

Ethylene Oxide - ToxFAQs™

What is ethylene oxide?

Ethylene oxide is a man-made flammable gas with a somewhat sweet odor when it is at very high levels. It dissolves easily in water. Small amounts of ethylene oxide are also produced when tobacco is burned. Very small amounts of ethylene oxide can be found in nature.



Ethylene oxide is mostly used at chemical plants to make ethylene glycol (a chemical used to make antifreeze and polyester). It is also used in hospitals or sterilization facilities to sterilize medical equipment and supplies and to sterilize food products and to control insects in some stored agricultural products (for example, spices, and herbs).

Ethylene oxide is also naturally formed in the body during the breakdown of ethylene. It is formed by naturally occurring bacteria in the intestines.

How can I be exposed to ethylene oxide?

Ethylene oxide has been measured in the air at low levels in many areas of the United States. Some of these areas were near industrial plants, but some were not. People living near industrial facilities that release ethylene oxide to the outdoor air may be exposed to higher levels of ethylene oxide than people who do not live near these facilities.

If you work where ethylene oxide is made or used (such as in hospitals or facilities processing certain herbs and spices), you could be exposed to it by breathing it in or getting it on your skin. These workers generally have a higher exposure to ethylene oxide than the public. Medical equipment or other items sterilized by ethylene oxide can also have very small amounts of ethylene oxide remaining many days after sterilization. Workers who do routine sterilization of medical equipment in hospitals or other workplaces may be exposed to relatively high levels (higher than other workers) of ethylene oxide.

A small amount of the total ethylene oxide used in the United States is used to remove the threat of mold, bacteria, and insects from herbs and spices, but because it breaks up into the air, only very small amounts could remain on food, if at all.

How can ethylene oxide affect my health?

Workers exposed to high levels (generally tens of thousands of times higher than the general population is exposed to) of ethylene oxide in the air for short periods of time reported lung irritation. Workers exposed to high concentrations of ethylene oxide for short and long amounts of time reported having effects such as headaches, memory loss, numbness, nausea, and vomiting.

Limited research that looked at pregnant women who were exposed to high levels of ethylene oxide in the workplace showed that some women had miscarriages. Another study did not find this effect. More studies are needed to better understand the risk of exposure during pregnancy.

Exposure of the general population to ethylene oxide usually involves levels that are lower than those known to cause health problems. People living near industrial facilities that release ethylene oxide to the outdoor air may be exposed to higher levels of ethylene oxide than people who do not live near these facilities.

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Some laboratory animals exposed to very high levels of ethylene oxide for a long time (months to years) had irritation in their nose, mouth, and lungs; nervous system effects; developmental effects; and male reproduction problems. Some laboratory animals exposed to ethylene oxide for several months also had kidney problems and anemia (low amount of red blood cells). Some of these effects have also been seen in humans. We do not know if other effects seen in animals would occur in humans.

Can ethylene oxide cause cancer?

Some studies of the highest exposed workers who were exposed to ethylene oxide over an average of 10 years or longer had higher risks of certain types of cancer, such as some blood cancers and breast cancer. Similar cancers were also found in animal studies. Some studies of workers have not found increases in cancer.

The Department of Health and Human Services (HHS) has determined that ethylene oxide is known to be a human carcinogen. The U.S. Environmental Protection Agency (EPA) has concluded that inhalation exposure to ethylene oxide is carcinogenic to humans.

Can I get a medical test to check for ethylene oxide?

If you are concerned about exposure to ethylene oxide, call your doctor or nurse.

There are medical tests that can show if you have been exposed to ethylene oxide, but these tests won't predict if you will have health problems. Once exposure stops, ethylene oxide leaves the body within hours or days, so a medical test may not show if you have been exposed in the past. The tests cannot tell you whether the ethylene oxide in your body is from environmental exposure or was naturally produced. The medical tests are not usually done in the doctor's office as part of a routine medical exam.

How can I protect myself and my family from ethylene oxide?

Workers using or making ethylene oxide should wear protective eye wear, clothing, gloves, and when needed, respiratory protection (<https://www.cdc.gov/niosh/npg/npgd0275.html>).

Visit [OSHA](#) (Occupational Safety and Health Administration) and [NIOSH](#) (The National Institute for Occupational Safety and Health) to learn more about protective gear and worker protection.

For more information:

Call **CDC-INFO** at 1-800-232-4636, or submit your question online at:

<https://wwwn.cdc.gov/dcs/ContactUs/Form>

Go to ATSDR's Toxicological Profile for Ethylene Oxide:

<https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=734&tid=133>

Go to ATSDR's Toxic Substances Portal: <https://wwwn.cdc.gov/TSP/index.aspx>

Find & contact your ATSDR Regional Representative at: http://www.atsdr.cdc.gov/DRO/dro_org.html

