

1. PUBLIC HEALTH STATEMENT

This Statement was prepared to give you information about diethyl phthalate and to emphasize the human health effects that may result from exposure to it. The Environmental Protection Agency (EPA) has identified 1,397 sites on its National Priorities List (NPL). Diethyl phthalate has been found in at least 248 of these sites, one of which is located in Guam. However, we do not know how many of the 1,397 NPL sites have been evaluated for diethyl phthalate. As EPA evaluates more sites, the number of sites at which diethyl phthalate is found may change. This information is important for you to know because diethyl phthalate may cause harmful health effects and because these sites are potential or actual sources of human exposure to diethyl phthalate.

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 diethyl phthalate, 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.

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1.1 WHAT IS DIETHYL PHTHALATE?

Diethyl phthalate is a man-made colorless liquid with a slight aromatic odor and a bitter, disagreeable taste. Trade names include neantine, peilatinol A, and solvanol. Diethyl phthalate is manufactured for many uses. It is commonly used to make plastics more flexible. Because diethyl phthalate is not a part of the chain of chemicals (polymers) which makes up the plastics, it can be released fairly easily from these products. These plastics are found in products such as toothbrushes, automobile parts, tools, toys, and food packaging. Diethyl phthalate is also used in cosmetics, insecticides, and aspirin. For more information on the chemical and physical properties of diethyl phthalate, see Chapter 3. For more information on its production and use, see Chapter 4.

1.2 WHAT HAPPENS TO DIETHYL PHTHALATE WHEN IT ENTERS THE ENVIRONMENT?

Diethyl phthalate may enter the environment in industrial waste waters, by evaporation into the air from disposal sites, directly from consumer products, from the burning of plastic products, and by leaking from landfills into soil or water including groundwater. In air, diethyl phthalate may break down into other products. It may also be deposited on the ground or in water by rain. Diethyl phthalate may also enter the environment by sticking onto dust particles. If released into water, diethyl phthalate may travel great distances in swiftly moving rivers. In more slowly moving waters, microorganisms in the water or sediment may break down some of the diethyl phthalate into nontoxic products. -Sewage bacteria from industrial facilities may break down diethyl phthalate in waste waters. In soils containing organic matter (matter with high levels of carbon), diethyl phthalate may stick to particles where it may eventually break down. If there is little organic matter in the soil, diethyl phthalate may move down through the soil and enter the groundwater. Many microorganisms are able to break down diethyl phthalate to carbon dioxide and other harmless

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products. Small amounts of diethyl phthalate can build up in animals that live in water, such as fish and oysters. For further information on what happens to diethyl phthalate when it enters the environment, see Chapters 4 and 5.

1.3 HOW MIGHT I BE EXPOSED TO DIETHYL PHTHALATE?

You may be exposed to diethyl phthalate in consumer products and plastics. You may also be exposed during the manufacturing or disposal of products that contain diethyl phthalate. Most exposure will result from inhalation of contaminated air or swallowing of contaminated drinking water or foods. The measured levels of diethyl phthalate in air, water, and soil are generally quite low. For example, diethyl phthalate has been measured at hazardous waste sites in the groundwater at 0.0125 parts of diethyl phthalate per million parts (ppm) of water, in surface water at 0.0121 ppm, and in soil at 0.039 ppm (on a weight basis, a part per million is equivalent to one unit of weight, such as one gram, of a chemical, in 1,000,000 grams of a medium, such as water or soil). Diethyl phthalate has been found in drinking water at concentrations of 0.00001-0.0046 ppm, in industrial waste waters at 0.00001-0.060 ppm, in river waters at 0.00006-0.044 ppm, and in sediments from other large bodies of water (Chesapeake Bay and Gulf of Mexico) at up to 0.042 ppm. The amount of diethyl phthalate in soil is unknown. However, diethyl phthalate will probably be rapidly decomposed by soil bacteria, so that little will be taken up into plants. Diethyl phthalate has been measured in indoor air (in a telephone switching office) at 0.00018-0.00022 ppm and in outdoor air (Newark, New Jersey) at 0.00004-0.00006 ppm. Fish taken from contaminated waters had up to about 2 ppm of diethyl phthalate in their tissues. Oysters contained up to about 1 ppm. Diethyl phthalate in plastic packaging may get into food and has been found in packaged food (quiche) at concentrations of about 2-5 ppm. The daily human intake of diethyl phthalate has been estimated to be 4 milligrams (mg) based on food intake, but the annual exposure from drinking contaminated drinking water has been estimated to be quite low (0.0058 mg/year/person).

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Occupational exposure to diethyl phthalate is possible as a result of its use in plastics and other products such as cosmetics and insect repellents. The National Occupational Exposure Survey estimated that over 239,000 employees could potentially be exposed to diethyl phthalate in the workplace. Diethyl phthalate was found in plants that manufacture rubber products at concentrations up to 0.0013 ppm. For further information on how you can be exposed to diethyl phthalate, see Chapter 5.

1.4 HOW CAN DIETHYL PHTHALATE ENTER AND LEAVE MY BODY?

Diethyl phthalate can enter your body when you breathe air, drink water, or eat food containing it. It can also enter your body through your skin. It is possible that exposure could occur near hazardous waste sites, at manufacturing facilities, or through the use of consumer products containing the substance. If you get it on your skin, your body will probably absorb only a small amount of it. We do not know how much you will absorb if you breathe or eat it. Once it enters your body, it breaks down into other chemicals, some of which are harmful. Diethyl phthalate and its breakdown products will leave your body mostly in the urine within about 2 days. Only small amounts of the compound or its breakdown products will remain in the tissues. For more information on how diethyl phthalate can enter and leave your body, see Chapter 2.

1.5 HOW CAN DIETHYL PHTHALATE AFFECT MY HEALTH?

No information is available regarding the possible effects caused by diethyl phthalate if you breathe, eat, drink, or have skin contact with it. Because no studies involving humans exposed exclusively to diethyl phthalate are available, we must rely on studies in laboratory animals. Furthermore, there is no information on the effects of breathing diethyl phthalate in laboratory animals. Diethyl phthalate has caused death in animals given very high doses by mouth, but brief oral exposures to lower doses caused no harmful effects. One effect found

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in animals that ate high doses of diethyl phthalate for long periods of time was a decrease in weight gain. This effect may have occurred because they ate less food, or because they excreted more of the food they ate. The livers and kidneys of these animals were larger than normal, but not from any harmful effect. Other studies noted the presence of an extra rib in rat fetuses whose mothers were given very high dietary levels of diethyl phthalate, but this effect is not considered harmful by all scientists.

Diethyl phthalate is not known to cause cancer in humans or animals. Unlike other phthalates such as di(2-ethylhexyl) phthalate, diethyl phthalate does not appear to affect the ability of male animals to father babies (see ATSDR toxicological profile for di[2-ethylhexyl] phthalate for more information on this chemical). However, a decrease occurred in the number of live babies born to female animals that were exposed to diethyl phthalate throughout their lives. Some birth defects occurred in newborn rats whose mothers received high doses (approximately 3 g/kg) of diethyl phthalate by injection during pregnancy. However, humans are not exposed to diethyl phthalate this way, and no information is available on whether this chemical can cause birth defects when given by mouth.

Diethyl phthalate can be mildly irritating when applied to the skin of animals. It can also be slightly irritating when put directly into the eyes of animals. We have no information on the health effects of diethyl phthalate when applied to the skin for long periods of time. For more information on the health effects of diethyl phthalate, please refer to Chapter 2.

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

Chemical tests are available to determine diethyl phthalate levels in semen, fat, and kidney tissues. See Chapters 2 and 6 for more information.

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

The government has developed regulations and guidelines for diethyl phthalate. These are designed to protect the public from the possible harmful health effects of the chemical.

Under laws that relate to Superfund sites, EPA has identified diethyl phthalate as a hazardous substance. This decision is based primarily on the large number of Superfund sites where diethyl phthalate is found.

The Occupational Safety and Health Administration (OSHA) regulates levels of diethyl phthalate in the workplace. The maximum amount of diethyl phthalate allowed in workroom air during an 8-hour workday, 40-hour workweek, is 5 milligrams per cubic meter (mg/m^3). See Chapter 7 for more information on regulations and guidelines. The National Institute for Occupational Safety and Health (NIOSH) also recommends a similar maximum air concentration of $5 \text{ mg}/\text{m}^3$ for workplace exposure.

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, E-29
Atlanta, Georgia 30333

This agency can also provide you with information on the location of the nearest occupational and environmental health clinic. These clinics specialize in the recognition, evaluation, and treatment of illnesses resulting from exposure to hazardous substances.