Product Stewardship Summary
for Styrene Monomer

This Product Stewardship Summary provides high level information to the public regarding the product safety of the subject chemical product. This summary is not intended to provide detailed information regarding emergency or medical treatment or detailed environmental and health information. Please refer to AmSty's Styrene Monomer Safety Data Sheet (SDS) for specific information related to this chemical.

Product Overview

Styrene monomer is commercially manufactured in production plants and is used globally as a building block in the production of a variety of plastic and rubber products. Styrene is used as a feedstock to produce polystyrene (PS) primarily but is also used for acrylonitrile-butadiene styrene (ABS), styrene acrylonitrile (SAN), expanded polystyrene, polyester, styrene-butadiene rubber (SBR), and styrene thermoplastic elastomers.

Chemical Identity

Product Name: Styrene Monomer
Common Names: Styrene monomer (inhibited), Vinylbenzene, Phenylethene, Phenylethylene, Ethenylbenzene
CAS No.: 100-42-5
EC No.: 202-851-5
EEC Annex I Index No: 601-026-00-0

Product Uses/Benefits

Styrene-derived products are used in the manufacture of industrial and consumer good applications which are a benefit to society and are able to be recycled. These end-use applications include the below:

- Appliances
- Automobile components
- Adhesives
- Food packaging
- Medical
- Printer toner
- Paints and inks
- Electronics
- Lubricants
- Carpet backing
- Coatings
- Construction
- Furniture
- Recreational equipment
- Tires
- Toys

Physical/Chemical Properties

Under ambient conditions, styrene is a colorless liquid with a sweet aromatic odor. Its low odor threshold allows it to be easily detected at levels below the occupational exposure limits. Styrene supplied by AmSty is inhibited with tertiary-butylcatechol (TBC), CAS No.98-29-3. If the inhibitor level is not maintained, uncontrolled exothermic polymerization may occur with exposure to heat or direct sunlight. Please refer to the Styrene Producers Association Safe Handling Guide for detailed information.

Styrene is classified as a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200 and is classified as a Flammable Liquid, Category 3 under GHS (Globally Harmonized System) classification and labeling.

Odor threshold: Air: 0.1 ppm
Relative density: 0.91 (literature)
Molecular formula: C8-H8
Molecular weight: 104.14 g/mol
Melting point/Freezing point: -23.1 °F/ -31.0 °C
Vapor Density: 3.6
Vapor pressure: 0.67 kPa at 68°F/20 °C
Boiling point: 293 °F/145 °C
Explosion limits in air: 0.9 - 6.8%vol
Flash point: 87.8 °F/31.0 °C
Autoignition temperature: 914 °F/490 °C
Partition coefficient (n-octanol/water): 2.95

Exposure Potential

Health Effects

The below table summarizes the toxicological effects of styrene.

Toxicological Category	Human Health Effects
Acute Toxicity (Inhalation/oral)	• Inhalation – Harmful • Oral (ingestion) – Droplets aspirated into the lungs may cause serious chemical pneumonia which can be fatal
Skin and Eye	• Skin contact – Irritating • Eye contact – Serious eye irritation
Sensitization	Not classified as a skin sensitizer
Chronic Toxicity – repeated exposure	Causes damage to organs
Carcinogenicity	• International Agency for Research on Cancer (IARC) – Group 2A (Probably carcinogenic to human) • NTP – Reasonably anticipated to be a human carcinogen
Specific target organ toxicity – single exposure	May cause respiratory irritation
Specific target organ toxicity – repeated exposure	Causes damage to organs (auditory systems)
Mutagenicity/Genotoxicity	No data available to indicate effects
Reproductive Toxicity	Not classified

Environmental Effects

Styrene is not classified as an environmental hazardous chemical. Styrene is not bio-accumulative and readily biodegrades and evaporates. Styrene can be acutely toxic to aquatic organisms; however, it is quickly metabolized and excreted by aquatic organisms so bioaccumulation is not expected to occur.

Exposure Information

Consumers

Americas Styrenics does not sell styrene monomer for direct consumer use as it is used only for industrial use. Due to the use of styrene as a basic building block for plastics and rubbers used for consumer applications, consumers could be exposed to residual styrene in these consumer goods. Styrene is also naturally occurring in some foods such as strawberries, coffee beans, peanuts, and cinnamon as well as combustion products such as car exhaust or cigarette smoke.

Workers

Exposure for workers can occur either in a manufacturing facility or in the various industrial or manufacturing facilities that use this product. Each facility should have a thorough training program for employees and appropriate work processes, engineering controls, and personal protective equipment to maintain exposure levels below the exposure limits that have been established for styrene. The below table summarizes the Occupational Exposure Limits for styrene.

	Type	Value
U.S. OSHA Table Z-2 (29 CFR 1910.1000)	Ceiling TWA	200 ppm 100 ppm
U.S. ACGIH Threshold Limit Values	STEL TWA	20 ppm 10 ppm
U.S. NIOSH: Pocket Guide to Chemical Hazards Material	STEL TWA	425 mg/m^3 100 ppm 215 mg/m^3 50 ppm

Risk Management/Product Stewardship

Americas Styrenics LLC has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our Product Stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employees, public health and our environment. The success of our Product Stewardship program rests with every individual involved with Americas Styrenics LLC products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Chemical recycling allows styrene monomer to be recycled from post-consumer use polystyrene at AmSty's joint venture Regenyx. More information is available on the AmSty website Regenyx Sustainability.

Only trained personnel should handle styrene. Please refer to the below information found on the AmSty Styrene Monomer product website:

1. AmSty Styrene Monomer Safety Data Sheet (SDS): https://amsty.com/products/styrene-monomer
2. Styrene Monomer: Safe Handling Guide issued by Plastics Europe/Styrene Producers Association(SPA) available on our AmSty website and https://www.plasticseurope.org/application/files/6115/4453/7896/Styrene_HSE_brochure_EN_20181211.pdf.

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