



1,4-DIOXANE FACT SHEET

WHAT IS 1,4-DIOXANE?

1,4-dioxane is a man-made chemical used by industry. It does not occur naturally in the environment. 1,4-dioxane is a colorless, flammable liquid with a mild odor that easily dissolves in water. The table below lists some common uses for 1,4-dioxane as well as some products where it is found.

Used in/as:	Found in:
Solvent	Lacquers, paints, dyes, resins, waxes, grease
Chlorinated solvent stabilizer	In small amounts in: cosmetics, detergents, and other consumer products
To make pharmaceuticals and adhesives	

Most of the 1,4-dioxane that is found in air comes from industrial processes that use the chemical. 1,4-dioxane does not stick to soil and can enter surface water or groundwater. It can migrate rapidly in groundwater and is relatively resistant to degradation in the environment. 1,4-dioxane has been detected in groundwater in the US, including Wisconsin.

HOW ARE PEOPLE EXPOSED TO 1,4-DIOXANE?

Breathing: People who work in an industry that uses 1,4-dioxane have the greatest risk of exposure by breathing. People in non-work settings may also be exposed to low levels in the air when using products that have 1,4-dioxane in them. If 1,4-dioxane concentrations are high enough in household water, people may be exposed to chemical vapors while showering or bathing.

Touching: 1,4-dioxane can be absorbed through the skin if consumer products such as cosmetics and detergents that contain small amounts of the chemical are used on the body.

Drinking/Eating: When 1,4-dioxane is released onto soil, it can readily enter surface or groundwater. Therefore, people who drink water from wells near waste sites contaminated with 1,4-dioxane may be exposed. Fish and plants do not accumulate 1,4-dioxane. However, exposure could occur if food has been treated with pesticides-containing 1,4-dioxane or has been packaged in materials containing 1,4-dioxane residues.

DO STANDARDS EXIST FOR REGULATING 1,4-DIOXANE?

Water: There is no federal drinking water standard for 1,4-dioxane. The Wisconsin groundwater standard for 1,4-dioxane is 3 parts per billion (ppb).

Air: There is no federal standard for 1,4-dioxane in air. The Wisconsin Department of Natural Resources (DNR) regulates the amount of 1,4-dioxane that can be released by industries into outdoor ambient air.

1,4-dioxane-containing products should be used for short periods of time, in small amounts, and in well-ventilated areas.

WILL EXPOSURE TO 1,4-DIOXANE RESULT IN HARMFUL HEALTH EFFECTS?

A chemical generally affects the same organ systems in all people. However, the severity of the effects may vary from person to person based on a number of factors, including age, gender, weight, genetic background, and smoking status. In addition, the potential for health effects may vary depending on how a person was exposed, how much of the chemical a person was exposed to, and how long the exposure lasts.

Non-cancer effects

Few studies are available that examine the effects of 1,4-dioxane in humans. Exposure to very high levels of 1,4-dioxane can result in drowsiness and liver and kidney damage. Eye and nose irritation have been reported by people inhaling low levels of 1,4-dioxane over short periods of time.

Studies in laboratory animals have also demonstrated that exposure to 1,4-dioxane can result in liver and kidney damage. Animals exposed to 1,4-dioxane also experienced nasal irritation and inflammation.

Cancer

The US EPA considers 1,4-dioxane “likely to be carcinogenic” by all routes of exposure. In studies of laboratory animals exposed to 1,4-dioxane in drinking water for most of their lifetime, rats and mice developed liver cancer and the rats also developed nasal tumors. Studies in humans that have looked at the ability of 1,4-dioxane to cause cancer are inconclusive.

CAN A MEDICAL TEST DETERMINE EXPOSURE TO 1,4-DIOXANE?

Blood and urine can be analyzed for the presence of 1,4-dioxane and its metabolites. This type of test can determine if there is exposure to 1,4-dioxane. However, 1,4-dioxane and its breakdown products are excreted fairly rapidly. Therefore, this type of test cannot measure how long the exposure has lasted or if exposures were higher previously. This test also does not predict whether exposure to 1,4-dioxane will result in harmful health effects.

Seek medical advice if you have any symptoms that you think may be related to chemical exposure.

This fact sheet summarizes information about this chemical and is not a complete listing of all possible effects. It does not refer to work exposure or emergency situations.

For more information, contact:

- Wisconsin Poison Center, 800-222-1222
- Your Local Health Department: <http://www.dhs.wisconsin.gov/localhealth/>
- Division of Public Health, Bureau of Environmental and Occupational Health, (608) 266-1120: <http://www.dhs.wisconsin.gov/eh/>