

## Safety Data Sheet

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### 1. Chemical product and company identification

Product name : Styrene

#### Company information

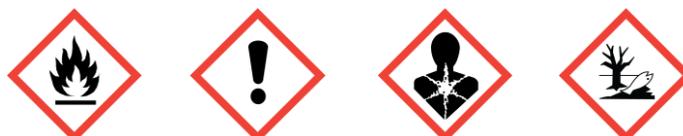
Name of manufacturer : KANTO CHEMICAL CO., INC.  
 Address : 2-1, Nihonbashi, Muromachi 2-Chome, Chuo-Ku, Tokyo, 103-0022, JP  
 Name of section : Business Administration Department, Reagent Division  
 Telephone number : +81-3-6214-1090  
 Facsimile number : +81-3-3241-1047  
 Mail address : BC32@kanto.co.jp  
 Reference No : 37360  
 Recommended use : For research use only  
 Restrictions on use : Seek expert judgment when using the product for applications other than those recommended.

### 2. Hazards identification

#### GHS classification

Physical hazards	Flammable liquids	Category 3
	Self-reactive substances and mixtures	Type G
Health hazards	Acute toxicity (inhalation:vapors)	Category 4
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Germ cell mutagenicity	Category 2
	Carcinogenicity	Category 1B
	Reproductive toxicity	Category 1B
	Specific target organ toxicity (single exposure)	Category 1 (central nervous system)
	Specific target organ toxicity (single exposure)	Category 3 (narcosis)
	Specific target organ toxicity (single exposure)	Category 3 (respiratory tract irritation.)
	Specific target organ toxicity (repeated exposure)	Category 1 (nervous system, auditory organs, visual organs, respiratory organs, liver)
Aspiration hazard	Category 1	
Environmental hazards	Aquatic acute	Category 1
	Aquatic chronic	Category 2

Hazard pictograms



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Signal word	: Danger
Hazard statements	: Flammable liquid and vapor May be fatal if swallowed and enters airways Causes skin irritation Causes serious eye irritation Harmful if inhaled May cause respiratory irritation May cause drowsiness or dizziness Suspected of causing genetic defects May cause cancer May damage fertility or the unborn child Causes damage to organs (central nervous system) Causes damage to organs (nervous system, auditory organs, visual organs, respiratory organs, liver) through prolonged or repeated exposure Very toxic to aquatic life Toxic to aquatic life with long lasting effects
Precautionary statements	
Prevention	: Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Keep container tightly closed. Ground and bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take action to prevent static discharges. Do not breathe mist/vapors. Wash hands, forearms and face thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.
Response	: IF SWALLOWED: Immediately call a POISON CENTER or doctor. IF ON SKIN: Wash with plenty of water. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water . IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF exposed or concerned: Call a POISON CENTER or doctor. IF exposed or concerned: Get medical advice/attention. Call a POISON CENTER or doctor if you feel unwell. Get medical advice/attention if you feel unwell. Do not induce vomiting. If skin irritation occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. Collect spillage.
Storage	: Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool.



Store locked up.

Disposal : Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

### 3. Composition/information on ingredients

Distinction of substance or mixture : Substance

Synonyms : Vinylbenzene

Chemical name	Concentration (%)	Formula	TSCA	EC-No.	CAS RN
Styrene	≥ 99	C <sub>8</sub> H <sub>8</sub>	Listed	202-851-5	100-42-5

\*Stabilized with 4-tert-butylpyrocatechol.

### 4. First aid measures

#### First aid measures

First-aid measures after inhalation : Remove the victim to fresh air, and make him blow his nose and gargle. If necessary, get medical treatment.

First-aid measures after skin contact : Wash the affected areas under running water.

First-aid measures after eye contact : Wash the affected areas under running water for at least 15 minutes. If necessary, get medical treatment.

First-aid measures after ingestion : The chemical is volatile. Do not induce vomiting because it increases the risk of aspiration into the lungs. Get medical attention immediately. If necessary, rinse mouth with water.

Personal Protection in First Aid and Measures : Rescuers should wear proper protective equipment like rubber gloves, goggles.

### 5. Fire fighting measures

Suitable extinguishing media : Dry chemical powder, carbon dioxide, dry sand, foam

Unsuitable extinguishing media : Water spray

Firefighting instructions : Move containers from fire area if it can be done without risk, if not possible, apply water from a safe distance to cool and protect surrounding area.

Fight fire from windward.

Dry chemical powder, carbon dioxide or dry sand should be used for small fires. Foam extinguisher is effective for a large scale fire.

Personal protection (Emergency response) : Firefighters should wear protective equipment.

### 6. Accidental release measures

#### Personal Precautions, Protective Equipment and Emergency Procedures

General measures : Wear proper protective equipment and avoid contact with skin and inhalation of vapor. Conduct operations from upwind and evacuate people downwind. Remove all sources of ignition. Keep away



personnel except for authorized ones from spillage area by stretching ropes.

**Environmental precautions**

Environmental precautions : Attention should be given to avoid damage to the environment by flowing of spillage to rivers.

**Methods and Equipment for Containment and Cleaning up**

For containment : Absorb spill with inert material (e.g, diatomaceous earth, sand) and flush spillage area with copious amounts of water.  
Prevention Measures for Secondary Accidents : Remove nearby sources of ignition and prepare extinguishing media.

**7. Handling and storage**

**Handling**

Technical measures : Wear proper protective equipment to avoid contact with skin or inhalation of vapor. Fire is strictly prohibited.  
Precautions for safe handling : Use with an enclosed system or a local exhaust ventilation. Use in well-ventilated areas.

**Storage**

Storage conditions : Keep the bottle tightly closed and store in a cool place (below 30 °C).  
Material used in packaging/containers : Glass, fluorine resin.

**8. Exposure controls / Personal protection equipment**

ACGIH TWA	10 ppm
ACGIH STEL	20 ppm

Appropriate engineering controls : Use with an enclosed system or a local exhaust ventilation.

**Protective equipment**

Respiratory protection : If necessary, wear chemical cartridge respirator with an organic vapor cartage  
Hand protection : Organic solvents resistant gloves  
Eye protection : Safety goggles  
Skin and body protection : Protective clothing, protective boots

**9. Physical and chemical properties**

Physical state : Liquid  
Color : Colorless.  
Odor : Pungent.  
pH : Neutral  
Melting point : -30.628 ° C  
Freezing point : No data available  
Boiling point : 145.14 ° C  
Flash point : 32.2 ° C (C.C.)  
Auto-ignition temperature : 490 ° C

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Decomposition temperature	: No data available
Flammability	: Flammable
Vapor pressure	: 8.4 hPa (25°C)
Relative density	: 0.905 - 0.911 (20/20°C)
Density	: No data available
Relative gas density	: 4.7
Solubility	: Organic solvents: Miscible with many kinds of organic solvents like ethanol, diethyl ether, acetone. Water: 0.031 % (25°C)
Partition coefficient n-octanol/water (log Pow)	: 2.95
Explosive limits (vol %)	: 1.1 - 6.1 vol %
Viscosity, kinematic	: 0.77 mm <sup>2</sup> /s (25°C)
Particle characteristics	: No data available

## 10. Stability and reactivity

Reactivity	: It has radical, anion, and cation polymerizable properties. Ethylbenzene and ethylcyclohexane are produced by catalysts such as platinum and nickel. When oxidized with chromium oxide, it becomes benzoic acid.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: The autocatalytic exothermic polymerization reaction is caused by heating.
Conditions to avoid	: Light, heat.
Incompatible materials	: Oxidizing substances.
Hazardous decomposition products	: Carbon monoxide.

## 11. Toxicological information

Acute toxicity (oral)	: No classification rat LD50=2650mg/kg
Acute toxicity (dermal)	: Classification not possible
Acute toxicity (inhalation)	: No classification (gas) Harmful if inhaled (vapor) rat LC50=2700ppm/4h Classification not possible (dust, mist)
Skin corrosion/irritation	: Causes skin irritation There are reports that in skin irritation tests with rabbits, significant irritation and partial degeneration of the skin were observed, and a description that this substance is irritating to the skin and causes redness and pain due to the contact with the skin. From the above, it was classified into category 2.
Serious eye damage/irritation	: Causes serious eye irritation There is a report that conjunctival redness, conjunctivitis, lacrimation, etc. were seen in an eye irritation test (OECD TG 405) with rabbits, and conjunctival redness was observed until the 7th day in one of 4 animals. From the above, based on the description of the moderate irritation in the animal tests, it was classified into category 2A.
Respiratory sensitization	: Classification not possible
Skin sensitization	: Classification not possible



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- Germ cell mutagenicity : Suspected of causing genetic defects  
As for in vivo, it was positive and negative in micronucleus tests with mouse bone marrow cells, negative in micronucleus tests with bone marrow cells and peripheral blood lymphocytes of rats, a micronucleus test with chinese hamster bone marrow cells, negative in a chromosomal aberration test with mouse bone marrow cells, positive and negative in chromosomal aberration tests with rat bone marrow cells, negative in a chromosomal aberration test with chinese hamster bone marrow cells, positive in sister chromatid exchange tests with mouse bone marrow cells and rat peripheral blood lymphocytes, positive or negative in DNA strand break tests with mouse bone marrow cells and rat peripheral blood lymphocytes, and negative in an unscheduled DNA synthesis test with mouse liver. As for in vitro, there were positive and negative results in all of bacterial reverse mutation tests, gene mutation tests, micronucleus tests, chromosomal aberration tests, and sister chromatid exchange tests with cultured mammalian cells. From the above, it was classified into category 2.
- Carcinogenicity : May cause cancer  
IARC classifies it as group 2A (probably carcinogenic to humans).
- Reproductive toxicity : May damage fertility or the unborn child  
From the above, as for humans, no data related to the exposure concentrations were obtained for the increase in the risk of infertility and abnormalities of pregnancy and birth and styrene exposure, there were so many confounding factors in reported reproductive effects, and evidence for effects on humans was not sufficient, but in animal experiments, effects on the next generation were shown in many experiments, therefore, Japan Society for Occupational Health classified it as reproductive toxicant group 2. Therefore, it was classified into category 1B.
- STOT-single exposure : Causes damage to organs (central nervous system)  
May cause drowsiness or dizziness  
May cause respiratory irritation  
This substance is irritating to the respiratory tract and has narcotic effects at high concentrations. As for humans, there are reports of incoordination, impairment of balance sense, slight muscle weakness, vestibular-oculomotor disorder and acute neurotoxicity, and reports of dizziness, lethargy, headaches, nausea, vomiting, weakness, and loss of consciousness in the inhalation route and nausea and vomiting in the oral route. As for experimental animals, there are reports of hypoactivity, stupor, incoordination, tremors, and coma by inhalation exposure in rats. From the above, it was classified into category 1 (central nervous system), category 3 (respiratory tract irritation, narcosis).



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- STOT-repeated exposure : Causes damage to organs (nervous system, auditory organs, visual organs, respiratory organs, liver) through prolonged or repeated exposure  
 As the main effects of occupational exposure to styrene, color-vision impairment, as well as peripheral and autonomic neuropathies, neurobehavioral effects, abnormal EEG, and short-term memory impairment have been reported. In addition, there are multiple reports of effects on the central nervous system, including color blindness and high-frequency hearing loss, in humans. Inhalation exposure to rats for 8 weeks resulted in mild hypersecretion and increased electron-dense material in the nasal mucosa at 30 ppm or more, vacuolation of epithelial cells, pyknotic changes, and desquamation in the nasal cavity and trachea at 800 ppm. Thus, it was classified into category 1 (nervous system, auditory organ, visual organs, respiratory organs, liver).
- Aspiration hazard : May be fatal if swallowed and enters airways  
 There is no evidence based on direct cases in humans, but this substance is a hydrocarbon, and the kinetic viscosity is calculated to be 0.772 mm<sup>2</sup>/sec (25°C). Therefore, it was classified into category 1.

## 12. Ecological information

### Ecotoxicity

- Aquatic acute : Very toxic to aquatic life  
 Pseudokirchneriella subcapitata EC50=0.72mg/L/96h
- Aquatic chronic : Toxic to aquatic life with long lasting effects  
 Pseudokirchneriella subcapitata NOEC=0.063mg/L/96h

### Persistence and degradability

Readily biodegradable  
 BOD : 100%

### Bioaccumulative potential

Low bioconcentration  
 BCF : 41

### Mobility in soil

Moderate mobility  
 Koc : 352

### Hazardous to the ozone layer

Ozone : Classification not possible

## 13. Disposal considerations

- Ecological waste information : Burn in a chemical incinerator equipped with an afterburner and a scrubber. Or entrust approved waste disposal companies with the disposal.
- Contaminated container and packaging : In case of disposal of empty bottles, dispose bottles after removing the content thoroughly.

## 14. Transport information

### International Regulations



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**Transport by sea (IMDG)**

UN-No. (IMDG) : 2055  
Proper Shipping Name (IMDG) : STYRENE MONOMER, STABILIZED  
Packing group (IMDG) : III  
Transport hazard class(es) : 3

(IMDG)

**Air transport (IATA)**

UN-No. (IATA) : 2055  
Proper Shipping Name (IATA) : Styrene monomer, stabilized  
Packing group (IATA) : III  
Transport hazard class(es) : 3

(IATA)

Marine pollutant : Applicable

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

Pollutant category : Y  
MFAG-No : 128P

**15. Regulatory information**

Regulatory information with regard to this substance in your country or region should be examined by your own responsibility.

**16. Other information**

Data sources : Dictionary of Organic Compounds, The society of Synthetic Organic Chemistry, Kodansha Ltd. (1985) .  
Solvents Handbook, T, Asahara el, Kodansha Scientific Ltd. (1976) .  
Handbook of Dangerous Substances Springer-Verlag Tokyo (1991) .  
Handbook of 17322 Chemical Products, The Chemical Daily Co. (2022) .  
NITE Chemical Risk Information Platform (NITE-CHRIP), National Institute of Technology and Evaluation.

The information contained herein is based on several references and the present state of our knowledge. However the SDS does not always cover all information about the product, handle the product carefully. The information is intended to ordinary usage, in case of particular handlings, conduct appropriate safety measurements. The information herein is only provision of information, and it does not represent a guarantee the properties of the product. The Safety Data Sheet (SDS) is prepared based on JIS Z7253.

