Printing and Allied Industries 530SW90027G

Industry Overview

Not all printing and allied industry operations produce hazardous waste. If, however, you use solvents, strong acid or alkaline solutions, or paint or ink containing toxic organic chemicals or heavy metals, the waste you generate might be hazardous. If so, you might be subject to Resource Conservation and Recovery Act (RCRA) requirements covering the generation, transportation, and management of hazardous waste.

Many printing industries generate hazardous waste. Your firm is included in *printing and allied industries* if it is involved in:

Preparation:

- Typesetting
- Lithography
- Letterpress
- Gravure
- Engraving (stationery)
- Photoengraving.

Printing:

- Heatset lithography
- Non-heatset lithography
- Thermography
- Business form printing
- Sheetfed lithography
- Letterpress printing (including flexography)
- Gravure printing
- Screen press printing.

Finishing Operations:

- Looseleaf binder manufacturing
- Trade binding operations
- Book binding operations
- In-house binding operations
- Magazine and catalog binding operations.

Hazardous Wastes from Printing and Allied Industries

Printing generates waste ink and ink sludges that might contain solvents or heavy metals. The composition of inks used in printing and allied industries varies greatly depending on whether an ink is to be used for lithography, letterpress, gravure, flexography, or screen printing. Oil-based or paste inks are generally composed of colorant or pigments (carbon black, inorganic, and organic), varnish (drying oils, alkyd, resin-phenolic, resin-ester), drier (cobalt, manganese, or zirconium fatty acid compounds), and sometimes an extender, solvents and modifiers (waxes, petroleum solvents, and magnesia). Fluid inks contain a vehicle made of resin and solvent or oil, and additives such as waxes, drier, and wetting agents. While not all waste inks and ink sludges are hazardous, those containing solvents or heavy metals generally are.

Photographic processes are used in all major printing operations for image conversion and plate making. Photographic wastes, including heavy metal solutions and spent solvents, make up a large portion of the hazardous waste generated in these industries. Photographic wastes such as processing solutions, developers, hardeners, plating chemicals, fountain solutions, and fixing baths, that are sent directly to publicly owned treatment works (POTWs) for disposal are exempt from RCRA requirements (as is any waste sent directly to a POTW). Silver-containing solutions that pass through electrolytic, chemical replacement, or ion exchange silver recovery units located on your premises are also exempt. If, however, you send your waste offsite for silver recycling or solvent recovery, the waste must be accompanied by a Uniform Hazardous Waste Manifest.

Table 1 lists typical processes/operations in the printing and allied industries that might produce hazardous waste. Table 2 provides the Department of Transportation (DOT) information needed for the Manifest for some wastes generated by printers. Table 1 and Table 2 are not comprehensive lists. If you do not find your waste here but suspect it is hazardous, contact your EPA Regional office or state hazardous waste management agency for additional information.

Waste Minimization

An effective waste minimization program can reduce the costs, liabilities, and regulatory burdens of hazardous waste management, while potentially enhancing efficiency, product quality, and community relations. Waste minimization techniques that can help you reduce the amount of hazardous waste that you generate include:

- Production planning and sequencing
- Process/equipment adjustment or modification
- Raw material substitution
- Loss prevention and housekeeping
- Waste segregation and separation
- Recycling.

Training and supervision of employees implementing waste minimization techniques is an important part of your successful program. Call the RCRA/Superfund Hotline toll-free at 800-424-9346 (or TDD 800-553-7672 for the hearing-impaired) for waste minimization information and publications.

Table 1

Typical Printing and Allied Industries Operations: Materials Used and Hazardous Wastes that Might be Generated

Process/Operation	Materials Used	Typical Material Ingredient	General Types of Waste Generated
PLATE PREPARATION			
*Counter-Etching to Remove Oxides	Phosphoric acid	Phosphoric acid	Acid/alkaline wastes
*Deep-Etch Coating of Plates	Deep-etch bath	Ammonium dichromate, ammonium hydroxide	Acid/alkaline wastes Heavy metal wastes
*Etch Baths	Multimetal plate and plate coating	Ferric chloride (copper), aluminum/zinc chloride/hydrochloric acid (chromium), nitric acid (zinc, magnesium), gum arabic	Acid/alkaline wastes Heavy metal wastes
Applying Light-sensitive Coating	Resins, binders, emulsifiers, photosensitizers, gelatin, photoinitiators	PVA/ammonium dichloromate, polyvinyl cinnamate, fish glue/albumin, silver halide, gelatin, emulsifiers, gum arabic/ammonium dichromate	Photographic processing wastes
Developing Plates	Developer	Lactic acid, zinc chloride, magnesium chloride, hydroquinone	Photographic processing wastes
*Applying lacquer	Resins, solvents, vinyl lacquer, lacquer developers	PVC, PVA, maleic acid, methyl ethyl ketone, cyclohexanone, isophorone	Solvent wastes
Using Ink (lithography, letterpress, screen printing, flexography)	Pigments, dyes, varnish, drier, extender, modifier, fountain solutions	Titanium oxide, iron blues, molybdated chrome orange, phthalocyanine pigments, oils, hydrocarbon solvents, waxes, cobalt/zinc/manganese oleates, plasticizers, barium-based pigments	Toxic waste ink with solvents/chromium/lead/barium. Ink sludges with chromium/lead/barium
Making Gravure Cylinders	Acid plating bath	Copper, chromic acid, chrome	Plating wastes
STENCIL PREPARATION FOR SCREEN PRINTING			
Lacquer Stencil Film	Solvents, polyester film, vinyl film, dyes	Aliphatic acetates, cellulose-based lacquer, plasticizers	Solvent wastes
Photographic Stencil Film	Organic acids, gelatin (pigmented), polyester film base	Acids, alkalies, peroxide-forming compounds, plasticizers, surfactants	Acid/alkaline wastes
Photoemulsion	Resins, binders, photosensitizers, dyes	PVA, PVAC, ammonium or potassium bichromate, diazonium compounds	Photographic processing wastes
Blockout (screen filler)	Pigmented polymers, solvents, acetates	Methylene chloride, methanol, methyl cellulose acetates	Solvent wastes
PHOTOPROCESSING			
Developing Negatives and Prints	Developer, cleaning agents, wetting agents, fixers, bleaches	Hydroquinone, ammonium thiosulfate, silver, lead, chromium, cadmium, phenol, toluene, chloroform, ethyl benzene, methylene chloride	Photographic processing wastes
PRINTING			
Using Ink (lithography, letterpress, screen printing lexography)	Pigments, dyes, varnish, drier, extender, modifier, fountain solutions, inks, solvents, plates, shellacs	Titanium oxide, iron blues, molybdated chrome orange, phthalocyanide pigments, oils, hydrocarbon solvents, waxes, cobalt/zinc/manganese oleates, plasticizers, barium-based pigments, acrylic copolymers	Heavy metal wastes (dust and sludge) Ink — sludges with chromium or lead Ink — toxic wastes with metals or organic constituents Solvent wastes
CLEAN UP			
Wash/Clean Plates, Type, Die, Press Blankets and Rollers	Alcohols, solvents, rags, alkaline cleaners	Ethyl alcohol, benzene, toluene, xylene, isopropyl alcohol, methyl ethyl ketone, trichloroethylene, perchloroethylene, carbon tetrachloride, gasoline, naphtha, kerosene	Acid/alkaline wastes Ink — toxic wastes with metals or organic constituents Solvent wastes

* Older technologies.

Table 2

Printing and Allied Industries Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
PHOTOGRAPHIC WASTES				
Heavy Metal Solutions	Photographic processing waste containing heavy metals	Hazardous Waste Solution containing Cadmium, Chromium, Lead, and/or Cyanide	ORM-E	NA9189
SPENT SOLVENTS AND OTHER WASTES CONTAINING:				
Trichloroethylene*	Trichloroethylene, Trichloroethene, Ethinyl trichloride, Tri-Clene, Trielene, Tri	Waste Trichloroethylene	ORM-A	UN1710
Carbon Tetrachloride*	Carbon Tetrachloride, Perchloromethane, Necatorina, Benzinoform, $CC1_4$	Waste Carbon Tetrachloride	ORM-A	UN1846
Ethanol	Ethanol, Ethyl alcohol	Waste Ethyl Alcohol	Flammable Liquid[2]	UN1170
Isopropanol	Isopropanol, Isopropyl alcohol	Waste Isopropanol	Flammable Liquid	UN1219
Ethyl Benzene	Ethyl Benzene	Waste Ethyl Benzene	Flammable Liquid	UN1175
1,1,1-Trichloroethane	Aerothene TT, Chlorten, Inhibisol, Trichloroethane, Chlorothen NU, NCI-C04626, Methylchloroform, Chlorothene VG, Chlorothane NU, Chlorotene	Waste 1,1,1-Trichloroethane	ORM-A	UN2831
Methylene Chloride	Dichloromethane, Methane dichloride, Methylene bichloride, NCI-CS0102, Methylene dichloride, Solaesthin, Aerothene MM, Narkotil, Solmethine	Waste Dichloromethane or Methylene Chloride	ORM-A	UN1593
Methyl Ethyl Ketone*	Methyl Ethyl Ketone, MEK, Methyl Acetone, Meetco, Butanone, Ethyl Methyl Ketone	Waste Methyl Ethyl Ketone	Flammable Liquid	UN1193
Chlorobenzene*	Chlorobenzene, Monochlorobenzene, Phenylchloride	Waste Chlorobenzene	Flammable Liquid	UN1134
Chloroform*	Chloroform	Waste Chloroform	ORM-A	UN1888
WASTE INK WITH SOLVENTS OR HEAVY METALS				
Waste Ink	Various ingredients: Carbon tetrachloride, Chloroform, Methylene chloride, 1,1,1-Trichloroethane, 1,2-Dichloroethane, Benzene, Toluene, Ethyl benzene, Tetrachloroethylene, Trichloroethylene, Chromium, Copper, Lead, Zinc, Cyanide, Aluminum, Cadmium, Nickel, Cobalt	Waste Ink	Combustible Liquid[3] Flammable Liquid	UN2867 UN1210
CORROSIVE WASTES				
Ammonium Hydroxide	Ammonium Hydroxide, Aqua Ammonia, Ammonia Water, Spirit of Hartshorn, NH_4OH	Waste Ammonium Hydroxide (containing not less than 12% but not more than 44% ammonia)	Corrosive Material	NA2672
		Waste Ammonium Hydroxide (containing less than 12% ammonia)	ORM-A	NA2672
Hydrochloric Acid	Hydrochloric Acid, Muriatic Acid	Waste Hydrochloric Acid Mixture	Corrosive Material	NA1789
		Waste Hydrochloric Acid Solution	Corrosive Material	UN1789
Nitric Acid	Nitric Acid, Aquafortis, HNO_3	Waste Nitric Acid (over 40%)	Oxidizer	UN2031
		Waste Nitric Acid (40% or less nitric acid)	Corrosive Material	NA1760
Phosphoric Acid	Phosphoric Acid, Orthophosphoric Acid, H_2SO_4	Waste Phosphoric Acid	Corrosive Material	UN1805
Sodium Hydroxide	Sodium Hydroxide, Caustic Soda, Soda Lye, Sodium hydrate, NaOH	Waste Sodium Hydroxide Solution Dry Solid, Flake, Bead, or Granular	Corrosive Material Corrosive Material	UN1824 UN1823

Table 2 (continued)
Printing and Allied Industries Waste Descriptions[1]

Waste Type	Designations/Trade Names	DOT Shipping Name	Hazard Class	UN/NA ID Number
Sulfuric Acid	Sulfuric Acid, Oil of Vitriol	Waste Sulfuric Acid	Corrosive Material	UN1832
Chromic Acid	Chromic Acid	Waste Chromic Acid Solution	Corrosive Material	UN1755
SPENT PLATING WASTES				
Spent Plating Wastes	Spent etch baths, spent plating solutions and sludges, stripping and cleaning baths	Hazardous Waste, Liquid or Solid, NOS[4]	ORM-E	NA9189
INK SLUDGE WITH CHROMIUM OR LEAD				
Ink Sludge with Chromium or Lead	Ink sludge containing heavy metals	Hazardous Waste, Liquid or Solid, NOS	ORM-E	NA9189
OTHER WASTES				
Ignitable Wastes, NOS	Ignitable Wastes, NOS	Waste Flammable Liquid, NOS Waste Combustible Liquid, NOS Waste Flammable Solid, NOS	Flammable Liquid Combustible Liquid Flammable Solid	UN1993 UN1993 UN1325
Hazardous Wastes, NOS		Hazardous Waste, NOS	ORM-E	UN9189

* Toxicity Characteristic constituent. Any waste that results in a TCLP extract containing a Toxicity Characteristic constituent equal to or above regulatory levels is hazardous.
1 These descriptions may change given variations in waste characteristics or conditions. Note that the DOT shipping name, hazard class, and UN/NA ID number do not directly correspond to RCRA hazardous waste categories.
2 A flammable liquid has a flash point below 100°F.
3 A combustible liquid has a flash point between 100°F and 200°F.
4 NOS - Not otherwise specified.