



PUBLIC HEALTH STATEMENT

VINYL ACETATE

CAS#: 108-05-4

Division of Toxicology

July 1992

This Public Health Statement is the summary chapter from the Toxicological Profile for Vinyl Acetate. It is one in a series of Public Health Statements about hazardous substances and their health effects. A shorter version, the ToxFAQs™, is also available. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present. For more information, call the ATSDR Information Center at 1-888-422-8737.

This Statement was prepared to give you information about vinyl acetate and to emphasize the human health effects that may result from exposure to it.

The Environmental Protection Agency (EPA) has identified 1,177 sites on its National Priorities List (NPL). Vinyl acetate has been found at 3 of these sites. However, we do not know how many of the 1,177 NPL sites have been evaluated for vinyl acetate. As EPA evaluates more sites, the number of sites at which vinyl acetate is found may change. The information is important for you because vinyl acetate may cause harmful health effects and because these sites are potential or actual sources of human exposure to vinyl acetate.

When a chemical is released from a large area, such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment as a chemical emission. This emission, which is also called a release, does not always lead to exposure. You can be exposed to a chemical only when you come into contact with the chemical. You may be

exposed to it in the environment by breathing, eating, or drinking substances containing the chemical or from skin contact with it.

If you are exposed to a hazardous substance such as vinyl acetate, several factors will determine whether harmful health effects will occur and what the type and severity of those health effects will be. These factors include the dose (how much), the duration (how long), the route or pathway by which you are exposed (breathing, eating, drinking, or skin contact), the other chemicals to which you are exposed, and your individual characteristics such as age, sex, nutritional status, family traits, life style, and state of health.

1.1 WHAT IS VINYL ACETATE?

Vinyl acetate is a clear, colorless liquid. It has a sweet, pleasant, fruity smell, but the odor may be sharp and irritating to some people. You can easily smell vinyl acetate when it is in the air at levels around 0.5 ppm (half a part of vinyl acetate in 1 million parts of air). It readily evaporates into air and dissolves easily in water. Vinyl acetate is flammable and may be ignited by heat, sparks, or flames. Vinyl acetate is used to make other industrial chemicals (such as polyvinyl acetate polymers and ethylene-vinyl acetate copolymers). These other chemicals are used mostly to make glues for the packaging and building industries. They are also used to make paints, textiles, and paper. The Food and Drug Administration (FDA) has determined that vinyl acetate may be safely used as a coating or a part of a coating that is used in plastic films for food packaging, and as a modifier of food starch.

DEPARTMENT of HEALTH AND HUMAN SERVICES, Public Health Service
Agency for Toxic Substances and Disease Registry

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Vinyl acetate does not occur naturally in the environment. It enters the environment from factories and facilities that make, use, store, or dispose of it. When vinyl acetate is disposed of at waste sites or elsewhere in the environment, it can enter the soil, air, and water. Vinyl acetate will break down in the environment. The half-life (time it takes for 1/2 of the chemical to break down) for vinyl acetate is about 6 hours in air and 7 days in water. We have no information on how long vinyl acetate will stay in soil.

1.2 HOW MIGHT I BE EXPOSED TO VINYL ACETATE?

Industrial facilities, accidental spills, contact with products that contain vinyl acetate, and hazardous waste disposal sites are possible sources of exposure to vinyl acetate. The most important way that you can be exposed to vinyl acetate if you live around factories that make, use, store, and dispose of vinyl acetate on site or if you live near waste sites in which vinyl acetate or products that contain vinyl acetate have been disposed, is by breathing air or drinking water that contain it. You can also be exposed to vinyl acetate by skin contact with products that were made with vinyl acetate, such as glues and paints. Exposure can also occur through ingestion of food items that were packaged in plastic films containing vinyl acetate or food items that contain vinyl acetate as a starch modifier. However, exposure to vinyl acetate occurs mostly in the workplace. Workers can breathe in the chemical when they are making it or using it to make other chemicals. Workers can also have skin contact with vinyl acetate solutions. It has been estimated that about 50,000 workers employed at about 5,000

plants are exposed to vinyl acetate in the United States.

Background levels of vinyl acetate in water, soil, or food have not been reported. However, vinyl acetate has been detected in water and soil from hazardous waste sites on the NPL. It has been measured in the air in industrial areas of Houston, Texas at a level of about 0.5 ppm.

1.3 HOW CAN VINYL ACETATE ENTER AND LEAVE MY BODY?

Vinyl acetate can enter your body through your lungs when you breathe air containing it, through your stomach and intestines when you eat food or drink water containing it, or through your skin. Studies in animals show that most of the vinyl acetate taken in through the nose or mouth enters the body almost immediately. We have no information on how fast it will enter your body tissues once it gets on your skin. Based on information obtained from animal studies, once vinyl acetate is taken into your body through your nose or mouth, vinyl acetate or its breakdown products may quickly be distributed throughout the body and removed. Studies in animals indicate that vinyl acetate is quickly broken down. Most of the vinyl acetate taken into your body leaves in your breath within a few days in the form of carbon dioxide. Small amounts of the vinyl acetate taken into your body also leave in your urine and feces as break down products.

1.4 HOW CAN VINYL ACETATE AFFECT MY HEALTH?

People who were exposed to vinyl acetate in air for

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short periods complained of irritation to their eyes, nose, and throat. One in nine volunteers who breathed air containing 4 ppm of vinyl acetate for 2 minutes had throat irritation. Several volunteers exposed to 72 ppm of vinyl acetate in air for 30 minutes reported coughing and hoarseness and eye irritation. No health effects were found in workers who were exposed to levels around 10 ppm of vinyl acetate in work room air for an average of 15 years of employment. However, we do not know if health effects would occur in people exposed to low levels for longer periods.

Exposure to high levels (around 1,000 ppm) of vinyl acetate in air for a couple of weeks caused irritation of the eyes, nose, throat, and lungs of laboratory animals. Vinyl acetate at levels around 200 ppm caused irritation to the respiratory tract and nose when it was breathed by rats and mice for up to 2 years. In this same study, damage to the lungs (congestion and increased lung weight) was seen in rats at 200 and 600 ppm and in mice at 600 ppm vinyl acetate. Studies with animals also suggest that breathing vinyl acetate may affect the immune system and nervous system. The extent and way in which vinyl acetate affects these systems is not well understood.

There is no evidence that vinyl acetate causes cancer in humans. Vinyl acetate caused tumors in the noses of rats that breathed 600 ppm for 2 years. The International Agency for Research on Cancer (IARC) has determined that vinyl acetate is possibly carcinogenic to humans (Group 2B).

We have no information on health effects in humans exposed to vinyl acetate in contaminated food or water. Information from animals exposed to vinyl

acetate in drinking water suggest that the immune system might be affected at very high levels.

There is no information to show that birth defects or low birth weights occur in humans exposed to vinyl acetate. No birth defects were seen in the offspring of animals that were exposed to vinyl acetate during their pregnancy. Pregnant animals exposed to high levels of vinyl acetate in drinking water or air produced offspring which were smaller in size than normal. These effects to the offspring were seen at the same level that caused reduced weight gain in pregnant animals. This suggests that the smaller size of the offspring may be due to the reduced weight gain in the pregnant animals and may not be a direct effect of vinyl acetate on the developing animal.

People who had a mild (2%) solution of vinyl acetate put on their skin for 48–72 hours did not show signs of skin irritation. However, vinyl acetate has caused skin irritation and blisters in workers who accidentally spilled it on their skin. More concentrated solutions of vinyl acetate have caused reddening, blisters, and corrosion to the skin of rabbits. The effects of continual or repeated skin contact with vinyl acetate or products that contain vinyl acetate over a long time are not known.

Exposure to vinyl acetate in air or direct contact with vinyl acetate solutions has caused irritation to the eyes. Several volunteers exposed to 72 ppm of vinyl acetate in air for 30 minutes reported eye irritation that lasted up to 60 minutes after exposure. Accidental contact of the eye with concentrated solutions of vinyl acetate has caused reddening and irritation to the eyes of workers. Symptoms were relieved after flushing the affected eye with water. We know of no cases in which permanent eye

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damage resulted after such contact. Rabbits that had very high concentrations of vinyl acetate put in their eyes for a short period also showed irritation and reddening to the eyes.

1.5 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO VINYL ACETATE?

No test is currently available to measure vinyl acetate in your blood, urine, or body tissues. Because vinyl acetate breaks down very quickly to substances that are normally found in your body, measurements of these breakdown products are not useful for showing whether you have been exposed to vinyl acetate. The symptoms caused by exposure to vinyl acetate can also occur for many other reasons. Therefore, they can not be used as proof of vinyl acetate exposure.

1.6 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

The federal government has set standards and guidelines to protect people from the possible health effects of vinyl acetate. EPA requires that any company that spills more than 5,000 pounds of vinyl acetate into the environment report the spill to the National Response Center.

To protect workers, the Occupational Safety and Health Administration (OSHA) has set a limit of 10 ppm vinyl acetate in workroom air during an 8-hour shift and over a 40-hour work week. The American Council of Government Industrial Hygienists (ACGIH) also recommends that workers should not be exposed to more than 10 ppm vinyl acetate in

workroom air during an 8-hour shift and over a 40-hour work week. OSHA has also set a short-term exposure limit (STEL) in work room air of 20 ppm for a 15-minute exposure period. The National Institute for Occupational Safety and Health (NIOSH) recommends that exposure to vinyl acetate should not exceed 4 ppm in workroom air for any 15-minute exposure period.

1.7 WHERE CAN I GET MORE INFORMATION?

If you have any more questions or concerns, please contact your community or state health or environmental quality department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop F-32
Atlanta, GA 30333

Information line and technical assistance:

Phone: 888-422-8737
FAX: (770)-488-4178

ATSDR can also tell you the location of occupational and environmental health clinics. These clinics specialize in recognizing, evaluating, and treating illnesses resulting from exposure to hazardous substances.

To order toxicological profiles, contact:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Phone: 800-553-6847 or 703-605-6000

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