Consumer Factsheet on: STYRENE

List of Contaminants

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

This is a factsheet about a chemical that may be found in some public or private drinking water supplies. It may cause health problems if found in amounts greater than the health standard set by the United States Environmental Protection Agency (EPA).

What is Styrene and how is it used?

Styrene is an oily organic liquid with an aromatic, almost floral odor. Initially, styrene was used primarily in the synthetic rubber industry, but it is currently used as a building block for polymers in making plastics, resins, coatings, and paints.

The list of trade names given below may help you find out whether you are using this chemical at home or work.

Trade Names and Synonyms:

Vinyl benzene
Phenethylene
Cinnamene
Diarex HF 77
Styrolene
Styrol
Styropol

Why is Styrene being Regulated?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine safe levels of chemicals in drinking water which do or may cause health problems. These non-enforceable levels, based solely on possible health risks and exposure, are called Maximum Contaminant Level Goals.

The MCLG for styrene has been set at 0.1 parts per million (ppm) because EPA believes this level of protection would not cause any of the potential health problems described below.

Based on this MCLG, EPA has set an enforceable standard called a Maximum Contaminant Level (MCL). MCLs are set as close to the MCLGs as possible, considering the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The MCL has been set at 0.1 ppm because EPA believes, given present technology and resources, this is the lowest level to which water systems can reasonably be required to remove this contaminant should it occur in drinking water.

These drinking water standards and the regulations for ensuring these standards are met, are called National Primary Drinking Water Regulations. All public water supplies must abide by these regulations.

What are the Health Effects?

Short-term: EPA has found styrene to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: nervous system effects such as depression, loss of concentration, weakness, fatigue and nausea.

Long-term: Styrene has the potential to cause the following effects from a lifetime exposure at levels above the MCL: liver and nerve tissue damage; cancer.

How much Styrene is produced and released to the environment?

Production of styrene was 10.7 billion lbs in 1993. It is released into the environment by emissions and effluents from its production and its use in polymer manufacture. Consumers may be exposed to styrene through contact with resin products used in fiberglass boat construction and repair, and in auto body fillers. Styrene may also leach from polystyrene containers used for food products.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, styrene releases to land and water totalled over 2 million lbs. These releases were primarily from adhesives and sealants industries. The largest releases occurred in Texas. The largest direct releases to water occurred in Louisiana.

What happens to Styrene when it is released to the environment?

Styrene released to water rapidly evaporates and is degraded by microbes. It does not bind well to soils and may leach to groundwater, but its rapid break down minimizes this process. It does not tend to accumulate in aquatic life.

How will Styrene be Detected in and Removed from My Drinking Water?

The regulation for styrene became effective in 1992. Between 1993 and 1995, EPA required your water supplier to collect water samples every 3 months for one year and analyze them to find out if styrene is present above 0.5 ppb. If it is present above this level, the system must continue to monitor this contaminant.

If contaminant levels are found to be consistently above the MCL, your water supplier must take steps to reduce the amount of styrene so that it is consistently below that level. The following treatment methods have been approved by EPA for removing styrene: Granular activated charcoal in combination with Packed Tower Aeration.

How will I know if Styrene is in my drinking water?

If the levels of styrene exceed the MCL, 0.1 ppm, the system must notify the public via newspapers, radio, TV and other means. Additional actions, such as providing alternative drinking water supplies, may be required to prevent serious risks to public health.

Drinking Water Standards:

Mclg: 0.1 ppm

Mcl: 0.1 ppm

Styrene Releases to Water and Land, 1987 to 1993 (in pounds):

	Water	Land
TOTALS (in pounds)	**275,888**	**1,796,451**
Top Ten States*		

TX	160,411	572,294
WV	1,600	555,360
IN	0	124,794
WI	0	102,973
OH	0	90,358
GA	0	79,000
LA	53,430	0
FL	0	38,800
NY	32	33,192
KY	0	18,000
Major Industries*		
Adhesives, sealants	0	537,360
Concrete products	0	398,424
Synthetic rubber	152,215	149,147
Misc. plastic products	515	201,713
Plastics and resins	25,133	71,363
Boatbuilding, repair	220	83,256
Car parts, access.	0	79,250
Misc. Indust. organics	34,275	43,290
Travel trailers, campers	0	45,129
Custom plastic resins	720	44,320

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

Learn more about your drinking water!

EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone books government listings are a good starting point.

Your local water supplier can give you a list of the chemicals they test for in your water, as well as how your water is treated.

Your state Department of Health/Environment is also a valuable source of information.

For help in locating these agencies or for information on drinking water in general, call: EPAs Safe Drinking Water Hotline: (800) 426-4791.

For additional information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.