

1. PUBLIC HEALTH STATEMENT

This Statement was prepared to give you information about 2-hexanone 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). 2-Hexanone has been found in at least 15 of these sites. However, we do not know how many of the 1,177 NPL sites have been evaluated for 2-hexanone. As EPA evaluates more sites, the number of sites at which 2-hexanone is found may change. This information is important for you to know because 2-hexanone may cause harmful health effects and because these sites are potential or actual sources of human exposure to 2-hexanone.

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 chemical such as 2-hexanone, 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 2-HEXANONE?

2-Hexanone, also known as methyl n-butyl ketone or MBK, is a clear, colorless liquid with a somewhat sharp odor. The liquid form can easily evaporate into the air as a vapor. It is a waste product of wood pulping, coal gasification, and oil shale operations. 2-Hexanone was formerly used in paint and paint thinner and in various chemical substances. However, since it was found to have harmful health effects, it is no longer made in the United States, and its uses have been restricted. There are no known major natural sources of 2-hexanone in the environment. When 2-hexanone is released to rivers or lakes, it dissolves very easily, and it may evaporate into the air in a few days. We do not know if 2-hexanone binds to soil. When 2-hexanone is released to the water, air, or soil, it is probably broken down into smaller products, possibly within a few days.

More information on the physical and chemical properties, uses, and releases of 2-hexanone and how it behaves in the environment can be found in Chapters 3, 4, and 5.

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1.2 HOW MIGHT I BE EXPOSED TO 2-HEXANONE?

You can be exposed to 2-hexanone if you live near an industry or hazardous waste site that releases the liquid into wastewater or the gas form into the surrounding air. These industries include coal gasification plants, oil shale operations, and wood pulping mills. We have no information on background levels of 2-hexanone in the environment.

2-Hexanone has been found as a natural substance in foods such as cheese, nectarines, nuts, bread, and chicken muscle. We do not know the levels of 2-hexanone in these foods. 2-Hexanone has been found in milk and cream at levels up to 0.018 ppm (0.018 parts of 2-hexanone in one million parts of liquid). These levels are far below the levels that have caused harmful effects in animals. It has also been found in drinking water and soil near hazardous waste sites. Exposures at these sites may take place if you drink the contaminated water or bathe in it, if you get contaminated soil on your skin, or if you breathe the contaminated air.

More information on how you might be exposed to 2-hexanone is given in Chapter 5.

1.3 HOW CAN 2-HEXANONE ENTER AND LEAVE MY BODY?

2-Hexanone can enter your body when you breathe its vapors, eat food or drink water that contains it, or when you come in contact with it through your skin. When 2-hexanone is breathed in, about 75% of it is taken up and remains in the body unchanged or as a breakdown product for an unknown length of time. If it enters the body by mouth, about 65% of the chemical leaves the body slowly (in about a week), either unchanged or as breakdown products, in the breath and urine. The rest may either stay in the body or may leave the body slowly through the breath or urine. One of the breakdown products, called 2,5-hexanedione, may be responsible for the harmful effects on the nervous system (see Section 1.4). When 2-hexanone gets in through the skin, some leaves the body through the lungs and urine within a few hours. We have no information on how much stays in the body or for how long. If you live or work near a hazardous waste site, you may be exposed to 2-hexanone in the air that you breathe or in the water you drink or bathe in, if it contains small amounts of this chemical.

More information on how 2-hexanone enters and leaves the body is given in Chapter 2.

1.4 HOW CAN 2-HEXANONE AFFECT MY HEALTH?

The most important health concern for humans from exposure to 2-hexanone is its harmful effects on the nervous system. These effects were seen in workers who were exposed to 2-hexanone for almost a year. The major effects were weakness, numbness, and tingling in the skin of the hands and feet.

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Similar effects were seen in animals that ate or breathed high levels of 2-hexanone; these effects included weakness, clumsiness, and paralysis.

We do not know whether 2-hexanone can cause cancer or birth defects. In one study, when pregnant rats were exposed to 2-hexanone in the air, fewer offspring lived after birth, and those that did survive had low birth weights.

Many of the studies in which the health effects of 2-hexanone in humans or animals were reported did not use pure 2-hexanone. Therefore, we do not know whether the results were caused by 2-hexanone itself or by the other chemicals in the mixture.

More information on health effects of 2-hexanone can be found in Chapter 2.

1.5 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO 2-HEXANONE?

Tests can be used to find out whether you have recently been exposed to 2-hexanone. The tests measure levels of 2-hexanone or its breakdown products in blood or urine. These tests require special equipment and are done in a special laboratory, so they are usually not available in a doctor's office. However, these tests cannot be used to predict whether harmful effects will occur.

More information on how 2-hexanone can be measured in exposed humans is given in Chapters 2 and 6.

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

The federal government has set certain regulations and guidelines to help protect people from the possible health effects of 2-hexanone in the workplace. The Occupational Safety and Health Administration (OSHA) has set a limit of 5 ppm (5 parts of 2-hexanone in 1 million parts of air) as an average exposure level to this chemical over a 40-hour work week. The American Conference of Governmental Industrial Hygienists (ACGIH) has made the same recommendation. The National Institute for Occupational Safety and Health (NIOSH) recommends an even lower limit, 1 ppm, as an average exposure during a 10-hour period.

More information on governmental regulations regarding 2-hexanone can be found in Chapter 7.

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1.7 WHERE CAN I GET MORE INFORMATION?

If you have any more questions or concerns not covered here, please contact your state health or environmental department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road, E-29
Atlanta, Georgia 30333

This agency can also provide you with information on the location of the nearest occupational and environmental health clinic. Such clinics specialize in recognizing, evaluating, and treating illnesses that result from exposure to hazardous substances.