

## 1. PUBLIC HEALTH STATEMENT

This public health statement tells you about dichloropropenes and the effects of exposure to it.

The Environmental Protection Agency (EPA) identifies the most serious hazardous waste sites in the nation. These sites are then placed on the National Priorities List (NPL) and are targeted for long-term federal clean-up activities. 1,1-, 1,2-, 1,3-, and 2,3-Dichloropropene have been found in at least 2, 9, 107, and 3 of the 1,699 current or former NPL sites, respectively. 3,3-Dichloropropene was not identified in any of the 1,699 current or former NPL sites. Although the total number of NPL sites evaluated for this substance is not known, the possibility exists that the number of sites at which dichloropropenes are found may increase in the future as more sites are evaluated. This information is important because these sites may be sources of exposure and exposure to dichloropropenes may be harmful.

When a substance is released either from a large area, such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment. Such a release does not always lead to exposure. You can be exposed to a substance only when you come in contact with it. You may be exposed by breathing, eating, or drinking the substance, or by skin contact.

If you are exposed to dichloropropenes, many factors will determine whether you will be harmed. These factors include the dose (how much), the duration (how long), and how you come in contact with these substances. You must also consider any other chemicals you are exposed to and your age, sex, diet, family traits, lifestyle, and state of health.

Most of the information on dichloropropenes is for one type of dichloropropene, 1,3-dichloropropene. There is much less information for 2,3-dichloropropene, almost no information on 1,2-dichloropropene, and no information on 1,1- and 3,3-dichloropropene.

### 1.1 WHAT ARE DICHLOROPROPENES?

<b>Description</b>	Five types (or isomers) of dichloropropene exist: 1,1-dichloropropene, 1,2-dichloropropene, 1,3-dichloropropene, 2,3-dichloropropene, and 3,3-dichloropropene.  1,3-Dichloropropene is a colorless liquid with a sweet smell. It dissolves in water and evaporates easily.
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<b>Uses</b>	<p>1,3-Dichloropropene is used mainly in farming to kill tiny pests called nematodes that eat the roots of important crops.</p> <p>2,3-Dichloropropene is produced and used in industry to make other chemicals.</p>
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For more information on the physical and chemical properties of dichloropropenes and their production, disposal and use, see Chapters 4 and 5.

## 1.2 WHAT HAPPENS TO DICHLOROPROPENES WHEN THEY ENTER THE ENVIRONMENT?

<b>Sources</b>	<p>When 1,3-dichloropropene is used in farm fields, it is sprayed into the ground.</p> <p>Some of the 1,3-dichloropropene in air may be washed down onto the ground, lakes, or streams by rain.</p>
<b>Break down</b> <ul style="list-style-type: none"> <li>• <b>Air</b></li> <li>• <b>Water and soil</b></li> </ul>	<p>1,3-Dichloropropene is quickly broken down in air, usually within several days.</p> <p>Some of the 1,3-dichloropropene in soil and water will evaporate into the air. The rest will be broken down through biodegradation pathways and hydrolysis.</p> <p>Information on what happens to 1,1-, 1,2-, 2,3-, and 3,3-dichloropropene when they enter the environment is not available. Based on their physical and chemical properties, these substances are expected to behave similarly to 1,3-dichloropropene.</p>

For more information on dichloropropenes in the environment, see Chapter 6.

## 1.3 HOW MIGHT I BE EXPOSED TO DICHLOROPROPENES?

<p>Data regarding human exposure to 1,1-, 1,2-, 2,3-, and 3,3-dichloropropene were not located in the available literature. Exposure of the general population to these substances is expected to be low since they are not produced or used in large quantities.</p>	
<b>Air—primary source of exposure</b>	<p>The primary way you can be exposed to 1,3-dichloropropene is by breathing air containing it.</p> <p>1,3-Dichloropropene is rarely detected in urban air samples; measured levels are usually less than 0.5 parts per billion (ppb). Higher levels (5 ppb and lower) were measured in areas with high 1,3-dichloropropene use.</p>

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<b>Water and soil</b>	Low levels of 1,3-dichloropropene have been measured in water samples; the average concentration was 0.5 ppb.  1,3-Dichloropropene is rarely detected in soil samples.
<b>Workplace</b>	Workers involved in the handling and application of 1,3-dichloropropene as a soil fumigant can be exposed to the chemical in air and through dermal contact.
<b>Crops</b>	1,3-Dichloropropene has not been detected in foods grown in fields treated with the chemical.

For more information on human exposure to dichloropropenes, see Chapter 6.

## 1.4 HOW CAN DICHLOROPROPENES ENTER AND LEAVE MY BODY?

<b>Enter your body</b>	When you breathe air containing 1,3- dichloropropene or 2,3-dichloropropene, most of the chemical will rapidly enter your body through your lungs.
• <b>Inhalation</b>	
• <b>Ingestion</b>	1,3-Dichloropropene and 2,3-dichloropropene in food or water may also rapidly enter your body through the digestive tract.
• <b>Dermal contact</b>	It is likely that dichloropropenes will enter through your skin when you come into contact with liquids containing them.
<b>Leave your body</b>	Once in your body, dichloropropenes are broken down into other chemicals. Most of these other chemicals leave your body in the urine within few days.

For more information on how dichloropropenes get into and leave your body, see Chapter 3.

## 1.5 HOW CAN DICHLOROPROPENES AFFECT MY HEALTH?

This section looks at studies concerning potential health effects in animal and human studies.

<b>Humans</b>	
• <b>Inhalation</b>	Inhalation of dichloropropenes may cause respiratory effects such as irritation, chest pain, and cough.
• <b>Oral</b>	Oral exposure may cause gastrointestinal effects that include irritation, erosion of the stomach lining, diarrhea, and bleeding.
• <b>Dermal</b>	Dermal exposure may cause dermatitis and dermal sensitization.

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<b>Laboratory animals</b> <ul style="list-style-type: none"> <li>• <b>Inhalation</b></li> <li>• <b>Oral</b></li> <li>• <b>Dermal</b></li> </ul>	<p>Animal studies have shown that inhalation of 1,3- or 2,3-dichloropropene can result in changes in the lining of the nose.</p> <p>Long-term exposure to 1,3-dichloropropene can cause damage to the lining of the urinary bladder and anemia.</p> <p>Oral exposure to 1,3-dichloropropene can result in damage to the stomach lining and anemia in animals.</p> <p>Skin and eye irritation are seen in animals after 1,3-dichloropropene gets on their skin or in their eyes.</p>
<b>Cancer</b>	<p>The Department of Health and Human Services has determined that 1,3-dichloropropene is reasonably anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) determined that 1,3-dichloropropene is a possible carcinogen. EPA classified 1,3-dichloropropene as a probable human carcinogen.</p>

Further information on the health effects of dichloropropenes in humans and animals can be found in Chapters 2 and 3.

## 1.6 HOW CAN DICHLOROPROPENES AFFECT CHILDREN?

This section discusses potential health effects in humans from exposures during the period from conception to maturity at 18 years of age.

<b>Effects in children</b>	<p>There are no studies evaluating the effect of dichloropropenes exposure on children or immature animals. It is likely that children would have the same health effects as adults. We do not know whether children would be more sensitive than adults to the effects of dichloropropenes.</p>
<b>Birth defects</b>	<p>We do not know if dichloropropenes will cause birth defects in people. Birth defects have not been seen in animals.</p> <p>1,3-Dichloropropene did not cause birth defects in animals, but pregnant rats that breathed it gave birth to fewer rat pups or pups with lower body weight. These effects only happened at exposures high enough to be toxic to the mother and reduce her food intake.</p>

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**1.7 HOW CAN FAMILIES REDUCE THE RISK OF EXPOSURE TO DICHLOROPROPENES?**

<b>Avoid fields during pesticide application</b>	<p>Families can reduce their exposure to 1,3-dichloropropene by staying away from treated fields during pesticide application.</p> <p>Workers who handle 1,3-dichloropropene should wash their hands before entering their homes and keep contaminated clothing isolated before it is washed.</p> <p>Children should be encouraged to wash their hands after playing near treated soil and discouraged from putting their hands in their mouths.</p>
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**1.8 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO DICHLOROPROPENES?**

<b>Detecting exposure</b>	It is possible to measure 1,3- or 2,3-dichloropropene or their breakdown products in blood and urine.
<b>Measuring exposure</b>	<p>In humans, the levels of 1,3-dichloropropene break down products in the urine could be used to predict how much 1,3-dichloropropene has been inhaled.</p> <p>Tests for 1,3- or 2,3-dichloropropene in the blood and urine would only be useful for recent exposures, because dichloropropenes leave the body within 1–2 days.</p>

You can find more information about these tests in Chapters 3 and 7.

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

The federal government develops regulations and recommendations to protect public health. Regulations can be enforced by law. The EPA, the Occupational Safety and Health Administration (OSHA), and the Food and Drug Administration (FDA) are some federal agencies that develop regulations for toxic substances. Recommendations provide valuable guidelines to protect public health, but cannot be enforced by law. The Agency for Toxic Substances and Disease Registry (ATSDR) and the National Institute for Occupational Safety and Health (NIOSH) are two federal organizations that develop recommendations for toxic substances.

Regulations and recommendations can be expressed as “not-to-exceed” levels, that is, levels of a toxic substance in air, water, soil, or food that do not exceed a critical value that is usually based on levels that affect animals; they are then adjusted to levels that will help protect humans. Sometimes these not-to-

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exceed levels differ among federal organizations because they used different exposure times (an 8-hour workday or a 24-hour day), different animal studies, or other factors.

Recommendations and regulations are also updated periodically as more information becomes available. For the most current information, check with the federal agency or organization that provides it.

Some regulations and recommendations for dichloropropenes include the following:

<b>Drinking water</b>	The EPA has determined that exposure to 1,3-dichloropropene in drinking water at concentrations of 0.03 parts per million (ppm) for 1 or 10 days is not expected to cause any noncancerous adverse effects in a child.
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**1.10 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 contact ATSDR at the address and phone number below.

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

Toxicological profiles are also available on-line at [www.atsdr.cdc.gov](http://www.atsdr.cdc.gov) and on CD-ROM. You may request a copy of the ATSDR ToxProfiles™ CD-ROM by calling the toll-free information and technical assistance number at 1-800-CDCINFO (1-800-232-4636), by e-mail at [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov), or by writing to:

Agency for Toxic Substances and Disease Registry  
 Division of Toxicology and Environmental Medicine  
 1600 Clifton Road NE  
 Mailstop F-32  
 Atlanta, GA 30333  
 Fax: 1-770-488-4178

Organizations for-profit may request copies of final Toxicological Profiles from the following:

National Technical Information Service (NTIS)  
 5285 Port Royal Road  
 Springfield, VA 22161  
 Phone: 1-800-553-6847 or 1-703-605-6000  
 Web site: <http://www.ntis.gov/>