

Answers to Common Questions About Styrene

What is styrene?

Styrene is a clear, colourless liquid that is derived from petroleum and natural gas by-products, but which also occurs naturally. Styrene helps create plastic materials used in thousands of remarkably strong, flexible, and lightweight products, that represent a vital part of our health and well being. It's used in everything from food containers and packaging materials to cars, boats, and computers. For more information on styrene products, see [Uses and Benefits](#).

The styrene used in these products is synthetically manufactured in petrochemical plants. However, styrene also occurs in the environment and is a natural component of many common foods, such as coffee, strawberries and cinnamon.

Some people confuse styrene, which is a liquid, with polystyrene, which is a solid plastic made from polymerised styrene. Styrene and polystyrene are fundamentally different. Polystyrene is inert, and has no smell of styrene, therefore polystyrene often is used in applications where hygiene is important, such as health care and food service products. [+](#)



Do I come into contact with styrene?

Most people are exposed to styrene in tiny amounts that may be present in the air, or that occur in food (styrene is a natural component of foods such as cinnamon, beef, coffee beans, peanuts, wheat, oats, strawberries, and peaches). These generally are trace amounts, which were difficult to detect until recent technological advances. We also may recognise styrene by its distinctive odour when using certain products containing styrene such as polyester resin solutions.

As noted, polystyrene is often used in applications where hygiene is important, such as health care and food service products. Other sections of the Styrene Forum will explain these distinctions, but for specific information on polystyrene products, visit the US [Polystyrene Packaging Council](#) web site or the [Association of Plastics Manufacturers in Europe](#) websites [+](#)

Is styrene harmful to my health?

Styrene is not harmful in the very small amounts most people might sometimes encounter in air or food. Someone working with resin solutions containing styrene (patching the surface of a fibreglass boat, for example) may find the odour of styrene causes slight nausea if instructions to ensure adequate ventilation are not heeded. This goes away with exposure to fresh air, and there is no lasting effect.

As with all chemicals it is important to control one's level of exposure to the product. Guidelines on this are contained in published Safety Data Sheets (SDS), known in US terminology as Material Safety Data Sheets (MSDS), that are produced and updated by the producers of the product. These SDS (MSDS) provide guidelines on the maximum allowable average exposure to the product that is permitted under the relevant country regulation. For those not directly working with the product, typical exposure levels will be well below those permitted. However in the case of an accident or in instances of intentional abuse, potentially dangerous exposure levels could be reached in which case the SDS (MSDS) should be consulted for the appropriate remedial action.

In an important decision made in 1994 after an extensive assessment of its possible health and environmental effects, the government agencies Health Canada and Environment Canada concluded that styrene is "non-toxic" for regulatory purposes. After a thorough review of health effects data and evaluation of potential human and environmental exposures, they found styrene "does not constitute a danger to human life and health" and "does not constitute a danger to the environment on which human life depends."

As part of a continuing effort to protect health and the environment, the European Union and the U.S. Environmental Protection Agency currently are both conducting formal reviews that will provide assessments of the scientific data on styrene.

For more information on styrene health effect research, visit the [Styrene Information & Research Centre](#). [+](#)

What about the safety of polystyrene food packaging?

Recent, independent scientific studies show that polystyrene food and beverage containers, ranging from ice cream containers to hot noodle cups, are safe for normal everyday use. However, over the last few years, there have been misleading reports in the news that some components of polystyrene might migrate from food containers into the food during [microwaving](#) or heating, causing oestrogenic and potentially adverse health effects in consumers. So-called environmental oestrogens cover both natural and man-made substances in the environment that are said to act like oestrogens (hormones that occur naturally in both plants and animals).

The styrene industry has always taken seriously its obligation for product safety. After the first studies suggesting effects were published, the industry conducted further research under the supervision of independent laboratories. It is worth mentioning that all these studies simulated highly exaggerated exposure conditions: the dose selected for one of the studies was equivalent to a daily intake of yoghurt of 5,000 grams per person - far more than even the most fanatic enthusiast eats in a day!

The research, conducted in Europe, the United States and Japan, clearly supports the conclusion that it is safe to eat hot or cold foods packaged in polystyrene. These conclusions are consistent with the findings of the Ministry of Health in Japan, which recently said that there is no reason to regulate the use of polystyrene products in relation to potential concerns over environmental oestrogens.

It is also worth emphasising that, in all industrialised countries, materials used in containers for food contact are subjected to rigorous testing. Health agencies like the US Food and Drug Administration or the European Scientific Committee on Food set tight industry standards with high safety factors that all packaging materials must meet in order to be used for food contact. This way, consumers can feel confident that the products they use under normal conditions are safe: and that is of course also the case with polystyrene. [+](#)

What about the odour of styrene?

Styrene's distinctive odour can be detected even when styrene is present at extremely low levels - levels that are many, many times below any possible health effect concern level. People living near facilities that make or use styrene may occasionally notice a slight scent of it in the air. [+](#)



What happens to styrene if it is released into the environment?

Extensive research has shown that styrene exists only briefly in the environment; it is rapidly destroyed in the air and disappears quickly from soils and surface waters. Studies also have shown that styrene is not likely to occur in drinking water. [+](#)

What about the health of workers exposed to styrene?

The health of workers in plants making or using styrene has been monitored for many years. Studies looking for long-term health effects related to styrene exposure have examined health records of over 50,000 workers exposed to styrene, going back nearly 50 years. Collectively these studies have not shown any long-term health problems attributable to styrene exposure in these workers.

In most industrialised countries there are strict regulations protecting worker health. While styrene exposure regulations differ, all are designed to be protective of persons exposed to styrene in the workplace.

For more information on styrene health effect research, visit the [Styrene Information & Research Centre](#). [+](#)

Is there a concern about a risk of cancer?

The styrene industry has invested many years of effort, and nearly \$12 million in funding state-of-the-art independent research, to develop the most thorough and accurate information about possible cancer effects resulting from styrene exposure.

The results of extensive health studies of workers in styrene-related industries collectively show that exposure to styrene does not increase the risk of developing cancer, or any other health effect. Results of a two-year styrene inhalation study in rats, completed in 1996, also showed no increased incidence of cancer. Studies in mice have shown effects in the lung. However, extensive subsequent research on these findings indicates the effects are likely unique to the mouse, based on the molecular response of the mouse lung to styrene, and would not suggest a human health concern.

From a regulatory viewpoint, in 1989, the U.S. Occupational Safety and Health Administration (OSHA) and its research arm, the National Institute for Occupational Safety and Health (NIOSH), reviewed the health data on styrene and concluded that styrene does not pose any cancer risk. An international panel of experts from the 12-nation European Community reached the same conclusion in 1988. Canada decided in 1994 that styrene posed no carcinogenic risk.

In 1987, the International Agency for Research on Cancer (IARC), in Lyon, France upgraded styrene's classification to a "possible" human carcinogen. Many scientists have disputed this action because it was not based on new cancer data, but resulted from changes in the criteria for IARC classifications. They feel the significant amount of available scientific data indicates this classification is not warranted, and have tried to readdress this decision. IARC recently announced it would review styrene again in February 2002.

It is important to note that IARC's charter stresses that their classifications are for hazard identification only - not to determine the risk of a given substance - and should not be used for regulatory purposes.

For more information on styrene health effect research, visit the [Styrene Information & Research Centre](#). [+](#)

Are there any alternatives for styrene-based products?

When designers select one specific material for one specific application, they do it after considering the general cost-benefits balance. In many applications, no other material can provide the same combination of performance characteristics, quality, and cost-effectiveness of styrene-based products. For example, by using styrene, packaging is more sanitary and less costly, automobiles have lighter components making them more fuel-efficient, boats are more structurally sound, and building insulation quality has greatly improved, helping to cut energy costs. [+](#)