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*Persistent, Bioaccumulative and Toxic Chemicals*

## Naphthalene

### What are PBT chemicals?

Persistent, bioaccumulative and toxic (PBT) chemicals do not readily break down in the environment, are not easily metabolized, may accumulate in human or ecological food-chains through consumption or uptake and may be hazardous to human health or the environment. A PBT chemical, once released to the environment, may present increasing long-term toxic effects to human health and the environment, even if the release was of a small amount. The U.S. Environmental Protection Agency (U.S. EPA) has created a priority in its hazardous waste minimization program to reduce the presence of PBT chemicals, promote pollution prevention and avoid the transfer of PBT chemicals across environmental media.

Naphthalene is a high priority PBT chemical.

In this fact sheet, naphthalene refers to naphthalene as well as to some of its derivatives, in particular, 1-methylnaphthalene and 2-methylnaphthalene.

### What is the adverse effect of naphthalene?

Naphthalene affects people by inhalation or passing through skin. Naphthalene can irritate the skin, eyes, nose and throat.

Exposure to large amounts of naphthalene may damage or destroy red blood cells. People, particularly children, have developed this problem

**Naphthalene** is a white solid that is found naturally in fossil fuels. Naphthalene is used to make moth repellents, dyes, resins, leather, tanning agents, explosives and lubricants. Naphthalene affects people by inhalation or passing through skin. Exposure to large amounts of naphthalene may cause hemolytic anemia, with symptoms of fatigue, lack of appetite, restlessness and pale skin. Exposure to large amounts of naphthalene may also cause nausea, vomiting, diarrhea and blood in the urine. Naphthalene usage and pollution should be reduced wherever possible.

In 1999, Ohio's hazardous waste program-regulated facilities reported generating 3.4 million pounds of naphthalene in waste.

(called hemolytic anemia) after eating naphthalene-containing mothballs or deodorant blocks. Some of the symptoms include fatigue, lack of appetite, restlessness and pale skin. Exposure to large amounts of naphthalene may also cause nausea, vomiting, diarrhea and blood in the urine.

Unborn children of pregnant woman with anemia due to naphthalene exposure may be anemic as well. Naphthalene can move from mother's blood to baby's blood. Once the child is born, naphthalene may also transfer from mother's body to the baby's body through breast feeding.

Animals sometimes develop cloudiness in their eyes (cataract) after swallowing naphthalene. It is not clear if this also develops in people.

When mice were repeatedly exposed to naphthalene vapors for two years, their noses and lungs became inflamed and irritated.

No human carcinogenicity studies are available. Studies have shown Naphthalene has caused cancer in female mice, but not in male mice or in rats of either sex.

The Department of Health and Human Services (DHHS), the International Agency for Research on Cancer (IARC) and U.S. EPA have not classified naphthalene as to its human carcinogenicity.

### Where is naphthalene found?

Naphthalene is a white solid that is found naturally in fossil fuels. Burning tobacco or wood produce naphthalene. It has a strong, but not unpleasant smell.

Naphthalene is a byproduct of coking in the steel-making process. The major product made from naphthalene is moth repellent. It is also used for making dyes, resins, leather, tanning agents, explosives, lubricants and insecticides.

# Naphthalene

## Who is at risk?

People are most likely to be exposed to naphthalene, 1-methylnaphthalene or 2-methylnaphthalene from the air. Outdoor air contains low levels of these chemicals, but burning wood or fossil fuels and industrial discharges can raise levels in the air. This is true in cities with polluted air. Typical air concentrations for naphthalene are low. In homes or businesses where cigarettes are smoked, wood is burned or moth repellents are used, the levels of naphthalene, 1-methylnaphthalene and 2-methylnaphthalene in the air are higher.

Workers using or making moth repellents, coal tar products, dyes or inks could be exposed to naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene in the air. Workers in the wood preserving, leather tanning, asphalt and foundry industries could experience naphthalene exposure.

Using moth repellents containing naphthalene in the home will expose one to naphthalene vapors. Use of naphthalene-treated clothing, blankets, or fabrics will expose people to naphthalene both by contact with the skin and by breathing its vapors. Cigarette smokers are exposed to naphthalene, 1-methylnaphthalene and 2-methylnaphthalene in the smoke. The highest airborne naphthalene concentrations in nonoccupational settings occur in the homes of cigarette smokers.

## How can people reduce the risk of naphthalene exposure?

Tests are available that measure levels of naphthalene and its breakdown products in urine, stool, blood or maternal milk. A small sample of the body fat can also be removed and analyzed for naphthalene. These tests do not determine exactly how much naphthalene one was exposed to nor predict whether harmful effects will occur.

U.S. EPA recommends that children not drink water containing more than 0.5 parts of naphthalene per million parts of water (ppm) for more than 10 days, or 0.4 ppm for longer than seven years. Adults should not drink water with more than 1 ppm for more than seven years. For water consumed over a lifetime, U.S. EPA suggests it contain no more than 0.02 ppm naphthalene.

The Occupational Safety and Health Administration (OSHA) has set a limit of 10 ppm for the level of naphthalene in workplace air over an eight-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) considers more than 250 ppm of naphthalene in air to be immediately dangerous to life or health. This is the exposure level of a chemical that is likely to cause permanent health problems or death.

- To reduce the risk of occupational exposure, ask why naphthalene is used on the job. Also inquire about how it can be removed or replaced. Always use recommended safety equipment.

- Wash thoroughly immediately after exposure to naphthalene and at the end of every workshift.

- Choose water-based or 100 percent vegetable-based inks for printing jobs. Petroleum-based inks contain polycyclic aromatic hydrocarbons and naphthalene.

## Sources

Agency for Toxic Substances and Disease Registry  
[www.atsdr.cdc.gov](http://www.atsdr.cdc.gov)

TOXNET, National Library of Medicine, National Institutes of Health  
[www.toxnet.nlm.nih.gov](http://www.toxnet.nlm.nih.gov)

The Office of Pollution Prevention was created to encourage multimedia pollution prevention activities in Ohio to reduce risk to public health, safety, welfare and the environment. Pollution prevention stresses source reduction and, as a second choice, environmentally-sound recycling while avoiding cross media transfers. The office develops information related to pollution prevention, increases awareness of pollution prevention opportunities, and can offer technical assistance to business, government and the public.

For more information, visit the Office of Pollution Prevention's Web site at  
[www.epa.state.oh.us/opp](http://www.epa.state.oh.us/opp)

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