



Styrene

General Information

Key Points

- styrene is a colourless or light yellow, flammable liquid
- it is mainly used in the production of plastics, resins and synthetic rubbers
- it may also be released from motor vehicle and tobacco smoke
- styrene can occur naturally in some plants in very small amounts
- inhalation of styrene can cause irritation of the nose and throat, coughing and wheezing
- exposure to larger amounts of styrene may cause headache, nausea, vomiting, weakness, tiredness, dizziness, confusion and clumsy or unsteady motion
- styrene can cause mild irritation to skin and moderate to severe irritation to eyes
- exposure to general public is low; potentially from residues in manufactured products

Public Health Questions

What is styrene?

Styrene is a colourless or light yellow, flammable liquid, which has a sweet odour. It is also known as styrol and vinyl benzene.

What is styrene used for?

Styrene is produced in industrial quantities from benzene and ethylene. The main use of styrene is in the production of plastics, resins and synthetic rubbers for commercial and domestic uses. Some of the most common plastics and resins produced using styrene including polystyrene and acrylonitrile-butadiene-styrene (ABS), styrene-acrylonitrile (SAN) resin and styrene-butadiene rubber (SBR). Plastics and rubbers such as these have many commercial and domestic uses, including containers for foodstuffs, packaging, synthetic marble, flooring, disposable tableware and moulded furniture.

Very small amounts of styrene may be present in products that have been manufactured with it, such as plastics. Styrene can also be released during combustion and so may be present in small quantities in vehicle exhaust emissions and tobacco smoke.

How does styrene get into the environment?

Styrene can occur naturally in the damaged trunks of certain trees, but only in very small quantities.

Styrene is most likely to enter the environment from workplaces involved with its manufacture or its use in the production of other materials (plastics, rubbers, etc.). However, safe limits are enforced to protect the employees; such levels are below those that are thought to cause harmful effects.

Styrene may also be present in very small quantities from the exhaust of motor vehicles or from the burning of tobacco.

How might I be exposed to styrene?

As styrene is only used industrially, it is unlikely that you will be exposed to significant amounts unless you work with it. Exposure of the general public to extremely low concentrations of styrene from residues in plastics, or from sources occurring naturally in the environment, are unlikely to cause adverse effects on health.

If I am exposed to styrene how might it affect my health?

The presence of styrene in the environment does not always lead to exposure. Clearly, in order for it to cause any adverse health effects, you must come into contact with it. You may be exposed by breathing, eating, or drinking the substance or by skin contact. Following exposure to any chemical, the adverse health effects, you may encounter depend on several factors, including the amount to which you are exposed (dose), the way you are exposed,

the duration of exposure, the form of the chemical and if you were exposed to any other chemicals.

Breathing air contaminated with styrene vapours can cause irritation of the nose and throat, coughing, wheezing and create a build-up of fluid in the lungs. Exposures to larger amounts can result in the onset of “styrene sickness”, the signs and symptoms of which include headache, nausea, vomiting, weakness, tiredness, dizziness, confusion and clumsy or unsteady motion (known collectively as central nervous system depression). In some cases exposure to styrene can also result in irregular heartbeats and coma.

Styrene can also be absorbed through the skin and contact with large quantities could result in central nervous system depression similar to that seen following inhalation. Similar health effects would be expected to be seen if styrene was ingested. Styrene splashes can cause mild irritation to skin and moderate to severe irritation to eyes.

Repeated exposure to styrene over a long period has been reported to cause subtle changes in hearing, balance, colour vision and psychological performance. Long-term exposure to styrene may also result in the impairment of short term memory, irregular heartbeat and changes in the function of the liver. There are a few reports that styrene may cause occupational asthma, although it is not known whether this is due to styrene alone.

Can styrene cause cancer?

The International Agency for Research on Cancer (IARC) has concluded that there is limited evidence in experimental animals and in humans that styrene can cause cancer. Therefore, it has classified styrene as possibly having the ability to cause cancer in humans.

Does styrene affect pregnancy or the unborn child?

There is some limited evidence to suggest that exposure to styrene during pregnancy may harm the unborn child.

How might styrene affect children?

Children exposed to styrene are expected to show similar adverse health effects to those seen in exposed adults, although the effects may be more severe.

What should I do if I am exposed to styrene?

It is very unlikely that the general population will be exposed to a level of styrene high enough to cause adverse health effects. However, if you have any health concerns regarding exposure to styrene seek guidance from your GP or contact NHS 111.

Additional sources of information

UKTIS Best Use of Medicines in Pregnancy (BUMPS): <http://www.medicinesinpregnancy.org/>

This information contained in this document from the PHE Centre for Radiation, Chemical and Environmental Hazards is correct at the time of its publication.

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