

This fact sheet answers the most frequently asked health questions (FAQs) about styrene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important 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.

SUMMARY: Exposure to styrene is most likely to occur from breathing indoor air that is contaminated with styrene vapors from building materials, tobacco smoke, and consumer products. 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 213 of 1,416 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is styrene?

(Pronounced sti/rēn)

Styrene is primarily a synthetic chemical. It is also known as vinylbenzene, ethenylbenzene, cinnamene, or phenylethylene. It's a colorless liquid that evaporates easily and has a sweet smell. It often contains other chemicals that give it a sharp, unpleasant smell.

It dissolves in some liquids but doesn't dissolve easily in water. Billions of pounds are produced each year to make products such as rubber, plastic, insulation, fiberglass, pipes, automobile parts, food containers, and carpet backing.

Most of these products contain styrene linked together in a long chain (polystyrene) as well as unlinked styrene. Low levels of styrene also occur naturally in a variety of foods such as fruits, vegetables, nuts, beverages, and meats.

What happens to styrene when it enters the environment?

- Styrene enters the environment during the manufacture, use, and disposal of styrene-based products. It can be found in air, water, and soil.
- It is quickly broken down in the air, usually within 1 to 2 days.

- It evaporates from shallow soils and surface water.
- It doesn't stick easily to soils and sediments.
- It's broken down by bacteria in the soil and water.
- It's not expected to build up in animals.
- Styrene breaks down to half the amount within a few days in surface water; in groundwater, however, it takes between 6 weeks and 7.5 months.

How might I be exposed to styrene?

- Breathing indoor air that is contaminated with styrene vapors from building materials, consumer products, and tobacco smoke.
- Breathing contaminated workplace air.
- Drinking contaminated water.
- Living near industrial facilities or hazardous waste sites.
- Smoking cigarettes or eating a lot of food packaged in polystyrene containers.

How can styrene affect my health?

If you breathe high levels of styrene for a short time, you're most likely to experience nervous system effects such as depression, concentration problems, muscle weakness, tiredness, and nausea, and possibly eye, nose, and throat irritation.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

When animals breathed styrene vapors in short-term studies, they damaged the lining of their noses. Long-term exposure damaged their livers, but there is no evidence that this will occur in people because there is no information on human health effects of breathing low levels for a long time.

There is also little information on human health effects from eating or touching styrene. Animal studies show that ingestion of high levels of styrene over several weeks can cause damage to the liver, kidneys, brain, and lungs. When styrene was applied to the skin of rabbits, it caused irritation.

There is no information as to whether breathing, ingesting, or touching styrene affects fetal development or human reproduction.

In animal studies, short-term exposure to very high levels resulted in some reproductive and developmental effects.

How likely is styrene to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that styrene is possibly carcinogenic to humans.

Several studies of workers have shown that breathing styrene may cause leukemia. There is no information on the carcinogenicity of styrene in people who swallow it or get it on their skin.

Studies in animals that breathed or ate styrene suggest that it is weakly carcinogenic.

Is there a medical test to show 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 if the exposure will affect your health.

The test for styrene and its breakdown products require special equipment and are not usually available at your doctor's office, but may be ordered by the doctor. Your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has determined that 0.1 part of styrene per million parts of water (0.1 ppm) is the maximum amount that may be present in drinking water. The EPA also requires that spills or accidental releases into the environment of 1,000 pounds or more of styrene be reported.

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.

Glossary

Carcinogen: A substance that can cause cancer.

CAS: Chemical Abstracts Service.

Ingesting: Taking food or drink into your body.

Leukemia: Cancer of the blood-forming tissues.

Long-term: Lasting one year or longer.

Polystyrene: A long chain of styrene molecules joined together.

ppm: Parts per million.

Short-term: Lasting 14 days or less.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1992. Toxicological profile for styrene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> 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.

