowsiness, dizziness; liver, kidney damage; in animals: central nervous system depression; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, liver, kidneys, central nervous system

Cancer Site [in animals: liver & mammary gland tumors]

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Propylene glycol dinitrate		CAS 6423-43-4		
CH ₃ CNO ₂ OHCHNO ₂ OH			RTECS TY6300000	
	Synonyms & Trade Names PGDN; Propylene glycol-1,2-dinitrate; 1,2-Propylene glycol dinitrate			
Exposure	NIOSH REL: TWA 0.05 p	NIOSH REL: TWA 0.05 ppm (0.3 mg/m ³) [skin]		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 6.79 n	ng/m ³	
Physical Description Colorless liquid with a disa	greeable odor. [Note: A solid	below 18°F.]		
MW: 166.1	BP: ?	FRZ: 18°F	Sol: 0.1%	
VP(72°F): 0.07 mmHg	IP: ?		Sp.Gr(77°F): 1.23	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Liquid		<u>'</u>		
Incompatibilities & React Ammonia compounds, amir dinitrate in explosion poten	nes, oxidizers, reducing agent	s, combustible materials [Note	: Similar to Ethylene glycol	
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: No recommendation Remove: No recommendation Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately				
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms Irritation eyes; conjunctivitis; methemoglobinemia; headache, impaired balance, visual disturbance; in animals: liver, kidney damage				
Target Organs Eyes, centr	Target Organs Eyes, central nervous system, blood, liver, kidneys			

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Propylene glycol m	CAS 107-98-2			
CH ₃ OCH ₂ CHCH ₃			RTECS UB7700000	
Synonyms & Trade Names Dowtherm® 209, 1-Methoxy-2-hydroxypropane, 1-Methoxy-2-propanol, 2-Methoxy-1-methylethanol, Propylene glycol methyl ether			DOT ID & Guide	
Exposure	NIOSH REL: TWA 100 ppn	n (360 mg/m ³) ST 150 ppm (5	540 mg/m ³)	
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 3.69 m	ng/m ³	
Physical Description Clear, colorless liquid with a	mild, ethereal odor.			
MW: 90.1	BP: 248°F	FRZ: -139°F (Sets to glass)	Sol: Miscible	
VP(77°F): 12 mmHg	IP: ?		Sp.Gr: 0.96	
Fl.P: 97°F	UEL(calc): 13.8%	LEL(calc.): 1.6%		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	low 100°F.		
Incompatibilities & Reactiv Oxidizers, strong acids [Note during prolonged storage.]		noisture from the air). May slo	owly form reactive peroxides	
Measurement Methods OSHA 99				
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation Remove: When wet (flammable) Change: No recommendation				
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, nose, throat; headache, nausea, dizziness, drowsiness, incoordination; vomiting, diarrhea				

Target Organs Eyes, skin, respiratory system, central nervous system

Remove: When wet (flammable)

Change: No recommendation Provide: Eyewash, Quick drench

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Propylene imine			CAS 75-55-8	
C ₃ H ₇ N			RTECS CM8050000	
			DOT ID & Guide 1921 131P (inhibited)	
Exposure	NIOSH REL: Ca TWA 2 pp	m (5 mg/m ³) [skin] See Appe	endix A	
Limits	OSHA PEL: TWA 2 ppm (5	mg/m ³) [skin]		
IDLH Ca [100 ppm]		Conversion 1 ppm = 2.34 m	ng/m ³	
Physical Description Colorless, oily liquid with an ammonia-like odor.				
MW: 57.1	BP: 152°F	FRZ: -85°F	Sol: Miscible	
VP: 112 mmHg	IP: 9.00 eV		Sp.Gr: 0.80	
Fl.P: 25°F	UEL: ?	LEL: ?		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.		
Incompatibilities & Reactivities Acids, strong oxidizers, water, carbonyl compounds, quinones, sulfonyl halides [Note: Subject to violent polymerization in contact with acids. Hydrolyzes in water to form methylethanolamine.]				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory suppo		

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Swallow: Medical attention immediately

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Eye, skin burns; [potential occupational carcinogen]

Target Organs Eyes, skin

Cancer Site [in animals: nasal tumors]

See also: <u>INTRODUCTION</u>

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Propylene oxide			CAS 75-56-9	
C ₃ H ₆ O			RTECS TZ2975000	
			DOT ID & Guide 1280 127P	
Exposure NIOSH REL: Ca See Appendix A				
Limits	OSHA PEL†: TWA 100 ppm (240 mg/m ³)			
IDLH Ca [400 ppm]		ng/m ³		
Physical Description Colorless liquid with a benzene-like odor. [Note: A gas above 94°F.]				
MW: 58.1	BP: 94°F	FRZ: -170°F	Sol: 41%	
VP: 445 mmHg	IP: 9.81 eV	IP: 9.81 eV Sp.Gr: 0.83		
Fl.P: -35°F	UEL: 36%	LEL: 2.3%		
Class IA Flammable Liquid: Fl.P. below 73°F and BP below 100°F.				
Incompatibilities & Reactivities Anhydrous metal chlorides; iron; strong acids, caustics & peroxides [Note: Polymerization may occur due to high temperatures or contamination with alkalis, aqueous acids, amines & acidic alcohols.]				
Measurement Methods NIOSH 1612; OSHA 88				
Personal Protection & Sanitation First Aid (See procedures)				

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Quick drench

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; skin blisters, burns; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system

Cancer Site [in animals: nasal tumors]

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n-Propyl nitrate			CAS 627-13-4
CH ₃ CH ₂ CH ₂ ONO ₂			RTECS UK0350000
			DOT ID & Guide 1865 131
Exposure	NIOSH REL: TWA 25 ppm	(105 mg/m ³) ST 40 ppm (170) mg/m ³)
Limits	OSHA PEL†: TWA 25 ppm	(110 mg/m ³)	
IDLH 500 ppm	Conversion 1 ppm = 4.30 m		ng/m ³
Physical Description Colorless to straw-colored liquid with an ether-like odor.			
MW: 105.1	BP: 231°F	FRZ: -148°F	Sol: Slight
VP: 18 mmHg	IP: 11.07 eV Sp.Gr		Sp.Gr: 1.07
Fl.P: 68°F	UEL: 100% LEL: 2%		
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.			
Incompatibilities & Reactivities Strong oxidizers, combustible materials [Note: Forms explosive mixtures with combustible materials.]			
Measurement Methods NIOSH S227 (II-3); OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable)		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 250 ppm: (APF = 10) Any supplied-air respirator

Up to 500 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concernⁱ/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes, skin; methemoglobinemia, anoxia, cyanosis; dyspnea (breathing difficulty), lassitude (weakness, exhaustion), dizziness, headache

Target Organs Eyes, skin, blood

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Pyrethrum			CAS 8003-34-7	
$ \frac{ C_{20} H_{28} O_3 / C_{21} H_{28} O_5 / C_{21} H_{30} O_3 / C_{22} H_{30} O_5 / C_{21} H_{28} O_3 / C_{22} H_{28} O_5 }{ } $			RTECS UR4200000	
Synonyms & Trade Names Cinerin I or II, Jasmolin I or II, Pyrethrin I or II, Pyrethrum I or II [Note: Pyrethrum is a variable mixture of Cinerin, Jasmolin, and Pyrethrin.]			DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 mg/m ²	NIOSH REL: TWA 5 mg/m ³		
Limits	OSHA PEL: TWA 5 mg/m ³	OSHA PEL: TWA 5 mg/m ³		
IDLH 5000 mg/m ³		Conversion		
Physical Description Brown, viscous oil or solid. [insecticide]				
MW: 316-374	BP: ?	MLT: ?	Sol: Insoluble	
VP: Low	IP: ?		Sp.Gr: 1 (approx)	
Fl.P: 180-190°F	UEL: ?	LEL: ?		
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.		
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH 5008; OSHA 70				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		

Respirator Recommendations NIOSH/OSHA

Up to 50 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter*/(APF = 10) Any supplied-air respirator*

Up to 125 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter* Up to 250 mg/m³: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)

in combination with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 5000 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Erythema, dermatitis, papules, pruritus, rhinorrhea (discharge of thin mucus); sneezing; asthma

Target Organs respiratory system, skin, central nervous system

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Pyridine			CAS 110-86-1	
C_5H_5N			RTECS UR8400000	
Synonyms & Trade Names Azabenzene, Azine		DOT ID & Guide 1282 129		
Exposure	NIOSH REL: TWA 5 ppm (15 mg/m ³)		
Limits	OSHA PEL: TWA 5 ppm (1	5 mg/m ³)		
IDLH 1000 ppm Co		Conversion 1 ppm = 3.24 mg/m ³		
Physical Description Colorless to yellow liquid with a nauseating, fish-like odor.				
MW: 79.1	BP: 240°F	FRZ: -44°F	Sol: Miscible	
VP: 16 mmHg	IP: 9.27 eV	IP: 9.27 eV		
Fl.P: 68°F	UEL: 12.4%	LEL: 1.8%		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.		
Incompatibilities & Reactivities Strong oxidizers, strong acids				
Measurement Methods NIOSH 1613; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supports Swallow: Medical attention in	ort	

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash, Quick drench

Up to 125 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{\pounds}$

Up to 50 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) $^{\pounds}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50)

Any supplied-air respirator with a full facepiece

Up to 1000 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes; headache, anxiety, dizziness, insomnia; nausea, anorexia; dermatitis; liver, kidney damage

Target Organs Eyes, skin, central nervous system, liver, kidneys, gastrointestinal tract,

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Quinone			CAS 106-51-4	
OC ₆ H ₄ O			RTECS DK2625000	
Synonyms & Trade Names 1,4-Benzoquinone; p-Benzoquinone; 1,4-Cyclohexadiene dioxide; p-Quinone		DOT ID & Guide 2587 153		
Exposure	Exposure NIOSH REL: TWA 0.4 mg/m ³ (0.1 ppm)			
Limits	OSHA PEL: TWA 0.4 mg/m	OSHA PEL: TWA 0.4 mg/m ³ (0.1 ppm)		
IDLH 100 mg/m ³		Conversion 1 ppm = 4.42 m	Conversion 1 ppm = 4.42 mg/m^3	
Physical Description Pale-yellow solid with an acrid, chlorine-like odor.				
MW: 108.1	BP: Sublimes	MLT: 240°F	Sol: Slight	
VP(77°F): 0.1 mmHg	IP: 9.68 eV		Sp.Gr: 1.32	
Fl.P: 100-200°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH S181 (II-4)				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		

Respirator Recommendations NIOSH/OSHA

Up to 10 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]

Up to 20 mg/m^3 : (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Eye irritation, conjunctivitis; keratitis (inflammation of the cornea); skin irritation

Target Organs Eyes, skin

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Resorcinol			CAS 108-46-3	
$C_6H_4(OH)_2$			RTECS VG9625000	
Synonyms & Trade Names 1,3-Benzenediol; m-Benzenediol; 1,3-Dihydroxybenzene; m-Dihydroxybenzene; 3-Hydroxyphenol; m-Hydroxyphenol			DOT ID & Guide 2876 153	
Exposure	NIOSH REL: TWA 10 ppm	(45 mg/m ³) ST 20 ppm (90 r	ng/m ³)	
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 4.50 m	ng/m ³	
Physical Description White needles, plates, crystals, flakes, or powder with a faint odor. [Note: Turns pink on exposure to air or light, or contact with iron.]				
MW: 110.1	BP: 531°F	MLT: 228°F	Sol: 110%	
VP(77°F): 0.0002 mmHg	IP: 8.63 eV		Sp.Gr: 1.27	
Fl.P: 261°F	UEL: ?	LEL(392°F): 1.4%		
Class IIIB Combustible Liqu	id, but may be difficult to ign	nite.		
Incompatibilities & Reactive Acetanilide, albumin, alkalis [Note: Hygroscopic (i.e., abs	antipyrine, camphor, ferric s	alts, menthol, spirit nitrous et	her, strong oxidizers & bases	
Measurement Methods NIOSH 5701; OSHA PV205	3			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendation	ng To be added later			

Symptoms Irritation eyes, skin, nose, throat, upper respiratory system; methemoglobinemia; cyanosis, convulsions; restlessness, bluish skin, increased heart rate, dyspnea (breathing difficulty); dizziness, drowsiness, hypothermia,

Exposure Routes inhalation, ingestion, skin and/or eye contact

hematuria (blood in the urine); spleen, kidney, liver changes; dermatitis

Target Organs Eyes, skin, respiratory system, cardiovascular system, central nervous system, blood, spleen, liver, kidneys

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Rhodium (metal f	Tume and insoluble	compounds, as	CAS 7440-16-6 (metal)	
Rh)				
Rh (metal)			RTECS VI9069000 (metal)	
Synonyms & Trade Names Rhodium metal: Elemental rhodium Synonyms of other insoluble rhodium compounds vary depending upon the specific compound.			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.1 mg	$/\mathrm{m}^3$		
Limits	OSHA PEL: TWA 0.1 mg/r	m^3		
IDLH 100 mg/m ³ (as Rh)		Conversion		
Physical Description Metal: White, hard, ductile, malleable solid with a bluish-gray luster.				
MW: 102.9	BP: 6741°F	MLT: 3571°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 12.41 (metal)	
Fl.P: NA	UEL: NA LEL: NA			
Metal: Noncombustible Soli	d in bulk form, but flammabl	e as dust or powder.		
Incompatibilities & Reactivities Chlorine trifluoride, oxygen difluoride				
Measurement Methods NIOSH S188 (II-3)				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendati	ons NIOSH/OSHA	11		

Up to 1 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators^/(APF =

Up to 0.5 mg/m^3 : (APF = 5) Any dust and mist respirator^

10) Any supplied-air respirator

Up to 2.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust, mist, and fume filter

Up to 5 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation

Symptoms Possible respiratory sensitization

Target Organs respiratory system

Any supplied-air respirator*

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Rhodium (soluble compounds, as Rh)		CAS	
			RTECS
Synonyms & Trade Names Synonyms vary depending upon the specific soluble rhodium compound.			DOT ID & Guide
Exposure	NIOSH REL: TWA 0.001 mg/m ³		
Limits	OSHA PEL: TWA 0.001 mg	r/m^3	
IDLH 2 mg/m ³ (as Rh)		Conversion	
Physical Description Appearance and odor vary d	epending upon the specific so	luble rhodium compound.	
Properties vary depending upon the specific soluble rhodium compound.			
Incompatibilities & Reactive Varies	vities		
Measurement Methods NIOSH S189 (II-3)			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory supports Swallow: Medical attention	
Respirator Recommendation	one NIOSH/OSHA		

Up to 0.01 mg/m^3 : (APF = 10) Any air-purifying respirator with a high-efficiency particulate filter*/(APF = 10)

Up to 0.05 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency

Up to 0.025 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any

powered, air-purifying respirator with a high-efficiency particulate filter*

particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 2 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes; central nervous system damage

Target Organs Eyes, central nervous system

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Ronnel			CAS 299-84-3	
(CH ₃ O) ₂ P(S)OC ₆ H ₂ Cl ₃			RTECS TG0525000	
Synonyms & Trade Names O,O-Dimethyl O-(2,4,5-trichlorophenyl) phosphorothioate; Fenchlorophos			DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 mg	$/m^3$		
Limits	OSHA PEL†: TWA 15 mg	y/m^3		
IDLH 300 mg/m ³		Conversion		
Physical Description White to light-tan, crystalline solid. [insecticide] [Note: A liquid above 106°F.]				
MW: 321.6	BP: Decomposes	MLT: 106°F	Sol(77°F): 0.004%	
VP(77°F): 0.0008 mmHg	IP: ?		Sp.Gr(77°F): 1.49	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reacti Strong oxidizers	vities			
Measurement Methods NIOSH 5600; OSHA PV2054				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately		
Remove: When wet or contaminated Change: Daily		Swallow: Medical atter	mon mimediately	

Respirator Recommendations NIOSH

Up to 100 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter/(APF = 10) Any supplied-air respirator

Up to 250 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter Up to 300 mg/m^3 : (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas

mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes; cholinesterase inhibition; liver, kidney damage

Target Organs Eyes, liver, kidneys, blood plasma

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Rosin core solder, formaldehyde)	CAS				
			RTECS		
Synonyms & Trade Names Rosin flux pyrolysis products	s, Rosin core soldering flux p	yrolysis products	DOT ID & Guide		
Exposure		y/m ³ [*Note: "Ca" in the prese yde. See Appendices A & C (
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion			
• • •	Physical Description Pyrolysis products of rosin core solder include acetone, aliphatic aldehydes, methyl alcohol, methane, ethane, various abietic acids (the major components of rosin), CO & CO ₂ .				
Properties vary depending upon the specific rosin core solder being used.	pecific rosin core				
Incompatibilities & Reactiv	vities				
Measurement Methods NIOSH 2541, 3500					
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Respiratory support			
Respirator Recommendation In the presence of Formaldey NIOSH		ldehyde:			

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF =

10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation

Symptoms Irritation eyes, nose, throat, upper respiratory system

Target Organs Eyes, respiratory system

Cancer Site [nasal cancer; thyroid gland tumors in animals (in presence of Formaldehyde, Acetaldehyde, or Malonaldehyde)]

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Rotenone			CAS 83-79-4	
$\overline{\mathbf{C_{23}H_{22}O_6}}$			RTECS DJ2800000	
Synonyms & Trade Names 1,2,12,12a-Tetrahydro-8,9-dimethoxy-2-(1-methyl-ethenyl)-[1]benzopyrano [3,4-b]furo[2,3-h][1] benzopyran-6(6aH)-one			DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 mg/n	n ³		
Limits	OSHA PEL: TWA 5 mg/m ²	3		
IDLH 2500 mg/m ³		Conversion		
Physical Description Colorless to red, odorless, crystalline solid. [insecticide]				
MW: 394.4	BP: Decomposes	MLT: 330°F	Sol: Insoluble	
VP: <0.00004 mmHg	IP: ?		Sp.Gr: 1.27	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reacti Strong oxidizers, alkalis	vities			
Measurement Methods NIOSH 5007				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supp Swallow: Medical attention		

Respirator Recommendations NIOSH/OSHA

Up to 50 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter/(APF = 10) Any supplied-air respirator

Up to 125 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter Up to 250 mg/m^3 : (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)

in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 2500 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; numb mucous membrane; nausea, vomiting, abdominal pain; muscle tremor, incoordination, clonic convulsions, stupor

Target Organs Eyes, skin, respiratory system, central nervous system

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Rouge		CAS 1309-37-1		
Fe ₂ O ₃			RTECS NO7400000	
		DOT ID & Guide		
Exposure	NIOSH REL: See Appendix	: <u>D</u>		
Limits	OSHA PEL†: TWA 15 mg/	m ³ (total) TWA 5 mg/m ³ (res	p)	
IDLH N.D.		Conversion		
Physical Description A fine, red powder of ferric	oxide. [Note: Usually used in	cake form or impregnated in	paper or cloth.]	
MW: 159.7	BP: ?	MLT: 2849°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 5.24	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reacti Calcium hypochlorite, carbo	vities on monoxide, hydrogen peroxi	de		
Measurement Methods NIOSH 0500, 0600				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact				
Symptoms Irritation eyes, skin, respiratory system				
Target Organs Eyes, skin, respiratory system				
See also: INTRODUCTION				

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Selenium		CAS 7782-49-2		
Se			RTECS VS7700000	
Synonyms & Trade Names Elemental selenium, Seleniu			DOT ID & Guide 2658 152 (powder)	
Exposure	NIOSH REL*: TWA 0.2 mg compounds (as Se) except Se	/m ³ [*Note: The REL also ap	plies to other selenium	
Limits	OSHA PEL*: TWA 0.2 mg/compounds (as Se) except Se	m ³ [*Note: The PEL also app elenium hexafluoride.]	lies to other selenium	
IDLH 1 mg/m ³ (as Se)		Conversion		
Physical Description Amorphous or crystalline, red to gray solid. [Note: Occurs as an impurity in most sulfide ores.]				
MW: 79.0	BP: 1265°F	MLT: 392°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 4.28	
Fl.P: NA	UEL: NA	LEL: NA		
Combustible Solid				
Incompatibilities & Reacti Acids, strong oxidizers, chro	vities omium trioxide, potassium bro	mate, cadmium		
Measurement Methods NIOSH 7300, S190 (II-7); OSHA ID121				
Personal Protection & Sanitation		First Aid (See procedures)		
Skin: Prevent skin contact Eyes: No recommendation		Eye: Irrigate immediately Skin: Soap wash immediately		
Wash skin: When contaminated		Breathing: Respiratory support		
Remove: When wet or contaminated		Swallow: Medical attention i	mmediately	
Change: No recommendatio	n			

Respirator Recommendations NIOSH/OSHA

Provide: Quick drench

Up to 1 mg/m³: (APF = 5) Any dust and mist respirator^*/(APF = 10) Any dust, mist, and fume respirator*/(APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter^*/(APF = 25) Any powered, air-purifying respirator with a dust, mist, and fume filter*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; in animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage

Target Organs Eyes, skin, respiratory system, liver, kidneys, blood, spleen

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Selenium hexafluoride			CAS 7783-79-1
SeF ₆			RTECS VS9450000
Synonyms & Trade Names Selenium fluoride			DOT ID & Guide 2194 125
Exposure	NIOSH REL: TWA 0.05 ppi	n	
Limits	OSHA PEL: TWA 0.05 ppm	(0.4 mg/m^3)	
IDLH 2 ppm		Conversion 1 ppm = 7.89 m	ng/m ³
Physical Description Colorless gas.			
MW: 193.0	BP: -30°F	FRZ: -59°F	Sol: Insoluble
VP: >1 atm	IP: ?	RGasD: 6.66	
Fl.P: NA	UEL: NA	LEL: NA	
Nonflammable Gas			
Incompatibilities & Reactive Water [Note: Hydrolyzes ver			
Measurement Methods None available			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Respiratory support	
Respirator Recommendation	ons NIOSH/OSHA		

Up to 0.5 ppm: (APF = 10) Any supplied-air respirator

Up to 1.25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 2 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation

Symptoms In animals: pulmonary irritation, edema

Target Organs respiratory system

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Silica, amorphous			CAS 7631-86-9	
SiO ₂			RTECS VV7310000	
Synonyms & Trade Names Diatomaceous earth, Diatomaceous silica, Diatomite, Precipitated amorphous silica Silica gel, Silicon dioxide (amorphous)		ipitated amorphous silica,	DOT ID & Guide	
Exposure	NIOSH REL: TWA 6 mg/m	3		
Limits	OSHA PEL†: TWA 20 mpp	cf (80 mg/m ³ /%SiO ₂)		
IDLH 3000 mg/m ³		Conversion		
Physical Description Transparent to gray, odorless powder. [Note: Amorphous silica is the non-crystalline form of SiO ₂ .]				
MW: 60.1	BP: 4046°F	MLT: 3110°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.20	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive Fluorine, oxygen difluoride,				
Measurement Methods NIOSH 7501				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air		
Respirator Recommendations NIOSH Up to 30 mg/m ³ : (APF = 5) Any dust and mist respirator				
op to 30 mg/m . (An r = 3) rany dust and mist respirator				

Up to 60 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF =

Up to 150 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

powered, air-purifying respirator with a dust and mist filter

10) Any supplied-air respirator

Up to 300 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 3000 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, pneumoconiosis

Target Organs Eyes, respiratory system

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Silica, crystalline	CAS 14808-60-7			
SiO ₂			RTECS VV7330000	
Synonyms & Trade Names Cristobalite, Quartz, Tridym			DOT ID & Guide	
Exposure Limits	NIOSH REL: Ca TWA 0.05 mg/m ³ See Appendix A OSHA PEL: Crystalline Quartz (respirable): TWA 250 mppcf/(%SiO ₂ +5); TWA 10 mg/m ³ /(%SiO ₂ + 2) Quartz (total dust): TWA 30 mg/m ³ /(%SiO ₂ + 2) Cristobalite: Use ½ the value calculated from the count or mass formulae for quartz. Tridymite: Use ½ the value calculated from the formulae for quartz.			
IDLH Ca [25 mg/m ³ (cristobalite, tridymite); 50 mg/m ³ (quartz, tripoli)				
Physical Description Colorless, odorless solid. [N	ote: A component of many m	ineral dusts.]		
MW: 60.1	BP: 4046°F	MLT: 3110°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.66	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive Powerful oxidizers: fluorine, acetylene; ammonia		ese trioxide, oxygen difluoride	e, hydrogen peroxide, etc.;	
Measurement Methods NIOSH 7500, 7601, 7602; OSHA ID142				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air		
Respirator Recommendations NIOSH				

Up to 0.5 mg/m: (APF = 10) Any air-purifying respirator with a high-efficiency particulate filter Up to 1.25 mg/m³: (APF = 25) Any powered, air-purifying respirator with a high-efficiency particulate filter/(APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 2.5 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter

Up to 25 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Cough, dyspnea (breathing difficulty), wheezing; decreased pulmonary function, progressive respiratory symptoms (silicosis); irritation eyes; [potential occupational carcinogen]

Target Organs Eyes, respiratory system

Cancer Site [in animals: lung cancer]

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Silicon			CAS 7440-21-3	
Si			RTECS VW0400000	
Elemental silicon [Note: Does not occur free in nature, but is found in silicon dioxide		DOT ID & Guide 1346 170 (amorphous powder)		
Exposure	NIOSH REL: TWA 10 mg/n	n ³ (total) TWA 5 mg/m ³ (resp	p)	
Limits	OSHA PEL†: TWA 15 mg/r	m ³ (total) TWA 5 mg/m ³ (res	p)	
IDLH N.D.		Conversion		
Physical Description Black to gray, lustrous, need	le-like crystals. [Note: The an	norphous form is a dark-brow	vn powder.]	
MW: 28.1	BP: 4271°F	MLT: 2570°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr(77°F): 2.33	
Fl.P: NA	UEL: NA	LEL: NA	MEC: 160 g/m ³	
Combustible Solid in powder	r form.			
Incompatibilities & Reactive Chlorine, fluorine, oxidizers,	vities calcium, cesium carbide, alk	aline carbonates		
Measurement Methods NIOSH 0500, 0600				
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, upper respiratory system; cough				
Target Organs Eyes, skin, respiratory system				
See also: INTRODUCTION				

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Silicon carbide			CAS 409-21-2	
SiC			RTECS VW0450000	
Synonyms & Trade Names Carbon silicide, Carborundu			DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 mg/n	n ³ (total) TWA 5 mg/m ³ (res	p)	
Limits	OSHA PEL†: TWA 15 mg/r	m ³ (total) TWA 5 mg/m ³ (res	p)	
IDLH N.D.		Conversion		
Physical Description Yellow to green to bluish-bl	ack, iridescent crystals.			
MW: 40.1	BP: Sublimes	MLT: 4892°F (Sublimes)	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: 9.30 eV		Sp.Gr: 3.23	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reaction None reported [Note: Subline 1988]	vities nes with decomposition at 489	2°F.]		
Measurement Methods NIOSH 0500, 0600				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation	Exposure Routes inhalation, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, skin, upper respiratory system; cough				
Target Organs Eyes, skin, respiratory system				
Can also, INTRODUCTION				

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Silicon tetrahydride		CAS 7803-62-5		
SiH ₄			RTECS VV1400000	
Synonyms & Trade Names Monosilane, Silane, Silicane			DOT ID & Guide 2203 116	
Exposure	NIOSH REL: TWA 5 ppm (7 mg/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 1.31 m	ng/m ³	
Physical Description Colorless gas with a repulsive	e odor.			
MW: 32.1	BP: -169°F	FRZ: -301°F	Sol: Decomposes	
VP: >1 atm	IP: ?	RGasD: 1.11		
Fl.P: NA (Gas)	UEL: ?	LEL: ?		
Flammable Gas (may ignite s	SPONTANEOUSLY in air).			
Incompatibilities & Reactive Halogens (bromine, chlorine		pentachloride, tin(IV) chlorid	le), water	
Measurement Methods None available				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Respiratory support		
Respirator Recommendations To be added later				
Exposure Routes inhalation				
Symptoms Irritation eyes, skin, mucous membrane; nausea, headache				
Target Organs Eyes, skin, respiratory system, central nervous system				
See also: INTRODUCTION				

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Silver (metal dust and soluble compounds, as Ag)			CAS 7440-22-4 (metal)	
A a (metal)			RTECS VW3500000 (metal)	
Synonyms & Trade Names Silver metal: Argentum Synonyms of soluble silver compounds such as Silver nitrate (AgNO ₃) vary depending upon the specific compound.			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.01 mg	r/m^3		
Limits	OSHA PEL: TWA 0.01 mg/	m^3		
IDLH 10 mg/m ³ (as Ag)		Conversion		
Physical Description Metal: White, lustrous solid.				
MW: 107.9	BP: 3632°F	MLT: 1761°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 10.49 (metal)	
Fl.P: NA	UEL: NA	LEL: NA		
Metal: Noncombustible Solic	d, but flammable in form of d	ust or powder.		
Incompatibilities & Reactive Acetylene, ammonia, hydrog		orine trifluoride, ethyleneimin	e, oxalic acid, tartaric acid	
Measurement Methods NIOSH 7300; OSHA ID121				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated (AgNO ₃) Change: Daily Provide: Eyewash		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory suppo		

Up to 0.25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any

Up to 0.5 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

powered, air-purifying respirator with a high-efficiency particulate filter[£]

Respirator Recommendations NIOSH/OSHA

filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 10 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance

Target Organs Nasal septum, skin, eyes

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Soapstone (containing less than 1% quartz)			CAS	
3MgO-4SiO ₂ -H ₂ O			RTECS VV8780000	
Synonyms & Trade Names Massive talc, Soapstone silicate, Steatite			DOT ID & Guide	
Exposure	NIOSH REL: TWA 6 mg/n	n ³ (total) TWA 3 mg/m ³ (r	esp)	
Limits	OSHA PEL†: TWA 20 mp	pcf		
IDLH 3000 mg/m ³	1	Conversion		
Physical Description Odorless, white-gray powd	ler.			
MW: 379.3	BP: ?	MLT: ?	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.7-2.8	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactivities None reported				
Measurement Methods NIOSH 0500				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Respiratory support		
Respirator Recommendations NIOSH Up to 30 mg/m ³ : (APF = 5) Any dust and mist respirator				

Up to 60 mg/m^3 : (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF =

filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow

Up to 300 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

Up to 150 mg/m^3 : (APF = 25) Any powered, air-purifying respirator with a dust and mist filter

10) Any supplied-air respirator

mode*/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 3000 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Pneumoconiosis: cough, dyspnea (breathing difficulty); digital clubbing; cyanosis; basal crackles, corpulmonale

Target Organs respiratory system, cardiovascular system

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Sodium aluminum fluoride (as F)			CAS 15096-52-3	
Na ₃ AlF ₆			RTECS WA9625000	
Synonyms & Trade Names Cryocide, Cryodust, Cryolite, Sodium hexafluoroaluminate		te	DOT ID & Guide	
Exposure NIOSH REL*: TWA 2.5 mg solid fluorides (as F).]		g/m ³ [*Note: The REL also applies to other inorganic,		
Limits	OSHA PEL*: TWA 2.5 mg/m ³ [*Note: The PEL also applies to other inorganic, solid fluorides (as F).]			
IDLH 250 mg/m ³ (as F)		Conversion		
Physical Description Colorless to dark odorless s	Physical Description Colorless to dark odorless solid. [pesticide] [Note: Loses color on heating.]			
MW: 209.9	BP: Decomposes	MLT: 1832°F	Sol: 0.04%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.90	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH 7902; OSHA ID110				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Fresh air Swallow: Medical attention	immediately	

Respirator Recommendations NIOSH/OSHA

Up to 12.5 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 25 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators*/(APF = 10) Any supplied-air respirator*

Up to 62.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter*+

Up to 125 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter+/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 250 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter+/Any appropriate escape-type, self-contained breathing apparatus

+Note: May need acid gas sorbent

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, respiratory system; nausea, abdominal pain, diarrhea; salivation, thirst, sweating; stiff spine; dermatitis; calcification of ligaments of ribs, pelvis

Target Organs Eyes, skin, respiratory system, central nervous system, skeleton, kidneys

Sodium azide

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CAS 26628-22-8

NaN ₃			RTECS VY8050000		
			DOT ID & Guide 1687 153		
Exposure	NIOSH REL: C 0.1 ppm (as	NIOSH REL: C 0.1 ppm (as HN ₃) [skin] C 0.3 mg/m ³ (as NaN ₃) [skin]			
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion			
Physical Description Colorless to white, odorless,	crystalline solid. [pesticide] [Note: Forms hydrazoic acid (l	HN3) in water.]		
MW: 65.0	BP: Decomposes	MLT: 527°F (Decomposes)	Sol(63°F): 42%		
VP: ?	IP: 11.70 eV		Sp.Gr: 1.85		
Fl.P: ?	UEL: ?	LEL: ?			
Combustible Solid (if heated	Combustible Solid (if heated above 572°F).				
Incompatibilities & Reactivities Acids, metals, water [Note: Over a period of time, sodium azide may react with copper, lead, brass, or solder in plumbing systems to form an accumulation of the HIGHLY EXPLOSIVE compounds of lead azide & copper azide.]					
Measurement Methods OSHA ID121, ID211					
Personal Protection & San Skin: Prevent skin contact Eyes: Prevent eye contact	itation	First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate			

Symptoms Irritation eyes, skin; headache, dizziness, lassitude (weakness, exhaustion), blurred vision; low blood

Target Organs Eyes, skin, central nervous system, cardiovascular system, kidneys

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Respirator Recommendations To be added later

pressure, bradycardia; kidney changes

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Sodium bisulfite			CAS 7631-90-5
NaHSO ₃			RTECS VZ2000000
		DOT ID & Guide 2693 154 (solution)	
Exposure	NIOSH REL: TWA 5 mg/m	3	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description White crystals or powder wit	h a slight odor of sulfur diox	ide.	
MW: 104.1	BP: Decomposes	MLT: Decomposes	Sol: 29%
VP: ?	IP: NA		Sp.Gr: 1.48
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid			
Incompatibilities & Reactive Heat (decomposes) [Note: Sleeping 1988]	vities owly oxidized to the sulfate of	on exposure to air.]	
Measurement Methods NIOSH 0500			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air Swallow: Medical attention immediately	
Respirator Recommendations To be added later			
Exposure Routes inhalation, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, skin, mucous membrane			
Target Organs Eyes, skin, respiratory system			
See also: <u>INTRODUCTION</u>			

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Sodium cyanide (as CN)			CAS 143-33-9	
NaCN			RTECS VZ7530000	
		DOT ID & Guide 1689 157		
Exposure		n ³ (4.7 ppm) [10-minute] except Hydrogen cyanide.]	[*Note: The REL also applies to	
Limits		OSHA PEL*: TWA 5 mg/m ³ [*Note: The PEL also applies to other cyanides (as CN) except Hydrogen cyanide.]		
IDLH 25 mg/m ³ (as CN) Conversion				
Physical Description White, granular or crystal	line solid with a faint, almor	nd-like odor.		
MW: 49.0	BP: 2725°F	MLT: 1047°F	Sol(77°F): 58%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.60	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid, but contact with acids releases highly flammable hydrogen cyanide.				
Incompatibilities & Reactivities Strong oxidizers (such as acids, acid salts, chlorates & nitrates) [Note: Absorbs moisture from the air forming a syrup.]				
Measurement Methods NOISH 6010, 7904				
Personal Protection & S Skin: Prevent skin contact		First Aid (See proce Eye: Irrigate immedi		

Respirator Recommendations NIOSH/OSHA

Eyes: Prevent eye contact

Change: Daily

Wash skin: When contaminated

Provide: Eyewash, Quick drench

Remove: When wet or contaminated

Up to 25 mg/m³: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Skin: Soap wash immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern and having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; asphyxia; lassitude (weakness, exhaustion), headache, confusion; nausea, vomiting; increased respiratory rate; slow gasping respiration; thyroid, blood changes

Target Organs Eyes, skin, cardiovascular system, central nervous system, thyroid, blood

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Sodium fluoride (as F)			CAS 7681-49-4		
NaF			RTECS WB0350000		
			DOT ID & Guide 1690 154		
Exposure	NIOSH REL*: TWA 2.5 mg/m ³ [*Note: The REL also applies to other inorganic, solid fluorides (as F).]				
Limits	OSHA PEL*: TWA 2.5 mg/m ³ [*Note: The PEL also applies to other inorganic, soli fluorides (as F).]				
IDLH 250 mg/m ³ (as F)		Conversion			
Physical Description Odorless, white powder or o	colorless crystals. [Note	: Pesticide grade is often dyec	l blue.]		
MW: 42.0	BP: 3099°F	MLT: 1819°F	Sol: 4%		
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.78		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid	Noncombustible Solid				
Incompatibilities & React Strong oxidizers	Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH 7902, 7906; OSHA ID110					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		Eye: Irrigate immedia Skin: Soap wash pron Breathing: Fresh air	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Fresh air Swallow: Medical attention immediately		
Respirator Recommendations NIOSH/OSHA					

Up to 25 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators*/(APF =

Up to 62.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any

Up to 12.5 mg/m^3 : (APF = 5) Any dust and mist respirator

powered, air-purifying respirator with a dust and mist filter*+

10) Any supplied-air respirator*

Up to 125 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter+/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 250 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter+/Any appropriate escape-type, self-contained breathing apparatus +Note: May need acid gas sorbent

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, respiratory system; nausea, abdominal pain, diarrhea; salivation, thirst, sweating; stiff spine; dermatitis; calcification of ligaments of ribs, pelvis

Target Organs Eyes, skin, respiratory system, central nervous system, skeleton, kidneys

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Sodium fluoroacetate			CAS 62-74-8	
FCH ₂ COONa			RTECS AH9100000	
			DOT ID & Guide 2629 151	
Exposure	NIOSH REL: TWA 0.05 mg	g/m ³ ST 0.15 mg/m ³ [skin]		
Limits	OSHA PEL†: TWA 0.05 mg	g/m ³ [skin]		
IDLH 2.5 mg/m ³		Conversion		
Physical Description Fluffy, colorless to white (sometimes dyed black), odorless powder. [Note: A liquid above 95°F.] [rodenticide]				
MW: 100.0	BP: Decomposes	BP: Decomposes MLT: 392°F Sol:		
VP: Low	IP: ?		Sp.Gr: ?	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactivities None reported				
Measurement Methods NIOSH S301 (II-5)				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supports Swallow: Medical attention in	ort	

Respirator Recommendations NIOSH/OSHA

Up to 0.25 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 0.5 mg/m^3 : (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any supplied-air respirator

Up to 1.25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter

Up to 2.5 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Vomiting; anxiety, auditory hallucinations; facial paresthesia; twitching face muscle; pulsus altenans, ectopic heartbeat, tachycardia, cardiac arrhythmias; pulmonary edema; nystagmus; convulsions; liver, kidney damage

Target Organs respiratory system, cardiovascular system, liver, kidneys, central nervous system

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NIOSH Pocket Guide to Chemical Hazards

CAS 1310-73-2

		RTECS WB4900000		
NaOH				
Synonyms & Trade Names Caustic soda, Lye, Soda lye, Sodium hydrate				
NIOSH REL: C 2 mg/m ³				
OSHA PEL†: TWA 2 mg/n	n ³			
	Conversion			
Physical Description Colorless to white, odorless solid (flakes, beads, granular form).				
BP: 2534°F	MLT: 605°F	Sol: 111%		
IP: NA		Sp.Gr: 2.13		
UEL: NA	LEL: NA			
Noncombustible Solid, but when in contact with water may generate sufficient heat to ignite combustible materials.				
Incompatibilities & Reactivities Water; acids; flammable liquids; organic halogens; metals such as aluminum, tin & zinc; nitromethane [Note: Corrosive to metals.]				
Measurement Methods NIOSH 7401				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		ort		
	NIOSH REL: C 2 mg/m³ OSHA PEL†: TWA 2 mg/m solid (flakes, beads, granular BP: 2534°F IP: NA UEL: NA when in contact with water may ities uids; organic halogens; metals iitation	NIOSH REL: C 2 mg/m³ OSHA PEL†: TWA 2 mg/m³ Conversion Solid (flakes, beads, granular form). BP: 2534°F IP: NA UEL: NA When in contact with water may generate sufficient heat to invities uids; organic halogens; metals such as aluminum, tin & zince that the contact with t		

Respirator Recommendations NIOSH/OSHA

Provide: Eyewash, Quick drench

Up to 10 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]/(APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter[£]/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

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breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; pneumonitis; eye, skin burns; temporary loss of hair

Target Organs Eyes, skin, respiratory system

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Sodium metabisulfite			CAS 7681-57-4	
$\overline{Na_2S_2O_5}$			RTECS UX8225000	
Synonyms & Trade Names Disodium pyrosulfite, Sodium metabisulphite, Sodium pyrosulfite		DOT ID & Guide		
Exposure	NIOSH REL: TWA 5 m	g/m ³		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description White to yellowish crystals of	or powder with an odor of	f sulfur dioxide.		
MW: 190.1	BP: Decomposes	MLT: >302°F (Decomposes)	Sol: 54%	
VP: ?	IP: NA		Sp.Gr: 1.4	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactivities Heat (decomposes) [Note: Slowly oxidized to the sulfate on exposure to air & moisture.]				
Measurement Methods NIOSH 0500				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		Eye: Irrigate immediat Breathing: Fresh air	First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air Swallow: Medical attention immediately	
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, mucous membrane				
Target Organs Eyes, skin, respiratory system				
See also: INTRODUCTION				

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Starch			CAS 9005-25-8	
$(C_6H_{10}O_5)_n$			RTECS GM5090000	
Synonyms & Trade Names Corn starch, Rice starch, Sor	Synonyms & Trade Names Corn starch, Rice starch, Sorghum gum, alpha-Starch, Starch gum, Tapioca starch		DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 mg/n	NIOSH REL: TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)		
Limits	OSHA PEL: TWA 15 mg/m ³ (total) TWA 5 mg/m ³ (resp)			
IDLH N.D.		Conversion		
Physical Description Fine, white, odorless powder	. [Note: A carbohydrate polyi	mer composed of 25% amylos	se & 75% amylpectin.]	
MW: varies	BP: Decomposes	MLT: Decomposes	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.45	
Fl.P: NA	UEL: NA	LEL: NA	MEC: 50 g/m ³	
Noncombustible Solid, but m	ay form explosive mixture w	ith air.		
Incompatibilities & Reactive Oxidizers, acids, iodine, alka				
Measurement Methods NIOSH 0500, 0600				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air Swallow: Medical attention immediately		
Respirator Recommendatio	ons To be added later			
Exposure Routes inhalation,	, ingestion, skin and/or eye co	ontact		
Symptoms Irritation eyes, sk mucus)	in, mucous membrane; cough	ı, chest pain; dermatitis; rhino	orrhea (discharge of thin	
Target Organs Eyes, skin, re	espiratory system			
See also: INTRODUCTION				

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Stibine			CAS 7803-52-3
SbH ₃			RTECS WJ0700000
Synonyms & Trade Names Antimony hydride, Antimony	y trihydride, Hydrogen antimo	onide	DOT ID & Guide 2676 119
Exposure	NIOSH REL: TWA 0.1 ppm (0.5 mg/m ³)		
Limits	OSHA PEL: TWA 0.1 ppm	(0.5 mg/m^3)	
IDLH 5 ppm		Conversion 1 ppm = 5.10 m	ng/m ³
Physical Description Colorless gas with a disagree	eable odor like hydrogen sulfi	de.	
MW: 124.8	BP: -1°F	FRZ: -126°F	Sol: Slight
VP: >1 atm	IP: 9.51 eV	RGasD: 4.31	
Fl.P: NA (Gas)	UEL: ?	LEL: ?	
Flammable Gas			
Incompatibilities & Reactive Acids, halogenated hydrocard	vities bons, oxidizers, moisture, chl	orine, ozone, ammonia	
Measurement Methods NIOSH 6008			
Personal Protection & Sani Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation	tion n	First Aid (See procedures) Breathing: Respiratory suppo	ort

Respirator Recommendations NIOSH/OSHA

Up to 1 ppm: (APF = 10) Any supplied-air respirator

Up to 2.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 5 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation

Symptoms Headache, lassitude (weakness, exhaustion); nausea, abdominal pain; lumbar pain, hematuria (blood in the urine), hemolytic anemia; jaundice; pulmonary irritation

Target Organs Blood, liver, kidneys, respiratory system

supplied-air respirator*

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Stoddard solvent		CAS 8052-41-3	
			RTECS WJ8925000
Synonyms & Trade Names Dry cleaning safety solvent, Mineral spirits, Petroleum solvent, Spotting naphtha [Note: A refined petroleum solvent with a flash point of 102-110°F, boiling point of 309-396°F, and containingg >65% C10 or higher hydrocarbons.]			DOT ID & Guide 1268 128 (petroleum distillate)
Exposure NIOSH REL: TWA 350 mg/r		mg/m ³ C 1800 mg/m ³ [15-minu	te]
Limits	OSHA PEL†: TWA 500]	ppm (2900 mg/m ³)	
IDLH 20,000 mg/m ³		Conversion	
Physical Description Colorless liquid with a keros	sene-like odor.		
MW: Varies	BP: 309-396°F	FRZ: ?	Sol: Insoluble
VP: ?	IP: ?		Sp.Gr: 0.78
Fl.P: 102-110°F	UEL: ?	LEL: ?	
Class II Combustible Liquid	: Fl.P. at or above 100°F at	nd below 140°F.	
Incompatibilities & Reactive Strong oxidizers	vities		
Measurement Methods NIOSH 1550			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendation	ons NIOSH		

Up to 3500 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any

Up to 8750 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any

Up to $17,500 \text{ mg/m}^3$: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor

powered, air-purifying respirator with organic vapor cartridge(s)*

cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to $20,000 \text{ mg/m}^3$: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; dizziness; dermatitis; chemical pneumonitis (aspiration liquid); in animals: kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, kidneys

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Strychnine CAS 57-24-9			CAS 57-24-9
$\boxed{\mathbf{C_{21}H_{22}N_2O_2}}$			RTECS WL2275000
Synonyms & Trade Names Nux vomica, Strynchnos		DOT ID & Guide 1692 151	
Exposure	NIOSH REL: TWA 0.15 mg/m ³		
Limits	OSHA PEL: TWA 0.15 mg/	m^3	
IDLH 3 mg/m ³		Conversion	
Physical Description Colorless to white, odorless,	crystalline solid. [pesticide]		
MW: 334.4	BP: Decomposes	MLT: 514°F	Sol: 0.02%
VP: Low	IP: ?		Sp.Gr: 1.36
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Solid, but diffic	cult to ignite.		
Incompatibilities & Reactive Strong oxidizers	vities		
Measurement Methods NIOSH 5016			
Personal Protection & San Skin: Prevent skin contact	itation	First Aid (See procedures) Eye: Irrigate immediately	
Eyes: No recommendation	41	Skin: Soap wash promptly	
Wash skin: When contaminated Remove: No recommendation		Breathing: Respiratory support Swallow: Medical attention immediately	
Change: Daily			, and the second se

Respirator Recommendations NIOSH/OSHA

Up to 0.75 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 1.5 mg/m^3 : (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any supplied-air respirator

Up to 3 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter/(APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full

facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Stiff neck, facial muscle; restlessness, anxiety, increased acuity of perception; increased reflex excitability; cyanosis; tetanic convulsions with opisthotonos

Target Organs central nervous system

supplied-air respirator*

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Styrene CAS 100-42-5			CAS 100-42-5	
C ₆ H ₅ CH=CH ₂			RTECS WL3675000	
Synonyms & Trade Names Ethenyl benzene, Phenylethy	lene, Styrene monomer, Styre	ol, Vinyl benzene	DOT ID & Guide 2055 128P (inhibited)	
Exposure	NIOSH REL: TWA 50 ppm	(215 mg/m ³) ST 100 ppm (42	25 mg/m ³)	
Limits	OSHA PEL†: TWA 100 ppm hours)	OSHA PEL†: TWA 100 ppm C 200 ppm 600 ppm (5-minute maximum peak in any 3 hours)		
IDLH 700 ppm		Conversion 1 ppm = 4.26 m	ng/m ³	
Physical Description Colorless to yellow, oily liqu	id with a sweet, floral odor.			
MW: 104.2	BP: 293°F	FRZ: -23°F	Sol: 0.03%	
VP: 5 mmHg	IP: 8.40 eV		Sp.Gr: 0.91	
Fl.P: 88°F	UEL: 6.8%	LEL: 0.9%		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	elow 100°F.		
	polymers, peroxides, strong	acids, aluminum chloride [No nibitor such as tert-butylcatecl		
Measurement Methods NIOSH 1501, 3800; OSHA 9), 89			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately				
Respirator Recommendation Up to 500 ppm: (APF = 10)		rator with organic vapor cartri	dge(s)*/(APF = 10) Any	

Up to 700 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any self-contained breathing

apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, respiratory system; headache, lassitude (weakness, exhaustion), dizziness, confusion, malaise (vague feeling of discomfort), drowsiness, unsteady gait; narcosis; defatting dermatitis; possible liver injury; reproductive effects

Target Organs Eyes, skin, respiratory system, central nervous system, liver, reproductive system

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Subtilisins	CAS 1395-21-7 (BPN) 9014-01-1 (Carlsburg)		
			RTECS CO9450000 (BPN) CO9550000 (Carlsburg)
	btilis BPN, Bacillus subtilis C abtilisin Carlsburg [Note: Con		DOT ID & Guide
Exposure NIOSH REL: ST 0.00006 mg/m ³ [60-minute]			
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description Light-colored, free-flowing 1	powders. [Note: A protein cor	ntaining numerous amino acid	s.]
MW: 28,000 (approx)	BP: ?	MLT: ?	Sol: ?
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: ?
Fl.P: NA	UEL: NA	LEL: NA	
Incompatibilities & Reactive None reported	vities		
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation	, ingestion, skin and/or eye co	ontact	
	kin, respiratory system; respiratory system; respiratory system; respiratory system; when	•	thma): sweating, headache,
Target Organs Eyes, skin, 1	respiratory system		

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Succinonitrile			CAS 110-61-2	
NCCH ₂ CH ₂ CN			RTECS WN3850000	
Synonyms & Trade Names Butanedinitrile; 1,2-Dicyanoethane; Dinile; Ethylene cyanide; Ethylene dicyanide; Succinic dinitrile			de; DOT ID & Guide	
Exposure	NIOSH REL: TWA	NIOSH REL: TWA 6 ppm (20 mg/m ³)		
Limits	OSHA PEL: none			
IDLH N.D.	'	Conversion 1 ppm =	= 3.28 mg/m ³	
Physical Description Colorless, odorless, waxy	solid. [Note: Forms cya	anide in the body.]		
MW: 80.1	BP: 509°F	MLT: 134°F	Sol: 13%	
VP(212°F): 2 mmHg	IP: ?		Sp.Gr: 0.99	
Fl.P: 270°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Rea Oxidizers	ctivities			
Measurement Methods NIOSH Nitriles Crit. Doc				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact		Eye: Irrigate immedi	First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash immediately	

Wash skin: When contaminated Remove: When wet or contaminated

Change: Daily Provide: Eyewash Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

Up to 60 ppm: (APF = 10) Any supplied-air respirator

Up to 150 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 250 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any suppliedair respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; headache, dizziness, lassitude (weakness, exhaustion), confusion, convulsions; blurred vision; dyspnea (breathing difficulty); abdominal pain, nausea, vomiting

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system

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Sucrose			CAS 57-50-1	
$C_{12}H_{22}O_{11}$			RTECS WN6500000	
Synonyms & Trade Names Beet sugar, Cane sugar, Confectioner's sugar, Granulated sugar, Rock candy Saccarose, Sugar, Table sugar			DOT ID & Guide	
Exposure	NIOSH REL: TWA 10	mg/m ³ (total) TWA 5 mg/m ³	(resp)	
Limits	OSHA PEL: TWA 15 m	ng/m ³ (total) TWA 5 mg/m ³	(resp)	
IDLH N.D.		Conversion		
Physical Description Hard, white, odorless crysta	als, lumps, or powder. [No	te: May have a characteristic	, caramel odor when heated.]	
MW: 342.3	BP: Decomposes	MLT: 320-367°F (Decomposes)	Sol: 200%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.59	
Fl.P: NA	UEL: NA	LEL: NA	MEC: 45 g/m ³	
Noncombustible Solid, but	fine airborne dust may exp	olode.	•	
Incompatibilities & React Oxidizers, sulfuric acid, nit				
Measurement Methods NIOSH 0500, 0600				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		· · · · · · · · · · · · · · · · · · ·	First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air	
Respirator Recommendat	ions To be added later			
Exposure Routes inhalatio	n, skin and/or eye contact			
Symptoms Irritation eyes,	skin, upper respiratory sys	tem; cough		
Target Organs Eyes, respi	ratory system			

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Sulfur dioxide			CAS 7446-09-5
$\overline{\mathrm{SO}_2}$			RTECS WS4550000
			DOT ID & Guide 1079 125
Exposure	NIOSH REL: TWA 2 ppm (5 mg/m³) ST 5 ppm (13 mg/m²)		
Limits	OSHA PEL†: TWA 5	5 ppm (13 mg/m ³)	
IDLH 100 ppm		Conversion 1 ppm =	2.62 mg/m ³
Physical Description Colorless gas with a cl compressed gas.]		-	w 14°F. Shipped as a liquefied
MW: 64.1	BP: 14°F	FRZ: -104°F	Sol: 10%
VP: 3.2 atm	IP: 12.30 eV	RGasD: 2.26	
Fl.P: NA	UEL: NA	LEL: NA	
Nonflammable Gas			
			uminum, brass, copper [Note:
Measurement Metho NIOSH 6004; OSHA l			
Personal Protection &	& Sanitation	First Aid (See proce	dures)

Respirator Recommendations NIOSH

Remove: When wet or contaminated (liquid)

Wash skin: No recommendation

Change: No recommendation

Skin: Frostbite Eyes: Frostbite

Provide: Frostbite

Up to 20 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern*/(APF = 10) Any supplied-air respirator*

Eye: Frostbite

Skin: Frostbite

Breathing: Respiratory support

Up to 50 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern* Up to 100 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing

protection against the compound of concern/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against the compound of concern*/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; rhinorrhea (discharge of thin mucus); choking, cough; reflex bronchoconstriction; liquid: frostbite

Target Organs Eyes, skin, respiratory system

See also: <u>INTRODUCTION</u>

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Sulfur hexafluorid	le		CAS 2551-62-4	
SF ₆			RTECS WS4900000	
			DOT ID & Guide 1080 126	
Exposure	NIOSH REL: TWA 1000 pp	m (6000 mg/m ³)		
Limits	OSHA PEL: TWA 1000 ppr	OSHA PEL: TWA 1000 ppm (6000 mg/m ³)		
IDLH N.D.	IDLH N.D. $ $ Conversion 1 ppm = 5.98 mg/m^3			
Physical Description Colorless, odorless gas. [Not	e: Shipped as a liquefied com	pressed gas. Condenses direc	tly to a solid upon cooling.]	
MW: 146.1	BP: Sublimes	FRZ: -83°F (Sublimes)	Sol(77°F): 0.003%	
VP: 21.5 atm	IP: 19.30 eV	RGasD: 5.11		
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Gas				
Incompatibilities & Reactive Disilane	vities			
Measurement Methods NIOSH 6602				
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: No recommendation Change: No recommendation Provide: Frostbite		First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory support		
Respirator Recommendation	ons To be added later			
Exposure Routes inhalation				
	sed breathing rate, pulse rate; ea, vomiting, convulsions; lic	slight muscle incoordination, uid: frostbite	emotional upset; lassitude	
Target Organs respiratory s	ystem			

See also: <u>INTRODUCTION</u>

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Sulfuric acid			CAS 7664-93-9	
H_2SO_4			RTECS WS5600000	
Synonyms & Trade Names Battery acid, Hydrogen sulfate, Oil of vitriol, Sulfuric acid (aqueous)		DOT ID & Guide 1830 137 1831 137 (fuming) 1832 137 (spent)		
Exposure	NIOSH REL: TWA	I mg/m ³		
Limits	OSHA PEL: TWA 1	mg/m^3		
IDLH 15 mg/m ³		Conversion		
Physical Description Colorless to dark-brown, oily aqueous solution.]	, odorless liquid. [No	te: Pure compound is a solid	below 51°F. Often used in an	
MW: 98.1	BP: 554°F	FRZ: 51°F	Sol: Miscible	
VP: 0.001 mmHg	IP: ?		Sp.Gr: 1.84 (96-98% acid)	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid, but of	capable of igniting fin	ely divided combustible mate	erials.	
Incompatibilities & Reactivities Organic materials, chlorates, carbides, fulminates, water, powdered metals [Note: Reacts violently with water with evolution of heat. Corrosive to metals.]				
Measurement Methods NIOSH 7903; OSHA ID165SG				

Personal Protection & SanitationSkin: Prevent skin contact

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Change: No recommendation

Provide: Eyewash (>1%), Quick drench (>1%)

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 15 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]/(APF = 25) Any powered, air-purifying respirator with acid gas cartridge(s) in combination with a high-efficiency particulate filter[£] (APF = 50) Any chemical cartridge respirator with a full facepiece and acid gas cartridge(s) in combination with a

high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister having a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; pulmonary edema, bronchitis; emphysema; conjunctivitis; stomatis; dental erosion; eye, skin burns; dermatitis

Target Organs Eyes, skin, respiratory system, teeth

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Sulfur monochloride			CAS 10025-67-9		
S_2Cl_2			RTECS WS4300000		
			DOT ID & Guide 1828 137		
Exposure	NIOSH REL: C 1 ppm (6 mg	g/m ³)			
Limits	OSHA PEL†: TWA 1 ppm (OSHA PEL†: TWA 1 ppm (6 mg/m ³)			
IDLH 5 ppm	IDLH 5 ppm $ $ Conversion 1 ppm = 5.52 mg/m^3				
Physical Description Light-amber to yellow-red, oily liquid with a pungent, nauseating, irritating odor.					
, ,					
MW: 135.0	BP: 280°F	FRZ: -107°F	Sol: Decomposes		
			Sol: Decomposes Sp.Gr: 1.68		
MW: 135.0	BP: 280°F IP: 9.40 eV		1		
MW: 135.0 VP: 7 mmHg	BP: 280°F IP: 9.40 eV UEL: ?	FRZ: -107°F	1		

sulfur dioxide, sulfur, sulfite, thiosulfate, and hydrogen sulfide. Corrosive to metals.]

Measurement Methods
None available

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

Change: No recommendation Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 5 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern $^{\pounds}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; lacrimation (discharge of tears); cough; eye, skin burns; pulmonary edema

Target Organs Eyes, skin, respiratory system

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Sulfur pentafluoride			CAS 5714-22-7	
$\overline{\mathbf{S_2F_{10}}}$			RTECS WS4480000	
Synonyms & Trade Names Disulfur decafluoride, Sulfur decafluoride			DOT ID & Guide	
Exposure	NIOSH REL: C 0.01 ppm (0	0.1 mg/m^3)		
Limits	OSHA PEL†: TWA 0.025 p	pm (0.25 mg/m ³)		
IDLH 1 ppm		Conversion 1 ppm = 10.39	mg/m ³	
Physical Description Colorless liquid or gas (above 84°F) with an odor like sulfur dioxide.				
MW: 254.1	BP: 84°F	FRZ: -134°F	Sol: Insoluble	
VP: 561 mmHg	IP: ?	RGasD: 8.77	Sp.Gr(32°F): 2.08	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid Non	flammable Gas			
Incompatibilities & Reactivities None reported				
Measurement Methods None available				
Personal Protection & San	itation	First Aid (See procedures)		
Skin: Prevent skin contact		Eye: Irrigate immediately Skin: Soap wash immediately		
Eyes: Prevent eye contact Wash skin: No recommendation		Breathing: Respiratory support		
Remove: When wet or contaminated		Swallow: Medical attention immediately		
Change: No recommendation			•	
Provide: Eyewash, Quick dro	ench			

Respirator Recommendations NIOSH

Up to 0.1 ppm: (APF = 10) Any supplied-air respirator

Up to 0.25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 0.5 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; in animals: pulmonary edema, hemorrhage

Target Organs Eyes, skin, respiratory system, central nervous system

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Sulfur tetrafluoride			CAS 7783-60-0	
SF ₄			RTECS WT4800000	
			DOT ID & Guide 2418 125	
Exposure	NIOSH REL: C 0.1	opm (0.4 mg/m ³)		
Limits	OSHA PEL†: none	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm =	Conversion 1 ppm = 4.42 mg/m^3	
Physical Description Colorless gas with an odor like sulfur dioxide. [Note: Shipped as a liquefied compressed gas.]				
MW: 108.1	BP: -41°F	FRZ: -185°F	Sol: Reacts	
VP(70°F): 10.5 atm	IP: 12.63 eV	RGasD: 3.78		
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Gas				
Incompatibilities & Reactivities Moisture, concentrated sulfuric acid, dioxygen difluoride [Note: Readily hydrolyzed by moisture, forming hydrofluoric acid & thionyl fluoride.]				
Measurement Methods OSHA ID110				

Personal Protection & Sanitation

Skin: Frostbite Eyes: Frostbite

Wash skin: No recommendation Remove: No recommendation Change: No recommendation

Provide: Frostbite

First Aid (See procedures)

Eye: Frostbite Skin: Frostbite

Breathing: Respiratory support

Respirator Recommendations To be added later

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; eye, skin burns (from SF₄ releasing hydrofluoric acid on exposure to moisture); liquid: frostbite; in animals: dyspnea (breathing difficulty), lassitude (weakness, exhaustion), rhinorrhea (discharge of thin mucus)

Target Organs Eyes, skin, respiratory system

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Sulfuryl fluoride			CAS 2699-79-8	
$\overline{\mathrm{SO_2F_2}}$			RTECS WT5075000	
Synonyms & Trade Names Sulfur difluoride dioxide, Vikane®			DOT ID & Guide 2191 123	
Exposure	NIOSH REL: TWA 5 ppm (20 mg/m ³) ST 10 ppm (40 mg/m ³)	g/m^3)	
Limits	OSHA PEL†: TWA 5 ppm (20 mg/m ³)		
IDLH 200 ppm		Conversion 1 ppm = 4.18 m	ng/m ³	
Physical Description Colorless, odorless gas. [insecticide/fumigant] [Note: Shipped as a liquefied compressed gas.]				
MW: 102.1	BP: -68°F	BP: -68°F FRZ: -212°F Sol(32°F)		
VP(70°F): 15.8 atm	IP: 13.04 eV	RGasD: 3.72		
Fl.P: NA	UEL: NA	LEL: NA		
Nonflammable Gas				
Incompatibilities & Reactivities None reported				
Measurement Methods NIOSH 6012				
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: No recommendation Change: No recommendation Provide: Frostbite		First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory support		

Respirator Recommendations NIOSH/OSHA

Up to 50 ppm: (APF = 10) Any supplied-air respirator*

Up to 125 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 200 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Conjunctivitis, rhinitis, pharyngitis, paresthesia; liquid: frostbite: in animals: narcosis, tremor, convulsions; pulmonary edema; kidney injury

Target Organs Eyes, skin, respiratory system, central nervous system, kidneys

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Sulprofos			CAS 35400-43-2	
$\boxed{C_{12}H_{19}O_2PS_3}$			RTECS TE4165000	
Synonyms & Trade Names Bolstar®, O-Ethyl O-(4-methylthio)phenyl S-propylphosphorodithioate			DOT ID & Guide	
Exposure	NIOSH REL: TWA 1 mg/m ³			
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 13.19	mg/m ³	
Physical Description Tan-colored liquid with a sul	fide-like odor.			
MW: 322.5	BP: ?	FRZ: ?	Sol: Low	
VP: <8 mmHg	IP: ?		Sp.Gr: 1.20	
Fl.P: ?	UEL: ?	LEL: ?		
Incompatibilities & Reactive None reported	rities			
Measurement Methods NIOSH 5600; PV2037				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: No recommendation Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion				
Symptoms Nausea, vomiting, abdominal cramps, diarrhea, salivation; headache, dizziness, lassitude (weakness, exhaustion); rhinorrhea (discharge of thin mucus), chest tightness; blurred vision, miosis; cardiac irregularities; muscle fasciculation; dyspnea (breathing difficulty)				
Target Organs respiratory system, central nervous system, cardiovascular system, blood cholinesterase				

See also: <u>INTRODUCTION</u>

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2,4,5-T		CAS 93-76-5		
Cl ₃ C ₆ H ₂ OCH ₂ COOH			RTECS AJ8400000	
Synonyms & Trade Names 2,4,5-Trichlorophenoxyacetic acid			DOT ID & Guide 2765 152	
Exposure	NIOSH REL: TWA 10 m	NIOSH REL: TWA 10 mg/m ³		
Limits	OSHA PEL: TWA 10 mg	y/m^3		
IDLH 250 mg/m ³		Conversion		
Physical Description Colorless to tan, odorless, cr	rystalline solid. [herbicide]			
MW: 255.5	BP: Decomposes	MLT: 307°F	Sol(77°F): 0.03%	
VP: 1 x 10-7 mmHg	IP: ?		Sp.Gr: 1.80	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Solid, but burn	s with difficulty.			
Incompatibilities & Reacti None reported	vities			
Measurement Methods NIOSH 5001				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendati	ons NIOSH/OSHA			

Up to 50 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 100 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any supplied-air respirator

Up to 250 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter/(APF = 50) Any self-contained breathing apparatus with a full

facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: ataxia; skin irritation, acne-like rash; liver damage

Target Organs Skin, liver, gastrointestinal tract

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Talc (containing no asbestos and less than 1% quartz)			CAS 14807-96-6	
$Mg_3Si_4O_{10}(OH)_2$			RTECS WW2710000	
Synonyms & Trade Names Hydrous magnesium silicate, Steatite talc			DOT ID & Guide	
Exposure	NIOSH REL: TWA 2 mg/r	NIOSH REL: TWA 2 mg/m ³ (resp)		
Limits	OSHA PEL†: TWA 20 mp	pcf		
IDLH 1000 mg/m ³		Conversion		
Physical Description Odorless, white powder.				
MW: Varies	BP: ?	MLT: 1652 to 1832°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.70-2.80	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reac None reported	tivities			
Measurement Methods NIOSH P&CAM355 (III)				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air		
Respirator Recommenda	tions NIOSH 5) Any dust and mist respirator			

Up to 20 mg/m^3 : (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF =

Up to 50 mg/m^3 : (APF = 25) Any powered, air-purifying respirator with a dust and mist filter/(APF = 25) Any

Up to 100 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

supplied-air respirator operated in a continuous-flow mode

10) Any supplied-air respirator

filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1000 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Fibrotic pneumoconiosis; irritation eyes

Target Organs Eyes, respiratory system, cardiovascular system

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Tantalum (metal and oxide dust, as Ta)			CAS 7440-25-7 (metal)	
Ta (metal)			RTECS WW5505000 (metal)	
Synonyms & Trade Names Tantalum metal: Tantalum-181 Synonyms of other tantalum dusts (including oxide dusts) vary depending upon the specific compound.			DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 mg/m	³ ST 10 mg/m ³		
Limits	OSHA PEL: TWA 5 mg/m ³	,		
IDLH 2500 mg/m ³ (as Ta)		Conversion		
Physical Description Metal: Steel-blue to gray sol	id or black, odorless powder.			
MW: 180.9	BP: 9797°F	MLT: 5425°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 16.65 (metal) 14.40 (powder)	
Fl.P: NA	UEL: NA	LEL: NA	MEC: <200 g/m ³	
Metal: Combustible Solid; pe	owder ignites SPONTANEO	USLY in air.		
Incompatibilities & Reactive Strong oxidizers, bromine tri				
Measurement Methods NIOSH 0500				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Respiratory support		
Respirator Recommendations NIOSH/OSHA				

Up to 50 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators^/(APF =

10) Any dust, mist, and fume respirator/(APF = 10) Any supplied-air respirator

Up to 25 mg/m^3 : (APF = 5) Any dust and mist respirator^

Up to 125 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter^

Up to 250 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 2500 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, skin; in animals: pulmonary irritation

Target Organs Eyes, skin, respiratory system

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TEDP			CAS 3689-24-5	
[(CH ₃ CH ₂ O) ₂ PS] ₂ O			RTECS XN4375000	
Synonyms & Trade Names Bladafum®, Dithion®, Sulfotep, Tetraethyl dithionopyrophosphate, Tetraethyl dithiopyrophosphate, Thiotepp®			DOT ID & Guide 1704 153	
Exposure	NIOSH REL: TWA 0.2 mg/	m ³ [skin]		
Limits	OSHA PEL: TWA 0.2 mg/m	n ³ [skin]		
IDLH 10 mg/m ³		Conversion 1 ppm = 13.18	mg/m^3	
Physical Description Pale-yellow liquid with a garlic-like odor. [Note: A pesticide that may be absorbed on a solid carrier or mixed in a more flammable liquid.]				
MW: 322.3	BP: Decomposes	FRZ: ?	Sol: 0.0007%	
VP: 0.0002 mmHg	IP: ?		Sp.Gr(77°F): 1.20	
Fl.P: ?	UEL: ?	UEL: ?		
Combustible Liquid	'			
Incompatibilities & Reactivities Strong oxidizers, iron [Note: Corrosive to iron.]				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support		
Remove: When wet or cont	aminated	Swallow: Medical attention immediately		

Respirator Recommendations NIOSH/OSHA

Change: No recommendation Provide: Eyewash, Quick drench

Up to 2 mg/m^3 : (APF = 10) Any supplied-air respirator

Up to 5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 10 mg/m^3 : (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; eye pain, blurred vision, lacrimation (discharge of tears); rhinorrhea (discharge of thin mucus); headache; cyanosis; anorexia, nausea, vomiting, diarrhea; localized sweating, lassitude (weakness, exhaustion), twitching, paralysis, Cheyne-Stokes respiration, convulsions, low blood pressure, cardiac irregularities

Target Organs Eyes, skin, respiratory system, central nervous system, cardiovascular system, blood cholinesterase

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Tellurium			CAS 13494-80-9	
Те			RTECS WY2625000	
Synonyms & Trade Names Aurum paradoxum, Metallum problematum			DOT ID & Guide	
Exposure	NIOSH REL*: TWA 0.1 mg/m³ [*Note: The REL also applies to other tellurium compounds (as Te) except Tellurium hexafluoride and Bismuth telluride.]			
Limits		OSHA PEL*: TWA 0.1 mg/m ³ [*Note: The PEL also applies to other tellurium compounds (as Te) except Tellurium hexafluoride and Bismuth telluride.]		
IDLH 25 mg/m ³ (as Te)		Conversion		
Physical Description Odorless, dark-gray to brown, amorphous powder or grayish-white, brittle solid.				
MW: 127.6	BP: 1814°F	MLT: 842°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 6.24	
Fl.P: NA	UEL: NA	LEL: NA		
Combustible Solid				
Incompatibilities & Reacti Oxidizers, chlorine, cadmiu				
Measurement Methods NIOSH 7300; OSHA ID121				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations NIOSH/OSHA Up to 0.5 mg/m ³ : (APF = 5) Any dust and mist respirator [^]				

Up to 1 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators^/(APF =

Up to 2.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

10) Any dust, mist, and fume respirator/(APF = 10) Any supplied-air respirator

powered, air-purifying respirator with a dust and mist filter^

Up to 5 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 25 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Garlic breath, sweating; dry mouth, metallic taste; drowsiness; anorexia, nausea, no sweating; dermatitis; in animals: central nervous system, red blood cell changes

Target Organs Skin, central nervous system, blood

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Tellurium hexafluoride		CAS 7783-80-4	
TeF ₆			RTECS WY2800000
Synonyms & Trade Names Tellurium fluoride		DOT ID & Guide 2195 125	
Exposure	NIOSH REL: TWA 0.02 ppr	$m (0.1 \text{ mg/m}^3)$	
Limits	OSHA PEL: TWA 0.02 ppm	n (0.2 mg/m ³)	
IDLH 1 ppm		Conversion 1 ppm = 9.88 m	ng/m ³
Physical Description Colorless gas with a repulsiv	ve odor. MW: 241.6		
	BP: Sublimes	FRZ: -36°F (Sublimes)	Sol: Decomposes
VP: >1 atm	IP: ?	RGasD: 8.34	
Fl.P: NA	UEL: NA	LEL: NA	
Nonflammable Gas			
Incompatibilities & Reactive Water [Note: Hydrolyzes slo	vities wly in water to telluric acid.]		
Measurement Methods NIOSH S187 (II-3)			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Respiratory support	
Respirator Recommendation	ons NIOSH/OSHA		

Up to 0.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 1 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

Up to 0.2 ppm: (APF = 10) Any supplied-air respirator

supplied-air respirator with a full facepiece

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation

Symptoms Headache; dyspnea (breathing difficulty); garlic breath; in animals: pulmonary edema

Target Organs respiratory system

nausea, diarrhea, vomiting

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Temephos			CAS 3383-96-8
$\boxed{S[C_6H_4OP(S)(OCH_3)_2]_2}$			RTECS TF6890000
Synonyms & Trade Names Abate®; Temefos; O,O,O'O		-phenylene phosphorothioate	DOT ID & Guide
Exposure	NIOSH REL: TWA 10 mg	g/m ³ (total) TWA 5 mg/m ³ (res	p)
Limits	OSHA PEL†: TWA 15 mg	g/m ³ (total) TWA 5 mg/m ³ (res	sp)
IDLH N.D.		Conversion	
Physical Description White, crystalline solid or li	quid (above 87°F). [insectic	ide] [Note: Technical grade is a	a viscous, brown liquid.]
MW: 466.5	BP: 248-257°F (Decomposes)	MLT: 87°F	Sol: Insoluble
VP(77°F): 0.00000007 mmHg	IP: ?		Sp.Gr: 1.32
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reacti None reported	vities		
Measurement Methods NIOSH 0500, 0600; OSHA	PV2056		
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendati	ons To be added later		
Exposure Routes inhalation	n, skin absorption, ingestion,	skin and/or eye contact	

Symptoms Irritation eyes, blurred vision; dizziness; dyspnea (breathing difficulty); salivation; abdominal cramps,

Target Organs Eyes, respiratory system, central nervous system, cardiovascular system, blood cholinesterase

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TEPP			CAS 107-49-3	
[(CH ₃ CH ₂ O) ₂ PO] ₂ O			RTECS UX6825000	
Ethyl pyrophosphate, Tetraethyl pyrophosphate, Tetron®			DOT ID & Guide 2783 152 3018 152 (liquid)	
Exposure	NIOSH REL: TWA 0.05 mg	g/m ³ [skin]		
Limits	OSHA PEL: TWA 0.05 mg/	/m ³ [skin]		
IDLH 5 mg/m ³		Conversion 1 ppm = 11.87	mg/m ³	
Physical Description Colorless to amber liquid wit	h a faint, fruity odor. [insect	icide] [Note: A solid below 32	2°F.]	
MW: 290.2	BP: Decomposes	FRZ: 32°F	Sol: Miscible	
VP: 0.0002 mmHg	IP: ?		Sp.Gr: 1.19	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid				
Incompatibilities & Reactivities Strong oxidizers, alkalis, water [Note: Hydrolyzes quickly in water to form pyrophosphoric acid.]				
Measurement Methods NIOSH 2504				

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 0.5 mg/m^3 : (APF = 10) Any supplied-air respirator

Up to 1.25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 2.5 mg/m³: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 5 mg/m: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Eye pain, blurred vision, lacrimation (discharge of tears); rhinorrhea (discharge of thin mucus); headache, chest tightness, cyanosis; anorexia, nausea, vomiting, diarrhea; lassitude (weakness, exhaustion), twitching, paralysis, Cheyne-Stokes respiration, convulsions; low blood pressure, cardiac irregularities; sweating

Target Organs Eyes, respiratory system, central nervous system, cardiovascular system, gastrointestinal tract, blood cholinesterase

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o-Terphenyl			CAS 84-15-1	
$C_6H_5C_6H_4C_6H_5$			RTECS WZ6472000	
Synonyms & Trade Names o-Diphenylbenzene; 1,2-Diphenylbenzene; 2-Phenylbiphenyl; 1,2-Terphenyl; ortho- Terphenyl; o-Triphenyl			DOT ID & Guide	
Exposure	NIOSH REL: C 5 mg/m ³	(0.5 ppm)		
Limits	OSHA PEL†: C 9 mg/m ³	(1 ppm)		
IDLH 500 mg/m ³	•	Conversion 1 ppm = 9.42 1	mg/m ³	
Physical Description Colorless or light-yellow solid.				
MW: 230.3	BP: 630°F	MLT: 136°F	Sol: Insoluble	
VP(200°F): 0.09 mmHg	IP: 7.99 eV		Sp.Gr: 1.1	
Fl.P(oc): 325°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & React None reported	ivities			
Measurement Methods NIOSH 5021				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations NIOSH				
Up to 25 mg/m ³ : (APF = 5) Any dust and mist respirator [£]				

Up to 50 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators $^{\pounds}$ /(APF =

Up to 125 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any

powered, air-purifying respirator with a dust and mist filter[£]

10) Any supplied-air respirator[£]

Up to 250 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; thermal skin burns; headache; sore throat; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, liver, kidneys

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m-Terphenyl			CAS 92-06-8	
$\boxed{C_6H_5C_6H_4C_6H_5}$			RTECS WZ6470000	
Synonyms & Trade Names m-Diphenylbenzene; 1,3-Diphenylbenzene; Isodiphenylbenzene; 3-Phenylbiphenyl; 1,3-Terphenyl; meta-Terphenyl; m-Triphenyl			DOT ID & Guide	
Exposure	NIOSH REL: C 5 mg/m ³ (0.5 ppm)		
Limits	OSHA PEL†: C 9 mg/m ³ ((1 ppm)		
IDLH 500 mg/m ³	•	Conversion 1 ppm = 9.57 r	mg/m ³	
Physical Description Yellow solid (needles).				
MW: 230.3	BP: 689°F	MLT: 192°F	Sol: Insoluble	
VP(200°F): 0.01 mmHg	IP: 8.01		Sp.Gr: 1.23	
Fl.P(oc): 375°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & React None reported	ivities			
Measurement Methods NIOSH 5021				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations NIOSH				
Up to 25 mg/m 3 : (APF = 5) Any dust and mist respirato	$r^{\mathfrak{L}}$	C	

Up to 50 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators $^{\pounds}$ /(APF =

Up to 125 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any

powered, air-purifying respirator with a dust and mist filter[£]

10) Any supplied-air respirator[£]

Up to 250 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; thermal skin burns; headache; sore throat; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, liver, kidneys

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p-Terphenyl			CAS 92-94-4
$C_6H_5C_6H_4C_6H_5$			RTECS WZ6475000
Synonyms & Trade Names p-Diphenylbenzene; 1,4-Diphenylbenzene; 4-Phenylbiphenyl; 1,4-Terphenyl; para-Terphenyl; p-Triphenyl			DOT ID & Guide
Exposure	NIOSH REL: C 5 mg/m ³ (0.	5 ppm)	
Limits	OSHA PEL†: C 9 mg/m ³ (1	ppm)	
IDLH 500 mg/m ³		Conversion 1 ppm = 9.57 m	ng/m ³
Physical Description White or light-yellow solid.			
MW: 230.3	BP: 761°F	MLT: 415°F	Sol: Insoluble
VP: Very low	IP: 7.78		Sp.Gr: 1.23
Fl.P: 405°F	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reactive None reported	vities		
Measurement Methods NIOSH 5021			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH			
Up to 25 mg/m ³ : (APF = 5) Any dust and mist respirator [£] Up to 50 mg/m ³ : (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators [£] /(APF =			

Up to 125 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 25) Any

powered, air-purifying respirator with a dust and mist filter[£]

10) Any supplied-air respirator[£]

Up to 250 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; thermal skin burns; headache; sore throat; in animals: liver, kidney damage

Target Organs Eyes, skin, respiratory system, liver, kidneys

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2,3,7,8-Tetrachloro-dibenzo-p-dioxin			CAS 1746-01-6	
$C_{12}H_4Cl_4O_2$			RTECS HP3500000	
Synonyms & Trade Names Dioxin; Dioxine; TCDBD; T production of 2,4,5-trichloro acid.]	DOT ID & Guide			
Exposure	NIOSH REL: Ca See Apper	ndix A		
Limits	OSHA PEL: none			
IDLH Ca [N.D.]		Conversion		
Physical Description Colorless to white, crystalline solid. [Note: Exposure may occur through contact at previously contaminated worksites.]				
MW: 322.0	BP: Decomposes	MLT: 581°F	Sol: 0.00000002%	
VP(77°F): 0.000002 mmHg	IP: ?		Sp.Gr: ?	
Fl.P: ?	UEL: ?	LEL: ?		
Incompatibilities & Reactiv UV light (decomposes)	vities			
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediatel Breathing: Respiratory supp Swallow: Medical attention	ort	

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes; allergic dermatitis, chloracne; porphyria; gastrointestinal disturbance; possible reproductive, teratogenic effects; in animals: liver, kidney damage; hemorrhage; [potential occupational carcinogen]

Target Organs Eyes, skin, liver, kidneys, reproductive system

Cancer Site [in animals: tumors at many sites]

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1,1,1,2-Tetrachloro-2,2-difluoroethane CAS 76-11-9				
CCl ₃ CClF ₂			RTECS KI1425000	
Synonyms & Trade Names 2,2-Difluoro-1,1,1,2-tetrachloroethane; Freon® 112a; Halocarbon 112a; Refrigerant 112a			DOT ID & Guide	
Exposure	NIOSH REL: TWA 500 p	opm (4170 mg/m ³)		
Limits	OSHA PEL: TWA 500 pp	om (4170 mg/m ³)		
IDLH 2000 ppm		Conversion 1 ppm = 8.34 m	ng/m ³	
Physical Description Colorless solid with a slight, ether-like odor. [Note: A liquid above 105°F.]				
MW: 203.8	BP: 197°F	MLT: 105°F	Sol: 0.01%	
VP: 40 mmHg	IP: ?		Sp.Gr: 1.65	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Read Chemically-active metals acids		, powdered aluminum, zinc, calc	cium, magnesium & sodium;	
Measurement Methods NIOSH 1016; OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supposed Swallow: Medical attention		

Up to 2000 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

Respirator Recommendations NIOSH/OSHA

full facepiece

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; central nervous system depression; pulmonary edema; drowsiness; dyspnea (breathing difficulty)

Target Organs Eyes, skin, respiratory system, central nervous system

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1,1,2,2-Tetrachloro-1,2-difluoroethane			CAS 76-12-0	
CCl ₂ FCCl ₂ F			RTECS KI1420000	
Synonyms & Trade Names 1,2-Difluoro-1,1,2,2-tetrachloroethane; Freon® 112; Halocarbon 112; Refrigerant 112			DOT ID & Guide	
Exposure	NIOSH REL: TWA 5	500 ppm (4170 mg/m ³)		
Limits	OSHA PEL: TWA 50	00 ppm (4170 mg/m ³)		
IDLH 2000 ppm Conversion 1 ppm = 8.34 m			$= 8.34 \text{ mg/m}^3$	
Physical Description Colorless solid or liquid (a	bove 77°F) with a slight	, ether-like odor.		
MW: 203.8	BP: 199°F	MLT: 77°F	Sol(77°F): 0.01%	
VP: 40 mmHg	IP: 11.30 eV		Sp.Gr: 1.65	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactivities Chemically-active metals such as potassium, beryllium, powdered aluminum, zinc, magnesium, calcium & sodium; acids				
Measurement Methods NIOSH 1016; OSHA 7				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 2000 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes, skin; conjunctivitis; pulmonary edema; narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

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NIOSH Pocket Guide to Chemical Hazards

1,1,1,2-Tetrachlor	CAS 630-20-6			
CCl ₃ CH ₂ Cl			RTECS KI8450000	
Synonyms & Trade Name None	S		DOT ID & Guide 1702 151	
Exposure	NIOSH REL: Handle with c	aution in the workplace. See	Appendix C (Chloroethanes)	
Limits	OSHA PEL: none			
IDLH N.D.		Conversion		
Physical Description Yellowish-red liquid.				
MW: 167.9	BP: 267°F	FRZ: -94°F	Sol: 0.1%	
VP(77°F): 14 mmHg	IP: ?		Sp.Gr: 1.54	
Fl.P: ?	UEL: ?	LEL: ?		
dinitrophenyl disulfide	ivities gen tetraoxide; potassium hydr	oxide; nitrogen tetroxide; sod	ium potassium alloy; 2,4-	
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin; lassitude (weakness, exhaustion), restlessness, irregular respiration, muscle incoordination; in animals: liver changes				
Target Organs Eyes, skin,	central nervous system, liver			

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1,1,2,2-Tetrachloroethane			CAS 79-34-5	
CHCl ₂ CHCl ₂			RTECS KI8575000	
Synonyms & Trade Names Acetylene tetrachloride, Sym			DOT ID & Guide 1702 151	
Exposure	NIOSH REL: Ca TWA 1 ppm (7 mg/m³) [skin] See Apper (Chloroethanes)			
Limits	OSHA PEL†: TWA 5 ppm	OSHA PEL†: TWA 5 ppm (35 mg/m ³) [skin]		
IDLH Ca [100 ppm]			ng/m ³	
Physical Description Colorless to pale-yellow liqu	id with a pungent, chlorofo	rm-like odor.		
MW: 167.9	BP: 296°F	FRZ: -33°F	Sol: 0.3%	
VP: 5 mmHg	IP: 11.10 eV		Sp.Gr(77°F): 1.59	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid				
Incompatibilities & Reactivities Chemically-active metals, strong caustics, fuming sulfuric acid [Note: Degrades slowly when exposed to air.]				
Measurement Methods NIOSH 1019; OSHA 7				

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Nausea, vomiting, abdominal pain; tremor fingers; jaundice, hepatitis, liver tenderness; dermatitis; leukocytosis (increased blood leukocytes); kidney damage; [potential occupational carcinogen]

Target Organs Skin, liver, kidneys, central nervous system, gastrointestinal tract

Cancer Site [in animals: liver tumors]

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Tetrachloroethylene			CAS 127-18-4	
Cl ₂ C=CCl ₂			RTECS KX3850000	
			DOT ID & Guide 1897 160	
Exposure	NIOSH REL: Ca Minimize	workplace exposure concentra	tions. See Appendix A	
Limits	OSHA PEL†: TWA 100 ppn 3-hours)	n C 200 ppm 300 ppm (5-min	ute maximum peak in any	
IDLH Ca [150 ppm]		Conversion 1 ppm = 6.78 m	ng/m ³	
Physical Description Colorless liquid with a mild, chloroform-like odor.				
MW: 165.8	BP: 250°F	FRZ: -2°F	Sol: 0.02%	
VP: 14 mmHg	IP: 9.32 eV		Sp.Gr: 1.62	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid, but	decomposes in a fire to hydro	ogen chloride and phosgene.		
Incompatibilities & Reactivities Strong oxidizers; chemically-active metals such as lithium, beryllium & barium; caustic soda; sodium hydroxide; potash				
Measurement Methods NIOSH 1003; OSHA 1001				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, liver, kidneys, central nervous system

Cancer Site [in animals: liver tumors]

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Tetrachloronaphthalene			CAS 1335-88-2	
$C_{10}H_4Cl_4$			RTECS QK3700000	
Synonyms & Trade Names Halowax®, Nibren wax, Seekay wax			DOT ID & Guide	
Exposure	NIOSH REL: TWA 2 mg/1	NIOSH REL: TWA 2 mg/m ³ [skin]		
Limits	OSHA PEL: TWA 2 mg/m	OSHA PEL: TWA 2 mg/m ³ [skin]		
IDLH Unknown	,	Conversion		
Physical Description Colorless to pale-yellow solid with an aromatic odor.				
MW: 265.9	BP: 599-680°F	MLT: 360°F	Sol: Insoluble	
VP: <1 mmHg	IP: ?		Sp.Gr: 1.59-1.65	
Fl.P(oc): 410°F	UEL: ?	UEL: ?		
Combustible Solid				
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH S130 (II-2)				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support		

Respirator Recommendations NIOSH/OSHA

Remove: When wet or contaminated

Change: Daily

Up to 20 mg/m^3 : (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

Swallow: Medical attention immediately

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Acne-form dermatitis; headache, lassitude (weakness, exhaustion), anorexia, dizziness; jaundice, liver injury

Target Organs Liver, skin, central nervous system

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Tetraethyl lead (as Pb)			CAS 78-00-2	
Pb(C ₂ H ₅) ₄			RTECS TP4550000	
Synonyms & Trade Names Lead tetraethyl, TEL, Tetraethylplumbane			DOT ID & Guide 1649 131	
Exposure	NIOSH REL: TWA 0.075 mg/m ³ [skin]			
Limits	OSHA PEL: TWA 0.075 mg/m ³ [skin]			
IDLH 40 mg/m ³ (as Pb)	Conversion			
Physical Description Colorless liquid (unless dyed red, orange, or blue) with a pleasant, sweet odor. [Note: Main usage is in anti-knock additives for gasoline.]				
	BP: 228°F (Decomposes) FRZ: -202°F Sol: 0.00002%			
MW: 323.5	BP: 228°F (Decomposes)	FRZ: -202°F	Sol: 0.00002%	
MW: 323.5 VP: 0.2 mmHg	BP: 228°F (Decomposes) IP: 11.10 eV	FRZ: -202°F	Sol: 0.00002% Sp.Gr: 1.65	
	` '	FRZ: -202°F LEL: 1.8%		
VP: 0.2 mmHg	IP: 11.10 eV UEL: ?			

Measurement Methods

NIOSH 2533

Personal Protection & Sanitation

Skin: Prevent skin contact (>0.1%)

Eyes: Prevent eye contact

Wash skin: When contaminated (>0.1%)

Remove: When wet or contaminated (>0.1%)

Change: Daily

Provide: Quick drench (>0.1%)

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 0.75 mg/m^3 : (APF = 10) Any supplied-air respirator

Up to 1.875 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 3.75 mg/m^3 : (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

supplied-air respirator with a full facepiece

Up to 40 mg/m^3 : (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Insomnia, lassitude (weakness, exhaustion), anxiety; tremor, hyper-reflexia, spasticity; bradycardia, hypotension, hypothermia, pallor, nausea, anorexia, weight loss; confusion, hallucinations, psychosis, mania, convulsions, coma; eye irritation

Target Organs central nervous system, cardiovascular system, kidneys, eyes

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Tetrahydrofuran			CAS 109-99-9	
C_4H_8O			RTECS LU5950000	
Synonyms & Trade Names Diethylene oxide; 1,4-Epoxybutane; Tetramethylene oxide; THF			DOT ID & Guide 2056 127	
Exposure	NIOSH REL: TWA 200 ppn	NIOSH REL: TWA 200 ppm (590 mg/m ³) ST 250 ppm (7		
Limits	OSHA PEL†: TWA 200 ppm (590 mg/m ³)			
IDLH 2000 ppm [10%LEL]			ng/m ³	
Physical Description Colorless liquid with an ether-like odor.				
MW: 72.1	BP: 151°F	FRZ: -163°F	Sol: Miscible	
VP: 132 mmHg	IP: 9.45 eV		Sp.Gr: 0.89	
Fl.P: 6°F	UEL: 11.8%	UEL: 11.8% LEL: 2%		
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.				
Incompatibilities & Reactivities Strong oxidizers, lithium-aluminum alloys [Note: Peroxides may accumulate upon prolonged storage in presence of air.]				
Measurement Methods NIOSH 1609, 3800; OSHA 7				

Respirator Recommendations NIOSH/OSHA

Personal Protection & Sanitation

Remove: When wet (flammable) Change: No recommendation

Skin: Prevent skin contact

Eyes: Prevent eye contact Wash skin: When contaminated

Up to 2000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{£}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{£}$ /(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

First Aid (See procedures)
Eye: Irrigate immediately

Skin: Water flush promptly

Breathing: Respiratory support

Swallow: Medical attention immediately

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, upper respiratory system; nausea, dizziness, headache, central nervous system depression

Target Organs Eyes, respiratory system, central nervous system

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Tetramethyl lead (as Pb)			CAS 75-74-1	
Pb(CH ₃) ₄			RTECS TP4725000	
Synonyms & Trade Names Lead tetramethyl, Tetramethylplumbane, TML			DOT ID & Guide	
Exposure	NIOSH REL: TWA 0.075 mg/m ³ [skin]			
Limits	OSHA PEL: TWA 0.075 m	OSHA PEL: TWA 0.075 mg/m ³ [skin]		
IDLH 40 mg/m ³ (as Pb)	Conversion			
Physical Description Colorless liquid (unless dyed red, orange, or blue) with a fruity odor. [Note: Main usage is in anti-knock additives for gasoline.]				
MW: 267.3	BP: 212°F (Decomposes)	FRZ: -15°F	Sol: 0.002%	
VP: 23 mmHg	IP: 8.50 eV	IP: 8.50 eV Sp.Gr: 2.00		
Fl.P: 100°F	UEL: ?			
Class II Combustible Liquid: Fl.P. at or above 100°F and below 140°F.				
Incompatibilities & React Strong oxidizers such as su	ivities Ifuryl chloride or potassium p	ermanganate		
Measurement Methods				

Measurement Methods

NIOSH 2534

Personal Protection & Sanitation

Skin: Prevent skin contact (>0.1%)

Eyes: Prevent eye contact

Wash skin: When contaminated (>0.1%)

Remove: When wet or contaminated (>0.1%)

Change: Daily

Provide: Quick drench (>0.1%)

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 0.75 mg/m^3 : (APF = 10) Any supplied-air respirator

Up to 1.875 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 3.75 mg/m^3 : (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

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Up to 40 mg/m: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Insomnia, bad dreams, restlessness, anxious; hypotension; nausea, anorexia; delirium, mania, convulsions; coma

Target Organs central nervous system, cardiovascular system, kidneys

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Tetramethyl succinonitrile			CAS 3333-52-6	
$(CH_3)_2C(CN)C(CN)(CH_3)_2$			RTECS WN4025000	
Synonyms & Trade Names Tetramethyl succinodinitrile, TMSN			DOT ID & Guide	
Exposure	NIOSH REL: TWA 3 mg/m			
Limits	OSHA PEL: TWA 3 mg/m ³	OSHA PEL: TWA 3 mg/m ³ (0.5 ppm) [skin]		
IDLH 5 ppm	IDLH 5 ppm		Conversion 1 ppm = 5.57 mg/m^3	
Physical Description Colorless, odorless solid. [Note: Forms cyanide in the body.]				
MW: 136.2	BP: Sublimes	MLT: 338°F (Sublimes)	Sol: Insoluble	
VP: ?	IP: ?		Sp.Gr: 1.07	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reactivities Strong oxidizers				
Measurement Methods NIOSH S155 (II-3); OSHA 7				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Up to 28 mg/m³: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Headache, nausea; convulsions, coma; liver, kidney, gastrointestinal effects

Target Organs central nervous system, liver, kidneys, gastrointestinal tract

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Tetranitromethane			CAS 509-14-8		
$C(NO_2)_4$			RTECS PB4025000		
Synonyms & Trade Names Tetan, TNM			DOT ID & Guide 1510 143		
Exposure	NIOSH REL: TWA 1 ppm (8 mg/m ³) OSHA PEL: TWA 1 ppm (8 mg/m ³)				
Limits					
IDLH 4 ppm		Conversion 1 ppm :	Conversion 1 ppm = 8.02 mg/m^3		
Physical Description Colorless to pale-yellow liquid or solid (below 57°F) with a pungent odor.					
MW: 196.0	BP: 259°F	BP: 259°F FRZ: 57°F Sol: Insoluble			
VP: 8 mmHg	IP: ?		Sp.Gr: 1.62		
Fl.P: ?	UEL: ?				
Combustible Liquid, but difficult to ignite.					
Incompatibilities & Reactivities Hydrocarbons, alkalis, metals, oxidizers, aluminum, toluene, cotton [Note: Combustible material wet with tetranitromethane may be highly explosive.]					
Measurement Methods					

NIOCH 2512

NIOSH 3513

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)

Remove: When wet (flammable)

Change: Daily Provide: Eyewash

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Soap wash promptly
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 4 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{\pounds}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern $^{\pounds}$ /(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted canister providing protection against the compound of concern $^{\pounds}$ /(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern $^{\pounds}$ /(APF = 50) Any self-contained

breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concernⁱ/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; dizziness, headache; chest pain, dyspnea (breathing difficulty); methemoglobinemia, cyanosis; skin burns

Target Organs Eyes, skin, respiratory system, blood, central nervous system

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Tetrasodium pyrophosphate			CAS 7722-88-5	
Na ₄ P ₂ O ₇			RTECS UX7350000	
Synonyms & Trade Names Pyrophosphate, Sodium pyrophosphate, Tetrasodium diphosphate, Tetrasodium pyrophosphate (anhydrous), TSPP			DOT ID & Guide	
Exposure	NIOSH REL: TWA 5 mg/m ³ OSHA PEL†: none			
Limits				
IDLH N.D.	JL	Conversion		
Physical Description Odorless, white powder or gransparent crystals.]	ranules. [Note: The decahydra	ate (Na ₄ P ₂ O ₇ • 10H ₂ O) is in t	he form of colorless,	
MW: 265.9	BP: Decomposes	MLT: 1810°F	Sol(77°F): 7%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 2.45	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reactive Strong acids	vities			
Measurement Methods NIOSH 0500				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash (solution)		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash promptly Breathing: Respiratory support Swallow: Medical attention immediately		
Despirator Decommendation				
Respirator Recommendation	ons To be added later			
	ons To be added later , ingestion, skin and/or eye co	ontact		
	, ingestion, skin and/or eye co	ontact		

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Tetryl			CAS 479-45-8	
$(NO_2)_3C_6H_2N(NO_2)CH_3$			RTECS BY6300000	
Synonyms & Trade Names N-Methyl-N,2,4,6-tetranitro methylnitramine	DOT ID & Guide			
Exposure	NIOSH REL: TWA 1.5 mg/m ³ [skin]			
Limits	OSHA PEL: TWA 1.5 mg/n	OSHA PEL: TWA 1.5 mg/m ³ [skin]		
IDLH 750 mg/m ³ Conversion		Conversion		
Physical Description Colorless to yellow, odorless, crystalline solid.				
MW: 287.2	BP: 356-374°F (Explodes)	MLT: 268°F	Sol: 0.02%	
VP: <1 mmHg	IP: ?		Sp.Gr: 1.57	
Fl.P: Explodes	UEL: ?	UEL: ?		
Combustible Solid (Class A	Explosive)			
Incompatibilities & Reactivities Oxidizable materials, hydrazine				
Measurement Methods NIOSH S225 (II-3)				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support	ort	

Respirator Recommendations NIOSH/OSHA

Remove: When wet or contaminated

Change: Daily

Up to 7.5 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 15 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators*/(APF = 10) Any supplied-air respirator*

Swallow: Medical attention immediately

Up to 37.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter*

3

Up to 75 mg/m: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 750 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Sensitization dermatitis, itch, erythema (skin redness); edema on nasal folds, cheeks, neck; keratitis (inflammation of the cornea); sneezing; anemia; cough, coryza; irritability; malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion), insomnia; nausea, vomiting; liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

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Thallium (soluble compounds, as Tl)			CAS
			RTECS
Synonyms & Trade Names Synonyms vary depending upon the specific soluble thallium compound.			DOT ID & Guide 1707 151 (compounds, n.o.s.)
Exposure	NIOSH REL: TWA 0.1 mg/	m ³ [skin]	
Limits	OSHA PEL: TWA 0.1 mg/r	m ³ [skin]	
IDLH 15 mg/m ³ (as Tl)		Conversion	
Physical Description Appearance and odor vary	depending upon the specific so	oluble thallium compou	nd.
Properties vary depending upon the specific soluble thallium compound.			
Incompatibilities & React Varies	ivities	J	
Measurement Methods NIOSH 7300; OSHA ID12	1		
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See proceed Eye: Irrigate immediat Skin: Water flush pro Breathing: Respirator Swallow: Medical attr	ately omptly sy support
Respirator Recommendat	ions NIOSH/OSHA		

Up to 1 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators^/(APF =

Up to 2.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

Up to 0.5 mg/m^3 : (APF = 5) Any dust and mist respirator^

powered, air-purifying respirator with a dust and mist filter^

10) Any supplied-air respirator

Up to 5 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 15 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs

Target Organs Eyes, respiratory system, central nervous system, liver, kidneys, gastrointestinal tract, body hair

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4,4'-Thiobis(6-ter	t-butyl-m-cresol)		CAS 96-69-5	
$\boxed{ [\text{CH}_3(\text{OH})\text{C}_6\text{H}_2\text{C}(\text{CH}_3)_3]_2\text{S} }$			RTECS GP3150000	
Synonyms & Trade Names 4,4'-Thiobis(3-methyl-6-tert-butylphenol); 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-butylbenzene)			DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 mg/	/m ³ (total) TWA 5 mg/m ³ (res	p)	
Limits	OSHA PEL†: TWA 15 mg	/m ³ (total) TWA 5 mg/m ³ (res	sp)	
IDLH N.D.		Conversion		
Physical Description Light-gray to tan powder w	ith a slightly aromatic odor.			
MW: 358.6	BP: ?	MLT: 302°F	Sol: 0.08%	
VP: 0.0000006 mmHg	IP: ?		Sp.Gr: 1.10	
Fl.P: 420°F	UEL: NA	LEL: NA		
Combustible Solid				
Incompatibilities & React None reported	ivities			
Measurement Methods NIOSH 0500; 0600				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, respiratory system				
Target Organs Eyes, skin, respiratory system				
See also: INTRODUCTION	<u></u>			

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Thioglycolic acid			CAS 68-11-1		
HSCH ₂ COOH			RTECS AI5950000		
			DOT ID & Guide 1940 153		
Exposure	NIOSH REL: TWA 1 ppm ((4 mg/m ³) [skin]			
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion 1 ppm = 3.77 m	ng/m ³		
Physical Description Colorless liquid with a strong after short exposures.]	g, disagreeable odor character	ristic of mercaptans. [Note: O	lfactory fatigue may occur		
MW: 92.1	BP: ?	FRZ: 2°F	Sol: Miscible		
VP(64°F): 10 mmHg	IP: ?		Sp.Gr: 1.32		
Fl.P: >230°F	UEL: ?	LEL: 5.9%			
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.				
Incompatibilities & Reactive Air, strong oxidizers, bases, a air.]		otassium, magnesium, calcium	n) [Note: Readily oxidized by		
Measurement Methods None available					
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench First Aid (See procedure Eye: Irrigate immediately Skin: Water flush immed Breathing: Respiratory su Swallow: Medical attenti			ort		
Respirator Recommendations To be added later					
Exposure Routes inhalation	, skin absorption, ingestion, s	kin and/or eye contact			
	Symptoms Irritation eyes, skin, nose, throat; lacrimation (discharge of tears), corneal damage; skin burns, blisters;				

in animals: lassitude (weakness, exhaustion); gasping respirations; convulsions

Target Organs Eyes, skin, respiratory system

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Thionyl chloride			CAS 7719-09-7	
SOCl ₂			RTECS XM5150000	
Synonyms & Trade Names Sulfinyl chloride, Sulfur chloride oxide, Sulfurous dichloride, Sulfurous oxychloride, Thionyl dichloride		DOT ID & Guide 1836 137		
Exposure	NIOSH REL: C 1 ppm (5 mg/m ³)			
Limits	OSHA PEL†: none			
IDLH N.D.	J1	Conversion 1 ppm = 4.87 m	ng/m ³	
Physical Description Colorless to yellow to reddish liquid with a pungent odor like sulfur dioxide. [Note: Fumes form when exposed to moist air.]				
MW: 119.0	BP: 169°F	FRZ: -156°F	Sol: Reacts	
VP(70°F): 100 mmHg	IP: ?		Sp.Gr: 1.64	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Liquid				
Incompatibilities & Reactive Water, acids, alkalis, ammor hydrogen chloride.]		Reacts violently with water to	o form sulfur dioxide &	
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort	
Respirator Recommendation	ons To be added later			
Exposure Routes inhalation	, ingestion, skin and/or eye co	ontact		
Symptoms Irritation eyes, sl	kin, mucous membrane; eye, s	skin burns		
Target Organs Eyes, skin, 1	<u>-</u>			
zurget Organis Lycs, skill, l	copilatory system			

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Thiram			CAS 137-26-8		
$C_6H_{12}N_2S_4$			RTECS JO1400000		
			DOT ID & Guide 2771 151		
Exposure	NIOSH REL: TWA 5 m	g/m ³			
Limits	OSHA PEL: TWA 5 mg	$/\mathrm{m}^3$			
IDLH 100 mg/m ³		Conversion			
Physical Description Colorless to yellow, crystalliblue.]	ne solid with a characteris	stic odor. [Note: Commerc	cial pesticide products may be dyed		
MW: 240.4	BP: Decomposes	MLT: 312°F	Sol: 0.003%		
VP: 0.000008 mmHg	IP: ?		Sp.Gr: 1.29		
Fl.P: ?	UEL: ?	LEL: ?			
Combustible Solid					
Incompatibilities & Reactivities Strong oxidizers, strong acids, oxidizable materials					
Measurement Methods					

NIOSH 5005

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated

Change: Daily

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 50 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter*/(APF = 10) Any supplied-air respirator*

Up to 100 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a highefficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; dermatitis; Antabuse-like effects

Target Organs Eyes, skin, respiratory system, central nervous system

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Tin			CAS 7440-31-5	
Sn			RTECS XP7320000	
Synonyms & Trade Names Metallic tin, Tin flake, Tin metal, Tin powder DOT ID & C			DOT ID & Guide	
Exposure		NIOSH REL*: TWA 2 mg/m³ [*Note: The REL also applies to other inorganic tin compounds (as Sn) except tin oxides.]		
Limits	OSHA PEL*: TWA 2 mg/m compounds (as Sn) except ti	3 [*Note: The PEL also applied no oxides.]	es to other inorganic tin	
IDLH 100 mg/m ³ (as Sn)		Conversion		
Physical Description Gray to almost silver-white,	ductile, malleable, lustrous so	olid.		
MW: 118.7	BP: 4545°F	MLT: 449°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 7.28	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid, but p	owdered form may ignite.			
Incompatibilities & Reacti Chlorine, turpentine, acids, a				
Measurement Methods NIOSH 7300; OSHA ID121	, ID206			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately				
Respirator Recommendations NIOSH/OSHA				

Up to 20 mg/m^3 : (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators^*/(APF =

Up to 50 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any

Up to 10 mg/m^3 : (APF = 5) Any dust and mist respirator*

powered, air-purifying respirator with a dust and mist filter^*

10) Any supplied-air respirator*

Up to 100 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; in animals: vomiting, diarrhea, paralysis with muscle twitching

Target Organs Eyes, skin, respiratory system

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Tin (organic compounds, as Sn)				
Tin (organic comp	ounds, as Sn)		CAS	
	RTECS			
Synonyms & Trade Names Synonyms vary depending up specific listing for Cyhexatin	pon the specific organic tin co	ompound. [Note: Also see	DOT ID & Guide	
Exposure		NIOSH REL*: TWA 0.1 mg/m ³ [skin] [*Note: The REL applies to all organic tin compounds except Cyhexatin.]		
Limits	OSHA PEL*: TWA 0.1 mg/s	m ³ [*Note: The PEL applies t	to all organic tin	
IDLH 25 mg/m ³ (as Sn)		Conversion		
Physical Description Appearance and odor vary depending upon the specific organic tin compound.				
Properties vary depending upon the specific organic tin compound.				
Incompatibilities & Reactive Varies	rities			
Measurement Methods NIOSH 5504				
Personal Protection & Sanitation Recommendations regarding personal protective clothing vary depending upon the specific compound. Recommendations regarding eye protection vary depending upon the specific compound. Recommendations regarding washing the skin vary depending upon the specific compound. Recommendations regarding the removal of personal protective clothing that becomes wet or contaminated vary depending upon the specific compound. Recommendations regarding the daily changing of		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory supports Swallow: Medical attention in	ort	

personal protective clothing vary depending upon the

specific compound.

Recommendations regarding the need for eyewash or quick drench facilities vary depending upon the specific compound.

Respirator Recommendations NIOSH/OSHA

Up to 1 mg/m^3 : (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust and mist filter/(APF = 10) Any supplied-air respirator

Up to 2.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter

Up to 5 mg/m³: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 25 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; headache, dizziness; psycho-neurologic disturbance; sore throat, cough; abdominal pain, vomiting; urine retention; paresis, focal anesthesia; skin burns, pruritus; in animals: hemolysis; hepatic necrosis; kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys, urinary tract, blood

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Tin(II) oxide (as S	CAS 21651-19-4			
SnO			RTECS	
Synonyms & Trade Names Stannous oxide, Tin protoxide [Note: Also see specific listing for Tin(IV) oxide (as Sn).]			DOT ID & Guide	
Exposure	NIOSH REL: TWA 2 mg/m	3		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description Brownish-black powder.				
MW: 134.7	BP: Decomposes	MLT(600 mmHg): 1976°F (Decomposes)	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 6.3	
Fl.P: NA	UEL: NA	LEL: NA		
Incompatibilities & Reactive None reported	rities			
Measurement Methods NIOSH 7300				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact				
Symptoms Stannosis (benign pneumoconiosis): dyspnea (breathing difficulty), decreased pulmonary function				
Target Organs respiratory system				
See also: INTRODUCTION				

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Tin(IV) oxide (as S	Sn)		CAS 18282-10-5	
SnO ₂			RTECS XQ4000000	
Synonyms & Trade Names Stannic dioxide, Stannic oxide, White tin oxide [Note: Also see specific listing for Tin(II) oxide (as Sn).]			DOT ID & Guide	
Exposure	NIOSH REL: TWA 2 mg/r	n^3		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion		
Physical Description White or slightly gray powder	er.			
MW: 150.7	BP: Decomposes	MLT: 2966°F (Decomposes)	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 6.95	
Fl.P: NA	UEL: NA	LEL: NA		
Incompatibilities & Reactive Chlorine trifluoride	rities			
Measurement Methods NIOSH 7300				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Breathing: Fresh air		
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact				
Symptoms Stannosis (benign pneumoconiosis): dyspnea (breathing difficulty), decreased pulmonary function				
Target Organs respiratory system				
See also: INTRODUCTION				

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Titanium dioxide			CAS 13463-67-7
TiO ₂			RTECS XR2275000
Synonyms & Trade Names Rutile, Titanium oxide, Titanium peroxide		DOT ID & Guide	
Exposure	NIOSH REL: Ca See A	ppendix A	
Limits	OSHA PEL†: TWA 15	mg/m ³	
IDLH Ca [5000 mg/m ³]		Conversion	
Physical Description White, odorless powder.			
MW: 79.9	BP: 4532-5432°F	MLT: 3326-3362°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 4.26
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid			
Incompatibilities & React None reported	ivities		
Measurement Methods NIOSH S385 (II-3)			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: Daily		First Aid (See procedures) Breathing: Respiratory support	
Respirator Recommendat	ions NIOSH		

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positivepressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation

Symptoms Lung fibrosis; [potential occupational carcinogen]

Target Organs respiratory system

Cancer Site [in animals: lung tumors]

See also: <u>INTRODUCTION</u>

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o-Tolidine			CAS 119-93-7	
$\boxed{C_{14}H_{16}N_2}$			RTECS DD1225000	
Synonyms & Trade Names 4,4'-Diamino-3,3'-dimethylbiphenyl; Diaminoditolyl; 3,3'-Dimethylbenzidine; 3,3'-Dimethyl-4,4'-diphenyldiamine; 3,3'-Tolidine			DOT ID & Guide	
Exposure	NIOSH REL: Ca C 0.02 mg	g/m ³ [60-minute] [skin] <u>See A</u>	ppendix A See Appendix C	
Limits	OSHA PEL: See Appendix	C		
IDLH Ca [N.D.]	•	Conversion		
Physical Description White to reddish crystals or powder. [Note: Darkens on exposure to air. Often used in paste or wet cake form. Used as a basis for many dyes.]				
MW: 212.3	BP: 572°F	MLT: 264°F	Sol: 0.1%	
VP: ?	IP: ?		Sp.Gr: ?	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reacti Strong oxidizers	vities			
Measurement Methods NIOSH 5013; OSHA 71				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory supports Swallow: Medical attention	ort	

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; in animals: liver, kidney damage; [potential occupational carcinogen]

Target Organs Eyes, respiratory system, liver, kidneys

Cancer Site [in animals: liver, bladder & mammary gland tumors]

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Toluene			CAS 108-88-3
C ₆ H ₅ CH ₃		RTECS XS5250000	
Synonyms & Trade Names Methyl benzene, Methyl benzol, Phenyl methane, Toluol		DOT ID & Guide 1294 130	
Exposure	NIOSH REL: TWA 100 ppn	n (375 mg/m ³) ST 150 ppm (5	560 mg/m ³)
Limits	OSHA PEL†: TWA 200 ppn	n C 300 ppm 500 ppm (10-mi	nute maximum peak)
IDLH 500 ppm		Conversion 1 ppm = 3.77 m	g/m ³
Physical Description Colorless liquid with a sweet, pungent, benzene-like odor.			
MW: 92.1	BP: 232°F	FRZ: -139°F	Sol(74°F): 0.07%
VP: 21 mmHg	IP: 8.82 eV		Sp.Gr: 0.87
Fl.P: 40°F	UEL: 7.1%	LEL: 1.1%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.	
Incompatibilities & Reactive Strong oxidizers	vities		
Measurement Methods NIOSH 1500, 1501, 3800, 4000; OSHA 111			
		First Aid (See procedures)	
Eyes: Prevent eye contact		Eye: Irrigate immediately Skin: Soap wash promptly	
Wash skin: When contaminated		Breathing: Respiratory support	
Remove: When wet (flammable)		Swallow: Medical attention immediately	

Respirator Recommendations NIOSH

Change: No recommendation

Up to 500 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or

other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, insomnia; paresthesia; dermatitis; liver, kidney damage

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

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Toluenediamine			CAS 25376-45-8 95-80-7 (2,4-TDA)	
$\overline{\text{CH}_{3}\text{C}_{6}\text{H}_{3}(\text{NH}_{2})_{2}}$			RTECS XS9445000 XS9625000 (2,4-TDA)	
Synonyms & Trade Names Diaminotoluene, Methylphenylene diamine, TDA, Toluenediamine isomers, Tolylenediamine [Note: Various isomers of TDA exist.]			DOT ID & Guide 1709 151	
Exposure	Exposure NIOSH REL: Ca (all isomers) See Appendix A			
Limits	OSHA PEL: none	OSHA PEL: none		
IDLH Ca [N.D.]	1	Conversion		
Physical Description Colorless to brown, need Properties given are for 2		der. [Note: Tends to darken on	storage & exposure to air.	
MW: 122.2	BP: 558°F	MLT: 210°F	Sol: Soluble	
VP(224°F): 1 mmHg	IP: ?		Sp.Gr: 1.05 (Liquid at 212°F)	
Fl.P: 300°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Rea None reported	ctivities			
Measurement Methods NIOSH 5516; OSHA 65				
Personal Protection & S	Sanitation	First Aid (See proced	ures)	

Respirator Recommendations NIOSH

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Provide: Eyewash, Quick drench

Skin: Prevent skin contact

Eyes: Prevent eye contact

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

Eye: Irrigate immediately Skin: Water flush immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; dermatitis; ataxia, tachycardia, nausea, vomiting, convulsions, respiratory depression; methemoglobinemia, cyanosis, headache, lassitude (weakness, exhaustion), dizziness, bluish skin; liver injury; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, blood, cardiovascular system, liver

Cancer Site [in animals: liver, skin & mammary gland tumors]

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Toluene-2,4-diisocyanate			CAS 584-84-9		
CH ₃ C ₆ H ₃ (NCO) ₂			RTECS CZ6300000		
			DOT ID & Guide 2078 156		
Exposure	Exposure NIOSH REL: Ca See Appendix A				
Limits	OSHA PEL†: C 0.02 ppm	OSHA PEL†: C 0.02 ppm (0.14 mg/m ³)			
IDLH Ca [2.5 ppm]			= 7.13 mg/m ³		
Physical Description Colorless to pale-yellow solid or liquid (above 71°F) with a sharp, pungent odor.					
MW: 174.2	BP: 484°F	BP: 484°F MLT: 71°F Sol: Insoluble			
VP(77°F): 0.01 mmHg	IP: ?	IP: ? Sp.Gr: 1.22			
Fl.P: 260°F	UEL: 9.5% LEL: 0.9%				
Class IIIB Combustible Liquid: Fl.P. at or above 200°F.					
water to form carbon dioxid	ds, bases & amines (may cau	se foam & spatter); alco	phols [Note: Reacts slowly with		
N/					

Measurement Methods

NIOSH 2535, 5521, 5522; OSHA 18, 33, 42

Personal Protection & Sanitation

Skin: Prevent skin contact Eyes: Prevent eye contact

Wash skin: When contaminated/Daily

Remove: When wet or contaminated

Change: Daily

Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately
Skin: Soap wash immediately
Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; choke, paroxysmal cough; chest pain, retrosternal (occurring behind the sternum) soreness; nausea, vomiting, abdominal pain; bronchitis, bronchospasm, pulmonary edema; dyspnea (breathing difficulty), asthma; conjunctivitis, lacrimation (discharge of tears); dermatitis, skin sensitization; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system

Cancer Site [in animals: pancreas, liver, mammary gland, circulatory system & skin tumors]

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o-Toluidine			CAS 95-53-4
CH ₃ C ₆ H ₄ NH ₂			RTECS XU2975000
Synonyms & Trade Names o-Aminotoluene, 2-Aminotoluene, 1-Methyl-2-aminobenzene, o-Methylaniline, 2- Methylaniline, ortho-Toluidine			DOT ID & Guide 1708 153
Exposure NIOSH REL: Ca [skin] See Appendix A			
Limits	OSHA PEL: TWA 5 ppm (22 mg/m ³) [skin]		
IDLH Ca [50 ppm]		Conversion 1 ppm = 4.38 m	ng/m ³
Physical Description Colorless to pale-yellow liquid with an aromatic, aniline-like odor.			
MW: 107.2	BP: 392°F	BP: 392°F FRZ: 6°F Sol: 2%	
VP: 0.3 mmHg	IP: 7.44 eV	IP: 7.44 eV Sp.Gr: 1.01	
Fl.P: 185°F	UEL: ?	LEL: ?	
Class IIIA Combustible Liquid: Fl.P. at or above 140°F and below 200°F.			
Incompatibilities & Reactivities Strong oxidizers, nitric acid, bases			
Measurement Methods NIOSH 2002, 2017; OSHA 7	73		

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated
Change: No recommendation
Provide: Eyewash, Quick drench

Breathing: Respiratory support Swallow: Medical attention immediately

First Aid (See procedures)
Eye: Irrigate immediately

Skin: Soap wash immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes; anoxia, headache, cyanosis; lassitude (weakness, exhaustion), dizziness, drowsiness; micro hematuria (blood in the urine); eye burns; dermatitis; [potential occupational carcinogen]

Target Organs Eyes, skin, blood, kidneys, liver, cardiovascular system

Cancer Site [bladder cancer]

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m-Toluidine			CAS 108-44-1
CH ₃ C ₆ H ₄ NH ₂			RTECS XU2800000
Synonyms & Trade Names 3-Amino-1-methylbenzene, 1-Aminophenylmethane, m-Aminotoluene, 3-Methylaniline, 3-Methylbenzenamine, 3-Toluidine, m-Tolylamine			DOT ID & Guide 1708 153
Exposure	NIOSH REL: See Appendix	D	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description Colorless to light-yellow liquid with an aromatic, amine-like odor. [Note: Used as a basis for many dyes.]			
MW: 107.2	BP: 397°F	FRZ: -23°F	Sol: 2%
VP(106°F): 1 mmHg	IP: 7.50 eV		Sp.Gr: 0.999
Fl.P: 187°F	UEL: ?	LEL: ?	
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.	
Incompatibilities & Reactive Oxidizers, acids	vities		
Measurement Methods NIOSH 2002; OSHA 73			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation	, skin absorption, ingestion, sl	kin and/or eye contact	
1 2 -	cin; dermatitis; hematuria (blo e, convulsions; anemia, lassitu	od in the urine), methemoglo de (weakness, exhaustion)	binemia; cyanosis, nausea,
Target Organs Eyes, skin, b	blood, cardiovascular system		

See also: <u>INTRODUCTION</u>

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p-Toluidine		CAS 106-49-0	
CH ₃ C ₆ H ₄ NH ₂			RTECS XU3150000
Synonyms & Trade Names 4-Aminotoluene, 4-Methylaniline, 4-Methylbenzenamine, 4-Toluidine, Tolylamine			DOT ID & Guide 1708 153
Exposure	NIOSH REL: Ca See Appen	dix A	
Limits	OSHA PEL†: none		
IDLH Ca [N.D.]		Conversion	
Physical Description White solid with an aromatic odor. [Note: Used as a basis for many dyes.]			
MW: 107.2	BP: 393°F	MLT: 111°F	Sol: 0.7%
VP(108°F): 1 mmHg	IP: 7.50 eV		Sp.Gr: 1.05
Fl.P: 188°F	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reactivities Oxidizers, acids			
Measurement Methods NIOSH 2002; OSHA 73			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	

Respirator Recommendations NIOSH

Provide: Eyewash, Quick drench

Change: Daily

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-

contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; dermatitis; hematuria (blood in the urine), methemoglobinemia; cyanosis, nausea, vomiting, low blood pressure, convulsions; anemia, lassitude (weakness, exhaustion); [potential occupational carcinogen]

Target Organs Eyes, skin, blood, cardiovascular system

Cancer Site [in animals: liver tumors]

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Tributyl phosphate			CAS 126-73-8
(CH ₃ [CH ₂] ₃ O) ₃ PO			RTECS TC7700000
Synonyms & Trade Names Butyl phosphate, TBP, Tributyl ester of phosphoric acid, Tri-n-butyl phosphate			DOT ID & Guide
Exposure	NIOSH REL: TWA 0.2 ppn	n (2.5 mg/m ³)	
Limits	OSHA PEL†: TWA 5 mg/m	1 ³	
IDLH 30 ppm Conversion 1		Conversion 1 ppm = 10.89 i	mg/m ³
Physical Description Colorless to pale-yellow, odorless liquid.			
MW: 266.3	BP: 552°F (Decomposes)	FRZ: -112°F	Sol: 0.6%
VP(77°F): 0.004 mmHg	IP: ?		Sp.Gr: 0.98
Fl.P(oc): 295°F	UEL: ?	LEL: ?	
Class IIIB Combustible Liqu	id: Fl.P. at or above 200°F.		
Incompatibilities & Reactivities Alkalis, oxidizers, water, moist air			
Measurement Methods NIOSH 5034			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	

Respirator Recommendations NIOSH

Up to 2 ppm: (APF = 10) Any supplied-air respirator

Up to 5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 10 ppm: (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 30 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system, headache; nausea

Target Organs Eyes, skin, respiratory system

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Trichloroacetic acid			CAS 76-03-9
CCl ₃ COOH			RTECS AJ7875000
Synonyms & Trade Names TCA, Trichloroethanoic acid		DOT ID & Guide 1839 153 (solid) 2564 153 (solution)	
Exposure	NIOSH REL: TWA 1 ppm (7 mg/m ³)	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 6.68 m	ng/m ³
Physical Description Colorless to white, crystalline solid with a sharp, pungent odor.			
MW: 163.4	BP: 388°F	MLT: 136°F	Sol: Miscible
VP(124°F): 1 mmHg	IP: ?		Sp.Gr: 1.62
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Solid			
Incompatibilities & Reactive Moisture, iron, zinc, aluminu chloride. Corrosive to metals	ım, strong oxidizers [Note: Do	ecomposes on heating to form	phosgene & hydrogen
Measurement Methods OSHA PV2017			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately			ort
Respirator Recommendation	ons To be added later		
Exposure Routes inhalation	, ingestion, skin and/or eye co	ontact	
Symptoms Irritation eyes, sk	kin, nose, throat, respiratory s	ystem; cough, dyspnea (breatl	ning difficulty), delayed

pulmonary edema; eye, skin burns; dermatitis; salivation, vomiting, diarrhea

Target Organs Eyes, skin, respiratory system, gastrointestinal tract

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1,2,4-Trichlorobenzene		CAS 120-82-1		
C ₆ H ₃ Cl ₃			RTECS DC2100000	
Synonyms & Trade Names unsym-Trichlorobenzene; 1,2,4-Trichlorobenzol		DOT ID & Guide 2321 153 (liquid)		
Exposure	NIOSH REL: C 5 ppm (40 mg/m ³)		
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm =	7.42 mg/m ³	
Physical Description Colorless liquid or crystalline solid (below 63°F) with an aromatic odor.				
MW: 181.4	BP: 416°F	FRZ: 63°F	Sol: 0.003%	
VP: 1 mmHg	IP: ?		Sp.Gr: 1.45	
Fl.P: 222°F	UEL(302°F): 6.6%	LEL(302°F): 2.5%		
Class IIIB Combustible Liquid Combustible Solid				
Incompatibilities & Reactive Acids, acid fumes, oxidizers,				
Measurement Methods NIOSH 5517				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately				
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, mucous membrane; in animals: liver, kidney damage; possible teratogenic effects				
Target Organs Eyes, skin, r	espiratory system, liver, 1	reproductive system		
C 1 DIEDODIJETION				

See also: <u>INTRODUCTION</u>

1,1,2-Trichloroethane

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CAS 79-00-5

CHCl ₂ CH ₂ Cl			RTECS KJ3150000	
Synonyms & Trade Names Ethane trichloride, beta-Trichloroethane, Vinyl trichloride DOT ID & Guide			DOT ID & Guide	
Exposure	NIOSH REL: Ca TWA 10 (Chloroethanes)	NIOSH REL: Ca TWA 10 ppm (45 mg/m ³) [skin] <u>See Appendix A See Appendix (</u> (Chloroethanes)		
Limits	OSHA PEL: TWA 10 ppn	n (45 mg/m ³) [skin]		
IDLH Ca [100 ppm]		Conversion 1 ppm = 5.46 n	ng/m ³	
Physical Description Colorless liquid with a sweet, chloroform-like odor.				
MW: 133.4	BP: 237°F	BP: 237°F FRZ: -34°F Sol: 0.4%		
VP: 19 mmHg	IP: 11.00 eV		Sp.Gr: 1.44	
Fl.P: ?	UEL: 15.5%	LEL: 6%		
Combustible Liquid, form	s dense soot.			
Incompatibilities & Reactivities Strong oxidizers & caustics; chemically-active metals (such as aluminum, magnesium powders, sodium & potassium)				
Measurement Methods NIOSH 1003; OSHA 11				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support			ort	

Respirator Recommendations NIOSH

Remove: When wet or contaminated

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Swallow: Medical attention immediately

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose; central nervous system depression; liver, kidney damage; dermatitis; [potential occupational carcinogen]

Target Organs Eyes, respiratory system, central nervous system, liver, kidneys

Cancer Site [in animals: liver cancer]

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richloroethene, Trilene		RTECS KX4550000	
		DOT ID & Ci.	
		DOT ID & Guide 1710 160	
NIOSH REL: Ca See Appen	dix A See Appendix C		
OSHA PEL†: TWA 100 ppn hours)	n C 200 ppm 300 ppm (5-min	ute maximum peak in any 2	
	Conversion 1 ppm = 5.37 m	g/m ³	
Physical Description Colorless liquid (unless dyed blue) with a chloroform-like odor.			
BP: 189°F	FRZ: -99°F	Sol(77°F): 0.1%	
IP: 9.45 eV		Sp.Gr: 1.46	
UEL(77°F): 10.5%			
ns with difficulty.			
Incompatibilities & Reactivities Strong caustics & alkalis; chemically-active metals (such as barium, lithium, sodium, magnesium, titanium & beryllium)			
Measurement Methods NIOSH 1022, 3800; OSHA 1001			
First Aid (See procedures)			
	OSHA PEL†: TWA 100 ppn hours) I blue) with a chloroform-like BP: 189°F IP: 9.45 eV UEL(77°F): 10.5% Ins with difficulty. Vities emically-active metals (such a content of the conten	Conversion 1 ppm = 5.37 m I blue) with a chloroform-like odor. BP: 189°F IP: 9.45 eV UEL(77°F): 10.5% LEL(77°F): 8% Ins with difficulty. Vities emically-active metals (such as barium, lithium, sodium, metal) Example 1001 First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppose	

Respirator Recommendations NIOSH

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system

Cancer Site [in animals: liver & kidney cancer]

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Trichloronaphthalene			CAS 1321-65-9	
$C_{10}H_5Cl_3$		RTECS QK4025000		
Synonyms & Trade Names Halowax®, Nibren wax, Seekay wax		DOT ID & Guide		
Exposure	NIOSH REL: TWA 5 mg/m	³ [skin]		
Limits	OSHA PEL: TWA 5 mg/m ³	[skin]		
IDLH Unknown	'	Conversion		
Physical Description Colorless to pale-yellow solid with an aromatic odor.				
MW: 231.5	BP: 579-669°F	MLT: 199°F	Sol: Insoluble	
VP: <1 mmHg	IP: ?		Sp.Gr: 1.58	
Fl.P(oc): 392°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reacti Strong oxidizers	Incompatibilities & Reactivities Strong oxidizers			
Measurement Methods NIOSH S128 (II-2)				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory sup		

Respirator Recommendations NIOSH/OSHA

Remove: When wet or contaminated

Change: Daily

Up to 50 mg/m^3 : (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

Swallow: Medical attention immediately

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Anorexia, nausea; dizziness; jaundice, liver injury

Target Organs Liver

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NIOSH Pocket Guide to Chemical Hazards

1,2,3-Trichloropropane			CAS 96-18-4
CH ₂ CICHCICH ₂ CI			RTECS TZ9275000
Synonyms & Trade Names Allyl trichloride, Glycerol trichlorohydrin, Glyceryl trichlorohydrin, Trichlorohydrin			DOT ID & Guide
Exposure	NIOSH REL: Ca TWA 10 p	pm (60 mg/m ³) [skin] <u>See Ap</u>	ppendix A
Limits	OSHA PEL†: TWA 50 ppm	(300 mg/m ³)	
IDLH Ca [100 ppm]		Conversion 1 ppm = 6.03 m	g/m ³
Physical Description Colorless liquid with a chloroform-like odor.			
MW: 147.4	BP: 314°F	FRZ: 6°F	Sol: 0.1%
VP: 3 mmHg	IP: ?		Sp.Gr: 1.39
Fl.P: 160°F	UEL(302°F): 12.6%	LEL(248°F): 3.2%	
Class IIIA Combustible Liqu	id: Fl.P. at or above 140°F ar	nd below 200°F.	
Incompatibilities & Reactive Chemically-active metals, str			
Measurement Methods NIOSH 1003; OSHA 7			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash	
Wash skin: When contamina Remove: When wet or conta		Breathing: Respiratory support Swallow: Medical attention immediately	

Respirator Recommendations NIOSH

Change: No recommendation Provide: Eyewash, Quick drench

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, nose, throat; central nervous system depression; in animals: liver, kidney injury; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

Cancer Site [in animals: forestomach, liver & mammary gland cancer]

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Respirator Recommendations NIOSH/OSHA

full facepiece

NIOSH Pocket Guide to Chemical Hazards

1,1,2-Trichloro-1,2	CAS 76-13-1		
CCl ₂ FCClF ₂			RTECS KJ4000000
Synonyms & Trade Names Chlorofluorocarbon-113, CFC-113, Freon® 113, Genetron® 113, Halocarbon 113, Refrigerant 113, TTE			DOT ID & Guide
Exposure	NIOSH REL: TWA 1000 pp	m (7600 mg/m ³) ST 1250 pp:	m (9500 mg/m ³)
Limits	OSHA PEL†: TWA 1000 pp	om (7600 mg/m ³)	
IDLH 2000 ppm		Conversion 1 ppm = 7.67 m	g/m ³
Physical Description Colorless to water-white liquid with an odor like carbon tetrachloride at high concentrations. [Note: A gas above 118°F.]			
MW: 187.4	BP: 118°F	FRZ: -31°F	Sol(77°F): 0.02%
VP: 285 mmHg	IP: 11.99 eV		Sp.Gr(77°F): 1.56
Fl.P: ?	UEL: ?	LEL: ?	
Noncombustible Liquid at or	dinary temperatures, but the g	gas will ignite and burn weakl	y at 1256°F.
Incompatibilities & Reactive Chemically-active metals such if in contact with alloys contact.	ch as calcium, powdered alum	ninum, zinc, magnesium & be	ryllium [Note: Decomposes
Measurement Methods NIOSH 1020; OSHA 113			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supports Swallow: Medical attention in	

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breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure

Up to 2000 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation skin, throat, drowsiness, dermatitis; central nervous system depression; in animals: cardiac arrhythmias, narcosis

Target Organs Skin, heart, central nervous system, cardiovascular system

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Triethylamine			CAS 121-44-8
$(C_2H_5)_3N$		RTECS YEO175000	
		DOT ID & Guide 1296 132	
Exposure	NIOSH REL: See Appendix	D	
Limits	OSHA PEL†: TWA 25 ppm	(100 mg/m^3)	
IDLH 200 ppm		Conversion 1 ppm = 4.14 m	ng/m ³
Physical Description Colorless liquid with a strong, ammonia-like odor.			
MW: 101.2	BP: 193°F	FRZ: -175°F	Sol: 2%
VP: 54 mmHg	IP: 7.50 eV		Sp.Gr: 0.73
Fl.P: 20°F	UEL: 8.0%	LEL: 1.2%	
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.	
Incompatibilities & Reactive Strong oxidizers, strong acid	vities s, chlorine, hypochlorite, halo	genated compounds	
Measurement Methods NIOSH S152 (II-3); OSHA PV2060			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory suppo	ort
Remove: When wet (flammable)		Swallow: Medical attention immediately	

Respirator Recommendations OSHA

Provide: Eyewash (>1%), Quick drench (>1%)

Change: No recommendation

Up to 200 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode[£]/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; in animals: myocardial, kidney, liver damage

Target Organs Eyes, skin, respiratory system, cardiovascular system, liver, kidneys

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Trifluorobromomethane			CAS 75-63-8	
CBrF ₃			RTECS PA5425000	
Synonyms & Trade Names Bromotrifluoromethane, Fluorocarbon 1301, Freon® 13B1, Halocarbon 13B1, Halon® 1301, Monobromotrifluoromethane, Refrigerant 13B1, Trifluoromonobromomethane			DOT ID & Guide 1009 126	
Exposure	NIOSH REL: TWA 10	00 ppm (6100 mg/m ³)		
Limits	OSHA PEL: TWA 100	OSHA PEL: TWA 1000 ppm (6100 mg/m ³)		
IDLH 40,000 ppm			ng/m ³	
Physical Description Colorless, odorless gas. [No	te: Shipped as a liquefied	d compressed gas.]		
MW: 148.9	BP: -72°F	FRZ: -267°F	Sol: 0.03%	
VP: >1 atm	IP: 11.78 eV	RGasD: 5.14		
Fl.P: NA	UEL: NA	UEL: NA LEL: NA		
Nonflammable Gas				
Incompatibilities & Reactivities Chemically-active metals (such as calcium, powdered aluminum, zinc & magnesium)				
Measurement Methods NIOSH 1017				

Personal Protection & Sanitation	First Aid (See procedures)
Skin: Frostbite	Eye: Frostbite
Eyes: Frostbite	Skin: Frostbite
Wash skin: No recommendation	Breathing: Respiratory support
Remove: No recommendation	
Change: No recommendation	
Provide: Frostbite	

Respirator Recommendations NIOSH/OSHA

Up to 10,000 ppm: (APF = 10) Any supplied-air respirator

Up to 25,000 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 40,000 ppm: (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Dizziness; cardiac arrhythmias; liquid: frostbite

Target Organs central nervous system, heart

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Trimellitic anhydride			CAS 552-30-7	
$C_9H_4O_5$			RTECS DC2050000	
Synonyms & Trade Names 1,2,4-Benzenetricarboxylic anhydride; 4-Carboxyphthalic anhydride; TMA; TMAN; Trimellic acid anhydride [Note: TMA is also a synonym for Trimethylamine.]		DOT ID & Guide		
Exposure	NIOSH REL: TWA 0.005 ppm (0.04 mg/m ³) Should be handled in the workplace an extremely toxic substance.			
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 7.86 m	ng/m ³	
Physical Description Colorless solid.				
MW: 192.1	BP: ?	MLT: 322°F	Sol: ?	
VP: 0.000004 mmHg	IP: ?		Sp.Gr: ?	
Fl.P: NA	UEL: NA	LEL: NA		
Combustible Solid				
Incompatibilities & Reactive None reported	vities			
Measurement Methods NIOSH 5036; OSHA 98				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory supposed Swallow: Medical attention		
Respirator Recommendation	Respirator Recommendations To be added later			
Exposure Routes inhalation	, ingestion, skin and/or eye co	ontact		
Symptoms Irritation eyes, skin, nose, respiratory system; pulmonary edema, respiratory sensitization; rhinitis, asthma, cough, wheezing, dyspnea (breathing difficulty), malaise (vague feeling of discomfort), fever, muscle aches, sneezing				

Target Organs Eyes, skin, respiratory system

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Trimethylamine			CAS 75-50-3
$(CH_3)_3N$			RTECS PA0350000
Synonyms & Trade Names N,N-Dimethylmethanamine; TMA [Note: May be used in (typically 25%, 30%, or 40% TMA.]		an aqueous solution	DOT ID & Guide 1083 118 (anhydrous) 1297 132 (aqueous solution)
Exposure	NIOSH REL: TWA 10 ppm	(24 mg/m ³) ST 15 ppm (36 n	ng/m ³)
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 2.42 m	g/m ³
Physical Description Colorless gas with a fishy, amine odor. [Note: A liquid below 37°F. Shipped as a liquefied compressed gas.]			ied compressed gas.]
MW: 59.1	BP: 37°F FRZ: -179°F Sol(86°F):		Sol(86°F): 48%
VP(70°F): 1454 mmHg	IP: 7.82 eV	RGasD: 2.09	
Fl.P: NA (Gas) 20°F (Liquid)	UEL: 11.6% LEL: 2.0%		
Flammable Gas Class IA Fla	mmable Liquid		
		osating agents (e.g., sodium ni um, copper).]	trite), mercury, strong acids
Measurement Methods OSHA PV2060			
Personal Protection & Sanitation Skin: Prevent skin contact (liquid/solution)/Frostbite Eyes: Prevent eye contact (liquid/solution)/Frostbite Wash skin: When contaminated (solution) Remove: When wet (flammable) Change: No recommendation Provide: Eyewash (liquid/solution), Quick drench (liquid/solution), Frostbite		First Aid (See procedures) Eye: Irrigate immediately (lie Skin: Water flush immediate Breathing: Respiratory supposwallow: Medical attention in	ly (liquid/solution)/Frostbite ort
Respirator Recommendations To be added later			

Symptoms Irritation eyes, skin, nose, throat, respiratory system; cough, dyspnea (breathing difficulty), delayed

Exposure Routes inhalation, ingestion (solution), skin and/or eye contact

pulmonary edema; blurred vision, corneal necrosis; skin burns; liquid: frostbite

Target Organs Eyes, skin, respiratory system

See also: <u>INTRODUCTION</u>

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1,2,3-Trimethylbenzene		CAS 526-73-8	
C ₆ H ₃ (CH ₃) ₃			RTECS DC330000
Synonyms & Trade Names Hemellitol [Note: Hemimellite is a mixture of the 1,2,3-isomer with up to 10% of related aromatics such as the 1,2,4-isomer.]		DOT ID & Guide	
Exposure	NIOSH REL: TWA 25 ppm	(125 mg/m ³)	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 4.92 m	ng/m ³
Physical Description Clear, colorless liquid with a distinctive, aromatic odor.			
MW: 120.2	BP: 349°F	BP: 349°F FRZ: -14°F Sol: Low	
VP(62°F): 1 mmHg	IP: 8.48 eV		Sp.Gr: 0.89
Fl.P: ?	UEL: 6.6%	LEL: 0.8%	
Flammable Liquid			
Incompatibilities & Reactive Oxidizers, nitric acid	vities		
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be added later			
Exposure Routes inhalation, ingestion, skin and/or eye contact			

Symptoms Irritation eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical

Target Organs Eyes, skin, respiratory system, central nervous system, blood

pneumonitis (aspiration liquid)

See also: <u>INTRODUCTION</u>

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1,2,4-Trimethylbenzene			CAS 95-63-6
C ₆ H ₃ (CH ₃) ₃			RTECS DC3325000
Synonyms & Trade Names Assymetrical trimethylbenzene, psi-Cumene, Pseudocumene [Note: Hemimellite is a mixture of the 1,2,3-isomer with up to 10% of related aromatics such as the 1,2,4-isomer.]			DOT ID & Guide
Exposure	NIOSH REL: TWA 25 ppm	(125 mg/m ³)	
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 4.92 m	ng/m ³
Physical Description Clear, colorless liquid with a distinctive, aromatic odor.			
MW: 120.2	BP: 337°F	FRZ: -77°F Sol: 0.006%	
VP(56°F): 1 mmHg	IP: 8.27 eV		Sp.Gr: 0.88
Fl.P: 112°F	UEL: 6.4%	LEL: 0.9%	
Class II Flammable Liquid			
Incompatibilities & Reaction Oxidizers, nitric acid	vities		
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately			
Respirator Recommendations To be added later			
Exposure Routes inhalation, ingestion, skin and/or eye contact			
Symptoms Irritation eyes, sl	kin, nose, throat, respiratory s	ystem; bronchitis; hypochrom	ic anemia; headache,

drowsiness, fatigue, dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)

Target Organs Eyes, skin, respiratory system, central nervous system, blood

See also: <u>INTRODUCTION</u>

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1,3,5-Trimethylbenzene			CAS 108-67-8	
C ₆ H ₃ (CH ₃) ₃			RTECS OX6825000	
Synonyms & Trade Names Mesitylene, Symmetrical trimethylbenzene, sym-Trimethylbenzene		DOT ID & Guide 2325 129		
Exposure	Exposure NIOSH REL: TWA 25 ppm (125 mg/m ³)			
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 4.92 m	ng/m ³	
Physical Description Clear, colorless liquid with a distinctive, aromatic odor.				
MW: 120.2	BP: 329°F	FRZ: -49°F	Sol: 0.002%	
VP: 2 mmHg	IP: 8.39 eV		Sp.Gr: 0.86	
Fl.P: 122°F	UEL: ?	LEL: ?		
Class II Flammable Liquid				
Incompatibilities & Reactive Oxidizers, nitric acid	vities			
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
		ystem; bronchitis; hypochrom ausea, incoordination; vomitir		

Target Organs Eyes, skin, respiratory system, central nervous system, blood

pneumonitis (aspiration liquid)

See also: <u>INTRODUCTION</u>

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Trimethyl phosphite			CAS 121-45-9	
(CH ₃ O) ₃ P			RTECS TH1400000	
Synonyms & Trade Names Methyl phosphite, Trimethoxyphosphine, Trimethyl ester of phosphorous acid		DOT ID & Guide 2329 129		
Exposure	NIOSH REL: TWA 2 ppm (10 mg/m ³)			
Limits	OSHA PEL†: none			
IDLH N.D.	<u> </u>	Conversion 1 ppm = 5.08 m	ng/m ³	
Physical Description Colorless liquid with a distinctive, pungent odor.				
MW: 124.1	BP: 232°F	FRZ: -108°F	Sol: Reacts	
VP(77°F): 24 mmHg	IP: ?		Sp.Gr: 1.05	
Fl.P: 82°F	UEL: ?	LEL: ?		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	low 100°F.		
Incompatibilities & Reactivities Magnesium perchlorate, water [Note: Reacts (hydrolyzes) with water.]				
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, upper respiratory system; dermatitis; in animals: teratogenic effects				
Target Organs Eyes, skin, respiratory system, reproductive system				
See also: INTRODUCTION				

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2,4,6-Trinitrotoluene			CAS 118-96-7	
$CH_3C_6H_2(NO_2)_3$			RTECS XU0175000	
Synonyms & Trade Names 1-Methyl-2,4,6-trinitrobenzene; TNT; Trinitrotoluene; sym-Trinitrotoluene; Trinitrotoluol			DOT ID & Guide 1356 113 (wet)	
Exposure	NIOSH REL: TWA 0.5 m	NIOSH REL: TWA 0.5 mg/m ³ [skin]		
Limits	OSHA PEL†: TWA 1.5 m	OSHA PEL†: TWA 1.5 mg/m ³ [skin]		
IDLH 500 mg/m ³	Conversion			
Physical Description Colorless to pale-yellow, odorless solid or crushed flakes.				
MW: 227.1	BP: 464°F (Explodes)	MLT: 176°F	Sol(77°F): 0.01%	
VP: 0.0002 mmHg	IP: 10.59 eV		Sp.Gr: 1.65	
Fl.P: ? (Explodes)	UEL: ?	UEL: ?		
Combustible Solid (Class	s A Explosive)	•		
Incompatibilities & Rea Strong oxidizers, ammon detonation.]	activities nia, strong alkalis, combustible	materials, heat [Note: Ra	pid heating will result in	
Measurement Methods OSHA 44				
Personal Protection & Sanitation First Aid (See procedures)				
Skin: Prevent skin contact			Eye: Irrigate immediately	
Eyes: Prevent eye contact			Skin: Soap wash promptly	
Wash skin: When contaminated/Daily Remove: When wet or contaminated			Breathing: Respiratory support Swallow: Medical attention immediately	
Change: Daily		Swanow. Wedicar att	ontion infinediatory	

Up to 12.5 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*

Up to 25 mg/m^3 : (APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

Respirator Recommendations NIOSH

supplied-air respirator with a full facepiece

Up to 5 mg/m^3 : (APF = 10) Any supplied-air respirator*

Up to 500 mg/m: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation skin, mucous membrane; liver damage, jaundice; cyanosis; sneezing; cough, sore throat; peripheral neuropathy, muscle pain; kidney damage; cataract; sensitization dermatitis; leukocytosis (increased blood leukocytes); anemia; cardiac irregularities

Target Organs Eyes, skin, respiratory system, blood, liver, cardiovascular system, central nervous system, kidneys

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Triorthocresyl phosphate			CAS 78-30-8	
$(CH_3C_6H_{40})_3PO$			RTECS TD0350000	
Synonyms & Trade Names TCP, TOCP, Tri-o-cresyl ester of phosphoric acid, Tri-o-cresyl phosphate			DOT ID & Guide 2574 151	
Exposure	NIOSH REL: TWA 0.1 mg	/m ³ [skin]		
Limits	OSHA PEL†: TWA 0.1 mg	OSHA PEL†: TWA 0.1 mg/m ³		
IDLH 40 mg/m ³		Conversion		
Physical Description Colorless to pale-yellow, odorless liquid or solid (below 52°F).				
MW: 368.4	BP: 770°F (Decomposes)	FRZ: 52°F	Sol: Slight	
VP(77°F): 0.00002	IP: ?		Sp.Gr: 1.20	
Fl.P: 437°F	UEL: ?	LEL: ?		
Class IIIB Combustible Liqu	nid: Fl.P. at or above 200°F.			
Incompatibilities & Reaction Oxidizers	vities			
Measurement Methods NIOSH 5037				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: No recommendation Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediatel Breathing: Respiratory supp Swallow: Medical attention	ort	

Respirator Recommendations NIOSH/OSHA

Up to 0.5 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 1 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any supplied-air respirator

Up to 2.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter

Up to 5 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 40 mg/m^3 : (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Gastrointestinal disturbance; peripheral neuropathy; cramps in calves, paresthesia in feet or hands; weak feet, wrist drop, paralysis

Target Organs peripheral nervous system, central nervous system

See also: <u>INTRODUCTION</u>

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Triphenylamine			CAS 603-34-9	
			RTECS YK2680000	
Synonyms & Trade Names N,N-Diphenylaniline; N,N-Diphenylbenzenamine		DOT ID & Guide		
Exposure	NIOSH REL: TWA	NIOSH REL: TWA 5 mg/m ³		
Limits	OSHA PEL†: none			
IDLH N.D.	Conversion			
Physical Description Colorless solid.				
MW: 245.3	BP: 689°F	MLT: 261°F	Sol: Insoluble	
VP: ?	IP: 7.60 eV		Sp.Gr: 0.77	
Fl.P: ?	UEL: ?	LEL: ?		
Incompatibilities & I None reported	Reactivities			
Measurement Metho None available	ds			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: No recommendation Change: Daily		Eye: Irrigate immedia Skin: Soap wash Breathing: Respirator	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms In animals: irritation skin				
Target Organs Skin				
See also: INTRODUC	TION			

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Triphenyl phosphate		CAS 115-86-6		
$(C_6H_5O)_3PO$			RTECS TC8400000	
Synonyms & Trade Names Phenyl phosphate, TPP, Triphenyl ester of phosphoric acid		DOT ID & Guide		
Exposure	NIOSH REL: TWA 3 mg/m ³			
Limits	OSHA PEL: TWA 3 mg/m ³			
IDLH 1000 mg/m ³	Conversion			
Physical Description Colorless, crystalline powder with a phenol-like odor.				
MW: 326.3	BP: 776°F	MLT: 120°F	Sol(129°F): 0.002%	
VP(380°F): 1 mmHg	IP: ?		Sp.Gr: 1.29	
Fl.P: 428°F	UEL: ?	LEL: ?		
Combustible Solid				
Incompatibilities & Reacti None reported	vities			
Measurement Methods NIOSH 5038				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendati	ons NIOSH/OSHA	JI		

Up to 30 mg/m^3 : (APF = 10) Any air-purifying respirator with a high-efficiency particulate filter/(APF = 10) Any

Up to 75 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

Up to 150 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

dust respirator except single-use and quarter-mask respirators/(APF = 10) Any supplied-air respirator

Up to 15 mg/m^3 : (APF = 5) Any dust respirator

powered, air-purifying respirator with a dust and mist filter

filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 1000 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion

Symptoms Minor changes in blood enzymes; in animals: muscle weakness, paralysis

Target Organs Blood, peripheral nervous system

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Tungsten			CAS 7440-33-7	
W			RTECS Y07175000	
Synonyms & Trade Names Tungsten metal, Wolfram			DOT ID & Guide	
Exposure NIOSH REL*: TWA 5 mg/m ³ ST 10 mg/m ³ [*Note: The insoluble tungsten compounds (as W).]		REL also applies to other		
Limits	OSHA PEL†: none			
IDLH N.D. Conversion				
Physical Description Hard, brittle, steel-gray to tin-white solid.				
MW: 183.9	BP: 10,701°F	P: 10,701°F		
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 19.3	
Fl.P: NA	UEL: NA LEL: NA			
Combustible in the form of finely divided powder; may ignite spontaneously.				
Incompatibilities & Reactivities Bromine trifluoride, chlorine trifluoride, fluorine, iodine pentafluoride				
Measurement Methods NIOSH 7074, 7300; OSHA ID213				
Personal Protection & Sanitation First Aid (See procedures)				
Skin: No recommendation		Eye: Irrigate immediately		
Eyes: No recommendation		Skin: Soap wash		
Wash skin: No recommendation		Breathing: Fresh air		
Remove: No recommendation		Swallow: Medical attention i	mmediately	
Change: No recommendatior	l			

Respirator Recommendations NIOSH

Up to 50 mg/m³: (APF = 10) Any air-purifying respirator with a high-efficiency particulate filter/(APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 10) Any air-purifying respirator with a high-efficiency particulate filter/Any appropriate escape-

type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; diffuse pulmonary fibrosis; loss of appetite, nausea, cough; blood changes

Target Organs Eyes, skin, respiratory system, blood

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CAS

Tungsten (soluble	compounds, as w				
			RTECS		
Synonyms & Trade Names Synonyms vary depending upon the specific soluble tungsten compound.			DOT ID & Guide		
Exposure	NIOSH REL: TWA 1 mg/m ³ ST 3 mg/m ³				
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion			
Physical Description Appearance and odor vary de	epending upon the specific so	luble tungsten compound.			
Properties vary depending upon the specific soluble tungsten compound.					
Incompatibilities & Reactiv	Incompatibilities & Reactivities Varies				
Measurement Methods NIOSH 7074; 7300; OSHA I	D213				
Personal Protection & Sanitation Recommendations regarding personal protective clothing vary depending upon the specific compound. Recommendations regarding eye protection vary depending upon the specific compound. Recommendations regarding washing the skin vary depending upon the specific compound. Recommendations regarding the removal of personal protective clothing that becomes wet or contaminated vary depending upon the specific compound. Recommendations regarding the daily changing of personal protective clothing vary depending upon the specific compound. Recommendations regarding the need for eyewash or quick drench facilities vary depending upon the specific		First Aid (See procedures) Eye: Irrigate immediately Skin: Water wash Breathing: Respiratory supports Swallow: Medical attention in			

compound.

Respirator Recommendations NIOSH

Up to 10 mg/m^3 : (APF = 10) Any air-purifying respirator with a high-efficiency particulate filter/(APF = 10) Any supplied-air respirator

Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode

Up to 50 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; in animals: central nervous system disturbances; diarrhea; respiratory failure; behavioral, body weight, blood changes

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal tract

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Tungsten carbide (cemented)			CAS 1: 11107-01-0 2: 12718-69-3 3: 37329-49-0 RTECS 1: Y07350000 2: Y07525000 3: Y07700000
WC/Co/Ni/Ti			
Synonyms & Trade Names Cemented tungsten carbide, (WC) content is generally 85 WC, 15% Co 2: 92% WC, 8	DOT ID & Guide		
Exposure	NIOSH REL: See Appendix	<u>. C</u>	
Limits	OSHA PEL†: See Appendix	<u>C</u>	
IDLH N.D.		Conversion	
Physical Description A mixture of tungsten carbic	le, cobalt, and sometimes other	er metals & metal oxides or c	arbides.
Properties vary depending upon the specific mixture.			
	vities chlorine trifluoride, oxides of	nitrogen, lead dioxide	
Measurement Methods None available			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily (Ni) Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air Swallow: Medical attention	immediately
Respirator Recommendation			
Up to 0.25 mg Co/m^3 : (APF)	F = 5) Any dust and mist respi	rator^	

Up to 0.5 mg Co/m^3 : (APF = 10) Any dust and mist respirator except single-use and quarter-mask

respirators*^/(APF = 10) Any dust, mist, and fume respirator*/(APF = 10) Any supplied-air respirator*

Up to 1.25 mg Co/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter*^/(APF = 25) Any powered, air-purifying respirator with a dust, mist, and fume filter*

Up to 2.5 mg Co/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 20 mg Co/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure- demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus NIOSH*

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

[*Note: Respirator for Tungsten carbide (cemented) containing Nickel.]

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; possible skin sensitization to cobalt, nickel; diffuse pulmonary fibrosis; loss of appetite, nausea, cough; blood changes

Target Organs Eyes, skin, respiratory system, blood

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Turpentine			CAS 8006-64-2
C ₁₀ H ₁₆ (approx)	C ₁₀ H ₁₆ (approx)		
Synonyms & Trade Names Gumspirits, Gum turpentine, wood turpentine, Turps, Woo	DOT ID & Guide 1299 128		
Exposure	NIOSH REL: TWA 100 ppn	n (560 mg/m ³)	
Limits	OSHA PEL: TWA 100 ppm	(560 mg/m ³)	
IDLH 800 ppm Conversion 1 ppm = 5.56 m			ng/m³ (approx)
Physical Description Colorless liquid with a characteristic control of the color of	cteristic odor.		
MW: 136 (approx)	BP: 309-338°F	FRZ: -58 to -76°F	Sol: Insoluble
VP: 4 mmHg	IP: ?		Sp.Gr: 0.86
Fl.P: 95°F	UEL: ?	LEL: 0.8%	
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	low 100°F.	
Incompatibilities & Reactivities Strong oxidizers, chlorine, chromic anhydride, stannic chloride, chromyl chloride			
Measurement Methods NIOSH 1551			

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet (flammable)
Change: No recommendation

First Aid (See procedures)

Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH/OSHA

Up to 800 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode $^{£}$ /(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s) $^{£}$ /(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained

breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; headache, dizziness, convulsions; skin sensitization; hematuria (blood in the urine), proteinuria; kidney damage; abdominal pain, nausea, vomiting, diarrhea; chemical pneumonitis (aspiration liquid)

Target Organs Eyes, skin, respiratory system, central nervous system, kidneys

See also: <u>INTRODUCTION</u>

supplied-air respirator

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1-Undecanethiol			CAS 5332-52-5	
CH ₃ (CH ₂) ₁₀ SH			RTECS	
		DOT ID & Guide 1228 131		
Exposure	NIOSH REL: C 0.5 ppm (3.9	9 mg/m ³) [15-minute]		
Limits	OSHA PEL: none			
IDLH N.D.		Conversion 1 ppm = 7.71 m	g/m ³	
Physical Description Liquid.				
MW: 188.4	BP: 495°F	FRZ: 27°F	Sol: Insoluble	
VP: ?	IP: ?		Sp.Gr: 0.84	
Fl.P: ?	UEL: ?	LEL: ?		
Combustible Liquid				
Incompatibilities & Reactive Oxidizers, reducing agents, s	vities trong acids & bases, alkali me	etals		
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendation	ons NIOSH			

Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any

Up to 25 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor

Up to 12.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

powered, air-purifying respirator with organic vapor cartridge(s)

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, respiratory system; confusion, dizziness, headache, drowsiness, nausea, vomiting, lassitude (weakness, exhaustion), convulsions

Target Organs Eyes, skin, respiratory system, central nervous system

Eyes: Prevent eye contact

Change: Daily Provide: Eyewash

Wash skin: When contaminated/Daily Remove: When wet or contaminated

Respirator Recommendations NIOSH

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Uranium (insoluble compounds, as U)			CAS 7440-61-1 (metal)	
U (metal)			RTECS YR3490000 (metal)	
Synonyms & Trade Names Uranium metal: Uranium I Synonyms of other insoluble uranium compounds vary depending upon the specific compound.			DOT ID & Guide 2979 162 (metal, pyrophoric)	
Exposure	NIOSH REL: Ca TWA 0.2	mg/m ³ ST 0.6 mg/m ³ See Ap	opendix A	
Limits	OSHA PEL†: TWA 0.25 mg	g/m ³		
IDLH Ca [10 mg/m ³ (as U)]		Conversion		
Physical Description Metal: Silver-white, malleab	Physical Description Metal: Silver-white, malleable, ductile, lustrous solid. [Note: Weakly radioactive.]			
MW: 238.0	BP: 6895°F	MLT: 2097°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 19.05 (metal)	
Fl.P: NA	UEL: NA	LEL: NA	MEC: 60 g/m ³	
Metal: Combustible Solid, es	specially turnings and powder	:.		
Incompatibilities & Reactivities Carbon dioxide, carbon tetrachloride, nitric acid, fluorine [Note: Complete coverage of uranium metal scrap with oil is essential for prevention of fire.]				
Measurement Methods None available				
Personal Protection & Sanitation First Aid (See procedures)				

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

Skin: Soap wash promptly

Breathing: Respiratory support

Swallow: Medical attention immediately

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Dermatitis; kidney damage; blood changes; [potential occupational carcinogen]; in animals: lung, lymph node damage [Potential for cancer is a result of alpha-emitting properties & radioactive decay products (e.g., radon).]

Target Organs Skin, kidneys, bone marrow, lymphatic system

Cancer Site [lung cancer]

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Uranium (soluble compounds, as U)			CAS	
			RTECS	
Synonyms & Trade Names Synonyms vary depending upon the specific soluble uranium compound.			DOT ID & Guide	
Exposure	NIOSH REL: Ca TWA 0.05	mg/m ³ See Appendix A		
Limits	OSHA PEL: TWA 0.05 mg/	m^3		
IDLH Ca [10 mg/m ³ (as U)]	Conversion		
Physical Description Appearance and odor vary d	Physical Description Appearance and odor vary depending upon the specific soluble uranium compound.			
Properties vary depending upon the specific soluble uranium compound.				
Incompatibilities & Reacti Uranyl nitrate: combustibles	vities Uranium hexafluoride: water			
Measurement Methods None available				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated/Daily Remove: When wet or contaminated Change: Daily Provide: Evewash (UF6), Ouick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediate Breathing: Respiratory suppo	ort	

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

Escape(Halides): (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or

Respirator Recommendations NIOSH

pressure breathing apparatus

back-mounted acid gas canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Escape(Non-halides): (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Lacrimation (discharge of tears), conjunctivitis; shortness breath, cough, chest rales; nausea, vomiting; skin burns; red blood cell, casts in urine; proteinuria; high blood urea nitrogen; [potential occupational carcinogen] [Potential for cancer is a result of alpha-emitting properties & radioactive decay products (e.g., radon).]

Target Organs respiratory system, blood, liver, kidneys, lymphatic system, skin, bone marrow

Cancer Site [lung cancer]

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n-Valeraldehyde	CAS 110-62-3			
CH ₃ (CH ₂) ₃ CHO			RTECS YV3600000	
Synonyms & Trade Names Amyl aldehyde, Pentanal, Va	ıleral, Valeraldehyde, Valeric	aldehyde	DOT ID & Guide 2058 129	
Exposure	NIOSH REL: TWA 50 ppm	(175 mg/m ³) See Appendix ((Aldehydes)	
Limits	OSHA PEL†: none			
IDLH N.D.		Conversion 1 ppm = 3.53 m	g/m^3	
Physical Description Colorless liquid with a strong	g, acrid, pungent odor.			
MW: 86.2	BP: 217°F	FRZ: -133°F	Sol: Slight	
VP: 26 mmHg	IP: 9.82 eV		Sp.Gr: 0.81	
Fl.P: 54°F	UEL: ?	LEL: ?		
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	or above 100°F.		
Incompatibilities & Reactive None reported	rities			
Measurement Methods NIOSH 2536; OSHA 85				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately		
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, nose, throat				
Target Organs Eyes, skin, respiratory system				
See also: INTRODUCTION				

supplied-air respirator*

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Vanadium dust			CAS 1314-62-1	
V_2O_5	RTECS YW2450000			
			DOT ID & Guide 2862 151	
Exposure		/m ³ [15-minute] [*Note: The m metal and Vanadium carbide		
Limits	OSHA PEL†: C 0.5 mg V ₂ C	O_5/m^3 (resp)		
IDLH 35 mg/m ³ (as V)		Conversion		
Physical Description Yellow-orange powder or dark-gray, odorless flakes dispersed in air.				
MW: 181.9	BP: 3182°F (Decomposes)	MLT: 1274°F	Sol: 0.8%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 3.36	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid, but n	nay increase intensity of fire	when in contact with combust	ible materials.	
Incompatibilities & Reactive Lithium, chlorine trifluoride	vities			
Measurement Methods NIOSH 7300, 7504; OSHA	ID185			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately				
Respirator Recommendation	Respirator Recommendations NIOSH (as V)			

Up to 0.5 mg/m^3 : (APF = 10) Any air-purifying respirator with a high-efficiency particulate filter*/(APF = 10) Any

Up to 1.25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any

powered, air-purifying respirator with a high-efficiency particulate filter*

Up to 2.5 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 35 mg/m³: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, throat; green tongue, metallic taste, eczema; cough; fine rales, wheezing, bronchitis, dyspnea (breathing difficulty)

Target Organs Eyes, skin, respiratory system

supplied-air respirator*

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Vanadium fume			CAS 1314-62-1	
$\overline{\mathrm{V_{2}O_{5}}}$			RTECS YW2460000	
Synonyms & Trade Names Divanadium pentoxide fume, Vanadic anhydride fume, Vanadium oxide fume, Vanadium pentaoxide fume Other synonyms vary depending upon the specific vanadium compound.			DOT ID & Guide 2862 151	
Exposure	NIOSH REL: C 0.05 mg V/	m ³ [15-minute]		
Limits	OSHA PEL†: C 0.1 mg V ₂ C	O_5/m^3		
IDLH 35 mg/m ³ (as V)		Conversion		
Physical Description Finely divided particulate dispersed in air.				
MW: 181.9	BP: 3182°F (Decomposes)	MLT: 1274°F	Sol: 0.8%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 3.36	
Fl.P: NA	UEL: NA LEL: NA			
Noncombustible Solid				
Incompatibilities & Reactive Lithium, chlorine trifluoride	vities			
Measurement Methods NIOSH 7300, 7504; OSHA	ID185			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Respiratory support		
Respirator Recommendations NIOSH (as V)				

Up to 0.5 mg/m^3 : (APF = 10) Any air-purifying respirator with a high-efficiency particulate filter*/(APF = 10) Any

Up to 1.25 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any

powered, air-purifying respirator with a high-efficiency particulate filter*

Up to 2.5 mg/m: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 35 mg/m^3 : (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, throat; green tongue, metallic taste; cough, fine rales, wheezing, bronchitis, dyspnea (breathing difficulty); eczema

Target Organs Eyes, skin, respiratory system

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Vegetable oil mist			CAS 68956-68-3	
			RTECS YX1850000	
Synonyms & Trade Names Vegetable mist			DOT ID & Guide	
Exposure	NIOSH REL: TWA 10 mg/m	m ³ (total) TWA 5 mg/m ³ (resp	p)	
Limits	OSHA PEL: TWA 15 mg/m	³ (total) TWA 5 mg/m ³ (resp))	
IDLH N.D.		Conversion		
Physical Description An oil extracted from the see	eds, fruit, or nuts of vegetable	s or other plant matter.		
MW: varies	BP: ?	FRZ: ?	Sol: Insoluble	
VP: ?	IP: ?		Sp.Gr: 0.91-0.95	
Fl.P: 323-540°F	UEL: ?	LEL: ?		
Combustible Liquid				
Incompatibilities & Reactive None reported	vities			
Measurement Methods NIOSH: 0500, 0600				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation Change: No recommendation				
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin and/or eye contact				
Symptoms Irritation eyes, skin, respiratory system; lacrimation (discharge of tears)				
Target Organs Eyes, skin, r	Target Organs Eyes, skin, respiratory system			
Can also, INTRODUCTION	· · · · · · · · · · · · · · · · · · ·	<u> </u>	<u> </u>	

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Vinyl acetate	CAS 108-05-4				
CH ₂ =CHOOCCH ₃	CH ₂ =CHOOCCH ₃				
			DOT ID & Guide 1301 129P		
Exposure	NIOSH REL: C 4 ppm (15 n	ng/m ³) [15-minute]			
Limits	OSHA PEL†: none				
IDLH N.D.		Conversion 1 ppm = 3.52 m	ng/m ³		
Physical Description Colorless liquid with a pleasa	Physical Description Colorless liquid with a pleasant, fruity odor. [Note: Raw material for many polyvinyl resins.]				
MW: 86.1	BP: 162°F	FRZ: -136°F	Sol: 2%		
VP: 83 mmHg	IP: 9.19 eV		Sp.Gr: 0.93		
Fl.P: 18°F	UEL: 13.4%	LEL: 2.6%			
Class IB Flammable Liquid:	Fl.P. below 73°F and BP at o	r above 100°F.			
Incompatibilities & Reactivities Acids, bases, silica gel, alumina, oxidizers, azo compounds, ozone [Note: Usually contains a stabilizer (e.g., hydroquinone or diphenylamine) to prevent polymerization.]					
Measurement Methods NIOSH 1453; OSHA 51					
Personal Protection & Sanitation First Aid (See procedures)					

Respirator Recommendations NIOSH

Skin: Prevent skin contact

Eyes: Prevent eye contact

Wash skin: When contaminated

Change: No recommendation Provide: Eyewash, Quick drench

Remove: When wet or contaminated

Up to 40 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*

Eye: Irrigate immediately

Skin: Soap flush immediately

Breathing: Respiratory support

Swallow: Medical attention immediately

Up to 100 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*

Up to 200 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor

cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 4000 ppm: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode*

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; hoarseness, cough; loss of smell; eye burns, skin blisters

Target Organs Eyes, skin, respiratory system

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Vinyl bromide			CAS 593-60-2	
CH ₂ =CHBr			RTECS KU8400000	
		DOT ID & Guide 1085 116P (inhibited)		
Exposure	NIOSH REL: Ca See	Appendix A		
Limits	OSHA PEL†: none			
IDLH Ca [N.D.]	7.	Conversion 1 ppm =	= 4.38 mg/m ³	
Physical Description Colorless gas or liquid (below 60°F) with a pleasant odor. [Note: Shipped as a liquefied compressed gas with 0.19 phenol added to prevent polymerization.]				
MW: 107.0	BP: 60°F	FRZ: -219°F	Sol: Insoluble	
VP: 1.4 atm	IP: 9.80 eV	RGasD: 3.79	Sp.Gr: 1.49 (Liquid at 60°F)	
Fl.P: NA (Gas)	UEL: 15%	LEL: 9%		
Flammable Gas Class IA	Flammable Liquid			
Incompatibilities & Reactivities Strong oxidizers (e.g., perchlorates, peroxides, chlorates, permanganates & nitrates.] [Note: May polymerize in sunlight.]				
Measurement Methods NIOSH 1009; OSHA 8				
Personal Protection & Sanitation Skin: Prevent skin contact (liquid) Eyes: Prevent eye contact (liquid)		Eye: Irrigate immedi	First Aid (See procedures) Eye: Irrigate immediately (liquid) Skin: Water flush immediately (liquid)	

Respirator Recommendations NIOSH

Wash skin: When contaminated (liquid)

Remove: When wet (flammable)

Change: No recommendation

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

Breathing: Respiratory support

Swallow: Medical attention immediately (liquid)

pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion (liquid), skin and/or eye contact

Symptoms Irritation eyes, skin; dizziness, confusion, incoordination, narcosis, nausea, vomiting; liquid: frostbite; [potential occupational carcinogen]

Target Organs Eyes, skin, central nervous system, liver

Cancer Site [in animals: liver & lymph node tumors]

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Vinyl chloride			CAS 75-01-4	
CH ₂ =CHCl			RTECS KU9625000	
			DOT ID & Guide 1086 116P	
Exposure	NIOSH REL: Ca See Appen	dix A		
Limits	OSHA PEL: [1910.1017] TV	WA 1 ppm C 5 ppm [15-minu	te]	
IDLH Ca [N.D.]		Conversion 1 ppm = 2.56 m	ng/m ³	
Physical Description Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations. [Note: Shipped as a liquefied compressed gas.]				
MW: 62.5	BP: 7°F	FRZ: -256°F	Sol(77°F): 0.1%	
VP: 3.3 atm	IP: 9.99 eV	RGasD: 2.21		
Fl.P: NA (Gas)	UEL: 33.0%	LEL: 3.6%		
Flammable Gas				
Incompatibilities & Reactivities Copper, oxidizers, aluminum, peroxides, iron, steel [Note: Polymerizes in air, sunlight, or heat unless stabilized by inhibitors such as phenol. Attacks iron & steel in presence of moisture.]				
Measurement Methods NIOSH 1007; OSHA 4, 75				
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Frostbite Skin: Frostbite Breathing: Respiratory suppo	ort	

Respirator Recommendations NIOSH

Provide: Frostbite

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin, and/or eye contact (liquid)

Symptoms Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]

Target Organs Liver, central nervous system, blood, respiratory system, lymphatic system

Cancer Site [liver cancer]

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ohexane; 4-Vinylcyclohexen		RTECS RN8640000		
ohexane; 4-Vinylcyclohexen				
	Synonyms & Trade Names 1-Epoxyethyl-3,4-epoxy-cyclohexane; 4-Vinylcyclohexene diepoxide; 4-Vinyl-1- cyclohexene dioxide			
Exposure NIOSH REL: Ca TWA 10 ppm (60 mg/m ³) [skin] See Appendix A				
OSHA PEL†: none				
DLH Ca [N.D.] Conversion 1 ppm = 5.73 mg/m ³		g/m ³		
Physical Description Colorless liquid.				
BP: 441°F FRZ: -164°F Sol: High				
IP: ?		Sp.Gr: 1.10		
UEL: ?	LEL: ?			
Class IIIB Combustible Liquid: Fl.P. at or above 200°F.				
Incompatibilities & Reactivities Alcohols, amines, water [Note: Slowly hydrolyzes in water.]				
Measurement Methods None available				
	NIOSH REL: Ca TWA 10 pp DSHA PEL†: none BP: 441°F P: ? JEL: ? I: Fl.P. at or above 200°F.	NIOSH REL: Ca TWA 10 ppm (60 mg/m³) [skin] See App OSHA PEL†: none Conversion 1 ppm = 5.73 m SP: 441°F		

Personal Protection & Sanitation

Skin: Prevent skin contact
Eyes: Prevent eye contact
Wash skin: When contaminated
Remove: When wet or contaminated

Change: No recommendation Provide: Eyewash, Quick drench

First Aid (See procedures)

Eye: Irrigate immediately Skin: Water wash immediately Breathing: Respiratory support

Swallow: Medical attention immediately

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms In animals: irritation eyes, skin, respiratory system; testicular atrophy; leukopenia (reduced blood leukocytes), necrosis thymus; skin sensitization; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, blood, thymus, reproductive system

Cancer Site [in animals: skin tumors]

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Vinyl fluoride			CAS 75-02-5	
CH ₂ =CHF			RTECS YZ7351000	
Synonyms & Trade Names Fluoroethene, Fluoroethylene, Monofluoroethylene, Vinyl fluoride monomer			DOT ID & Guide 1860 116P (inhibited)	
Exposure	NIOSH REL: TWA 1 ppm (C 5 ppm [use 1910.1017]		
Limits	OSHA PEL: none			
IDLH N.D. $\mathbf{Conversion} \ 1 \ \mathrm{ppm} = 1.89 \ \mathrm{mg/m}^3$		ng/m ³		
Physical Description Colorless gas with a faint, et	hereal odor. [Note: Shipped a	s a liquefied compressed gas.]	
MW: 46.1	BP: -98°F	FRZ: -257°F	Sol: Insoluble	
VP: 25.2 atm	IP: 10.37 eV	RGasD: 1.60		
Fl.P: NA (Gas)	UEL: 21.7%	LEL: 2.6%		
Flammable Gas	Flammable Gas			
Incompatibilities & Reactivities None reported [Note: Inhibited with 0.2% terpenes to prevent polymerization.]				
Measurement Methods None available				
Personal Protection & San	itation	First Aid (See procedures)		
Skin: Frostbite		Eye: Frostbite Skin: Frostbite		
-		Breathing: Respiratory support		
Remove: When wet (flammable)			л	
Change: No recommendation				
Provide: Frostbite				

Respirator Recommendations NIOSH

Up to 10 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 50 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and

organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 200 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Headache, dizziness, confusion, incoordination, narcosis, nausea, vomiting; liquid: frostbite

Target Organs central nervous system

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Vinylidene chloride			CAS 75-35-4
CH ₂ =CCl ₂			RTECS KV9275000
			DOT ID & Guide 1303 129P (inhibited)
Exposure	NIOSH REL: Ca See Appen	dix A	
Limits	OSHA PEL†: none		
IDLH Ca [N.D.]		Conversion	
Physical Description Colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like odor.			
MW: 96.9	BP: 89°F	FRZ: -189°F	Sol: 0.04%
VP: 500 mmHg	IP: 10.00 eV		Sp.Gr: 1.21
Fl.P: -2°F	UEL: 15.5%	LEL: 6.5%	
Class IA Flammable Liquid:	Fl.P. below 73°F and BP below	ow 100°F.	
Incompatibilities & Reactivities Aluminum, sunlight, air, copper, heat [Note: Polymerization may occur if exposed to oxidizers, chlorosulfonic acid, nitric acid, or oleum. Inhibitors such as the monomethyl ether of hydroquinone are added to prevent polymerization.]			
Measurement Methods NIOSH 1015; OSHA 19			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory suppo	ort

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

Cancer Site [in animals: liver & kidney tumors]

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Vinylidene fluoride			CAS 75-38-7
CH ₂ =CF ₂			RTECS KW0560000
			DOT ID & Guide 1959 116P
Exposure	NIOSH REL: TWA 1 ppm C 5 ppm [use 1910.1017]		
Limits	OSHA PEL: none		
IDLH N.D.	Conversion 1 ppm = 2.62 mg/m^3		
Physical Description Colorless gas with a faint, ethereal odor. [Note: Shipped as a liquefied compressed gas.]			
MW: 64.0	BP: -122°F FRZ: -227°F Sol: Insoluble		
VP: 35.2 atm	IP: 10.29 eV	RGasD: 2.21	
Fl.P: NA (Gas)	UEL: 21.3%	LEL: 5.5%	
Flammable Gas			
Incompatibilities & Reactivities Oxidizers, aluminum chloride [Note: Violent reaction with hydrogen chloride when heated under pressure.]			
Measurement Methods NIOSH 3800			
		1	

Personal Protection & Sanitation

Skin: Frostbite Eyes: Frostbite

Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation

Provide: Frostbite

First Aid (See procedures)

Eye: Frostbite Skin: Frostbite

Breathing: Respiratory support

Respirator Recommendations NIOSH

Up to 10 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any supplied-air respirator

Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)

Up to 50 ppm: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor

cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 200 ppm: (APF = 2000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact (liquid)

Symptoms Dizziness, headache, nausea; liquid: frostbite

Target Organs central nervous system

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Vinyl toluene			CAS 25013-15-4 (inhibited)	
CH ₂ =CHC ₆ H ₄ CH ₃			RTECS WL5075000	
			DOT ID & Guide 2618 130P	
Exposure	NIOSH REL: TWA 100 ppm (480 mg/m ³)			
Limits	OSHA PEL: TWA 100 ppm	(480 mg/m ³)		
IDLH 400 ppm	Conversion 1 ppm = 4.83 mg		ng/m ³	
Physical Description Colorless liquid with a strong	Physical Description Colorless liquid with a strong, disagreeable odor.			
MW: 118.2	BP: 339°F	FRZ: -106°F	Sol: 0.009%	
VP: 1 mmHg	IP: 8.20 eV		Sp.Gr: 0.89	
Fl.P: 127°F	UEL: 11.0%	LEL: 0.8%		
Class II Combustible Liquid:	Class II Combustible Liquid: Fl.P. at or above 100°F and below 140°F.			
Incompatibilities & Reactivities Oxidizers, peroxides, strong acids, iron or aluminum salts [Note: Usually inhibited with tert-butyl catechol to prevent polymerization.]				
Measurement Methods NIOSH 1501, OSHA 7				
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 400 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure

mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, upper respiratory system; drowsiness; in animals: narcosis

Target Organs Eyes, skin, respiratory system, central nervous system

supplied-air respirator

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VM & P Naphtha		CAS 8032-32-4	
			RTECS 0I6180000
Synonyms & Trade Names Ligroin, Painters naphtha, Petroleum ether, Petroleum spirit, Refined solvent naphtha, Varnish makers' & painters' naphtha		DOT ID & Guide 1271 128	
Exposure	NIOSH REL: TWA 350 mg/m ³ C 1800 mg/m ³ [15-minute]		te]
Limits	OSHA PEL†: none		
IDLH N.D.		Conversion	
Physical Description Clear to yellowish liquid with	th a pleasant, aromatic odor.		
MW: 87-114 (approx)	BP: 203-320°F	FRZ: ?	Sol: Insoluble
VP: 2-20 mmHg	IP: ?		Sp.Gr(60°F): 0.73-0.76
Fl.P: 20-55°F	UEL: 6.0%	LEL: 1.2%	
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.			
Incompatibilities & Reactivities None reported [Note: VM&P Naphtha is a refined petroleum solvent predominantly C7-C11 which is typically 55% paraffins, 30% monocycloparaffins, 2% dicycloparaffins & 12% alklybenzenes.]			
Measurement Methods NIOSH 1550; OSHA 48			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendation Up to 3500 mg/m ³ : (APF =		espirator with organic vapor c	artridge(s)/(APF = 10) Any

Up to 8750 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

Up to $17,500 \text{ mg/m}^3$: (APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor

powered, air-purifying respirator with organic vapor cartridge(s)

cartridge(s)/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, upper respiratory system; dermatitis; central nervous system depression; chemical pneumonitis (aspiration liquid)

Target Organs Eyes, skin, respiratory system, central nervous system

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Warfarin			CAS 81-81-2
$C_{19}H_{16}O_4$			RTECS GN4550000
Synonyms & Trade Names 3-(alpha-Acetonyl)-benzyl-4-hydroxycoumarin, 4-Hydroxy-3-(3-oxo-1-phenyl butyl)- 2H-1-benzopyran-2-one, WARF			
Exposure	NIOSH REL: TWA 0.1 mg/	m^3	
Limits	OSHA PEL: TWA 0.1 mg/r	n^3	
IDLH 100 mg/m ³		Conversion	
Physical Description Colorless, odorless, crystalline powder. [rodenticide]			
MW: 308.3	BP: Decomposes	MLT: 322°F	Sol: 0.002%
VP(71°F): 0.09 mmHg	IP: ?		Sp.Gr: ?
Fl.P: ?	UEL: ?	LEL: ?	
Combustible Solid			
Incompatibilities & Reactivities Strong oxidizers			
Measurement Methods NIOSH 5002			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: No recommendation Wash skin: When contaminated Remove: When wet or contaminated Change: Daily		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH/OSHA			

Up to 1 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF =

Up to 2.5 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

Up to 0.5 mg/m^3 : (APF = 5) Any dust and mist respirator

powered, air-purifying respirator with a dust and mist filter

10) Any supplied-air respirator

Up to 5 mg/m: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 100 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Hematuria (blood in the urine), back pain; hematoma arms, legs; epistaxis (nosebleed), bleeding lips, mucous membrane hemorrhage; abdominal pain, vomiting, fecal blood; petechial rash; abnormal hematologic indices

Target Organs Blood, cardiovascular system

pressure breathing apparatus

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Welding fumes			CAS	
			RTECS ZC2550000	
Synonyms & Trade Names Synonyms vary depending upon the specific component of the welding fumes.			DOT ID & Guide	
Exposure	NIOSH REL: Ca See Appen	dix A		
Limits	OSHA PEL†: none			
IDLH Ca [N.D.]		Conversion		
Physical Description Fumes generated by the proc	ess of joining or cutting piece	es of metal by heat, pressure, o	or both.	
Properties vary depending upon the specific component of the welding fumes.				
Incompatibilities & Reactive Varies	vities			
Measurement Methods NIOSH 7300				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support		
Respirator Recommendation At concentrations above the		is no RFI at any detectable o	oncentration: (APF –	

10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in

a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-

mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Symptoms vary depending upon the specific component of the welding fumes; metal fume fever: flulike symptoms, dyspnea (breathing difficulty), cough, muscle pain, fever, chills; interstitial pneumonitis; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system

Cancer Site [lung cancer]

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Wood dust			CAS	
			RTECS ZC9850000	
Synonyms & Trade Names Hard wood dust, Soft wood dust, Western red cedar dust		DOT ID & Guide		
Exposure	NIOSH REL: Ca 1 mg/m ³	See Appendix A		
Limits	OSHA PEL†: TWA 15 mg/s	m ³ (total) TWA 5 mg/m ³ (res	p)	
IDLH Ca [N.D.]		Conversion		
Physical Description Dust from various types of v	wood.			
MW: varies	BP: NA	MLT: NA	Sol: ?	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: ?	
Fl.P: NA	UEL: NA	LEL: NA		
Combustible Solid				
Incompatibilities & Reacti None reported	vities			
Measurement Methods NIOSH 0500				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air		

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes; epistaxis (nosebleed); dermatitis; respiratory hypersensitivity; granulomatous pneumonitis; asthma, cough, wheezing, sinusitis; prolonged colds; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system

Cancer Site [nasal cancer]

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o-Xylene CAS 95-47			CAS 95-47-6	
$C_6H_4(CH_3)_2$			RTECS ZE2450000	
Synonyms & Trade Names 1,2-Dimethylbenzene; ortho-			DOT ID & Guide 1307 130	
Exposure	NIOSH REL: TWA 100 ppn	n (435 mg/m ³) ST 150 ppm (6	655 mg/m ³)	
Limits	OSHA PEL†: TWA 100 ppn	n (435 mg/m ³)		
IDLH 900 ppm		Conversion 1 ppm = 4.34 m	ng/m ³	
Physical Description Colorless liquid with an aromatic odor.				
MW: 106.2	BP: 292°F	FRZ: -13°F	Sol: 0.02%	
VP: 7 mmHg	IP: 8.56 eV		Sp.Gr: 0.88	
Fl.P: 90°F	UEL: 6.7%	LEL: 0.9%		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	low 100°F.		
Incompatibilities & Reactive Strong oxidizers, strong acid				
Measurement Methods NIOSH 1501, 3800; OSHA 1002				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory supports Swallow: Medical attention in		

Respirator Recommendations NIOSH/OSHA

Up to 900 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys

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m-Xylene CAS			CAS 108-38-3	
$C_6H_4(CH_3)_2$			RTECS ZE2275000	
Synonyms & Trade Names 1,3-Dimethylbenzene; meta-			DOT ID & Guide 1307 130	
Exposure	NIOSH REL: TWA 100 ppn	n (435 mg/m ³) ST 150 ppm (6	655 mg/m ³)	
Limits	OSHA PEL†: TWA 100 ppn	n (435 mg/m ³)		
IDLH 900 ppm		Conversion 1 ppm = 4.34 m	ng/m ³	
Physical Description Colorless liquid with an aromatic odor.				
MW: 106.2	BP: 282°F	FRZ: -54°F	Sol: Slight	
VP: 9 mmHg	IP: 8.56 eV		Sp.Gr: 0.86	
Fl.P: 82°F	UEL: 7.0%	LEL: 1.1%		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	elow 100°F.		
Incompatibilities & Reactive Strong oxidizers, strong acid				
Measurement Methods NIOSH 1501, 3800; OSHA 1002				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory suppo		

Respirator Recommendations NIOSH/OSHA

Up to 900 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys

See also: <u>INTRODUCTION</u>

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p-Xylene			CAS 106-42-3	
$C_6H_4(CH_3)_2$			RTECS ZE2625000	
			DOT ID & Guide 1307 130	
Exposure	NIOSH REL: TWA 100 ppn	n (435 mg/m ³) ST 150 ppm (6	655 mg/m ³)	
Limits	OSHA PEL†: TWA 100 ppn	n (435 mg/m ³)		
IDLH 900 ppm		Conversion 1 ppm = 4.41 m	g/m ³	
Physical Description Colorless liquid with an aromatic odor. [Note: A solid below 56°F.]				
MW: 106.2	BP: 281°F	FRZ: 56°F	Sol: 0.02%	
VP: 9 mmHg	IP: 8.44 eV		Sp.Gr: 0.86	
Fl.P: 81°F	UEL: 7.0%	LEL: 1.1%		
Class IC Flammable Liquid:	Fl.P. at or above 73°F and be	low 100°F.		
Incompatibilities & Reactive Strong oxidizers, strong acid				
Measurement Methods NIOSH 1501, 3800; OSHA 1002				
Personal Protection & Sanitation First Aid (See procedures)				
	Skin: Prevent skin contact		Eye: Irrigate immediately	
Eyes: Prevent eye contact		Skin: Soap wash promptly		
Wash skin: When contamina Remove: When wet (flamma		Breathing: Respiratory support Swallow: Medical attention immediately		
Change No recommendation		Swanow. Medical attention infinediately		

Respirator Recommendations NIOSH/OSHA

Change: No recommendation

Up to 900 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)*/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain; dermatitis

Target Organs Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys

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m-Xylene-alpha,	alpha'-diamine		CAS 1477-55-0	
$C_6H_4(CH_2NH_2)_2$			RTECS PF8970000	
Synonyms & Trade Names 1,3-bis(Aminomethyl)benzene; 1,3-Benzenedimethanamine; MXDA; m- Phenylenebis(methylamine); m-Xylylenediamine			DOT ID & Guide	
Exposure	NIOSH REL: C 0.1 mg	g/m ³ [skin]		
Limits	OSHA PEL†: none			
IDLH N.D.	'	Conversion		
Physical Description Colorless liquid.				
MW: 136.2	BP: 477°F	FRZ: 58°F	Sol: Miscible	
VP(77°F): 0.03 mmHg	IP: ?		Sp.Gr: 1.032	
Fl.P: 243°F	UEL: ?	LEL: ?		
Class IIIB Combustible Li	quid: Fl.P. at or above 200	0°F.		
Incompatibilities & Reac None reported	tivities			
Measurement Methods OSHA 105				
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench First Aid (Eye: Irriga Skin: Water Skin:			ately mediately	
Respirator Recommendations To be added later				
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact				
Symptoms In animals: irritation eyes, skin; liver, kidney, lung damage				
Target Organs Eyes, skin	, respiratory system, liver	, kidneys		
See also: INTRODUCTIO	N			

supplied-air respirator

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Xylidine			CAS 1300-73-8
$\boxed{(CH_3)_2C_6H_3NH_2}$			RTECS ZE8575000
			DOT ID & Guide 1711 153
Exposure	NIOSH REL: TWA 2 ppm ((10 mg/m ³) [skin]	
Limits	OSHA PEL†: TWA 5 ppm ((25 mg/m ³) [skin]	
IDLH 50 ppm		Conversion 1 ppm = 4.96 m	ng/m ³
Physical Description Pale-yellow to brown liquid	with a weak, aromatic, amine	e-like odor.	
MW: 121.2	BP: 415-439°F	FRZ: -33°F	Sol: Slight
VP: <1 mmHg	IP: 7.65 eV (2,4-) 7.30 eV (2,6-)		Sp.Gr: 0.98
Fl.P: 206°F (2,3-)	UEL: ?	LEL: 1.0% (o-isomer)	
Class IIIB Combustible Liqu	id (2,3-)		
Incompatibilities & Reactive Strong oxidizers, hypochloric			
Measurement Methods NIOSH 2002			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH Up to 20 ppm: (APF = 10) Any chemical cartridge respirator with organic vapor cartridge(s)/(APF = 10) Any			

Up to 50 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 50) Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)/(APF = 50) Any air-purifying,

full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/(APF = 25) Any powered, air-purifying respirator with organic vapor cartridge(s)/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Anoxia, cyanosis, methemoglobinemia; lung, liver, kidney damage

Target Organs respiratory system, blood, liver, kidneys, cardiovascular system

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Yttrium			CAS 7440-65-5	
Y			RTECS ZG2980000	
Synonyms & Trade Names Yttrium metal			DOT ID & Guide	
Exposure	NIOSH REL*: TW compounds (as Y).	NIOSH REL*: TWA 1 mg/m ³ [*Note: The REL also applies to other yttrium compounds (as Y).]		
Limits	OSHA PEL*: TWA compounds (as Y).	1 mg/m ³ [*Note: The PEL al	so applies to other yttrium	
IDLH 500 mg/m ³ (as Y)		Conversion		
Physical Description Dark-gray to black, odorle	ess solid.			
MW: 88.9	BP: 5301°F	MLT: 2732°F	Sol: Soluble in hot H ₂ O	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 4.47	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid in	bulk form.			
Incompatibilities & Read Oxidizers	ctivities			
Measurement Methods NIOSH 7300; OSHA ID1	21			
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See proce Eye: Irrigate immedi Skin: Soap wash pro Breathing: Respirato Swallow: Medical at	iately mptly ory support	
Respirator Recommenda	ations NIOSH/OSHA			

respirator recommendations (violation)

Up to 5 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 10 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 10) Any supplied-air respirator

Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter

Up to 50 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 mg/m^3 : (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes; in animals: pulmonary irritation; eye injury; possible liver damage

Target Organs Eyes, respiratory system, liver

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Zinc chloride fume			CAS 7646-85-7	
ZnCl ₂			RTECS ZH1400000	
Synonyms & Trade Names Zinc dichloride fume			DOT ID & Guide 2331 154	
Exposure	NIOSH REL: TWA 1 mg/m	n ³ ST 2 mg/m ³		
Limits	OSHA PEL†: TWA 1 mg/m	n ³		
IDLH 50 mg/m ³		Conversion		
Physical Description White particulate dispersed in air.				
MW: 136.3	BP: 1350°F	MLT: 554°F	Sol(70°F): 435%	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr(77°F): 2.91	
Fl.P: NA	UEL: NA	LEL: NA		
Noncombustible Solid				
Incompatibilities & Reacti Potassium	vities			
Measurement Methods OSHA ID121				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedures) Breathing: Respiratory support		
Respirator Recommendati	ons NIOSH/OSHA			

Up to 10 mg/m^3 : (APF = 10) Any dust, mist, and fume respirator*/(APF = 10) Any supplied-air respirator* Up to 25 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with a dust, mist, and fume filter*

Up to 50 mg/m^3 : (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter*/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any

supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; conjunctivitis; cough, copious sputum; dyspnea (breathing difficulty), chest pain, pulmonary edema, pneumonitis; pulmonary fibrosis, cor pulmonale; fever; cyanosis; tachypnea; skin burns

Target Organs Eyes, skin, respiratory system, cardiovascular system

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Zinc oxide			CAS 1314-13-2		
ZnO			RTECS ZH4810000		
			DOT ID & Guide 1516 143		
Exposure	III	NIOSH REL: Dust: TWA 5 mg/m ³ C 15 mg/m ³ Fume: TWA 5 mg/m ³ ST 10 mg/m ³			
Limits	OSHA PEL†: TWA 5 n dust)	ng/m ³ (fume) TWA 15 mg/	/m ³ (total dust) TWA 5 mg/m ³ (resp		
IDLH 500 mg/m ³		Conversion			
Physical Description White, odorless solid.					
MW: 81.4	BP: ?	MLT: 3587°F	Sol(64°F): 0.0004%		
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 5.61		
Fl.P: NA	UEL: NA	LEL: NA			
Noncombustible Solid	'	'			
Incompatibilities & React Chlorinated rubber (at 419°		ecomposed by water.]			
Measurement Methods NIOSH 7502; OSHA ID12	1, ID143				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid (See procedure) Breathing: Respirator			
Respirator Recommendations NIOSH/OSHA					

powered, air-purifying respirator with a dust, mist, and fume filter

Up to 50 mg/m^3 : (APF = 10) Any dust, mist, and fume respirator/(APF = 10) Any supplied-air respirator

Up to 250 mg/m³: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate

Up to 125 mg/m^3 : (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/(APF = 25) Any

filter/(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow

mode/(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Up to 500 mg/m³: (APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation

Symptoms Metal fume fever: chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function

Target Organs respiratory system

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Zinc stearate		CAS 557-05-1		
$Zn(C_{18}H_{35}O_2)_2$		RTECS ZH5200000		
Synonyms & Trade Nam Dibasic zinc stearate, Zinc		distearate	DOT ID & Guide	
Exposure	NIOSH REL: TWA 1	0 mg/m ³ (total) TWA 5 mg	g/m ³ (resp)	
Limits	OSHA PEL†: TWA 1	5 mg/m ³ (total) TWA 5 mg	g/m ³ (resp)	
IDLH N.D.	'	Conversion		
Physical Description Soft, white powder with a	slight, characteristic odo	r.		
MW: 632.4	BP: ?	MLT: 266°F	Sol: Insoluble	
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 1.10	
Fl.P(oc): 530°F	UEL: ?	LEL: ?	MEC: 20 g/m ³	
Combustible Solid	'	,,		
Incompatibilities & Reac Oxidizers, dilute acids [No		pels water).]		
Measurement Methods NIOSH 0500, 0600				
Personal Protection & Sanitation Skin: No recommendation Eyes: No recommendation Wash skin: No recommendation Remove: No recommendation Change: No recommendation		Eye: Irrigate immed Skin: Soap wash Breathing: Fresh air	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Fresh air Swallow: Medical attention immediately	
Respirator Recommendations To be added later				
Exposure Routes inhalation, ingestion, skin and/or eye contact				
Symptoms Irritation eyes, skin, upper respiratory system; cough				
Target Organs Eyes, skin	, respiratory system			
See also: INTRODUCTION				

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Zirconium comp	ounds (as Zr)		CAS 7440-67-7 (Metal)
(Zr (Metal)			RTECS ZH7070000 (Metal)
Synonyms & Trade Names Zirconium metal: Zirconium Synonyms of other zirconium compounds vary depending upon the specific compound.			DOT ID & Guide 1358 170 (powder, wet) 1932 135 (scrap) 2008 135 (powder, dry)
Exposure	NIOSH REL*: TWA 5 mg compounds (as Zr) except	/m ³ ST 10 mg/m ³ [*Note: The Zirconium tetrachloride.]	REL applies to all zirconium
Limits	OSHA PEL†: TWA 5 mg/s	m^3	
IDLH 50 mg/m ³ (as Zr)		Conversion	
Physical Description Metal: Soft, malleable, du	ctile, solid or gray to gold, am	orphous powder.	
MW: 91.2	BP: 6471°F	MLT: 3375°F	Sol: Insoluble
VP: 0 mmHg (approx)	IP: NA		Sp.Gr: 6.51 (Metal)
Fl.P: NA	UEL: NA	LEL: NA	
Metal: Combustible, but so and can continue burning		however, powder form may ign	nite SPONTANEOUSLY
Incompatibilities & Read Potassium nitrate, oxidizer		stored completely immersed in	water.]
Measurement Methods NIOSH 7300; OSHA ID1	21		
vary depending upon the s Recommendations regardi depending upon the specif Recommendations regardi depending upon the specif Recommendations regardi	ng personal protective clothing pecific compound. ng eye protection vary ic compound. ng washing the skin vary	First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory supposed Swallow: Medical attention	

vary depending upon the specific compound.
Recommendations regarding the daily changing of

personal protective clothing vary depending upon the specific compound.

Recommendations regarding the need for eyewash or quick drench facilities vary depending upon the specific compound.

Respirator Recommendations NIOSH/OSHA

Up to 25 mg/m^3 : (APF = 5) Any dust and mist respirator

Up to 50 mg/m³: (APF = 10) Any dust and mist respirator except single-use and quarter-mask respirators/(APF = 25) Any powered, air-purifying respirator with a dust and mist filter/(APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/(APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Skin, lung granulomas; in animals: irritation skin, mucous membrane; X-ray evidence of retention in lungs

Target Organs Skin, respiratory system

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APPENDIX A NIOSH POTENTIAL OCCUPATIONAL CARCINOGENS

New Policy

For the past 20 plus years, NIOSH has subscribed to a carcinogen policy that was published in 1976 by Edward J. Fairchild, II, Associate Director for Cincinnati Operations, which called for "no detectable exposure levels for proven carcinogenic substances" (Annals of the New York Academy of Sciences, 271:200-207, 1976). This was in response to a generic OSHA rulemaking on carcinogens. Because of advances in science and in approaches to risk assessment and risk management, NIOSH has adopted a more inclusive policy. NIOSH recommended exposure limits (RELs) will be based on risk evaluations using human or animal health effects data, and on an assessment of what levels can be feasibly achieved by engineering controls and measured by analytical techniques. To the extent feasible, NIOSH will project not only a no-effect exposure, but also exposure levels at which there may be residual risks. This policy applies to all workplace hazards, including carcinogens, and is responsive to Section 20(a)(3) of the Occupational Safety and Health Act of 1970, which charges NIOSH to ". . .describe exposure levels that are safe for various periods of employment, including but not limited to the exposure levels at which no employee will suffer impaired health or functional capacities or diminished life expectancy as a result of his work experience."

The effect of this new policy will be the development, whenever possible, of quantitative RELs that are based on human and/or animal data, as well as on the consideration of technological feasibility for controlling workplace exposures to the REL. Under the old policy, RELs for most carcinogens were non-quantitative values labeled "lowest feasible concentration (LFC)." [Note: There are a few exceptions to LFC RELs for carcinogens (e.g., RELs for asbestos, formaldehyde, benzene, and ethylene oxide are quantitative values based primarily on analytical limits of detection or technological feasibility). Also, in 1989, NIOSH adopted several quantitative RELs for carcinogens from OSHA's permissible exposure limit (PEL) update.]

Under the new policy, NIOSH will also recommend the complete range of respirators (as determined by the NIOSH Respirator Decision Logic) for carcinogens with quantitative RELs. In this way, respirators will be consistently recommended regardless of whether a substance is a carcinogen or a non-carcinogen.

Old Policy

In the past, NIOSH identified numerous substances that should be treated as potential occupational carcinogens even though OSHA might not have identified them as such. In determining their carcinogenicity, NIOSH used the OSHA classification outlined in 29 CFR 1990.103, which states in part:

Potential occupational carcinogen means any substance, or combination or mixture of substances, which causes an increased incidence of benign and/or malignant neoplasms, or a substantial decrease in the latency period between exposure and onset of neoplasms in humans or in one or more experimental mammalian species as the result of any oral, respiratory or dermal exposure, or any other exposure which

results in the induction of tumors at a site other than the site of administration. This definition also includes any substance which is metabolized into one or more potential occupational carcinogens by mammals.

When thresholds for carcinogens that would protect 100% of the population had not been identified, NIOSH usually recommended that occupational exposures to carcinogens be limited to the lowest feasible concentration. To ensure maximum protection from carcinogens through the use of respiratory protection, NIOSH also recommended that only the most reliable and protective respirators be used. These respirators include (1) a self-contained breathing apparatus (SCBA) that has a full facepiece and is operated in a positive-pressure mode, or (2) a supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in a pressure-demand or other positive-pressure mode.

Recommendations to be Revised

The RELs and respirator recommendations for carcinogens listed in this edition of the *Pocket Guide* still reflect the old policy. Changes in the RELs and respirator recommendations that reflect the new policy will be included in future editions.

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APPENDIX B THIRTEEN OSHA-REGULATED CARCINOGENS

Without establishing PELs, OSHA promulgated standards in 1974 to regulate the industrial use of 13 chemicals identified as potential occupational carcinogens.

- 2-acetylaminofluorene
- 4-aminodiphenyl
- benzidine
- bis-chloromethyl ether
- 3,3'-dichlorobenzidine
- 4-dimethylaminoazobenzene
- ethyleneimine
- methyl chloromethyl ether
- alpha-naphthylamine
- beta-naphthylamine
- 4-nitrobiphenyl
- N-nitrosodimethylamine
- beta-propiolactone

Exposures of workers to these 13 chemicals are to be controlled through the required use of engineering controls, work practices, and personal protective equipment, including respirators. See 29 CFR 1910.1003-1910.1016 for specific details of these requirements.

Respirator selections in the Pocket Guide are based on NIOSH policy, which considers the 13 chemicals to be potential occupational carcinogens.

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APPENDIX C SUPPLEMENTARY EXPOSURE LIMITS

Aldehydes (Low-Molecular-Weight)

Exposure to acetaldehyde has produced nasal tumors in rats and laryngeal tumors in hamsters, and exposure to malonaldehyde has produced thyroid gland and pancreatic islet cell tumors in rats. NIOSH therefore recommends that acetaldehyde and malonaldehyde be considered potential occupational carcinogens in conformance with the OSHA carcinogen policy.

Testing has not been completed to determine the carcinogenicity of acrolein, butyraldehyde (CAS#: 123-72-8), crotonaldehyde, glutaraldehyde, glyoxal (CAS#: 107-22-2), paraformaldehyde (CAS#: 30525-89-4), propiolaldehyde (CAS#: 624-67-9), propionaldehyde (CAS#: 123-38-6), and n-valeraldehyde, nine related low-molecular-weight-aldehydes.

However, the limited studies to date indicate that these substances have chemical reactivity and mutagenicity similar to acetaldehyde and malonaldehyde. Therefore, NIOSH recommends that careful consideration should be given to reducing exposures to these nine related aldehydes.

Further information can be found in the "NIOSH Current Intelligence Bulletin 55: Carcinogenicity of Acetaldehyde and Malonaldehyde, and Mutagenicity of Related Low-Molecular-Weight Aldehydes" [DHHS (NIOSH) Publication No. 91-112.]

Asbestos

NIOSH considers asbestos to be a potential occupational carcinogen and recommends that exposures be reduced to the lowest feasible concentration. For asbestos fibers >5 micrometers in length, NIOSH recommends a REL of 100,000 fibers per cubic meter of air (100,000 fibers/m³), which is equal to 0.1 fiber per cubic centimeter of air (0.1 fiber/cm³), as determined by a 400-liter air sample collected over 100 minutes in accordance with NIOSH Analytical Method #7400. Airborne asbestos fibers are defined as those particles having (1) an aspect ratio of 3 to 1 or greater and (2) the mineralogic characteristics (that is, the crystal structure and elemental composition) of the asbestos minerals and their nonasbestiform analogs. The asbestos minerals are defined as chrysotile, crocidolite, amosite (cummingtonite-grunerite), anthophyllite, tremolite, and actinolite. In addition, airborne cleavage fragments from the nonasbestiform habits of the serpentine minerals antigorite and lizardite, and the amphibole minerals contained in the series cummingtonite-grunerite, tremolite-ferroactinolite, and glaucophane-riebeckite should also be counted as fibers provided they meet the criteria for a fiber when viewed microscopically.

As found in 29 CFR 1910.1001, the OSHA PEL for asbestos fibers (i.e., actinolite asbestos, amosite, anthophyllite asbestos, chrysotile, crocidolite, and tremolite asbestos) is an 8-hour TWA airborne concentration of 0.1 fiber (longer than 5 micrometers and having a length-to-diameter ratio of at least 3 to 1) per cubic centimeter of air (0.1 fiber/cm³), as determined by the membrane filter method at approximately 400X magnification with phase contrast illumination. No worker should be exposed in excess of 1 fiber/cm³ (excursion limit) as averaged over a sampling period of 30 minutes.

Benzidine-, o-Tolidine, and o-Dianisidine-based Dyes

In December 1980, OSHA and NIOSH jointly published the Health Hazard Alert: Benzidine-, o-Tolidine-, and o-Dianisidine-based Dyes.

In this Alert, OSHA and NIOSH concluded that benzidine and benzidine-based dyes were potential occupational carcinogens and recommended that worker exposure be reduced to the lowest feasible level.

OSHA and NIOSH further concluded that o-tolidine and o-dianisidine (and dyes based on them) may present a cancer risk to workers and should be handled with caution and exposure minimized.

Carbon Black

NIOSH considers "Carbon Black" to be the material consisting of more than 80% elemental carbon in the form of near-spherical colloidal particles and coalesced particle aggregates of colloidal size that is obtained by the partial

combustion or thermal decomposition of hydrocarbons.

The NIOSH REL (10-hour TWA) for carbon black is 3.5 mg/m³. Polycyclic aromatic hydrocarbons (PAHs), particulate polycyclic organic material (PPOM), and polynuclear aromatic hydrocarbons (PNAs) are terms frequently used to describe various petroleum-based substances that NIOSH considers to be potential occupational carcinogens.

Since some of these aromatic hydrocarbons may be formed during the manufacture of carbon black (and become adsorbed on the carbon black), the NIOSH REL (10-hour TWA) for carbon black in the presence of PAHs is also 0.1 mg PAHs/m³ (measured as the cyclohexane-extractable fraction).

The OSHA PEL (8-hour TWA) for carbon black is 3.5 mg/m³.

Chloroethanes

NIOSH considers ethylene dichloride; hexachloroethane; 1,1,2,2-tetrachloroethane; and 1,1,2-trichloroethane; to be potential occupational carcinogens.

Additionally, NIOSH recommends that the other five chloroethane compounds:

- 1,1-dichloroethane
- ethyl chloride
- · methyl chloroform
- pentachloroethane
- 1,1,1,2-tetrachloroethane

be treated in the workplace with caution because of their structural similarity to the four chloroethanes shown to be carcinogenic in animals.

Chromic Acid and Chromates (as CrO_3), Chromium(II) and Chromium(III) Compounds (as Cr), and Chromium Metal (as Cr)

The NIOSH REL (10-hour TWA) is 0.001 mg Cr(VI)/m³ for all hexavalent chromium [Cr(VI)] compounds. NIOSH considers all Cr(VI) compounds (including chromic acid, tert-butyl chromate, zinc chromate, and chromyl chloride) to be potential occupational carcinogens.

The NIOSH REL (8-hour TWA) is 0.5~mg Cr/m 3 for chromium metal and chromium(II) and chromium(III) compounds.

The OSHA PEL is $0.1 \text{ mg CrO}_3/\text{m}^3$ (ceiling) for chromic acid and chromates (including tert-butyl chromate with a "skin" designation and zinc chromate); 0.5 mg Cr/m^3 (8-hour TWA) for chromium(II) and chromium(III) compounds; and 1 mg Cr/m^3 (8-hour TWA) for chromium metal and insoluble salts.

Coal Tar Pitch Volatiles

NIOSH considers coal tar products (i.e., coal tar, coal tar pitch, or creosote) to be potential occupational carcinogens; the NIOSH REL (10-hour TWA) for coal tar products is 0.1 mg/m³ (cyclohexane-extractable fraction).

The OSHA PEL (8-hour TWA) for coal tar pitch volatiles is 0.2 mg/m³ (benzene-soluble fraction). OSHA defines "coal tar pitch volatiles" in 29 CFR 1910.1002 as the fused polycyclic hydrocarbons that volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter and includes substances such as anthracene, benzo(a)pyrene (BaP), phenanthrene, acridine, chrysene, pyrene, etc.

Coke Oven Emissions

The production of coke by the carbonization of bituminous coal leads to the release of chemically-complex emissions from coke ovens that include both gases and particulate matter of varying chemical composition.

The emissions include coal tar pitch volatiles (e.g., particulate polycyclic organic matter [PPOM], polycyclic aromatic hydrocarbons [PAHs], and polynuclear aromatic hydrocarbons [PNAs]), aromatic compounds (e.g., benzene and beta-naphthylamine), trace metals (e.g., arsenic, beryllium, cadmium, chromium, lead, and nickel), and gases (e.g., nitric oxides and sulfur dioxide).

Cotton Dust (raw)

NIOSH recommends reducing exposures to cotton dust to the lowest feasible concentration to reduce the prevalence and severity of byssinosis; the REL is <0.200 mg/m³ (as lint-free cotton dust).

As found in OSHA Table Z-1 (29 CFR 1910.1000), the PEL for cotton dust (raw) is 1 mg/m³ for the cotton waste processing operations of waste recycling (sorting, blending, cleaning, and willowing) and garnetting.

PELs for other sectors (as found in 29 CFR 1910.1043) are 0.200 mg/m³ for yarn manufacturing and cotton washing operations, 0.500 mg/m³ for textile mill waste house operations or for dust from "lower grade washed cotton" used during yarn manufacturing, and 0.750 mg/m³ for textile slashing and weaving operations.

The OSHA standard in 29 CFR 1910.1043 does not apply to cotton harvesting, ginning, or the handling and processing of woven or knitted materials and washed cotton.

All PELs for cotton dust are mean concentrations of lint-free, respirable cotton dust collected by the vertical elutriator or an equivalent method and averaged over an 8-hour period.

Lead

NIOSH considers "Lead" to mean metallic lead, lead oxides, and lead salts (including organic salts such as lead soaps but excluding lead arsenate).

The NIOSH REL for lead (8-hour TWA) is 0.050 mg/m³; air concentrations should be maintained so that worker blood lead remains less than 0.060 mg Pb/100 g of whole blood.

OSHA considers "Lead" to mean metallic lead, all inorganic lead compounds (lead oxides and lead salts), and a class of organic compounds called soaps; all other lead compounds are excluded from this definition.

The OSHA PEL (8-hour TWA) is 0.050 mg/m^3 ; other OSHA requirements can be found in 29 CFR 1910.1025. The OSHA PEL (8-hour TWA) for lead in "non-ferrous foundries with less than 20 employees" is 0.075 mg/m^3 .

Mineral Dusts

These OSHA PELs for "mineral dusts" listed below are from Table Z-3 of 29 CFR 1910.1000.

The OSHA PEL (8-hour TWA) for crystalline silica (as respirable quartz) is either 250 mppcf divided by the value "%SiO₂ + 5" or 10 mg/m³ divided by the value "%SiO₂ + 2".

The OSHA PEL (8-hour TWA) for crystalline silica (as total quartz) is 30 mg/m^3 divided by the value " $\% \text{SiO}_2 + 2$ ".

The OSHA PELs (8-hour TWAs) for cristobalite and tridymite are the values calculated above using the count or mass formulae for quartz.

The OSHA PEL (8-hour TWA) for amorphous silica (including diatomaceous earth) is either 80 mg/m^3 divided by the value "%SiO₂", or 20 mppcf.

The OSHA PELs (8-hour TWAs) for mica, soapstone, and talc (not containing asbestos) are 20 mppcf.

The OSHA PEL (8-hour TWA) for Portland cement is 50 mppcf. The OSHA PEL (8-hour TWA) for graphite (natural) is 15 mppcf.

The OSHA PEL (8-hour TWA) for coal dust (as the respirable fraction) containing less than 5% SiO_2 is 2.4 mg/m^3 .

The OSHA PEL (8-hour TWA) for coal dust (as the respirable fraction) containing greater than 5% SiO_2 is 10 mg/m³ divided by the value "% $SiO_2 + 2$ ".

NIAX® Catalyst ESN

In May 1978, OSHA and NIOSH jointly published the Current Intelligence Bulletin (CIB) 26: NIAX® Catalyst ESN.

In this CIB, OSHA and NIOSH recommended that occupational exposure to NIAX® Catalyst ESN, its components, dimethylaminopropionitrile and bis(2-(dimethylamino)ethyl)ether, as well as formulations containing either component, be minimized.

Exposures should be limited to as few workers as possible, while minimizing workplace exposure concentrations with effective work practices and engineering controls.

Exposed workers should be carefully monitored for potential disorders of the nervous and genitourinary system. Although substitution is a possible control measure, alternatives to NIAX® Catalyst ESN or its components should be carefully evaluated with regard to possible adverse health effects.

Trichloroethylene

NIOSH considers trichloroethylene (TCE) to be a potential occupational carcinogen and recommends a REL of 2 ppm (as a 60-minute ceiling) during the usage of TCE as an anesthetic agent and 25 ppm (as a 10-hour TWA) during all other exposures.

Tungsten Carbide (Cemented)

"Cemented tungsten carbide" or "hard metal" refers to a mixture of tungsten carbide, cobalt, and sometimes metal oxides or carbides and other metals (including nickel).

When the cobalt (Co) content exceeds 2%, its contribution to the potential hazard is judged to exceed that of tungsten carbide.

Therefore, the NIOSH REL (10-hour TWA) for cemented tungsten carbide containing >2% Co is 0.05 mg Co/m³; the applicable OSHA PEL is 0.1 mg Co/m³ (8-hour TWA). Nickel (Ni) may sometimes be used as a binder rather than cobalt.

NIOSH considers cemented tungsten carbide containing nickel to be a potential occupational carcinogen and recommends a REL of 0.015 mg Ni/m³ (10-hour TWA).

The OSHA PEL for Insoluble Nickel (i.e., a 1 mg Ni/m³ 8-hour TWA) applies to mixtures of tungsten carbide and nickel.

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APPENDIX D SUBSTANCES WITH NO ESTABLISHED RELS

After reviewing available published literature, NIOSH provided comments to OSHA on August 1, 1988, regarding the "Proposed Rule on Air Contaminants" (29 CFR 1910, Docket No. H-020).

In these comments, NIOSH questioned whether the PELs proposed (and listed below) for the following substances included in the Pocket Guide were adequate to protect workers from recognized health hazards:

- acetylene tetrabromide [TWA 1 ppm]
- chlorobenzene [TWA 75 ppm]
- coal dust ($<5\% SiO_2$) [2 mg/m³ (as the respirable dust fraction)], coal dust ($>/=5\% SiO_2$) [0.1 mg/m³ (as the respirable quartz fraction)]
- ethyl bromide [TWA 200 ppm; STEL 250 ppm]
- ethylene glycol [Ceiling 50 ppm]
- ethyl ether [TWA 400 ppm; STEL 500 ppm]
- fenthion [TWA 0.2 mg/m³ (skin)]
- furfural [TWA 2 ppm (skin)]
- 2-isopropoxyethanol [TWA 25 ppm]
- isopropyl acetate [TWA 250 ppm; STEL 310 ppm]
- isopropylamine [TWA 5 ppm; STEL 10 ppm]
- manganese tetroxide (as Mn) [TWA 1 mg/m³]
- molybdenum (soluble compounds as Mo) [TWA 5 mg/m³]
- nitromethane [TWA 100 ppm]
- m-toluidine [TWA 2 ppm (skin)]
- triethylamine [TWA 10 ppm; STEL 15 ppm]

At that time, NIOSH also conducted a limited evaluation of the literature and concluded that the documentation cited by OSHA was inadequate to support the proposed PEL (as an 8-hour TWA) of 10 mg/m³ for alpha-alumina, benomyl, emery, glycerine (mist), graphite (synthetic), magnesium oxide fume, molybdenum (insoluble compounds as Mo), particulates not otherwise regulated, picloram, and rouge.

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APPENDIX E

RESPIRATOR RECOMMENDATIONS FOR SELECTED CHEMICALS

Mercury compounds [except (organo) alkyls]

Mercury vapor:

NIOSH

Up to 0.5 (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the

mg/m³: compound of concern † / (APF = 10) Any supplied air respirator

Up to 1.25 (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/ (APF = 25) Any

 mg/m^3 : powered, air-purifying respirator with cartridge(s) providing protection against the compound of

concern[†]

Up to 2.5 (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing

 mg/m^3 :

protection against the compound of concern † / (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern † / (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/ (APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against the compound of concern † / (APF = 50) Any self-contained breathing apparatus that has a full facepiece/ (APF = 50) Any supplied-air respirator with a full facepiece

Up to 10

(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure

 mg/m^3 :

mode

Emergency or (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a planned entry pressure-demand or other positive-pressure mode/ (APF = 10,000) Any supplied-air respirator that has into unknown a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination concentrations with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode in combination or IDLH pressure mode

conditions:

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or backmounted canister providing protection against the compund of concern † / Any appropriate escape-type, self-contained breathing apparatus

† End of service life indicator (ESLI) required

Other non (organo) alkyl mercury compounds:

NIOSH/OSHA

Up to 1 (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the

 mg/m^3 : compound of concern[†]/ (APF = 10) Any supplied air respirator

Up to 2.5 (APF = 25) Any supplied-air respirator operated in a continuous-flow mode/ (APF = 25) Any

 mg/m^3 : powered, air-purifying respirator with cartridge(s) providing protection against the compound of

concern[†]

Up to 5 (APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing

 mg/m^3 :

protection against the compound of concern † / (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern † / (APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode/ (APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against the compound of concern † / (APF = 50) Any self-contained breathing apparatus that has a full facepiece/ (APF = 50) Any supplied-air respirator with a full facepiece

Up to 10

(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure

 mg/m^3 : mode

Emergency or (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a planned entry pressure-demand or other positive-pressure mode/ (APF = 10,000) Any supplied-air respirator that has into unknown a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination concentrations with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode in combination or IDLH pressure mode

conditions:

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compund of concern † / Any appropriate escape-type,

self-contained breathing apparatus

† End of service life indicator (ESLI) required

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APPENDIX F MISCELLANEOUS NOTES

Benzene: The final OSHA Benzene standard in 1910.1028 applies to all occupational exposures to benzene except some subsegments of industry where exposures are consistently under the action level (i.e., distribution and sales of fuels, sealed containers and pipelines, coke production, oil and gas drilling and production, natural gas processing, and the percentage exclusion for liquid mixtures); for the excepted subsegments, the benzene limits in Table Z-2 apply (i.e., an 8-hour TWA of 10 ppm, an acceptable ceiling of 25 ppm, and 50 ppm for a maximum duration of 10 minutes as an acceptable maximum peak above the acceptable ceiling).

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APPENDIX G 1989 AIR CONTAMINANTS UPDATE PROJECT: EXPOSURE LIMITS NOT IN EFFECT

Acetaldehyde	TWA 100 ppm (180 mg/m ³)
	ST 150 ppm (270 mg/m ³)
Acetic anhydride	C 5 ppm (20 mg/m ³)
Acetone	TWA 750 ppm (1800 mg/m ³)
	ST 1000 ppm (2400 mg/m ³)
Acetonitrile	TWA 40 ppm (70 mg/m ³)
	ST 60 ppm (105 mg/m ³)
Acetylsalicyclic acid	TWA 5 mg/m ³
Acrolein	TWA 0.1 ppm (0.25 mg/m ³)
	ST 0.3 ppm (0.8 mg/m ³)
Acrylamide	TWA 0.03 mg/m ³ [skin]
Acrylic acid	TWA 10 ppm (30 mg/m ³) [skin]
Allyl alcohol	TWA 2 ppm (5 mg/m ³)
	ST 4 ppm (10 mg/m ³) [skin]
Allyl chloride	TWA 1 ppm (3 mg/m ³)
	ST 2 ppm (6 mg/m ³)
Allyl glycidyl ether	TWA 5 ppm (22 mg/m ³)
	ST 10 ppm (44 mg/m ³)
Allyl propyl disulfide	TWA 2 ppm (12 mg/m ³)
	ST 3 ppm (18 mg/m ³)
alpha-Alumina	TWA 10 mg/m ³ (total)
	TWA 5 mg/m ³ (resp)
Aluminum (pyro powders & welding fumes, as Al)	TWA 5 mg/m ³

Aluminum (soluble salts & alkyls, as Al)	TWA 2 mg/m ³
Amitrole	TWA 0.2 mg/m ³
Ammonia	ST 35 ppm (27 mg/m ³)
Ammonium chloride fume	TWA 10 mg/m ³
	ST 20 mg/m ³
Ammonium sulfamate	TWA 10 mg/m ³ (total)
	TWA 5 mg/m ³ (resp)
Aniline (and homologs)	TWA 2 ppm (8 mg/m ³) [skin]
Atrazine	TWA 5 mg/m ³
Barium sulfate	TWA 10 mg/m ³ (total)
	TWA 5 mg/m ³ (resp)
Benomyl	TWA 10 mg/m ³ (total)
	TWA 5 mg/m ³ (resp)
Benzenethiol	TWA 0.5 ppm (2 mg/m ³)
Bismuth telluride (doped with selenium sulfide, as Bi2Te3)	TWA 5 mg/m ³
Borates, tetra, sodium salts (Anhydrous)	TWA 10 mg/m ³
Borates, tetra, sodium salts (Decahydrate)	TWA 10 mg/m ³
Borates, tetra, sodium salts (Pentahydrate)	TWA 10 mg/m ³
Boron oxide	TWA 10 mg/m ³
Boron tribromide	C 1 ppm (10 mg/m ³)
Bromacil	TWA 1 ppm (10 mg/m ³)
Bromine	TWA 0.1 ppm (0.7 mg/m ³)
	ST 0.3 ppm (2 mg/m ³)
Bromine pentafluoride	TWA 0.1 ppm (0.7 mg/m ³)
n-Butane	TWA 800 ppm (1900 mg/m ³)
2-Butanone	TWA 200 ppm (590 mg/m ³)
	ST 300 ppm (885 mg/m ³)
2-Butoxyethanol	TWA 25 ppm (120 mg/m ³) [skin]
n-Butyl acetate	TWA 150 ppm (710 mg/m ³)
	ST 200 ppm (950 mg/m ³)
Butyl acrylate	TWA 10 ppm (55 mg/m ³)
n-Butyl alcohol	C 50 ppm (150 mg/m ³) [skin]
sec-Butyl alcohol	TWA 100 ppm (305 mg/m ³)
tert-Butyl alcohol	TWA 100 ppm (300 mg/m ³)
	ST 150 ppm (450 mg/m ³)
n-Butyl glycidyl ether	TWA 25 ppm (135 mg/m ³)

n-Butyl lactate	TWA 5 ppm (25 mg/m ³)
n-Butyl mercaptan	TWA 0.5 ppm (1.5 mg/m ³)
o-sec-Butylphenol	TWA 5 ppm (30 mg/m ³) [skin]
p-tert-Butyltoluene	TWA 10 ppm (60 mg/m ³)
	ST 20 ppm (120 mg/m ³)
Calcium cyanamide	TWA 0.5 mg/m ³
Caprolactam	Dust:
	TWA 1 mg/m ³
	ST 3 mg/m ³
	Vapor:
	TWA 5 ppm (20 mg/m ³)
	ST 10 ppm (40 mg/m ³)
Captafol	TWA 0.1 mg/m ³
Captan	TWA 5 mg/m ³
Carbofuran	TWA 0.1 mg/m ³
Carbon dioxide	TWA 10,000 ppm (18,000 mg/m ³)
	ST 30,000 ppm (54,000 mg/m ³)
Carbon disulfide	TWA 4 ppm (12 mg/m ³)
	ST 12 ppm (36 mg/m ³) [skin]
Carbon monoxide	TWA 35 ppm (40 mg/m ³)
	C 200 ppm (229 mg/m ³)
Carbon tetrabromide	TWA 0.1 ppm (1.4 mg/m^3)
Carlan Astrophical I	ST 0.3 ppm (4 mg/m ³)
Carbon tetrachloride	TWA 2 ppm (12.6 mg/m ³)
Carbonyl fluoride	TWA 2 ppm (5 mg/m ³)
Catachal	ST 5 ppm (15 mg/m ³)
Catechol	TWA 5 ppm (20 mg/m ³) [skin]
Cesium hydroxide	TWA 2 mg/m ³
Chlorinated camphene	TWA 0.5 mg/m^3
	ST 1 mg/m ³ [skin]
Chlorine	TWA 0.5 ppm (1.5 mg/m^3)
	ST 1 ppm (3 mg/m ³)
Chlorine dioxide	TWA 0.1 ppm (0.3 mg/m ³)
Chlorogotyl chlorida	ST 0.3 ppm (0.9 mg/m ³)
Chloroacetyl chloride	TWA 0.05 ppm (0.2 mg/m ³)
o-Chlorobenzylidene malononitrile	C 0.05 ppm (0.4 mg/m ³) [skin]
Chlorodifluoromethane	TWA 1000 ppm (3500 mg/m ³)

Chloroform	TWA 2 ppm (9.78 mg/m ³)
1-Chloro-1-nitropropane	TWA 2 ppm (10 mg/m ³)
Chloropentafluoroethane	TWA 1000 ppm (6320 mg/m ³)
beta-Chloroprene	TWA 10 ppm (35 mg/m ³) [skin]
o-Chlorostyrene	TWA 50 ppm (285 mg/m ³)
	ST 75 ppm (428 mg/m ³)
o-Chlorotoluene	TWA 50 ppm (250 mg/m ³)
Chlorpyrifos	TWA 0.2 mg/m ³ [skin]
Coal dust	TWA 2 mg/m ³ (<5% SiO ₂)(resp dust)
	TWA 0.1 mg/m ³ (>/= 5% SiO_2) (resp quartz)
Cobalt metal dust & fume, as Co)	TWA 0.05 mg/m ³
Cobalt carbonyl (as Co)	TWA 0.1 mg/m ³
Cobalt hydrocarbonyl (as Co)	TWA 0.1 mg/m ³
Crag® herbicide	TWA 10 mg/m ³ (total)
	TWA 5 mg/m ³ (resp)
Crufomate	TWA 5 mg/m ³
Cyanamide	TWA 2 mg/m ³
Cyanogen	TWA 10 ppm (20 mg/m ³)
Cyanogen chloride	C 0.3 ppm (0.6 mg/m ³)
Cyclohexanol	TWA 50 ppm (200 mg/m ³) [skin]
Cyclohexanone	TWA 25 ppm (100 mg/m ³) [skin]
Cyclohexylamine	TWA 10 ppm (40 mg/m ³)
Cyclonite	TWA 1.5 mg/m ³ [skin]
Cyclopentane	TWA 600 ppm (1720 mg/m ³)
Cyhexatin	TWA 5 mg/m ³
Decaborane	TWA 0.3 mg/m ³ (0.05 ppm)
	ST 0.9 mg/m ³ (0.15 ppm) [skin]
Diazinon	TWA 0.1 mg/m ³ [skin]
2-N-Dibutylaminoethanol	TWA 2 ppm (14 mg/m ³)
Dibutyl phosphate	TWA 1 ppm (5 mg/m ³)
	ST 2 ppm (10 mg/m ³)
Dichloroacetylene	C 0.1 ppm (0.4 mg/m ³)
p-Dichlorobenzene	TWA 75 ppm (450 mg/m ³)
1.2 Dialana 5.5 di di 11. di 12.	ST 110 ppm (675 mg/m ³)
1,3-Dichloro-5,5-dimethylhydantoin	TWA 0.2 mg/m^3
	ST 0.4 mg/m ³

Dichloroethyl ether	TWA 5 ppm (30 mg/m ³) ST 10 ppm (60 mg/m ³) [skin]
Dichloromonofluoromethane	TWA 10 ppm (40 mg/m ³)
1,1-Dichloro-1-nitroethane	TWA 2 ppm (10 mg/m ³)
1,3-Dichloropropene	TWA 1 ppm (5 mg/m ³) [skin]
2,2-Dichloropropionic acid	TWA 1 ppm (6 mg/m ³)
Dicrotophos	TWA 0.25 mg/m ³ [skin]
Dicyclopentadiene	TWA 5 ppm (30 mg/m ³)
Dicyclopentadienyl iron	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)
Diethanolamine	TWA 3 ppm (15 mg/m ³)
Diethylamine	TWA 10 ppm (30 mg/m ³) ST 25 ppm (75 mg/m ³)
Diethylenetriamine	TWA 1 ppm (4 mg/m ³)
Diethyl ketone	TWA 200 ppm (705 mg/m ³)
Diethyl phthalate	TWA 5 mg/m ³
Diglycidyl ether	TWA 0.1 ppm (0.5 mg/m ³)
Diisobutyl ketone	TWA 25 ppm (150 mg/m ³)
N,N-Dimethylaniline	TWA 5 ppm (25 mg/m ³) ST 10 ppm (50 mg/m ³) [skin]
Dimethyl-1,2-dibromo-2,2-dichlorethyl phosphate	TWA 3 mg/m ³ [skin]
Dimethyl sulfate	TWA 0.1 ppm (0.5 mg/m ³) [skin]
Dinitolmide	TWA 5 mg/m ³
Di-sec octyl phthalate	TWA 5 mg/m ³ ST 10 mg/m ³
Dioxane	TWA 25 ppm (90 mg/m ³) [skin]
Dioxathion	TWA 0.2 mg/m ³ [skin]
Diphenylamine	TWA 10 mg/m ³
Dipropylene glycol methyl ether	TWA 100 ppm (600 mg/m ³) ST 150 ppm (900 mg/m ³) [skin]
Dipropyl ketone	TWA 50 ppm (235 mg/m ³)
Diquat (Diquat dibromide)	TWA 0.5 mg/m ³
Disulfiram	TWA 2 mg/m ³
Disulfoton	TWA 0.1 mg/m ³ [skin]
	2
2,6-Di-tert-butyl-p-cresol	TWA 10 mg/m^3

Divinyl benzene	TWA 10 ppm (50 mg/m ³)
Emery	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)
Endosulfan	TWA 0.1 mg/m ³ [skin]
Epichlorohydrin	TWA 2 ppm (8 mg/m ³) [skin]
Ethanolamine	TWA 3 ppm (8 mg/m ³) ST 6 ppm (15 mg/m ³)
Ethion	0.4 mg/m ³ [skin]
Ethyl acrylate	TWA 5 ppm (20 mg/m ³) ST 25 ppm (100 mg/m ³) [skin]
Ethyl benzene	TWA 100 ppm (435 mg/m ³) ST 125 ppm (545 mg/m ³)
Ethyl bromide	TWA 200 ppm (890 mg/m ³) ST 250 ppm (1110 mg/m ³)
Ethylene chlorohydrin	C 1 ppm (3 mg/m ³) [skin]
Ethylene dichloride	TWA 1 ppm (4 mg/m ³) ST 2 ppm (8 mg/m ³)
Ethylene glycol	C 50 ppm (125 mg/m ³)
Ethylene glycol dinitrate	ST 0.1 mg/m ³ [skin]
Ethyl ether	TWA 400 ppm (1200 mg/m ³) ST 500 ppm (1500 mg/m ³)
Ethylidene norbornene	C 5 ppm (25 mg/m ³)
Ethyl mercaptan	TWA 0.5 ppm (1 mg/m ³)
N-Ethylmorpholine	TWA 5 ppm (23 mg/m ³) [skin]
Ethyl silicate	TWA 10 ppm (85 mg/m ³)
Fenamiphos	TWA 0.1 mg/m ³ [skin]
Fensulfothion	TWA 0.1 mg/m ³
Fenthion	TWA 0.2 mg/m ³ [skin]
Ferbam	TWA 10 mg/m ³
Ferrovanadium dust	TWA 1 mg/m ³ ST 3 mg/m ³
Fluorotrichloromethane	C 1000 ppm (5600 mg/m ³)
Fonofos	TWA 0.1 mg/m ³ [skin]
Formamide	TWA 20 ppm (30 mg/m ³) ST 30 ppm (45 mg/m ³)
Furfural	TWA 2 ppm (8 mg/m ³) [skin]
Furfuryl alcohol	3

ST 15 ppm (60 mg/m³) [skin]		TWA 10 ppm (40 mg/m)
ST 500 ppm (1500 mg/m³)		ST 15 ppm (60 mg/m ³) [skin]
Germanium tetrahydride TWA 0.2 ppm (0.6 mg/m³) Glutaraldehyde C 0.2 ppm (0.8 mg/m³) Glycerin (mist) TWA 10 mg/m³ (total)	Gasoline	
Glutaraldehyde		ST 500 ppm (1500 mg/m ³)
Glycerin (mist) TWA 10 mg/m³ (total) TWA 5 mg/m³ (total) TWA 5 mg/m³ (total) TWA 5 mg/m³ (resp) TWA 2.5 mg/m³ (resp) TWA 2.5 mg/m³ (resp) TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp) TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp) TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp) TWA 400 ppm (1600 mg/m³) TWA 400 ppm (1600 mg/m³) TWA 400 ppm (1600 mg/m³) TWA 0.02 ppm (0.24 mg/m³) TWA 0.01 ppm (0.1 mg/m³) TWA 50 ppm (1800 mg/m³) TWA 50 ppm (1800 mg/m³) TWA 50 ppm (1800 mg/m³) TWA 50 ppm (205 mg/m³) TWA 50 ppm (300 mg/m³) TWA 50 ppm (3	Germanium tetrahydride	TWA 0.2 ppm (0.6 mg/m ³)
TWA 5 mg/m³ (resp)	Glutaraldehyde	C 0.2 ppm (0.8 mg/m ³)
Glycidol TWA 25 ppm (75 mg/m³) Graphite (natural) TWA 2.5 mg/m³ (resp) TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp) TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp) TWA 400 ppm (1600 mg/m³) ST 500 ppm (2000 mg/m³) ST 500 ppm (2000 mg/m³) TWA 0.02 ppm (0.24 mg/m³) TWA 0.01 ppm (0.1 mg/m³) TWA 0.01 ppm (1800 mg/m³) TWA 50 ppm (1800 mg/m³) TWA 500 ppm (205 mg/m³) TWA 500 ppm (205 mg/m³) TWA 500 ppm (205 mg/m³) TWA 500 ppm (100 mg/m³) TWA 500 pp	Glycerin (mist)	
Graphite (natural) TWA 2.5 mg/m³ (resp)		TWA 5 mg/m ³ (resp)
Graphite (synthetic) Graphite (synthetic) TWA 10 mg/m³ (total) TWA 5 mg/m³ (tesp) n-Heptane TWA 400 ppm (1600 mg/m³) ST 500 ppm (2000 mg/m³) Hexachlorobutadiene TWA 0.02 ppm (0.24 mg/m³) Hexachlorocyclopentadiene TWA 0.01 ppm (0.1 mg/m³) Hexafluoroacetone TWA 0.1 ppm (0.7 mg/m³) [skin] n-Hexane TWA 50 ppm (1800 mg/m³) Hexane isomers (except n-Hexane) TWA 500 ppm (1800 mg/m³) ST 1000 ppm (3600 mg/m³) TWA 500 ppm (205 mg/m³) Hexone TWA 50 ppm (205 mg/m³) ST 75 ppm (300 mg/m²) Hexylene glycol C 25 ppm (125 mg/m³) Hydrazine TWA 0.1 ppm (0.1 mg/m³) [skin] Hydrogenated terphenyls TWA 0.5 ppm (5 mg/m³) Hydrogen bromide C 3 ppm (10 mg/m³) Hydrogen fluoride (as F) TWA 3 ppm ST 6 ppm TWA 3 ppm ST 6 ppm TWA 10 ppm (14 mg/m³) ST 15 ppm (21 mg/m³) ST 15 ppm (21 mg/m³) ST 15 ppm (21 mg/m³) ST 15 ppm (21 mg/m³) ST 15 ppm (21 mg/m³) ST 15 ppm (21 mg/m³) ST 15 ppm (21 mg/m³) ST 15 ppm (21 mg/m³) ST 15 ppm (21 mg/m³) ST 15 ppm (21 mg/m³) TWA 0.5 ppm (3600 mg/m²) TWA 0.6 ppm (14 mg/m²) TWA 0.6 ppm (10 mg/m²)	Glycidol	TWA 25 ppm (75 mg/m ³)
TWA 5 mg/m³ (resp)	Graphite (natural)	TWA 2.5 mg/m ³ (resp)
n-Heptane TWA 400 ppm (1600 mg/m³) ST 500 ppm (2000 mg/m³) Hexachlorobutadiene TWA 0.02 ppm (0.24 mg/m³) Hexachlorocyclopentadiene TWA 0.01 ppm (0.1 mg/m³) Hexafluoroacetone TWA 0.1 ppm (0.7 mg/m³) [skin] n-Hexane TWA 50 ppm (1800 mg/m³) Hexane isomers (except n-Hexane) TWA 500 ppm (1800 mg/m³) 2-Hexanone TWA 5 ppm (20 mg/m³) Hexone TWA 50 ppm (205 mg/m³) Hexylene glycol C 25 ppm (125 mg/m³) Hydrazine TWA 0.1 ppm (0.1 mg/m³) [skin] Hydrogenated terphenyls TWA 0.5 ppm (5 mg/m³) Hydrogen bromide C 3 ppm (10 mg/m³) Hydrogen fluoride (as F) TWA 3 ppm ST 6 ppm Hydrogen sulfide TWA 10 ppm (14 mg/m³) [skin] Hydrogen sulfide TWA 0.5 ppm (3 mg/m³) [skin] Hydroxypropyl acrylate TWA 0.5 ppm (3 mg/m³) [skin] Indene TWA 0.1 mg/m³ Indium TWA 0.6 ppm (10 mg/m³)	Graphite (synthetic)	TWA 10 mg/m ³ (total)
ST 500 ppm (2000 mg/m³) Hexachlorobutadiene		TWA 5 mg/m ³ (resp)
Hexachlorobutadiene TWA 0.02 ppm (0.24 mg/m³) Hexachlorocyclopentadiene TWA 0.01 ppm (0.1 mg/m³) Hexafluoroacetone TWA 0.1 ppm (0.7 mg/m³) [skin] n-Hexane TWA 50 ppm (1800 mg/m³) Hexane isomers (except n-Hexane) TWA 500 ppm (1800 mg/m³) 2-Hexanone TWA 5 ppm (200 mg/m³) Hexone TWA 50 ppm (205 mg/m³) Hexylene glycol C 25 ppm (1025 mg/m³) Hydrazine TWA 0.1 ppm (0.1 mg/m³) [skin] Hydrogenated terphenyls TWA 0.5 ppm (5 mg/m³) Hydrogen bromide C 3 ppm (10 mg/m³) Hydrogen cyanide ST 4.7 ppm (5 mg/m³) [skin] Hydrogen sulfide TWA 3 ppm ST 6 ppm Hydrogen sulfide TWA 10 ppm (14 mg/m³) ST 15 ppm (21 mg/m³) 2-Hydroxypropyl acrylate TWA 0.5 ppm (3 mg/m³) [skin] Indene TWA 0.5 ppm (45 mg/m³) Indium TWA 0.1 mg/m³ Indium TWA 0.1 mg/m³ Indium TWA 0.6 ppm (10 mg/m³)	n-Heptane	
Hexachlorocyclopentadiene TWA 0.01 ppm (0.1 ppm (0.1 ppm (0.7 mg/m³) Mexafluoroacetone TWA 0.1 ppm (0.7 mg/m³) Skin m-Hexane TWA 50 ppm (180 mg/m³) Mexane isomers (except n-Hexane) TWA 500 ppm (1800 mg/m³) ST 1000 ppm (3600 mg/m³) ST 1000 ppm (3600 mg/m³) ST 1000 ppm (205 mg/m³) Mexane TWA 50 ppm (205 mg/m³) ST 75 ppm (300 mg/m³) Mexylene glycol C 25 ppm (125 mg/m³) Mexylene glycol C 25 ppm (125 mg/m³) Mexylene glycol TWA 0.1 ppm (0.1 mg/m³) Skin Mydrogenated terphenyls TWA 0.5 ppm (5 mg/m³) Mydrogen bromide C 3 ppm (10 mg/m³) ST 4.7 ppm (5 mg/m³) ST 4.7 ppm (5 mg/m³) ST 6 ppm Mydrogen fluoride (as F) TWA 3 ppm ST 6 ppm TWA 10 ppm (14 mg/m³) ST 15 ppm (21 mg/m³) ST 15 ppm (21 mg/m³) ST 15 ppm (21 mg/m³) ST 15 ppm (30 mg/m³) Skin TWA 0.5 ppm (3 mg/m³) Skin Mydrogen sulfide TWA 10 ppm (45 mg/m³) ST 15 ppm (30 mg/m³) Skin Mydrogen fluoride TWA 10 ppm (45 mg/m³) ST 15 ppm (30 mg/m³) Skin Mydrogen fluoride TWA 10 ppm (45 mg/m³) ST 15 ppm (30 mg/m³) Skin Mydrogen fluoride TWA 10 ppm (45 mg/m³) St 15 ppm (30 mg/m³) Skin Mydrogen fluoride TWA 10 ppm (45 mg/m³) Skin Mydrogen fluoride TWA 10 ppm (45 mg/m³) Skin Mydrogen fluoride TWA 0.1 mg/m³ Skin Mydrogen fluoride TWA 0.1 mg/m³ Skin Mydrogen fluoride TWA 0.1 mg/m³ Skin Mydrogen fluoride TWA 0.6 ppm (10 mg/m³) Mydrogen fluoride Mydrogen fluoride My		ST 500 ppm (2000 mg/m ³)
Hexafluoroacetone TWA 0.1 ppm (0.7 mg/m³) [skin]	Hexachlorobutadiene	TWA 0.02 ppm (0.24 mg/m ³)
TWA 5.1 ppm (6.7 mg/m²) [skm]	Hexachlorocyclopentadiene	TWA 0.01 ppm (0.1 mg/m ³)
Hexane isomers (except n-Hexane)	Hexafluoroacetone	TWA 0.1 ppm (0.7 mg/m ³) [skin]
ST 1000 ppm (3600 mg/m³)	n-Hexane	TWA 50 ppm (180 mg/m ³)
2-Hexanone TWA 5 ppm (20 mg/m³) Hexone TWA 50 ppm (205 mg/m³) TVA 50 ppm (205 mg/m³) ST 75 ppm (300 mg/m³) Hexylene glycol C 25 ppm (125 mg/m³) Hydrazine TWA 0.1 ppm (0.1 mg/m³) [skin] Hydrogenated terphenyls TWA 0.5 ppm (5 mg/m³) Hydrogen bromide C 3 ppm (10 mg/m³) Hydrogen cyanide ST 4.7 ppm (5 mg/m³) [skin] Hydrogen fluoride (as F) TWA 3 ppm ST 6 ppm Hydrogen sulfide TWA 10 ppm (14 mg/m³) (ST 15 ppm (21 mg/m³)) 2-Hydroxypropyl acrylate TWA 0.5 ppm (3 mg/m³) [skin] Indene TWA 10 ppm (45 mg/m³) Indium TWA 0.1 mg/m³ Iodoform TWA 0.6 ppm (10 mg/m³)	Hexane isomers (except n-Hexane)	
Hexone		ST 1000 ppm (3600 mg/m ³)
ST 75 ppm (300 mg/m³) Hexylene glycol	2-Hexanone	TWA 5 ppm (20 mg/m ³)
Hexylene glycol C 25 ppm (125 mg/m³) Hydrazine TWA 0.1 ppm (0.1 mg/m³) [skin] Hydrogenated terphenyls TWA 0.5 ppm (5 mg/m³) Hydrogen bromide C 3 ppm (10 mg/m³) Hydrogen cyanide ST 4.7 ppm (5 mg/m³) [skin] Hydrogen fluoride (as F) TWA 3 ppm ST 6 ppm Hydrogen sulfide TWA 10 ppm (14 mg/m³) ST 15 ppm (21 mg/m³) 2-Hydroxypropyl acrylate TWA 0.5 ppm (3 mg/m³) [skin] Indene TWA 10 ppm (45 mg/m³) Indium TWA 0.1 mg/m³ Indium TWA 0.1 mg/m³ Indione TWA 0.6 ppm (10 mg/m³)	Hexone	
Hydrazine TWA 0.1 ppm (0.1 mg/m³) [skin] Hydrogenated terphenyls TWA 0.5 ppm (5 mg/m³) Hydrogen bromide C 3 ppm (10 mg/m³) Hydrogen cyanide ST 4.7 ppm (5 mg/m³) [skin] TWA 3 ppm ST 6 ppm Hydrogen sulfide TWA 10 ppm (14 mg/m³) ST 15 ppm (21 mg/m³) 2-Hydroxypropyl acrylate TWA 0.5 ppm (3 mg/m³) [skin] Indene TWA 0.1 mg/m³ Indium TWA 0.1 mg/m³ TWA 0.6 ppm (10 mg/m³)		ST 75 ppm (300 mg/m ³)
Hydrogenated terphenyls TWA 0.5 ppm (5 mg/m³) Hydrogen bromide C 3 ppm (10 mg/m³) Hydrogen cyanide ST 4.7 ppm (5 mg/m³) [skin] Hydrogen fluoride (as F) TWA 3 ppm ST 6 ppm Hydrogen sulfide TWA 10 ppm (14 mg/m³) ST 15 ppm (21 mg/m³) 2-Hydroxypropyl acrylate TWA 0.5 ppm (3 mg/m³) [skin] Indene TWA 10 ppm (45 mg/m³) Indium TWA 0.1 mg/m³ Iodoform TWA 0.6 ppm (10 mg/m³)	Hexylene glycol	C 25 ppm (125 mg/m ³)
Hydrogen bromide C 3 ppm (10 mg/m³) Hydrogen cyanide ST 4.7 ppm (5 mg/m³) [skin] Hydrogen fluoride (as F) TWA 3 ppm ST 6 ppm Hydrogen sulfide TWA 10 ppm (14 mg/m³) ST 15 ppm (21 mg/m³) 2-Hydroxypropyl acrylate TWA 0.5 ppm (3 mg/m³) [skin] Indene TWA 10 ppm (45 mg/m³) Indium TWA 0.1 mg/m³ Iodoform TWA 0.6 ppm (10 mg/m³)	Hydrazine	TWA 0.1 ppm (0.1 mg/m ³) [skin]
Hydrogen cyanide ST 4.7 ppm (5 mg/m³) [skin] Hydrogen fluoride (as F) TWA 3 ppm ST 6 ppm Hydrogen sulfide TWA 10 ppm (14 mg/m³) ST 15 ppm (21 mg/m³) 2-Hydroxypropyl acrylate TWA 0.5 ppm (3 mg/m³) [skin] Indene TWA 10 ppm (45 mg/m³) Indium TWA 0.1 mg/m³ Iodoform TWA 0.6 ppm (10 mg/m³)	Hydrogenated terphenyls	TWA 0.5 ppm (5 mg/m ³)
Hydrogen fluoride (as F) TWA 3 ppm ST 6 ppm Hydrogen sulfide TWA 10 ppm (14 mg/m³) ST 15 ppm (21 mg/m³) 2-Hydroxypropyl acrylate TWA 0.5 ppm (3 mg/m³) [skin] Indene TWA 10 ppm (45 mg/m³) Indium TWA 0.1 mg/m³ Iodoform TWA 0.6 ppm (10 mg/m³)	Hydrogen bromide	C 3 ppm (10 mg/m ³)
ST 6 ppm	Hydrogen cyanide	ST 4.7 ppm (5 mg/m ³) [skin]
Hydrogen sulfide TWA 10 ppm (14 mg/m³) ST 15 ppm (21 mg/m³) TWA 0.5 ppm (3 mg/m³) [skin] Indene TWA 10 ppm (45 mg/m³) Indium TWA 0.1 mg/m³ Iodoform TWA 0.6 ppm (10 mg/m³)	Hydrogen fluoride (as F)	
ST 15 ppm (21 mg/m³) 2-Hydroxypropyl acrylate TWA 0.5 ppm (3 mg/m³) [skin] Indene TWA 10 ppm (45 mg/m³) Indium TWA 0.1 mg/m³ Iodoform TWA 0.6 ppm (10 mg/m³)	Hydrogen sulfide	
2-Hydroxypropyl acrylate TWA 0.5 ppm (3 mg/m³) [skin] Indene TWA 10 ppm (45 mg/m³) Indium TWA 0.1 mg/m³ Iodoform TWA 0.6 ppm (10 mg/m³)	are generalized	
Indene TWA 10 ppm (45 mg/m³) Indium TWA 0.1 mg/m³ Iodoform TWA 0.6 ppm (10 mg/m³)	2-Hydroxypropyl acrylate	
TWA 0.1 mg/m ³ TWA 0.6 ppm (10 mg/m ³)	Indene	
Iodoform TWA 0.6 ppm (10 mg/m ³)	Indium	
Iron pentacarbonyl (as Fe) TWA 0.1 ppm (0.8 mg/m ³)	Iodoform	TWA 0.6 ppm (10 mg/m ³)
	Iron pentacarbonyl (as Fe)	TWA 0.1 ppm (0.8 mg/m ³)

	ST 0.2 ppm (1.6 mg/m ³)
Iron salts (soluble, as Fe)	TWA 1 mg/m ³
Isoamyl alcohol (primary & secondary)	TWA 100 ppm (360 mg/m ³)
	ST 125 ppm (450 mg/m ³)
Isobutane	TWA 800 ppm (1900 mg/m ³)
Isobutyl alcohol	TWA 50 ppm (150 mg/m ³)
Isooctyl alcohol	TWA 50 ppm (270 mg/m ³) [skin]
Isophorone	TWA 4 ppm (23 mg/m ³)
Isophorone diisocyanate	TWA 0.005 ppm ST 0.02 ppm [skin]
2-Isopropoxyethanol	TWA 25 ppm (105 mg/m ³)
Isopropyl acetate	TWA 250 ppm (950 mg/m ³) ST 310 ppm (1185 mg/m ³)
Isopropyl alcohol	TWA 400 ppm (980 mg/m ³) ST 500 ppm (1225 mg/m ³)
Isopropylamine	TWA 5 ppm (12 mg/m ³) ST 10 ppm (24 mg/m ³)
N-Isopropylaniline	TWA 2 ppm (10 mg/m ³) [skin]
Isopropyl glycidyl ether	TWA 50 ppm (240 mg/m ³) ST 75 ppm (360 mg/m ³)
Kaolin	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)
Ketene	TWA 0.5 ppm (0.9 mg/m ³) ST 1.5 ppm (3 mg/m ³)
Magnesium oxide fume	TWA 10 mg/m ³
Malathion	TWA 10 mg/m ³ [skin]
Manganese compounds and fume (as Mn)	Compounds: C 5 mg/m ³
	Fume: TWA 1 mg/m ³ ST 3 mg/m ³
Manganese cyclopentadienyl tricarbonyl (as Mn)	TWA 0.1 mg/m ³ [skin]
Manganese tetroxide (as Mn)	TWA 1 mg/m ³
Mercury compounds, as Hg [except(organo) alkyls]	
Hg Vapor	TWA 0.05 mg/m ³ [skin]
Non-alkyl compounds	C 0.1 mg/m ³ [skin]
Mercury (organo) alkyl compounds (as Hg)	TWA 0.01 mg/m ³

	ST 0.03 mg/m [skin]
Mesityl oxide	TWA 15 ppm (60 mg/m ³)
	ST 25 ppm (100 mg/m ³)
Methacrylic acid	TWA 20 ppm (70 mg/m ³) [skin]
Methomyl	TWA 2.5 mg/m ³
Methoxychlor	TWA 10 mg/m ³
4-Methoxyphenol	TWA 5 mg/m ³
Methyl acetate	TWA 200 ppm (610 mg/m ³) ST 250 ppm (760 mg/m ³)
Methyl acetylene-propadiene mixture	TWA 1000 ppm (1800 mg/m ³) ST 1250 ppm (2250 mg/m ³)
Methylacrylonitrile	TWA 1 ppm (3 mg/m ³) [skin]
Methyl alcohol	TWA 200 ppm (260 mg/m ³) ST 250 ppm (325 mg/m ³) [skin]
Methyl bromide	TWA 5 ppm (20 mg/m ³) [skin]
Methyl chloride	TWA 50 ppm (105 mg/m ³) ST 100 ppm (210 mg/m ³)
Methyl chloroform	TWA 350 ppm (1900 mg/m ³) ST 450 ppm (2450 mg/m ³)
Methyl-2-cyanoacrylate	TWA 2 ppm (8 mg/m ³) ST 4 ppm (16 mg/m ³)
Methylcyclohexane	TWA 400 ppm (1600 mg/m ³)
Methylcyclohexanol	TWA 50 ppm (235 mg/m ³)
o-Methylcyclohexanone	TWA 50 ppm (230 mg/m ³) ST 75 ppm (345 mg/m ³) [skin]
Methyl cyclopentadienyl manganese tricarbonyl (as Mn)	TWA 0.2 mg/m ³ [skin]
Methyl demeton	TWA 0.5 mg/m ³ [skin]
4,4'-Methylenebis(2-chloroaniline)	TWA 0.02 ppm (0.22 mg/m ³) [skin]
Methylene bis(4-cyclo-hexylisocyanate)	C 0.01 ppm (0.11 mg/m ³) [skin]
Methyl ethyl ketone peroxide	C 0.7 ppm (5 mg/m ³)
Methyl formate	TWA 100 ppm (250 mg/m ³) ST 150 ppm (375 mg/m ³)
Methyl iodide	TWA 2 ppm (10 mg/m ³) [skin]
Methyl isoamyl ketone	TWA 50 ppm (240 mg/m ³)
Methyl isobutyl carbinol	TWA 25 ppm (100 mg/m ³) ST 40 ppm (165 mg/m ³) [skin]

Methyl mercaptan	TWA 0.5 ppm (1 mg/m^3)
Methyl parathion	TWA 0.2 mg/m ³ [skin]
Methyl silicate	TWA 1 ppm (6 mg/m ³)
alpha-Methyl styrene	TWA 50 ppm (240 mg/m ³)
	ST 100 ppm (485 mg/m ³)
Metribuzin	TWA 5 mg/m ³
Mica	TWA 3 mg/m ³ (resp)
Molybdenum (insoluble compounds, as Mo)	TWA 10 mg/m^3
Monocrotophos	TWA 0.25 mg/m ³
Monomethyl aniline	TWA 0.5 ppm (2 mg/m ³) [skin]
Morpholine	TWA 20 ppm (70 mg/m ³)
	ST 30 ppm (105 mg/m ³) [skin]
Naphthalene	TWA 10 ppm (50 mg/m ³)
	ST 15 ppm (75 mg/m ³)
Nickel metal & other compounds (as Ni)	
Metal & insoluble compounds	TWA 1 mg/m ³
Soluble compounds	TWA 0.1 mg/m ³
Nitric acid	TWA 2 ppm (5 mg/m^3)
	ST 4 ppm (10 mg/m ³)
p-Nitroaniline	TWA 3 mg/m ³ [skin]
Nitrogen dioxide	ST 1 ppm (1.8 mg/m ³)
Nitroglycerine	ST 0.1 mg/m ³) [skin]
2-Nitropropane	TWA 10 ppm (35 mg/m ³)
Nitrotoluene (o-, m-, p-isomers)	TWA 2 ppm (11 mg/m ³) [skin]
Nonane	TWA 200 ppm (1050 mg/m ³)
Octachloronaphthalene	TWA 0.1 mg/m ³
	ST 0.3 mg/m ³ [skin]
Octane	TWA 300 ppm (1450 mg/m ³)
	ST 375 ppm (1800 mg/m ³)
Osmium tetroxide (as Os)	TWA $0.002 \text{ mg/m}^3 (0.0002 \text{ ppm})$
	ST 0.006 mg/m ³ (0.0006 ppm)
Oxalic acid	TWA 1 mg/m ³
Ouvean diffusida	$ST 2 mg/m^3$
Oxygen difluoride	C 0.05 ppm (0.1 mg/m ³)
Ozone	TWA 0.1 ppm (0.2 mg/m^3)
Paraffin way fuma	ST 0.3 ppm (0.6 mg/m ³)
Paraffin wax fume	TWA 2 mg/m ³

Paraquat	TWA 0.1 mg/m ³ (resp) [skin]
Pentaborane	TWA 0.005 ppm (0.01 mg/m ³)
	ST 0.015 ppm (0.03 mg/m ³)
Pentaerythritol	TWA 10 mg/m ³ (total)
	TWA 5 mg/m ³ (resp)
n-Pentane	TWA 600 ppm (1800 mg/m ³)
	ST 750 ppm (2250 mg/m ³)
2-Pentanone	TWA 200 ppm (700 mg/m ³)
	ST 250 ppm (875 mg/m ³)
Perchloryl fluoride	TWA 3 ppm (14 mg/m^3)
	ST 6 ppm (28 mg/m ³)
Petroleum distillates (naphtha)	TWA 400 ppm (1600 mg/m ³)
Phenothiazine	TWA 5 mg/m ³ [skin]
Phenyl glycidyl ether	TWA 1 ppm (6 mg/m ³)
Phenylhydrazine	TWA 5 ppm (20 mg/m ³)
	ST 10 ppm (45 mg/m ³) [skin]
Phenylphosphine	C 0.05 ppm (0.25 mg/m ³)
Phorate	TWA 0.05 mg/m ³
	ST 0.2 mg/m ³ [skin]
Phosdrin	TWA 0.01 ppm (0.1 mg/m ³)
	ST 0.03 ppm (0.3 mg/m ³) [skin]
Phosphine	TWA 0.3 ppm (0.4 mg/m^3)
	ST 1 ppm (1 mg/m ³)
Phosphoric acid	TWA 1 mg/m ³
	ST 3 mg/m ³
Phosphorus oxychloride	TWA 0.1 ppm (0.6 mg/m ³)
Phosphorus pentasulfide	TWA 1 mg/m ³
	ST 3 mg/m ³
Phosphorus trichloride	TWA 0.2 ppm (1.5 mg/m^3)
	ST 0.5 ppm (3 mg/m ³)
Phthalic anhydride	TWA 6 mg/m ³ (1 ppm)
m-Phthalodinitrile	TWA 5 mg/m ³
Picloram	TWA 10 mg/m ³ (total)
	TWA 5 mg/m ³ (resp)
Piperazine dihydrochloride	TWA 5 mg/m ³
Platinum metal (as Pt)	TWA 1 mg/m ³
Portland cement	TWA 10 mg/m ³ (total)
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	TWA 5 mg/m (resp)
Potassium hydroxide	TWA 2 mg/m ³
Propargyl alcohol	TWA 1 ppm (2 mg/m ³) [skin]
Propionic acid	TWA 10 ppm (30 mg/m ³)
Propoxur	TWA 0.5 mg/m ³
n-Propyl acetate	TWA 200 ppm (840 mg/m ³)
	ST 250 ppm (1050 mg/m ³)
n-Propyl alcohol	TWA 200 ppm (500 mg/m ³)
	ST 250 ppm (625 mg/m ³)
Propylene dichloride	TWA 75 ppm (350 mg/m ³)
	ST 110 ppm (510 mg/m ³)
Propylene glycol dinitrate	TWA 0.05 ppm (0.3 mg/m ³)
Propylene glycol monomethyl ether	TWA 100 ppm (360 mg/m ³)
	ST 150 ppm (540 mg/m ³)
Propylene oxide	TWA 20 ppm (50 mg/m ³)
n-Propyl nitrate	TWA 25 ppm (105 mg/m ³)
D : 1	ST 40 ppm (170 mg/m ³)
Resorcinol	TWA 10 ppm (45 mg/m ³)
Ronnel	ST 20 ppm (90 mg/m ³)
Rosin core solder, pyrolysis products (as formaldehyde)	TWA 10 mg/m ³
	TWA 0.1 mg/m ³
Rouge	TWA 10 mg/m 3 (total)
Silica, amorphous	TWA 5 mg/m ³ (resp)
Sinca, amorphous	TWA 6 mg/m ³ TWA 0.1 mg/m ³ (fused)
Silica, crystalline (as respirable dust)	TWA 0.05 mg/m ³ (cristobalite)
asineu, erystumine (us respiruese dust)	TWA 0.05 mg/m ³ (tridymite)
	TWA 0.1 mg/m ³ (quartz)
	TWA 0.1 mg/m ³ (tripoli)
Silicon	TWA 10 mg/m ³ (total)
	TWA 5 mg/m ³ (resp)
Silicon carbide	TWA 10 mg/m ³ (total)
	TWA 5 mg/m ³ (resp)
Silicon tetrahydride	TWA 5 ppm (7 mg/m ³)
Soapstone	TWA 6 mg/m ³ (total)
	TWA 3 mg/m ³ (resp)
Sodium azide	C 0.1 ppm (as HN ₃) [skin]
	$C 0.3 \text{ mg/m}^3 \text{ (as NaN}_3) \text{ [skin]}$

Sodium bisulfite	TWA 5 mg/m ³
Sodium fluoroacetate	TWA 0.05 mg/m ³ ST 0.15 mg/m ³ [skin]
Sodium hydroxide	C 2 mg/m ³
Sodium metabisulfite	TWA 5 mg/m ³
Stoddard solvent	TWA 525 mg/m ³ (100 ppm)
Styrene	TWA 50 ppm (215 mg/m ³) ST 100 ppm (425 mg/m ³)
Subtilisins	ST 0.00006 mg/m ³ [60-minute]
Sulfur dioxide	TWA 2 ppm (5 mg/m ³) ST 5 ppm (13 mg/m ³)
Sulfur monochloride	C 1 ppm (6 mg/m ³)
Sulfur pentafluoride	C 0.01 ppm (0.1 mg/m ³)
Sulfur tetrafluoride	C 0.1 ppm (0.4 mg/m ³)
Sulfuryl fluoride	TWA 5 ppm (20 mg/m ³) ST 10 ppm (40 mg/m ³)
Sulprofos	TWA 1 mg/m ³
Talc	TWA 2 mg/m ³ (resp)
Temephos	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)
Terphenyl (o-, m-, p-isomers)	C 5 mg/m ³ (0.5 ppm)
1,1,2,2-Tetrachloroethane	TWA 1 ppm (7 mg/m ³) [skin]
Tetrachloroethylene	TWA 25 ppm (170 mg/m ³)
Tetrahydrofuran	TWA 200 ppm (590 mg/m ³) ST 250 ppm (735 mg/m ³)
Tetrasodium pyrophosphate	TWA 5 mg/m ³
4,4'-Thiobis(6-tert-butyl-m-cresol)	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)
Thioglycolic acid	TWA 1 ppm (4 mg/m ³) [skin]
Thionyl chloride	C 1 ppm (5 mg/m ³)
Tin (organic compounds, as Sn)	TWA 0.1 mg/m ³ [skin]
Tin(II) oxide (as Sn)	TWA 2 mg/m ³
Tin(IV) oxide (as Sn)	TWA 2 mg/m ³
Titanium dioxide	TWA 10 mg/m ³
Toluene	TWA 100 ppm (375 mg/m ³) ST 150 ppm (560 mg/m ³)

Toluene-2,4-diisocyanate	TWA 0.005 ppm (0.04 mg/m^3)
	ST 0.02 ppm (0.15 mg/m ³)
m-Toluidine	TWA 2 ppm (9 mg/m ³) [skin]
p-Toluidine	TWA 2 ppm (9 mg/m ³) [skin]
Tributyl phosphate	TWA 0.2 ppm (2.5 mg/m ³)
Trichloroacetic acid	TWA 1 ppm (7 mg/m ³)
1,2,4-Trichlorobenzene	C 5 ppm (40 mg/m ³)
Trichloroethylene	TWA 50 ppm (270 mg/m ³) ST 200 ppm (1080 mg/m ³)
1,2,3-Trichloropropane	TWA 10 ppm (60 mg/m ³)
1,1,2-Trichloro-1,2,2-trifluoroethane	TWA 1000 ppm (7600 mg/m ³) ST 1250 ppm (9500 mg/m ³)
Triethylamine	TWA 10 ppm (40 mg/m ³) ST 15 ppm (60 mg/m ³)
Trimellitic anhydride	TWA 0.005 ppm (0.04 mg/m ³)
Trimethylamine	TWA 10 ppm (24 mg/m ³) ST 15 ppm (36 mg/m ³)
1,2,3-Trimethylbenzene	TWA 25 ppm (125 mg/m ³)
1,2,4-Trimethylbenzene	TWA 25 ppm (125 mg/m ³)
1,3,5-Trimethylbenzene	TWA 25 ppm (125 mg/m ³)
Trimethyl phosphite	TWA 2 ppm (10 mg/m ³)
2,4,6-Trinitrotoluene	TWA 0.5 mg/m ³ [skin]
Triorthocresyl phosphate	TWA 0.1 mg/m ³ [skin]
Triphenylamine	TWA 5 mg/m ³
Tungsten (insoluble compounds, as W)	TWA 5 mg/m ³ ST 10 mg/m ³
Tungsten (soluble compounds, as W)	TWA 1 mg/m ³ ST 3 mg/m ³
Tungsten carbide (cemented)	TWA 5 mg/m ³ (as W) ST 10 mg/m ³ (as W) TWA 0.05 mg/m ³ (as Co) TWA 1 mg/m ³ (as Ni)
Uranium (insoluble compounds, as U)	TWA 0.2 mg/m ³ ST 0.6 mg/m ³
n-Valeraldehyde	TWA 50 ppm (175 mg/m ³)
Vanadium dust	TWA 0.05 mg V_2O_5/m^3 (resp)
Vanadium fume	C 0.05 mg V ₂ O ₅ /m ³

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Vinyl acetate	TWA 10 ppm (30 mg/m ³)
	ST 20 ppm (60 mg/m ³)
Vinyl bromide	TWA 5 ppm (20 mg/m ³)
Vinyl cyclohexene dioxide	TWA 10 ppm (60 mg/m ³) [skin]
Vinylidene chloride	TWA 1 ppm (4 mg/m ³)
VM & P Naphtha	TWA 1350 mg/m ³ (300 ppm)
	ST 1800 mg/m ³ (400 ppm)
Welding fumes	TWA 5 mg/m ³
Wood dust (all wood dusts except Western red cedar)	TWA 5 mg/m ³
	$ST 10 \text{ mg/m}^3$
Wood dust (Western red cedar)	TWA 2.5 mg/m ³
Xylene (o-, m-, p-isomers)	TWA 100 ppm (435 mg/m ³)
	ST 150 ppm (655 mg/m ³)
m-Xylene alpha, alpha'-diamine	C 0.1 mg/m ³ [skin]
Xylidine	TWA 2 ppm (10 mg/m ³) [skin]
Zinc chloride fume	TWA 1 mg/m ³
	ST 2 mg/m ³
Zinc oxide	TWA 5 mg/m ³ (fume)
	ST 10 mg/m ³ (fume)
	TWA 10 mg/m ³ (total dust)
	TWA 5 mg/m ³ (resp dust)
Zinc stearate	TWA 10 mg/m ³ (total)
	TWA 5 mg/m ³ (resp)
Zirconium compounds (as Zr)	TWA 5 mg/m ³
	ST 10 mg/m ³

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