

OPPT Chemical Fact Sheets

1,4-Dioxane (CAS No. 123-91-1)

Chemicals can be released to the environment as a result of their manufacture, processing, and use. EPA has developed information summaries on selected chemicals to describe how you might be exposed to these chemicals, how exposure to them might affect you and the environment, what happens to them in the environment, who regulates them, and whom to contact for additional information. EPA is committed to reducing environmental releases of chemicals through source reduction and other practices that reduce creation of pollutants.

WHAT IS 1,4-DIOXANE, HOW IS IT USED, AND HOW MIGHT I BE EXPOSED?

1,4-Dioxane (also called dioxane) is a flammable liquid. It may form explosive chemicals, especially when anhydrous (very dry). It is produced in large amounts (between 10 million and 18 million pounds in 1990) by three companies in the United States. Information of future U.S. demand for dioxane is not available. Companies use dioxane as a solvent for paper, cotton, and textile processing and for various organic products. It is also used in automotive coolant liquid, and in shampoos and other cosmetics.

Exposure to dioxane can occur in the workplace or in the environment following releases to air, water, land, or groundwater. It enters the body when people breathe air or consume water or food contaminated with dioxane. It can also be absorbed through skin contact. It does not remain in the body due to its breakdown and removal.

WHAT HAPPENS TO 1,4-DIOXANE IN THE ENVIRONMENT?

1,4-Dioxane can evaporate when exposed to air. It mixes easily with water. Most references of 1,4-dioxane to the U.S. environment are to air and surface water. Once in air, it breaks down to other chemicals. 1,4-Dioxane can evaporate from dry soil exposed to air. It is not likely to evaporate as readily from water or moist soil. Because it is a liquid that does not bind well to soil, dioxane that makes its way into the ground can move through the ground and enter groundwater. Plants and animals are not likely to store 1,4-dioxane.

HOW DOES 1,4-DIOXANE AFFECT HUMAN HEALTH AND THE ENVIRONMENT?

Effects of 1,4-dioxane on human health and the environment depend on how much 1,4-dioxane is present and the length and frequency of exposure. Effects also depend on the health of a person or the condition of the environment when exposure occurs.

Breathing 1,4-dioxane for short periods of time causes irritation of the eyes, nose and throat in humans. Exposure to large amounts of 1,4-dioxane can cause kidney and liver damage. Accidental worker exposure to large amounts of 1,4-dioxane has resulted in several deaths. Symptoms associated with these industrial deaths suggest 1,4-dioxane causes adverse nervous system effects. These acute effects are not likely to occur at concentrations of 1,4-dioxane that are normally found in the U.S. environment.

Limited evidence suggests that repeatedly breathing small amounts of 1,4-dioxane over long periods of time causes no adverse effects in workers. Laboratory studies show that exposure to 1,4-dioxane over a lifetime causes cancer in animals. 1,4-Dioxane may likewise cause cancer in humans. Laboratory studies show that repeat exposure to large amounts of 1,4-dioxane in drinking water, in air, or on the skin causes liver and kidney damage in animals.

1,4-Dioxane has low toxicity to aquatic life. It is not likely to cause environmental harm at levels normally found in the U.S. environment.

WHAT EPA OFFICES OR OTHER FEDERAL AGENCIES OR OTHER GROUPS CAN I CONTACT FOR ADDITIONAL INFORMATION ON 1,4-DIOXANE?

EPA OFFICE	STATUTE	PHONE NUMBER
Pollution Prevention & Toxics	Pollution Prevention Act (PPA)	(202) 260-1023
	Emergency Planning and Community Right-to-Know Act (EPCRA) (¹ 313/TRI)	(800) 424-9346
Air	Clean Air Act	(919) 541-0888
	Resource Conservation and Recovery Act (RCRA)	(415) 744-2074
	EPCRA (¹ 304/311/312)	(800) 424-9346
	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)	(800) 424-9346
Water	Safe Drinking Water Act	(800) 426-4791

OTHER FEDERAL AGENCY/DEPARTMENT OR GROUP	PHONE NUMBER
Agency of Toxic Substances & Disease Registry	(404) 639-6000
American Conference of Governmental Industrial Hygienists	(513) 742-2020
National Institute for Occupational Safety & Health	(800) 356-4674
Occupational Safety & Health Administration (Check local phone book under Department of Labor)	

The Support Document for this and other OPPT Chemical Fact Sheets can be found on the Internet at: <http://www.epa.gov/chemfact/>