Chemical Safety Data Sheet MSDS / SDS

# Styrene SDS

Revision Date:2024-04-25 Revision Number:1



## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### Product identifier

Product name: Styrene

CAS: 100-42-5

### Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: For R&D use only. Not for medicinal, household or other use.

Uses advised against: none

### Company Identification

Company: Chemicalbook.in

Address: 5 vasavi Layout Basaveswara Nilayam Pragathi Nagar Hyderabad, India -500090

Telephone: +91 9550333722

## SECTION 2: Hazards identification

### Classification of the substance or mixture

Flammable liquids, Category 3
Skin irritation, Category 2

Eye irritation, Category 2
Acute toxicity - Category 4, Inhalation
Specific target organ toxicity – repeated exposure, Category 1
Reproductive toxicity, Category 2

**GHS label elements, including precautionary statements**

Pictogram(s)

Signal word Danger

**Hazard statement(s)**

H226 Flammable liquid and vapour
H315 Causes skin irritation
H319 Causes serious eye irritation
H332 Harmful if inhaled
H372 Causes damage to organs through prolonged or repeated exposure

**Precautionary statement(s)**

**Prevention**

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P240 Ground and bond container and receiving equipment.
P241 Use explosion-proof [electrical/ventilating/lighting/…] equipment.
P242 Use non-sparking tools.
P243 Take action to prevent static discharges.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/…
P264 Wash … thoroughly after handling.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P271 Use only outdoors or in a well-ventilated area.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P270 Do not eat, drink or smoke when using this product.
P203 Obtain, read and follow all safety instructions before use.

**Response**

P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse affected areas with water [or shower].
P370+P378 In case of fire: Use … to extinguish.

P302+P352 IF ON SKIN: Wash with plenty of water/...
P321 Specific treatment (see ... on this label).
P332+P317 If skin irritation occurs: Get medical help.
P362+P364 Take off contaminated clothing and wash it before reuse.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P317 Get medical help.
P319 Get medical help if you feel unwell.
P318 IF exposed or concerned, get medical advice.

**Storage**

P403+P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.

**Disposal**

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

**Other hazards which do not result in classification**

no data available

## SECTION 3: Composition/information on ingredients

**Substance**

| | |
|---|---|
| Chemical name: | Styrene |
| Common names and synonyms: | Styrene |
| CAS number: | 100-42-5 |
| EC number: | 202-851-5 |
| Concentration: | 100% |

## SECTION 4: First aid measures

### Description of necessary first-aid measures

#### If inhaled

Fresh air, rest. Refer for medical attention.

#### Following skin contact

Remove contaminated clothes. Rinse and then wash skin with water and soap.

#### Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

#### Following ingestion

Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Rest.

### Most important symptoms/effects, acute and delayed

Moderate irritation of eyes and skin. High vapor concentrations cause dizziness, drunkeness, and anesthesia. (USCG, 1999) Excerpt from ERG Guide 133 [Flammable Solids]: Fire may produce irritating and/or toxic gases. Contact may cause burns to skin and eyes. Contact with molten substance may cause severe burns to skin and eyes. Runoff from fire control may cause pollution. (ERG, 2016)

### Indication of immediate medical attention and special treatment needed, if necessary

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. Aromatic hydrocarbons and related compounds

## SECTION 5: Firefighting measures

### Suitable extinguishing media

Use water spray to cool unopened containers.

### Specific hazards arising from the chemical

Behavior in Fire: Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back. At elevated

temperatures such as in fire conditions, polymerization may take place which may lead to container explosion. (USCG, 1999) Excerpt from ERG Guide 133 [Flammable Solids]: Flammable/combustible material. May be ignited by friction, heat, sparks or flames. Some may burn rapidly with flare-burning effect. Powders, dusts, shavings, borings, turnings or cuttings may explode or burn with explosive violence. Substance may be transported in a molten form at a temperature that may be above its flash point. May re-ignite after fire is extinguished. (ERG, 2016)

### Special protective actions for fire-fighters

Use dry powder. Use foam. Use carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

## SECTION 6: Accidental release measures

### Personal precautions, protective equipment and emergency procedures

Personal protection: chemical protection suit including self-contained breathing apparatus. Remove all ignition sources. Do NOT let this chemical enter the environment. Do NOT wash away into sewer. Collect leaking and spilled liquid in covered containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

### Environmental precautions

Personal protection: particulate filter respirator adapted to the airborne concentration of the substance. Ventilation. Remove all ignition sources. Sweep spilled substance into covered suitable, labelled containers.

### Methods and materials for containment and cleaning up

If styrene is spilled or leaked ... /in/ small quantities, absorb on paper towels. Evaporate in a safe place (such as a fume hood). Allow sufficient time for evaporating vapors to completely clear the hood ductwork. Burn the paper in a suitable location away from combustible materials. Large quantities can be collected and atomized in a suitable combustion chamber. Combustion may be improved by mixing with a more flammable liq.

## SECTION 7: Handling and storage

### Precautions for safe handling

NO open flames, NO sparks and NO smoking. Above 31°C use a closed system, ventilation and explosion-proof electrical equipment. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

### Conditions for safe storage, including any incompatibilities

Fireproof. Separated from incompatible materials. See Chemical Dangers. Cool. Keep in the dark. Store only if stabilized. Store in an area without drain or sewer access.Must be inhibited during storage.

## SECTION 8: Exposure controls/personal protection

### Control parameters

### Occupational Exposure limit values

TLV: 20 ppm as TWA; 40 ppm as STEL; A4 (not classifiable as a human carcinogen); BEI issued.MAK: 86 mg/m3, 20 ppm; peak limitation category: II(2); carcinogen category: 5; pregnancy risk group: C

### Biological limit values

no data available

### Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

### Individual protection measures, such as personal protective equipment (PPE)

### Eye/face protection

Wear safety goggles or eye protection in combination with breathing protection.

### Skin protection

Protective clothing. Protective gloves.

### Respiratory protection

Use ventilation, local exhaust or breathing protection.

### Thermal hazards

no data available

## SECTION 9: Physical and chemical properties and safety characteristics

| | |
|---|---|
| **Physical state:** | STYRENE MONOMER, STABILIZED is a clear colorless to dark liquid with an aromatic odor. Vapors heavier than air and irritating to the eyes and mucous membranes. Subject to polymerization. If the polymerization takes place inside a closed container, the container may rupture violently. Less dense than water and insoluble in water. Used to make plastics, paints, and synthetic rubber. |
| **Colour:** | Colorless to yellowish, oily liquid |
| **Odour:** | Extremely penetrating |
| **Melting point/freezing point:** | -31°C(lit.) |
| **Boiling point or initial boiling point and boiling range:** | 145°C |
| **Flammability:** | Class IC Flammable Liquid: Fl.P. at or above 73°F and below 100°F. |
| **Lower and upper explosion limit/flammability limit:** | Lower flammable limit: 0.9% by volume; Upper flammable limit: 6.8% by volume |
| **Flash point:** | 32°C(lit.) |
| **Auto-ignition temperature:** | 914° F (USCG, 1999) |
| **Decomposition temperature:** | no data available |
| **pH:** | no data available |
| **Kinematic viscosity:** | 0.696 cP at 25 deg C |
| **Solubility:** | less than 1 mg/mL at 66° F (NTP, 1992) |
| **Partition coefficient n-octanol/water:** | log Kow = 2.95 |
| **Vapour pressure:** | 12.4 mm Hg ( 37.7 °C) |
| **Density and/or relative density:** | 0.906 |

| | |
|---|---|
| Relative vapour density: | 3.6 (vs air) |
| Particle characteristics: | no data available |

## SECTION 10: Stability and reactivity

### Reactivity

Decomposes above 300°C . This produces toxic fumes including styrene. Decomposes on burning. This produces irritating fumes. Reacts with strong oxidants.
The substance can form explosive peroxides. The substance may polymerize due to warming, under the influence of light, oxidants, oxygen and peroxides. This generates fire and explosion hazard. Reacts violently with strong acids and strong oxidants. This generates fire and explosion hazard. Attacks rubber, copper and copper alloys.

### Chemical stability

On exposure to light and air it slowly undergoes polymerization and oxidation with formation of peroxides.

### Possibility of hazardous reactions

Flammable liquid.STYRENE MONOMER is a colorless, oily liquid, moderately toxic, flammable. A storage hazard above 32°C, involved in several industrial explosions caused by violent, exothermic polymerization [Bond, J., Loss Prev. Bull., 1985, (065), p. 25]. Polymerization becomes self-sustaining above 95°C [MCA SD-37, 1971]. Presence of an inhibitor lessens but does not eliminate the possibility of unwanted polymerization. Violent polymerization leading to explosion may be initiated by peroxides (e.g., di-tert-butyl peroxide, dibenzoyl peroxide), butyllithium, azoisobutyronitrile. Reacts violently with strong acids (sulfuric acid, oleum, chlorosulfonic acid), strong oxidizing agents [Lewis, 3rd ed., 1993, p. 1185]. Reacts with oxygen above 40°C to form explosive peroxide [Barnes, C. E. et al., J. Amer. Chem. Soc., 1950, 72, p. 210]. Oxidizes readily in air to form unstable peroxides that may explode spontaneously [Bretherick 1979 p.151-154, 164]. Mixing styrene in equal molar portions with any of the following substances in a closed container caused the temperature and pressure to increase: chlorosulfonic acid, oleum, and sulfuric acid [NFPA 1991].

### Conditions to avoid

no data available

### Incompatible materials

Oxidizers, catalysts for vinyl polymers, peroxides, strong acids, aluminum chloride [Note: May polymerize if contaminated or

subjected to heat. Usually contains an inhibitor such as tert-butylcatechol].

### Hazardous decomposition products

When heated to decomposition it emits acrid smoke and irritating fumes.

## SECTION 11: Toxicological information

### Acute toxicity

Oral: LD50 Rat oral, male and female 5000 mg/kg

Inhalation: LC50 Rat inhalation 24 g/cu m/4 hr

Dermal: no data available

### Skin corrosion/irritation

no data available

### Serious eye damage/irritation

no data available

### Respiratory or skin sensitization

no data available

### Germ cell mutagenicity

no data available

### Carcinogenicity

NTP: Reasonably anticipated to be a human carcinogen

### Reproductive toxicity

Human studies have not reported an increase in developmental effects in women who worked in the plastics industry, while an increased frequency of spontaneous abortions and a decreased frequency of births were reported in a study on the reproductive effects of styrene in humans. However, these studies are not conclusive, due to the lack of exposure data and confounding factors.

(,2) Animal studies have not reported developmental or reproductive effects from inhalation exposure to styrene. Lung tumors have been observed in the offspring of orally exposed mice. (12)

### STOT-single exposure

The substance is irritating to the eyes, skin and respiratory tract. If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure at high levels could cause unconsciousness.

### STOT-repeated exposure

The substance defats the skin, which may cause dryness or cracking. The substance may have effects on the central nervous system. Exposure to the substance may increase noise-induced hearing loss. This substance is possibly carcinogenic to humans. See Notes.

### Aspiration hazard

A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.

## SECTION 12: Ecological information

### Toxicity

Toxicity to fish: LC50; Species: Lepomis macrochirus (Bluegill) length 3.8-6.4 cm, weight 1-2 g; Conditions: freshwater, static, 25 deg C, pH 7.5, hardness 20 mg/L CaCO3, alkalinity 18 mg/L CaCO3, dissolved oxygen 7.8 mg/L; Concentration: 25050 ug/L for 24 hr (95% confidence interval: 19030-33530 ug/L) /formulation

Toxicity to daphnia and other aquatic invertebrates: LC50; Species: Daphnia magna (Water Flea) age < or =24 hr; Conditions: freshwater, flow through, 20-21 deg C, pH 7.5-8.0, hardness 170-180 mg/L CaCO3, alkalinity 110-120 mg/L CaCO3, dissolved oxygen 5.8-8.4 mg/L; Concentration: 5000 ug/L for 24 hr (95% confidence interval: 3300-7400 ug/L) /99.929% purity

Toxicity to algae: EC50; Species: Pseudokirchneriella subcapitata (Green Algae) 1X10+4 cells/mL; Conditions: freshwater, static, 24-25 deg C, pH 7.6-9.4; Concentration: 3900 ug/L for 24 hr (95% confidence interval: 220-66000 ug/L); Effect: decreased population abundance /99.929% purity

Toxicity to microorganisms: no data available

### Persistence and degradability

AEROBIC: Styrene biodegraded 97 and 87% in 16 weeks in a landfill soil and sandy loam soil, respectively. Degradation was not detected in sterile soil(1). Styrene was biodegraded at all experimental concentrations in soil, but decreased with an increase in

styrene concentration; 62% at 20 ug/kg to 16% at 1000 mg/kg(2). The rate of microbial transformation varied in different soils and was notably slower in an acid silt loam (pH 4.87)(2). Degradation of styrene of 2.3 to 4.3% per week and 3.8-12.0% per week in subsurface soil was shown with samples taken directly above and below aquifers from Pickett, OK and Fort Polk, LA, respectively; degradation in autoclave samples was not observed(3).

### Bioaccumulative potential

A BCF of 13.5 for goldfish was determined for styrene(1). According to a classification scheme(2), this BCF suggests bioconcentration in aquatic organisms is low(SRC). Calculated biomagnification of styrene in water respiring organisms (zooplankton, forage and predatory fish) and air breathing organisms (reptile, amphibian, sea bird, marine mammal, terrestrial herbivore and carnivore, human) were all <1(3).

### Mobility in soil

The log Koc of styrene is reported to be 2.96(1). According to a classification scheme(2), this Koc value suggests that styrene is expected to have low mobility in soil. More than 85% of styrene is sorbed in 78 hrs on samples from a sandy aquifer(3). Styrene is retained by particulates particularly in organic matter-rich soils(3). Of styrene that had been allowed to sorb for 3 days, 61.0 and 66.7% was desorbed in 16 days from soil and aquifer soils, respectively(4).

### Other adverse effects

no data available

## SECTION 13: Disposal considerations

### Disposal methods

### Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

### Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

## SECTION 14: Transport information

### UN Number

ADR/RID: UN2055 (For reference only, please check.)
IMDG: UN2055 (For reference only, please check.)
IATA: UN2055 (For reference only, please check.)

### UN Proper Shipping Name

ADR/RID: STYRENE MONOMER, STABILIZED (For reference only, please check.)
IMDG: STYRENE MONOMER, STABILIZED (For reference only, please check.)
IATA: STYRENE MONOMER, STABILIZED (For reference only, please check.)

### Transport hazard class(es)

ADR/RID: 3 (For reference only, please check.)
IMDG: 3 (For reference only, please check.)
IATA: 3 (For reference only, please check.)

### Packing group, if applicable

ADR/RID: III (For reference only, please check.)
IMDG: III (For reference only, please check.)
IATA: III (For reference only, please check.)

### Environmental hazards

ADR/RID: No
IMDG: No
IATA: No

### Special precautions for user

no data available

### Transport in bulk according to IMO instruments

no data available

## SECTION 15: Regulatory information

**Safety, health and environmental regulations specific for the product in question**

**European Inventory of Existing Commercial Chemical Substances (EINECS)**

Listed.

**EC Inventory**

Listed.

**United States Toxic Substances Control Act (TSCA) Inventory**

Listed.

**China Catalog of Hazardous chemicals 2015**

Listed.

**New Zealand Inventory of Chemicals (NZIoC)**

Listed.

**(PICCS)**

Listed.

**Vietnam National Chemical Inventory**

Listed.

**IECSC)**

Listed.

**Korea Existing Chemicals List (KECL)**

Listed.

## SECTION 16: Other information

**Abbreviations and acronyms**

CAS: Chemical Abstracts Service

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

IMDG: International Maritime Dangerous Goods

IATA: International Air Transportation Association

TWA: Time Weighted Average

STEL: Short term exposure limit

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

**References**

IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home

HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm

IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/

eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en

CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple

ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp

ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg

Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

ECHA - European Chemicals Agency, website: https://echa.europa.eu/

**Other Information**

Depending on the degree of exposure, periodic medical examination is suggested.Check for peroxides prior to distillation; eliminate if found.Styrene monomer vapours are uninhibited and may form polymers in vents or flame arresters of storage tanks, resulting in blockage of vents.Do NOT take working clothes home.