

Vinyl Chloride

Answers to Frequently Asked Health Questions

What is vinyl chloride?

Vinyl chloride is a colorless, flammable gas with a mild, sweet odor. It does not occur naturally in the environment but is a man-made product that is used to make polyvinyl chloride (PVC).

Polyvinyl chloride (PVC) is used to make a variety of plastic products including pipes, wire and cable coatings, and packaging materials. Before the mid-1970s, vinyl chloride was used as a coolant, used as a propellant in aerosol spray cans and could be found in some cosmetics.



Vinyl chloride can also be produced as a by-product or when chlorinated solvents such as TCE & PCE chemically break down.

How can vinyl chloride get in your body?

- By breathing (inhalation) vinyl chloride that has leaked from plastics industries, hazardous waste sites, and landfills.
- By breathing (inhalation) vinyl chloride in contaminated workplace air or having skin or eye contact.
- By breathing (inhalation) tobacco smoke from cigarettes or cigars.
- By drinking (ingesting) water from contaminated wells.

Most people begin to smell vinyl chloride in the air at 3,000 parts vinyl chloride parts per million (ppm) of air. However, this is too high a level to prevent adequate warning of exposure. Most people begin to taste vinyl chloride in water at 3.4 parts per million (ppm).

Before government regulations, vinyl chloride could get into food that was stored in materials containing PVC.

How can vinyl chloride affect your health?

It is hard to know what levels of exposure to vinyl chloride can cause health problems. The kinds of health problems and extent of problems that are seen with exposure depend on many factors. These factors include:

- How much vinyl chloride a person is exposed to (dose).
- How long a person is exposed to the vinyl chloride (duration).
- How often a person is exposed to the vinyl chloride (frequency).
- How you were exposed (inhalation or drinking).

Most vinyl chloride you breathe or swallow will quickly enter your blood. When it reaches your liver, the liver will change it into other substances which also travel in your blood. Most of the vinyl chloride leaves your system through the urine within a day after entering your body. But the products made by the liver will take a little longer to leave your body.

Short-term exposure effects:

Breathing high levels of vinyl chloride (much higher than what is normally in the environment) can cause a person to feel dizzy or become sleepy. Studies in animals show that extremely high levels of vinyl chloride can damage the liver, lungs, kidneys, and heart, and prevent blood clotting.

Long-term exposure effects:

People who have breathed high levels (thousands of parts per million-ppm) vinyl chloride for several years under industrial conditions have changes in the structure of their liver. People that have worked with vinyl chloride have nerve damage and others have developed an immune reaction. Some workers exposed to very high levels of vinyl chloride have problems with the blood flow to their hands.

Are there other health problems seen with exposure to vinyl chloride?

Some men who work with vinyl chloride have complained of a lack of libido (sex drive). Women who work with vinyl chloride have reported irregular menstrual periods and have developed high blood pressure during pregnancy. Vinyl chloride has not been shown to cause birth defects.

Is there a test to find out if I have been exposed to vinyl chloride?

There are two tests which can measure vinyl chloride in your body. However, these tests are not routinely available at your doctor's office and must be done at special laboratories that have the right equipment.

Vinyl chloride can be measured in your breath and vinyl chloride's chief breakdown product, thiodiglycolic acid, can be measured in your urine. But exposure to other chemicals can also produce the same breakdown products in your urine.

Note that both the breath and urine test must be done shortly after exposure and these tests are not very helpful for measuring low levels of the chemical.

Does vinyl chloride cause cancer?

The Department of Health and Human Services (HHS) has determined that vinyl chloride is a known carcinogen (causes cancer).

The International Agency for Research on Cancer (IARC) has determined that vinyl

chloride is carcinogenic (causes cancer) to humans, and the Environmental Protection Agency (EPA) has determined that vinyl chloride causes cancer.

Studies of workers who breathed very high levels vinyl chloride for many years showed an increased risk of cancers of the liver. Also, brain, lung and some cancers of the blood may also be connected with breathing vinyl chloride.

What recommendations has the federal government made to protect human health?

The federal government develops regulations and recommendations to protect public health and these regulations can be enforced by law.

The U.S. EPA requires that the amount of vinyl chloride in drinking water not exceed 0.002 ppm (parts per million).

The Food and Drug Administration (FDA) regulates the vinyl chloride content of plastics, because vinyl chloride may leak from plastic into foods or water.

References:

The Agency for Toxic Substances and Disease Registry (ATSDR). Toxicological profile for vinyl chloride, September, 1997.

Where Can I Get More Information?

Ohio Department of Health
Bureau of Environmental Health and Radiation Protection
Radiological Health and Safety Section
246 N. High Street
Columbus, Ohio 43215
Phone: (614) 644-2727

This fact sheet was developed in cooperation with the Agency for Toxic Substances and Disease Registry



This fact sheet was developed in cooperation with the Agency for Toxic Substances and Disease Registry

