



ACRYLAMIDE

FACT SHEET ON A DRINKING WATER CHEMICAL CONTAMINANT

GENERAL INFORMATION

Synonyms:

- 2-Propenamamide; Acrylic Amide; Akrylamid; Ethylene Carboxamide; Acrylic Acid Amide; Propinoic Acid Amide

Chemical Description:

- Synthetic organic chemical

Properties:

- Odorless, white crystalline solid
- Highly soluble in water
- Low vapor pressure

Production and Use:

- Used in manufacture of polymers, dyes, and adhesives; flocculant for sewage and waste treatment; soil conditioning; ore processing; paper additives; oil stabilizers; grouting agent

ENVIRONMENTAL PROFILE

Occurrence:

- Not expected to occur in drinking water at levels to cause detrimental health effects

Releases:

- Releases to the environment are minimal, occurring in effluents from industrial processes:
 - majority of releases are to water due to its high aqueous solubility
 - principle source of acrylamide in drinking water is impurities in water treatment chemicals and surfaces in contact with drinking water
 - releases to air are negligible due to its low vapor pressure

Environmental Fate:

- Expected to be mobile in soil, and is likely to migrate to groundwater, where biodegradation is unlikely, and may travel great distances in deep rock aquifers
- Likely to biodegrade in soils and surface waters
- Low potential for bioaccumulation

HEALTH EFFECTS

Humans:

- Exposure via ingestion of drinking water contaminated with high levels of acrylamide caused symptoms of widespread dysfunction of the central and/or peripheral nervous system; similar effects reported to occur with dermal or inhalation exposure

Experimental Animals:

- Toxicological evidence indicates that acrylamide is a cumulative poison. Signs of neuropathology have appeared when the total dose administered reached 100 to 130 mg/kg
- Both short and long-term, high-dose oral exposures cause adverse health effects resulting from damage to central and peripheral nerve tissue
 - most characteristic effects are weakness and ataxia in the hind limbs, progressing to paralysis with continued exposure
- Causes detrimental reproductive effects (e.g., testicular atrophy in male mice)
- Crosses the placenta in pregnant animals and causes detrimental health effects in offspring
- Equivocal evidence of mutagenic potential
- Carcinogenic potential

REGULATORY PROFILE

Existing Standards:

- **Clean Air Act (CAA):** Regulated
- **Clean Water Act (CWA):**
No criteria established
- **Resource Conservation and Recovery Act (RCRA):**
Hazardous waste
- **Superfund (CERCLA):**
 - Hazardous substance
 - **SARA:** Toxic chemical
- **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA):**
Not registered
- **Toxic Substances Control Act (TSCA):**
Regulated

HEALTH INFORMATION

Treatment Technique Requirements:

- Because no standardized analytical methods are available for acrylamide at low levels in drinking water, EPA proposed a treatment technique rather than an MCLG/MCL in order to reduce the chance of exposure to acrylamide
- EPA proposed to limit the allowable levels of acrylamide monomers in products used during water treatment, storage, and distribution
- Under the proposed rule, a water system using a product containing acrylamide must certify annually in writing to the State that the combination of the amount of residual monomer in the polymer and the dosage rate does not cause the concentration in finished water to exceed the specified level:

**0.05 percent acrylamide in
polyacrylamide dosed at 1.0 ppm
(effective July 1992)**

- Exceedance of the specified level in drinking water may result in adverse effects which will depend upon the contaminant concentration in water, amount of water/contaminant ingested, length of exposure, and other biological parameters

EPA Health Advisories (HA):

- **Short-term HAs:** Provide acceptable concentrations of contaminants in water for up to 10 day exposures, primarily to evaluate the public health risk resulting from an accidental spill or an emergency contamination situation
- **Longer-term HAs:** Provide guidance for persistent water contamination situations to cover a period of up to 7 years
- **Lifetime HAs:** Derived in the same way as an MCLG

Health Advisories:

Short-term HA for a child = 0.3 mg/L
Longer-term HA for a child = 0.02 mg/L
Longer-term HA for an adult = 0.07 mg/L
Lifetime HA = Not recommended

ANALYTICAL METHODS

- No standardized analytical methods are available for acrylamide at low levels in drinking water

WATER TREATMENT

- Since a Best Available Technology (BAT) does not exist for acrylamide, EPA suggests that water systems limit the use of products containing acrylamide

SHORT-TERM HAZARD ELIMINATION

- If the drinking water standards are exceeded, use an alternative drinking water supply such as bottled water

ADDITIONAL HELP

- State or county health officials can indicate a certified laboratory for testing
- Experts in the state Department of Environmental Protection or Natural Resources may also be of help
- The EPA has toll-free numbers for further information on drinking water quality, treatment technologies, for obtaining Health Advisories, and for other regulatory information
- EPA Hotlines are available Monday through Friday
 - **Safe Drinking Water:** 800-426-4791
 - **National Pesticides:** 800-858-7378
 - **Superfund/RCRA:** 800-424-9346
- For information on the Clean Water Act, call (202) 260-7301
- For information on the Toxic Substances Control Act, call (202) 554-1404
- For information on the Clean Air Act, call (919) 541-2777