

Common Chemicals



Found at Superfund Sites





EPA Facts About *Vinyl Chloride*

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What is vinyl chloride?

Vinyl chloride is a colorless gas with a mild, sweet odor. It is a man-made chemical that does not occur naturally. Most of the vinyl chloride produced in the United States is used to make polyvinyl chloride (PVC). This material is used to manufacture a variety of plastic and vinyl products including pipes, wire and cable coatings, packaging materials, furniture and automobile upholstery, wall coverings, housewares, and automotive parts. Much smaller amounts of vinyl chloride are used as a cooling gas and in the manufacture of other compounds.

Emissions from vinyl chloride and PVC manufacturers are responsible for the majority of vinyl chloride released to the environment.

How might exposure to vinyl chloride occur?

Vinyl chloride has been found in approximately 418 of the 1,300 hazardous waste sites on the *National Priorities List (NPL)*. Vinyl chloride is mainly released into the air and discharged in wastewater from the plastics industry. Most of the vinyl chloride that enters the air gradually breaks down into less harmful substances. Levels of vinyl chloride found in the environment are usually more than a thousand times below levels found in occupational settings. Elevated outdoor levels are usually expressed in terms of parts of vinyl chloride present in a billion parts of air or water (ppb). The term "parts per billion" is a way of expressing the concentration of a contaminant in a liquid or air. One part per billion is equal to one inch in a distance of about sixteen thousand miles (or a penny in ten million dollars), a very small amount. Outdoor levels of vinyl chloride result from the discharge of exhaust gases from factories that manufacture or process vinyl chloride, or evaporation from areas where chemical wastes are stored. The highest outdoor levels have been measured in air near vinyl chloride factories or over chemical waste storage areas.

Vinyl chloride that enters drinking water comes from factories that release vinyl chloride wastes into rivers and lakes, and from *leaching* into groundwater in areas where chemical wastes are stored. Small amounts of vinyl chloride can enter drinking water from contact with polyvinyl chloride pipes. In the past, higher than expected amounts were present in foods packaged in plastic that contained vinyl chloride. Currently, the U.S. Food and Drug Administration (FDA) regulates the amount of vinyl chloride allowed in food packaging in order to limit the intake of vinyl chloride.

How can vinyl chloride affect human health?

Short-term exposures to very high levels of vinyl chloride in air can cause dizziness, lack of muscle coordination, headaches, unconsciousness, or death. Long-term exposure to lower amounts in factories which produce or use vinyl chloride has caused "vinyl chloride disease". This disease is characterized by severe damage to the liver, effects on the lungs, poor circulation in the fingers, changes in the bones of the fingers, thickening of the skin, and changes in the blood. An increased risk of developing cancer of the liver and possibly several other tissues has been linked with breathing air in factories containing vinyl chloride.

Some health effects observed in humans have also been seen in laboratory animals. Effects on the nervous system of animals have occurred following short-term exposure to very high levels of vinyl chloride in air. Animals exposed to high levels for a short period of time, as well as to low levels for a long period, developed liver damage. Kidney effects have also occurred following exposure to high levels. Animals developed cancer in several tissues after eating food or breathing air that contained vinyl chloride.

How can vinyl chloride enter the body?

The most likely way that vinyl chloride can enter the body is by inhalation. This *exposure route* is of concern for persons employed in vinyl chloride manufacturing or processing, for people living in communities where vinyl chloride plants are located, and for individuals living near hazardous waste disposal sites. Vinyl chloride can also enter the body through ingestion. Absorption of vinyl chloride through the skin is not likely to be an important exposure route.