

1. PUBLIC HEALTH STATEMENT FOR 1-BROMOPROPANE

This Public Health Statement summarizes the Agency for Toxic Substances and Disease Registry's (ATSDR) findings on 1-bromopropane, including chemical characteristics, exposure risks, possible health effects from exposure, and ways to limit exposure.

The U.S. Environmental Protection Agency (EPA) identifies the most serious hazardous waste sites in the nation. These sites make up the National Priorities List (NPL) and are sites targeted for long-term federal clean-up activities. 1-Bromopropane has not been reported at any EPA NPL sites; however, it is unknown how many of the 1,832 current or former NPL sites have been evaluated for the presence of 1-bromopropane. But the possibility remains that as more sites are evaluated, the sites where 1-bromopropane is found may increase. This information is important because these future sites may be sources of exposure, and exposure to 1-bromopropane may be harmful.

If you are exposed to 1-bromopropane, many factors determine whether you'll be harmed. These include how much you are exposed to (dose), how long you are exposed (duration), how often you are exposed (frequency), and how you are exposed (route of exposure). You must also consider the other chemicals you are exposed to and your age, sex, diet, family traits, lifestyle, and state of health.

WHAT IS 1-BROMOPROPANE?

1-Bromopropane is a colorless liquid. Commercial 1-bromopropane includes not only 1-bromopropane, but also additives that improve its performance in the desired application and stabilizers to inhibit decomposition.

1-Bromopropane was originally used in the production of pesticides, flavors and fragrances, pharmaceuticals, and other chemicals. It is currently used as a solvent in the adhesives, dry cleaning, vapor degreasing, and electronic and metal cleaning industries. 1-Bromopropane production has increased over the last 10 years due to its use as a replacement for other more harmful substances.

More information regarding the identity of 1-bromopropane can be found in Chapters 4 and 5.

WHAT HAPPENS TO 1-BROMOPROPANE WHEN IT ENTERS THE ENVIRONMENT?

1-Bromopropane quickly evaporates into the air when released to the environment. In air, it is broken down quickly. Half of 1-bromopropane will be broken down in 2 weeks. 1-Bromopropane has been

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detected in ambient air. 1-Bromopropane that enters surface water is slowly broken down. Most of it evaporates into air. 1-Bromopropane released to soil can enter surface water. It is not bound to soil particles, so it may enter groundwater. 1-Bromopropane is not likely to concentrate in the food chain.

More information regarding the levels 1-bromopropane in the environment can be found in Chapter 6.

HOW MIGHT I BE EXPOSED TO 1-BROMOPROPANE?

Exposure to 1-bromopropane is mainly an occupational problem. Use of 1-bromopropane in aerosol applications can lead to dermal and inhalation exposure of workers. Workers using 1-bromopropane as a spray adhesive have the highest exposures. Workers involved in the production of 1-bromopropane, as well as those using it in commercial applications, such as adhesive sprays, degreasing operations for cleaning metals, plastics, and electronic components, dry cleaning, asphalt production, aircraft maintenance, and synthetic fiber manufacturing, also have potential for high exposure.

You may be exposed to 1-bromopropane in air when it is used during aerosol applications, specifically at locations in close proximity to facilities where it is used, processed, or manufactured, where vapor may migrate.

More information regarding exposure and 1-bromopropane can be found in Sections 6.5–6.7.

HOW CAN 1-BROMOPROPANE ENTER AND LEAVE MY BODY?

When you breathe or touch 1-bromopropane (or products containing 1-bromopropane), it can be taken directly into your blood through your lungs and skin. There is no information available to show whether 1-bromopropane can enter the bloodstream if you swallow this substance in liquid form, but based on studies in animals, some of it will likely enter the bloodstream. Factors such as your age, sex, body composition, and overall health will affect what happens to 1-bromopropane once it is in your body. The majority of 1-bromopropane is removed from your body within a day. 1-Bromopropane may leave your body unchanged in the air you breathe or in your urine after it has been changed to breakdown products. More information on how 1-bromopropane can enter and leave your body can be found in Chapter 3.

HOW CAN 1-BROMOPROPANE AFFECT MY HEALTH?

1-Bromopropane may have an effect on your nervous system (brain and nerves). Day-after-day exposure to low concentrations in workplace air has been associated with minor effects, such as headache,

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decreased sensation in the fingers and toes, and a drunk-like feeling. However, workers exposed to higher levels for weeks, months, or years have experienced severe effects requiring hospitalization, including incoordination, weakness, loss of feeling, inability to walk, and damage to nerves. Damage to the nervous system may not be reversible, resulting in long-term effects even after 1-bromopropane exposure is stopped.

Breathing 1-bromopropane may also lead to irritation of your nose and throat. Studies in animals suggest that high 1-bromopropane exposure may damage the liver or kidney, decrease your ability to resist infection, or impair your ability to get pregnant (or get someone pregnant). Evidence for these effects is limited. It is not known whether the same effects will happen in humans.

We do not know if 1-bromopropane causes cancer in humans. 1-Bromopropane has caused tumors in animal studies. Based on the findings in animals, the American Conference of Industrial Hygienists (ACGIH) has assigned 1-bromopropane a classification of “A3 – *Confirmed animal carcinogen with unknown relevance to humans*” and the Department of Health and Human Services (DHHS) has classified 1-bromopropane as “*reasonably anticipated to be a human carcinogen*”. The International Agency for Research on Cancer (IARC) and the EPA have not evaluated the carcinogenicity of 1-bromopropane.

See Chapters 2 and 3 for more information on health effects of 1-bromopropane.

HOW CAN 1-BROMOPROPANE AFFECT CHILDREN?

This section discusses potential health effects of 1-bromopropane exposure in humans from when they're first conceived to 18 years of age.

The health effects of 1-bromopropane exposure in children are not known. The nervous system is expected to be a target based on findings in adults. Because the nervous system is still developing in children, they might be more sensitive to nervous system effects seen in adults. However, since exposure to 1-bromopropane occurs mainly in worker settings, children are less likely to be exposed to 1-bromopropane.

It is not known if a fetus or infant can be harmed if a woman is exposed to 1-bromopropane during pregnancy or breastfeeding. Studies in animals have shown effects when mothers were exposed to high levels of 1-bromopropane (500 parts per million [ppm] or higher) during pregnancy and/or nursing.

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However, the exposure levels in these studies were much higher than is expected to occur in human exposures. Therefore, the relevance of these findings to humans is unknown.

More information regarding children's health and 1-bromopropane can be found in Section 3.7.

HOW CAN FAMILIES REDUCE THE RISK OF EXPOSURE TO 1-BROMOPROPANE?

If your doctor finds that you have been exposed to significant amounts of 1-bromopropane, ask whether your children might also be exposed. Your doctor might need to ask your state health department to investigate. You may also contact the state or local health department with health concerns.

Unless you live near a factory/business that uses 1-bromopropane, your household exposure to 1-bromopropane is expected to be minimal. If someone in the household works in a factory or business that produces or uses 1-bromopropane, a change of clothes prior to returning home will decrease the chance of traces of 1-bromopropane entering the home. Although the speed of dermal absorption of 1-bromopropane is unknown, thorough washing of exposed skin including face and hands should decrease the chance of carrying the substance home.

ARE THERE MEDICAL TESTS TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO 1-BROMOPROPANE?

1-Bromopropane and its breakdown products (metabolites) can be measured in the urine. However, the detection of 1-bromopropane or its metabolites cannot predict the kind of health effects that might develop from that exposure. Because 1-bromopropane and its metabolites leave the body fairly rapidly, urine tests for these substances need to be conducted within days after exposure.

For more information on the different substances formed by 1-bromopropane breakdown and on tests to detect these substances in the body, see Chapters 3 and 7.

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. Federal agencies that develop regulations for toxic substances include the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and the Food and Drug Administration (FDA). Recommendations provide valuable guidelines to protect

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public health but are not enforceable by law. Federal organizations that develop recommendations for toxic substances include the Agency for Toxic Substances and Disease Registry (ATSDR) and the National Institute for Occupational Safety and Health (NIOSH).

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 usually based on levels that affect animals; levels are then adjusted to help protect humans. Sometimes these not-to-exceed levels differ among federal organizations. Different organizations use different exposure times (e.g., an 8-hour workday or a 24-hour day), different animal studies, or emphasize some factors over others, depending on their mission.

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 issued the regulation or recommendation.

Currently, there are no federal recommendations or regulations available for 1-bromopropane.

For more information regarding regulations and recommendations pertaining to 1-bromopropane, see Chapter 8.

WHERE CAN I GET MORE INFORMATION?

If you have any questions or concerns, please contact your community or state health or environmental quality department, or contact ATSDR at the address and phone number below. You may also contact your doctor if experiencing adverse health effects or for medical concerns or questions. ATSDR can also provide publicly available information regarding medical specialists with expertise and experience recognizing, evaluating, treating, and managing patients exposed to hazardous substances.

- Call the toll-free information and technical assistance number at 1-800-CDCINFO (1-800-232-4636) or
- Write to:
Agency for Toxic Substances and Disease Registry
Division of Toxicology and Human Health Sciences
1600 Clifton Road NE
Mailstop F-57
Atlanta, GA 30329-4027

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Toxicological profiles and other information are available on ATSDR's web site:
<http://www.atsdr.cdc.gov>.