

This fact sheet answers the most frequently asked health questions (FAQs) about ethylene glycol and propylene glycol. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Ethylene glycol and propylene glycol are clear liquids used in antifreeze and deicing solutions. Exposure to large amounts of ethylene glycol can damage the kidneys, heart, and nervous system. Propylene glycol is generally regarded as safe for use in food. Ethylene glycol has been found in at least 34, and propylene glycol in at least 5, of the 1,416 National Priorities List sites identified by the Environmental Protection Agency (EPA).

### What are ethylene glycol and propylene glycol? (Pronounced ěth'ə-lěn' and prō' pə-lěn' glī' kōl)

Both ethylene glycol and propylene glycol are clear, colorless, slightly syrupy liquids at room temperature. Either compound may exist in air in the vapor form, although propylene glycol must be heated or briskly shaken to produce a vapor. Ethylene glycol is odorless but has a sweet taste. Propylene glycol is practically odorless and tasteless.

Both compounds are used to make antifreeze and deicing solutions for cars, airplanes, and boats; to make polyester compounds; and as solvents in the paint and plastics industries. Ethylene glycol is also an ingredient in photographic developing solutions, hydraulic brake fluids and in inks used in stamp pads, ballpoint pens, and print shops.

The Food and Drug Administration (FDA) has classified propylene glycol as an additive that is "generally recognized as safe" for use in food. It is used to absorb extra water and maintain moisture in certain medicines, cosmetics, or food products. It is a solvent for food colors and flavors.

Propylene glycol is also used to create artificial smoke or fog used in fire-fighting training and in theatrical productions.

### What happens to ethylene glycol and propylene glycol when they enter the environment?

- Neither compound is likely to exist in large amounts in air.
- About half of the compounds that enter the air will break down in 24–50 hours.
- Both compounds break down within several days to a week in water and soil.

### How might I be exposed to ethylene glycol and propylene glycol?

- You can be exposed to ethylene glycol when you use anti-freeze, photographic developing solutions, coolants, and brake fluid.
- You can be exposed to propylene glycol by eating food products, using cosmetics, or taking medicine that contains it.
- If you work in an industry that uses ethylene glycol or propylene glycol, you could be exposed by breathing or touching these substances.

### How can ethylene glycol and propylene glycol affect my health?

Eating or drinking very large amounts of ethylene glycol can result in death, while large amounts can result in nausea,

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

convulsions, slurred speech, disorientation, and heart and kidney problems.

Female animals that ate large amounts of ethylene glycol had babies with birth defects, while male animals had reduced sperm counts. However, these effects were seen at very high levels and would not be expected in people exposed to lower levels at hazardous waste sites.

Ethylene glycol affects the body's chemistry by increasing the amount of acid, resulting in metabolic problems. Similar to ethylene glycol, propylene glycol increases the amount of acid in the body. However, larger amounts of propylene glycol are needed to cause this effect.

### **How likely are ethylene and propylene glycol to cause cancer?**

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC), and the EPA have not classified ethylene glycol and propylene glycol for carcinogenicity. Studies with people who used ethylene glycol did not show carcinogenic effects. Animal studies also have not shown these chemicals to be carcinogens.

### **Is there a medical test to show whether I've been exposed to ethylene or propylene glycol?**

Tests are available to determine if you have been exposed to ethylene glycol. These tests are only used on people who are showing symptoms of ethylene glycol poisoning (but they could be used in other situations). The tests are most often used on people who have intentionally consumed, or who suspect they have consumed, large amounts of ethylene glycol.

Propylene glycol is generally considered to be a safe chemical, and is not routinely tested for, unless specific exposure, such as to a medicine or cosmetic, can be linked with symptoms. Since both chemicals break down very quickly in

the body, they are very difficult to detect, even though symptoms may be present.

### **Has the federal government made recommendations to protect human health?**

The EPA has set a drinking water guideline for ethylene glycol of 7,000 micrograms (7,000 µg/L) in a liter of water for an adult.

The Food and Drug Administration (FDA) has classified propylene glycol as "generally recognized as safe," which means that it is acceptable for use in flavorings, drugs, and cosmetics, and as a direct food additive.

The American Conference of Governmental Industrial Hygienists (ACGIH) recommends a maximum level of 127 milligrams of ethylene glycol per cubic meter of air (127 mg/m<sup>3</sup>) for a 15-minute exposure.

### **Glossary**

Acid: A sour substance.

Carcinogenicity: Ability to cause cancer.

CAS: Chemical Abstracts Service.

Metabolic: Chemical changes in cells that provide energy to the body.

Synthetic: Made by humans.

### **References**

This ToxFAQs information is taken from the 1997 Toxicological Profile for Ethylene Glycol and Propylene Glycol produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

