Vinyl Chloride

Job Health Hazard Series

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Endangered Workers

Most job health hazards—such as lead, mercury, and silica—have been recognized for decades or centuries. But vinyl chloride, a gas used in the production of more than half of today's plastic products, has only recently been shown to be highly dangerous.

Until January 1974, the gas was generally considered of low toxicity. Then it was found to cause a rare form of cancer of the liver—angiosarcoma—which cannot be diagnosed until it is incurable.

Vinyl chloride (VC), which has always been handled with relative care, since it is both explosive and highly flammable, is the basic ingredient in making polyvinyl chloride (PVC).

PVC is all around us. The chances are you ride to work on a vinyl seat, walk across vinyl-tiled floors on PVC-soled shoes, eat sandwiches wrapped in PVC from a vinyl tablecloth, relax to the sound of PVC records. Infants suck on PVC pacifiers.

Although studies are continuing in both government and private laboratories, no one has yet discovered any danger in these finished products. By the time the plastics reach this stage, most of the vinyl chloride has been chemically locked into the PVC and will not come out again.

The danger comes during the production process. Three basic steps are necessary to the production of vinyl products. First the vinyl chloride, or "monomer," is produced in a closed process, usually involving a reaction between ethylene and chlorine.

The VC monomer is shipped as a compressed, liquefied gas to plants that produce the PVC resin. Batches of VC are "polymerized" by mixing them with catalysts in giant vats or reactors.

After drying, the PVC resins are compounded by the addition of stablizers, lubricants, and plasticizers. Before being shipped to fabrication plants, the resin may be converted to pellets, powders, pastes, or film.

The fabrication end of the PVC industry covers a huge range of processes in which the PVC is turned into its myriad of finished products.

In the United States there are 15 monomer plants employing about 1,000 workers, 36 PVC plants with 5,600 workers, and some 7,500 fabrication plants with about 350,000 employees. At each stage there are certain potential trouble spots where the VC gas may escape into the air and reach the workers.

Pr vention of Vinyl Chloride P isoning

The basic protection from VC must come from engineering controls: avoiding leakage of the gas into the air. Under the Occupational Safety and Health Act, this is the responsibility of employers, many of whom have expressed doubts about being able to meet the stringent OSHA standard of one part per million of VC in the air, averaged over an 8-hour day, with a maximum peak of five ppm.

If these limits are not met, employers must reduce exposures to the "lowest practicable level," and personal respirators must be made available to the employees who are exposed. In certain situations, employees have a choice as to whether or not to wear respirators. Until April 1, 1976, a worker can decline to wear a respirator when the VC concentrations are above one ppm but not above 25 ppm.

Federal Standards for Vinyl Chloride Exposure

The OSHA standard for vinyl chloride exposure, although promulgated in October 1974, to take effect January 1, 1975, was held in abeyance pending action on a suit brought by the plastics manufacturers. Under a decision by a special three-judge panel of the United States Second Circuit Court, the standard went into effect April 1, 1975. The plastics manufacturers have indicated that they intend to appeal this decision to the U. S. Supreme Court.

The standard applies to the "manufacture, reaction, packaging, storage, handling or use of VC and PVC" but not to the handling or use of finished PVC products. PVC is considered a "finished product" when it has passed through all production steps that involve mass melting. The standard, for example, would cover such operations as molding, extrusion. banbury mixing, and calendering. It would not cover thermoforming or blister packaging.

Although the standard sets an air concentration limit of one ppm

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