

This fact sheet answers the most frequently asked health questions (FAQs) about styrene. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to styrene is most likely to occur from breathing indoor air that is contaminated with styrene vapors from building materials, tobacco smoke, and use of copying machines. Exposure may also occur by breathing automobile exhaust. People who work where styrene is used or manufactured are likely to be exposed by breathing workplace air. Breathing styrene is most likely to affect the nervous system. Styrene has been found in at least 251 of 1,699 National Priorities List (NPL) sites identified by the Environmental Protection Agency (EPA).

What is styrene?

Styrene is a colorless liquid that evaporates easily and has a sweet smell. It often contains other chemicals that give it a sharp, unpleasant smell.

Styrene is widely used to make plastics and rubber. Products containing styrene include insulation, fiberglass, plastic pipes, automobile parts, shoes, drinking cups and other food containers, and carpet backing.

Most of these products contain styrene linked together in a long chain (polystyrene) as well as unlinked styrene.

What happens to styrene when it enters the environment?

- Styrene can be found in air, water, and soil after release from the manufacture, use, and disposal of styrene-based products.
- It is quickly broken down in the air, usually within 1 to 2 days.
- Styrene evaporates from shallow soils and surface water. Styrene that remains in soil or water may be broken down by bacteria or other microorganisms.
- Styrene is not expected to build up in animals.

How might I be exposed to styrene?

- Breathing indoor air that is contaminated with styrene vapors from building materials, cigarette smoke, or use of photocopy machines.

- Breathing automobile exhaust.
- Breathing contaminated workplace air or skin contact with liquid styrene and resins.
- Drinking or bathing in contaminated water.
- Living near industrial facilities or hazardous waste sites.
- Smoking cigarettes or eating food packaged in polystyrene containers; small amounts of styrene can be transferred to food from styrene-based packaging material.
- Ingesting low levels of styrene that occurs naturally in a variety of foods such as fruits, vegetables, nuts, beverages, and meats.

How can styrene affect my health?

If you breathe high levels of styrene (more than 1,000 times higher than levels normally found in the environment), you may experience nervous system effects such as changes in color vision, tiredness, feeling drunk, slowed reaction time, concentration problems, or balance problems.

Hearing loss has been observed in animals exposed to very high concentrations of styrene. Changes in the lining of the nose and damage to the liver has also been observed in animals exposed to high concentrations of styrene, but animals may be more sensitive than humans to these effects.

Styrene

CAS # 100-42-5

How likely is styrene to cause cancer?

The Department of Health and Human Services (DHHS), National Toxicology Program (NTP) listed styrene as “reasonably anticipated to be a human carcinogen” in the Report on Carcinogens, Twelfth Edition, released on June 10, 2011.

The International Agency for Research on Cancer (IARC) has determined that styrene is a possible human carcinogen.

How can styrene affect children?

There are no studies evaluating the effects of styrene 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 styrene.

Studies in workers have examined whether styrene can cause birth defects or low birth weight; however, the results are inconclusive. No birth defects were observed in animal studies.

Nursing infants can be exposed to styrene from breast milk.

How can families reduce the risk of exposure to styrene?

- Styrene is a component of tobacco smoke. Avoid smoking in enclosed spaces like inside the home or car in order to limit exposure to children and other family members.
- Styrene is released during the use of home copiers. Families should use a home copier only when needed and turn it off when finished. It is also important to keep the room with the copier well ventilated.

Is there a medical test to determine whether I've been exposed to styrene?

Styrene and its breakdown products can be measured in your blood, urine, and body tissues. Styrene leaves your body quickly. If you are tested within one day, the actual amount of exposure can be estimated. However, it is difficult to predict the kind of health effects that might develop from that exposure. Styrene breakdown products can also form in the body when you are exposed to other substances.

Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to styrene in drinking water at concentrations of 20 mg/L for 1 day or 2 mg/L for 10 days is not expected to cause any adverse effects in a child.

The EPA has determined that lifetime exposure to 0.1 mg/L styrene is not expected to cause any adverse effects.

The FDA has determined that the styrene concentration in bottled drinking water should not exceed 0.1 mg/L.

The Occupational Health and Safety Administration (OSHA) has limited workers' exposure to an average of 100 ppm for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2010. Toxicological Profile for Styrene (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 2011. Addendum to the Toxicological Profile for Styrene (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service. http://www.atsdr.cdc.gov/toxprofiles/styrene_addendum.pdf.

Where can I get more information?

For more information, contact the 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.

Phone: 1-800-232-4636, FAX: 770-488-4178.

ToxFAQs™ Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaqs/index.asp>.

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.