



PUBLIC HEALTH STATEMENT

ISOPHORONE

CAS#: 78-59-1

Division of Toxicology

December 1989

This Public Health Statement is the summary chapter from the Toxicological Profile for Isophorone. 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.

Isophorone has been found in the drinking water of Cincinnati, Philadelphia, and New Orleans at amounts less than 10 parts of isophorone in 1 billion parts of water (10 ppb). In one instance (a screen print shop), isophorone was found in amounts as high as 26 parts in 1 million parts of air (26 ppm), but the usual amounts in the workplace are much lower. At this time, isophorone has been found in at least 9 out of 1177 National Priorities List (NPL) hazardous waste sites in the United States. Exposure to isophorone at these sites may occur by touching contaminated soil, water, or sediment.

1.1 WHAT IS ISOPHORONE?

Isophorone is a clear liquid with a peppermint-like odor. It evaporates faster than water but slower than charcoal starter or paint thinner, and it will not mix completely with water. Isophorone is a manmade chemical for use commercially, but it has been found to occur naturally in cranberries. It is used as a solvent in some printing inks, paints, lacquers, and adhesives. Isophorone does not remain in the air very long, but can remain in water for possibly more than 20 days. The length of time that isophorone will remain in soil is not known, but it probably is about the same as the length of time it remains in water.

1.2 HOW MIGHT I BE EXPOSED TO ISOPHORONE?

Exposure to isophorone may take place where you work or in very low concentrations at home. Because it is used in some inks, paints, lacquers, and adhesives, people who work with these products may be exposed to isophorone.

1.3 HOW CAN ISOPHORONE ENTER AND LEAVE MY BODY?

Isophorone can enter your body if you breathe its vapor, have skin contact with it, drink contaminated water, or eat contaminated food. If isophorone is present at a waste site near homes that use local wells as a source of water, the well water could be contaminated with isophorone. Experiments in animals show that after doses by mouth, isophorone enters easily and spreads to many organs of the body, but most of it leaves the body within 24 hours in the breath and in urine. Isophorone may enter the lungs of workers exposed to isophorone where it is used indoors as a solvent. Isophorone disappears quickly from outside air, so the chance of breathing outdoor air contaminated with isophorone is small. If isophorone is spilled at a waste site and evaporates, however, a person nearby may breathe isophorone before it disappears from the air. In addition, soil around waste sites may contain isophorone, and a person, such as a child playing in the dirt, may eat or have skin contact with the contaminated soil. How much isophorone enters the body through the skin is not known.

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



PUBLIC HEALTH STATEMENT

ISOPHORONE

CAS#: 78-59-1

Division of Toxicology

December 1989

1.4 HOW CAN ISOPHORONE AFFECT MY HEALTH?

The only effects of isophorone reported in humans are irritation of the skin, eyes, nose, and throat, and possibly dizziness and fatigue. These effects have occurred in workers who breathe vapors of isophorone and other solvents during use in the printing industry. Short-term exposure of animals to high vapor amounts and short- or long-term exposure of animals to high doses by mouth cause death or a shortened lifespan. Short-term exposure to high amounts of vapors or high doses by mouth has caused inactivity and coma in animals. Inconclusive studies suggested that isophorone may have caused birth defects and growth retardation in the offspring of rats and mice that breathed the vapors during pregnancy.

Some harmful health effects were seen in adult female animals in these studies. It is not known whether isophorone could cause birth defects in humans. In a long-term study in which rats and mice were given high doses of isophorone by mouth, the male rats developed kidney disease and kidney tumors. Male rats also developed tumors in a reproductive gland. Some male mice developed tumors in the liver, in connective tissue, and in lymph glands (tissues of the body that help fight disease), but the evidence was not strong. It is not known whether isophorone causes cancer in humans.

1.5 WHAT LEVELS OF EXPOSURE HAVE RESULTED IN HARMFUL HEALTH EFFECTS?

Odor is first notice at about 0.2 ppm. This means

that you can probably smell isophorone before you would have harmful health effects.

Eye, nose, and throat irritation have been seen in people at isophorone levels of 25 ppm from short-term exposures, and fatigue and depression from long-term exposure have been seen at 5 ppm.

The levels of isophorone in air that cause death and lung congestion in animals are much higher than the amounts that workers breathe in industry when using isophorone as a solvent. The amount that causes lung irritation in animals is about the same as the amount that causes eye, nose, and throat irritation in humans. Skin irritation or eye damage has occurred in animals after a few drops of isophorone was applied directly to the skin or eyes.

1.6 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO ISOPHORONE?

No medical test is known to determine human exposure to isophorone. A few studies in rats and rabbits have shown that isophorone and its metabolites can be found in the urine of these animals, so it may be possible to find a method for testing the urine of humans to determine exposure to isophorone. It is not known, however, whether such a measurement would predict how much exposure had occurred or the possible health effects.

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

The EPA recommends that levels in lakes and streams should be limited to 8.4 ppb to prevent

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



PUBLIC HEALTH STATEMENT

ISOPHORONE

CAS#: 78-59-1

Division of Toxicology

December 1989

possible health effects from drinking water or eating fish contaminated with isophorone.

The EPA requires that discharges, spills, or accidental releases of 5,000 pounds or more of isophorone must be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit of 140 milligrams of isophorone per cubic meter of air (140 mg/m³) for an 8-hour workday in a 40-hour workweek.

The federal recommendations have been updated as of July 1999.

1.8 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

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 1989. Toxicological profile for isophorone. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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

www.atsdr.cdc.gov/

Telephone: 1-888-422-8737

Fax: 770-488-4178

E-Mail: atsdric@cdc.gov