

Vinyl Chloride & the Workplace

Vinyl chloride is a flammable gas at room temperature and is usually encountered as a cooled liquid. The colorless liquid forms a vapor that has a pleasant odor. Vinyl chloride is used as a vinyl monomer in the manufacture of polyvinyl chloride and other resins. It is also used as a chemical intermediate and as a solvent.

The danger comes during the production process. Three basic steps are necessary to the production of vinyl chloride products.

- First, the vinyl chloride, or monomer, is produced in a closed process. The vinyl chloride monomer is then shipped as a compressed liquified gas to plants/locations that produce the polyvinyl chloride resin.
- Second, batches of vinyl chloride are polymerized by mixing them with catalysts in giant vats or reactors. After drying, the polyvinyl chloride resins are compounded by the addition of stabilizers, lubricants, and plasticizers.
- Third, the polyvinyl chloride resins are fabricated into a myriad of finished products. This step involves a large number of industrial processes.

Health Effects

CWA members are most often exposed to vinyl chloride as a result of the inhalation of or breathing the chemical's vapors. Once inside the body, vinyl chloride depresses the central nervous system causing symptoms that resemble alcohol intoxication. Acute exposures may result in lightheadedness, nausea, and a dulling of the visual and auditory (hearing) responses. Further, severe vinyl chloride exposure may cause death.

Vinyl chloride is a skin irritant causing a skin rash or contact dermatitis. Contact with the liquid may also cause frostbite upon evaporation.

Also, contact with the eye(s) will result in immediate and severe irritation.

Chronic or long-term exposure to vinyl chloride may result in skin changes and liver damage. Vinyl chloride is considered a human carcinogen. Specifically, the chemical has caused cancers of the brain, liver, and lungs. Of concern, these diseases take fifteen or more years to develop after the initiation of exposure.

Medical Tests

Presently, there are no special medical tests to diagnose the medical consequences of vinyl chloride exposure. However, CWA members who work with vinyl chloride must be provided with employer-paid periodic physical examinations. Such exams should emphasize liver function and palpation. Liver scans have been successful in detecting liver tumors. Medical histories should include alcohol consumption, past liver ailments or infections, exposure to agents that may be harmful to the liver, exposure to drugs and chemicals that can cause liver damage, past blood transfusions, and past hospitalizations. Long-term medical follow-up for workers exposed to vinyl chloride is essential.

When a CWA member who works with vinyl chloride suffers poor health, she/he should consult a physician as soon as possible. In addition, the affected worker should be sure to tell the doctor that she/he works with vinyl chloride.

In cases of acute poisoning due to vinyl chloride exposure, the victim should be taken into fresh air or a well-ventilated room. In turn, clothing contaminated by vinyl chloride

should be taken off and removed from the area. If the worker stops breathing, artificial respiration should be given and a doctor should be called immediately.

Controlling the Hazard

The best method of controlling exposure to vinyl chloride is achieved through the substitution of a less hazardous material. Where this is not possible, engineering controls such as enclosure of the source of exposure and local exhaust ventilation should be implemented. As a last resort, employers should introduce administrative controls and provide personal protective equipment such as non-porous gloves, goggles, non-porous aprons, sleeves, boots, and, where vinyl chloride levels cannot meet the OSHA Standard, respiratory protection.

The OSHA Standard

The OSHA Standard applies to the manufacture, reaction, packaging, repackaging, storage, handling, or use of vinyl chloride or polyvinyl chloride in such operations as molding, extrusion, mixing, and calendaring. The Standard does not apply to the handling or use of fabricated products made of polyvinyl chloride such as thermoforming or blister packaging.

The Standard sets the following permissible exposure limits:

- Employers must ensure that workers are not exposed to vinyl chloride at concentrations greater than one part per million (PPM) averaged over any eight-hour period (time weighted average).
- Employers must ensure that workers are not exposed to vinyl chloride at concentrations greater than five parts per million over any period not exceeding fifteen minutes. This is called the Action Level.

- Employers must ensure that workers are not exposed to vinyl chloride by direct contact with liquid vinyl chloride.

In addition, the Standard mandates that the employer:

- Initiate an air monitoring program,
- Eliminate hazardous exposure to vinyl chloride through engineering controls,
- Supply respiratory protection where necessary,
- Institute a comprehensive training program that describes the toxicity and hazards associated with vinyl chloride exposure, as well as precautions for the safe use of vinyl chloride,
- Initiate a medical surveillance program for all exposed CWA members,
- Post warning signs where vinyl chloride is used and apply the appropriate warning labels on vinyl chloride containers, and
- Initiate recordkeeping and reporting procedures relative to worker exposure to vinyl chloride.

What Can You Do?

All CWA members should make sure that their employer is maintaining a safe and healthful workplace. The key to making the workplace safe for all CWA members is strong, active local safety and health committees. The committee can identify dangerous conditions at the workplace and discuss them with management. If the employer refuses to cooperate, the committee can request an OSHA inspection. The committee should always coordinate its activities through the local officers, the CWA Representatives, and negotiated safety and health committees.