SAFETY DATA SHEET
According to the Hazardous Products Regulations
BC Styrene Monomer

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SECTION 1. IDENTIFICATION

Product name : BC Styrene Monomer

Product code : Q9275
Other means of identification : Phenyl ethene, Phenyl ethylene, Vinyl benzene

Manufacturer or supplier's details

Manufacturer/Supplier : **Shell Chemicals Canada**
PO Box 4280 STN C
CALGARY AB T2T 5Z5
Canada

Telephone : 1-855-697-4355

Telefax : 1-866-213-7508

Emergency telephone number

CHEMTREC (24 hr) : 1-800-424-9300

Recommended use of the chemical and restrictions on use

Recommended use : Base chemical for the production of polystyrene, rubbers and resins.

Restrictions on use : Restricted to professional users., This product must not be used in applications other than the above without first seeking the advice of the supplier.

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquids : Category 3

Aspiration hazard : Category 1

Skin irritation : Category 2

Eye irritation : Category 2A

Acute toxicity (Inhalation) : Category 4

Specific target organ toxicity - single exposure : Category 3 (Respiratory Tract)

Specific target organ toxicity - repeated exposure : Category 1 (Auditory system)

Long-term (chronic) aquatic hazard : Category 3

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : PHYSICAL HAZARDS:
H226 Flammable liquid and vapour.
HEALTH HAZARDS:
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H332 Harmful if inhaled.
H335 May cause respiratory irritation.
H372 Causes damage to organs (Auditory system) through prolonged or repeated exposure if inhaled.
ENVIRONMENTAL HAZARDS:
H412 Harmful to aquatic life with long lasting effects.

Precautionary statements : **Prevention:**
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
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.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P273 Avoid release to the environment.
Response:
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P370 + P378 In case of fire: Use appropriate media to extinguish.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P331 Do NOT induce vomiting.
P332 + P313 If skin irritation occurs: Get medical advice/ atten-

tion.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312 Call a POISON CENTER/ doctor if you feel unwell.
Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P235 Keep cool.
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards which do not result in classification
Vapours are heavier than air. Vapours may travel across the ground and reach remote ignition sources causing a flashback fire danger.
Highly reactive.
Maintain dissolved oxygen and inhibitor at proper levels to prevent runaway polymerisation.
May form flammable/explosive vapour-air mixture.
This material is a static accumulator.
Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.
If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Substance name : BC Styrene Monomer 100-42-5

Hazardous components

Chemical name	CAS-No.	Concentration (% w/w)
styrene	100-42-5	>= <= 100

SECTION 4. FIRST-AID MEASURES

General advice : Not expected to be a health hazard when used under normal conditions.

If inhaled : Call emergency number for your location / facility.
Remove to fresh air. Do not attempt to rescue the victim unless proper respiratory protection is worn. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting,

or unresponsive, give 100% oxygen with rescue breathing or Cardio-Pulmonary Resuscitation as required and transport to the nearest medical facility.

In case of skin contact : Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.

In case of eye contact : Immediately flush eye(s) with plenty of water.
Remove contact lenses, if present and easy to do. Continue rinsing.
Transport to the nearest medical facility for additional treatment.

If swallowed : Call emergency number for your location / facility.
If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration.
If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing.

Most important symptoms and effects, both acute and delayed : Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing.
Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters.
Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision.
If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever.
If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing.
Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance.
Auditory system effects may include temporary hearing loss and/or ringing in the ears.
Visual system disturbances may be evidenced by decreases in the ability to discriminate between colours.

Protection of first-aiders : When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.

Notes to physician : IMMEDIATE TREATMENT IS EXTREMELY IMPORTANT!
Call a doctor or poison control center for guidance.

Potential for chemical pneumonitis.
Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable extinguishing media	:	Do not use water in a jet.
Specific hazards during fire-fighting	:	Flammable vapours may be present even at temperatures below the flash point. Sustained fire attack on vessels may result in a Boiling Liquid Expanding Vapor Explosion (BLEVE). The vapour is heavier than air, spreads along the ground and distant ignition is possible. Will float and can be reignited on surface water. Hazardous combustion products may include: Carbon monoxide. Formaldehyde
Specific extinguishing methods	:	Standard procedure for chemical fires.
Further information	:	Clear fire area of all non-emergency personnel. All storage areas should be provided with adequate fire fighting facilities. Keep adjacent containers cool by spraying with water.
Special protective equipment for firefighters	:	Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Observe all relevant local and international regulations. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained. Isolate hazard area and deny entry to unnecessary or unprotected personnel. Avoid contact with skin, eyes and clothing. Be ready for fire or possible exposure. Do not operate electrical equipment.

Stay upwind and out of low areas.

Environmental precautions : Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.
Monitor area with combustible gas indicator.

Methods and materials for containment and cleaning up : For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely

Additional advice : For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.
For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet.

SECTION 7. HANDLING AND STORAGE

General Precautions : Avoid breathing of or direct contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.
Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Ensure that all local regulations regarding handling and storage facilities are followed.

Advice on safe handling : Avoid inhaling vapour and/or mists.
Avoid contact with skin, eyes and clothing.
Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks.
The vapour is heavier than air. Beware of accumulation in pits and confined spaces.

Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.
Bulk storage tanks should be diked (bunded).
Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.
Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.
If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.
Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges.
These include but are not limited to pumping (especially turbulent flow), mixing, filtering, splash filling, cleaning and filling of tanks and containers, sampling, switch loading, gauging, vacuum truck operations, and mechanical movements.
These activities may lead to static discharge e.g. spark formation.
Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 1 m/s until fill pipe submerged to twice its diameter, then ≤ 7 m/s). Avoid splash filling.
Do NOT use compressed air for filling, discharging, or handling operations.
Inhibitor levels should be maintained.
Protect against light.

Avoidance of contact : Strong oxidising agents.
Copper alloys.

Product Transfer : If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve. Refer to guidance under Handling section.

Storage

Conditions for safe storage : Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.

Other data : Storage Temperature:
25 °C / 77 °F maximum.

Keep away from aerosols, flammables, oxidizing agents, corrosives and from other flammable products which are not harmful or toxic to man or to the environment.
Must be stored in a diked (bunded) well- ventilated area, away from sunlight, ignition sources and other sources of heat.
Must be kept inhibited during storage and shipment as material can polymerise.
Vapours from tanks should not be released to atmosphere.
Breathing losses during storage should be controlled by a suitable vapour treatment system.

Electrostatic charges will be generated during pumping.
Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk.
The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable.

Packaging material : Suitable material: For container paints, use epoxy paint, zinc silicate paint., For containers, or container linings use mild steel, stainless steel.
Unsuitable material: Copper., Copper alloys.

Container Advice : Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.

Specific use(s) : Not applicable

Ensure that all local regulations regarding handling and storage facilities are followed.
See additional references that provide safe handling practices for liquids that are determined to be static accumulators: American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practices on Static Electricity).
IEC/TS 60079-32-1: Electrostatic hazards, guidance

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
styrene	100-42-5	TWA	20 ppm 85 mg/m3	Shell Internal Standard (SIS) for 8-12 hour TWA.
	Further information: The value is provided by the Industry Association. This value is provided for information only.			
		TWA	100 ppm	OSHA Z-2
		CEIL	200 ppm	OSHA Z-2
		Peak	600 ppm (5 mins. in any 3 hrs.)	OSHA Z-2
		TWA	10 ppm	ACGIH

		STEL	20 ppm	ACGIH

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
styrene	100-42-5	Mandelic acid plus phenylglyoxylic acid	Urine	End of shift (As soon as possible after exposure ceases)	400 mg/g creatinine	ACGIH BEI
styrene		Styrene	Urine	End of shift (As soon as possible after exposure ceases)	40 µg/l	ACGIH BEI

Monitoring Methods

Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory.
Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.
National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods http://www.cdc.gov/niosh/
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods http://www.osha.gov/
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances http://www.hse.gov.uk/
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA) , Germany http://www.dguv.de/inhalt/index.jsp
L'Institut National de Recherche et de Securité, (INRS), France http://www.inrs.fr/accueil

Engineering measures : Use sealed systems as far as possible.
Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.
Local exhaust ventilation is recommended.
Firewater monitors and deluge systems are recommended.
Eye washes and showers for emergency use.
Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.
The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances.
Appropriate measures include:

General Information:
Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when there is potential for inhalation; clear up spills immediately and dispose of wastes safely.Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Personal protective equipment

Respiratory protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation.
Check with respiratory protective equipment suppliers.
Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.
Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.
If air-filtering respirators are suitable for conditions of use:
Select a filter suitable for organic gases and vapours [Type A boiling point >65°C (149°F)].

Hand protection
Remarks : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. Longer term protection: Viton.
Incidental contact/Splash protection: Nitrile rubber.
For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material.

Glove thickness should be typically greater than 0.35 mm depending on the glove make and model. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

Eye protection : Wear goggles for use against liquids and gas.
Wear full face shield if splashes are likely to occur.

Skin and body protection : Wear chemical resistant gloves/gauntlets and boots. Where risk of splashing, also wear an apron.
Wear antistatic and flame-retardant clothing, if a local risk assessment deems it so.

Protective measures : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.
The following information, while appropriate for the product is general in nature. The selection of Personal Protective Equipment will vary depending on the conditions of use.

Hygiene measures : Wash hands before eating, drinking, smoking and using the toilet.
Launder contaminated clothing before re-use.

Environmental exposure controls

General advice : Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.
Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.
Information on accidental release measures are to be found in section 6.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Oily liquid.

Colour : Colourless to yellowish

Odour : Aromatic hydrocarbon

Odour Threshold : 0.1 ppm

pH	:	Not applicable
Melting / freezing point	:	-31 °C / -24 °F
Boiling point	:	145 °C / 293 °F
Flash point	:	32 °C / 90 °F Method: closed cup
Evaporation rate	:	12.4 Method: ASTM D 3539, nBuAc=1
Flammability		
Flammability (solid, gas)	:	Data not available
Lower explosion limit and upper explosion limit / flammability limit		
Upper explosion limit	:	6.1 %(V)
Lower explosion limit	:	1.1 %(V)
Vapour pressure	:	670 Pa (20 °C / 68 °F)
Relative vapour density	:	3.6
Relative density	:	Data not available
Density	:	906 kg/m3 (20 °C / 68 °F)Method: ASTM D4052
Solubility(ies)		
Water solubility	:	0.29 kg/m3 (20 °C / 68 °F)
Solubility in other solvents	:	Data not available
Partition coefficient: n-octanol/water	:	log Pow: 2.96 Method: Literature data. log Pow: 2.96 Method: Literature data.
Auto-ignition temperature	:	490 °C / 914 °F
Decomposition temperature	:	Data not available
Viscosity		
Viscosity, dynamic	:	0.7 mPa.s (25 °C / 77 °F) Method: ASTM D445
Viscosity, kinematic	:	Data not available

Explosive properties	:	Not applicable
Oxidizing properties	:	Not applicable
Surface tension	:	34 mN/m
Conductivity	:	Low conductivity: < 100 pS/m, The conductivity of this material makes it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10,000 pS/m., Whether a liquid is nonconductive or semiconductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid
Molecular weight	:	104.15 g/mol

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Polymerises with risk of fire and explosion. Reacts with strong oxidising agents.
Chemical stability	:	Material is stable when properly inhibited and an appropriate dissolved oxygen level is maintained (see Storage in Chapter 7). Polymerises with risk of fire and explosion. Reacts with strong oxidising agents.
Possibility of hazardous reactions	:	Normally stable under ambient conditions and if properly inhibited.
Conditions to avoid	:	Heat, flames, and sparks. Exposure to sunlight. Exposure to air. In certain circumstances product can ignite due to static electricity.
Incompatible materials	:	Strong oxidising agents. Copper alloys.
Hazardous decomposition products	:	Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

SECTION 11. TOXICOLOGICAL INFORMATION

Basis for assessment : Information given is based on data on the components and the toxicology of similar products.
Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Information on likely routes of exposure
Inhalation is the primary route of exposure although absorption may occur through skin contact or following accidental ingestion.

Acute toxicity

Components:

styrene:

Acute oral toxicity : LD 50 (Rat, male and female): > 5,000 mg/kg
Method: Based on weight of evidence.
Remarks: Low toxicity

Acute inhalation toxicity : LC 50 (Rat, Unspecified): 11.8 mg/l, 2770 ppm
Exposure time: 4 h
Test atmosphere: vapour
Method: Based on weight of evidence.
Remarks: Harmful if inhaled.

Acute dermal toxicity : LD 50 (Rat, male and female): > 2,000 mg/kg
Method: OECD Test Guideline 402
Remarks: Based on available data, the classification criteria are not met.

Skin corrosion/irritation

Components:

styrene:
Species: Rabbit
Method: Based on weight of evidence.
Remarks: Causes skin irritation.

Serious eye damage/eye irritation

Components:

styrene:
Species: Rabbit
Method: Based on weight of evidence.
Remarks: Causes serious eye irritation.

Respiratory or skin sensitisation

Components:

styrene:
Species: Humans
Method: Based on Human Evidence
Remarks: Based on available data, the classification criteria are not met.

Germ cell mutagenicity

Components:

styrene:

Genotoxicity in vitro	:	Method: Based on weight of evidence. Remarks: Based on available data, the classification criteria are not met.
Genotoxicity in vivo	:	Method: Based on weight of evidence. Remarks: Based on available data, the classification criteria are not met.
Germ cell mutagenicity - Assessment	:	This product does not meet the criteria for classification in categories 1A/1B.

Carcinogenicity

Components:

styrene:
Species: Humans
Application Route: Occupational exposure
Method: Based on weight of evidence.
Remarks: Based on available data, the classification criteria are not met.

Species: Rat
Application Route: Inhalation
Method: Based on weight of evidence.
Remarks: Based on available data, the classification criteria are not met.

Species: Rat
Application Route: Oral
Method: Based on weight of evidence.
Remarks: Based on available data, the classification criteria are not met.

Carcinogenicity - Assessment	:	This product does not meet the criteria for classification in categories 1A/1B.

IARC	Group 2A: Probably carcinogenic to humans	
	styrene	100-42-5
OSHA	No component of this product present at levels greater than or	

equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP	Reasonably anticipated to be a human carcinogen	
	styrene	100-42-5

Reproductive toxicity

Components:

styrene:

Effects on fertility : Species: Rat
Application Route: Inhalation

Method: OECD Test Guideline 416
Remarks: Based on available data, the classification criteria are not met.

Effects on foetal development : Species: Rat
Application Route: Inhalation
Method: OECD Test Guideline 416
Remarks: Causes foetotoxicity in animals at doses which are maternally toxic.

Reproductive toxicity - Assessment : This product does not meet the criteria for classification in categories 1A/1B.

STOT - single exposure

Components:

styrene:
Exposure routes: Inhalation
Target Organs: Respiratory system
Remarks: Inhalation of vapours or mists may cause irritation to the respiratory system.

STOT - repeated exposure

Components:

styrene:
Exposure routes: Inhalation
Target Organs: ear
Remarks: Harmful: danger of serious damage to health by prolonged exposure through inhalation.
Can cause liver damage.
Respiratory system: repeated exposure affects the respiratory system. Effects were seen at high doses only.
Auditory system: prolonged and repeated exposures to high concentrations have resulted in hearing loss in rats.

Repeated dose toxicity

Components:

styrene:
Species: Humans, Unspecified
Application Route: Inhalation
Method: Occupational exposure
Target Organs: ear
Remarks: Harmful: danger of serious damage to health by prolonged exposure through inhalation.
Can cause liver damage.
Respiratory System: repeated exposure affects the respiratory system.
Auditory system: prolonged and repeated exposures to high concentrations have resulted in hearing loss in rats. Solvent abuse and noise interaction in the work environment may cause hearing loss.
Nervous system: repeated exposure affects the nervous system. Effects were seen at high doses only.

Species: Rat, Unspecified
Application Route: Inhalation
Test atmosphere: vapour
Method: Acceptable non-standard method.
Target Organs: ear
Remarks: Harmful: danger of serious damage to health by prolonged exposure through inhalation.
Can cause liver damage.
Respiratory System: repeated exposure affects the respiratory system.
Auditory system: prolonged and repeated exposures to high concentrations have resulted in hearing loss in rats. Solvent abuse and noise interaction in the work environment may cause hearing loss.
Nervous system: repeated exposure affects the nervous system. Effects were seen at high doses only.

Aspiration toxicity

Components:

styrene:
Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.

Further information

Components:

styrene:
Remarks: Classifications by other authorities under varying regulatory frameworks may exist.

SECTION 12. ECOLOGICAL INFORMATION

Basis for assessment : Information given is based on product data.

Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Ecotoxicity

Components:

styrene:

Toxicity to fish (Acute toxicity)	:	LC50 (Pimephales promelas (fathead minnow)): 4.02 mg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: Toxic LC/EC/IC50 >1 - <=10 mg/l
Toxicity to crustacean (Acute toxicity)	:	EC50 (Daphnia magna (Water flea)): 4.7 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: Toxic LC/EC/IC50 >1 - <=10 mg/l
Toxicity to algae/aquatic plants (Acute toxicity)	:	ErC50 (Pseudokirchneriella subcapitata (algae)): 4.9 mg/l Exposure time: 96 h Method: Test(s) equivalent or similar to OECD Guideline 202 Remarks: Toxic NOEC/NOEL > 1.0 - <= 10 mg/l
Toxicity to fish (Chronic toxicity)	:	Remarks: Data not available
Toxicity to crustacean(Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 1.01 mg/l Exposure time: 21 d Method: OECD Test Guideline 211 Remarks: NOEC/NOEL > 1.0 - <=10 mg/l (based on test data)
Toxicity to bacteria	:	LC50 (Activated sludge): 500 mg/l Exposure time: 3 h Method: Test(s) equivalent or similar to OECD Guideline 209 Remarks: Practically non toxic: LL/EL/IL50 > 100 mg/l

Persistence and degradability

Components:

styrene:

Biodegradability	:	Biodegradation: 70.9 % Exposure time: 28 d Method: Other guideline method. Remarks: Readily biodegradable.

Bioaccumulative potential

Partition coefficient: n-octanol/water	:	log Pow: 2.96 Method: Literature data. log Pow: 2.96 Method: Literature data.

Components:

styrene:

Bioaccumulation	:	Remarks: Does not bioaccumulate significantly.

Mobility in soil

Components:

styrene:

Mobility	:	Remarks: Floats on water. If product enters soil, it will be highly mobile and may contaminate groundwater.

Other adverse effects

Components:

styrene:

Results of PBT and vPvB assessment	:	The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Waste product should not be allowed to contaminate soil or ground water, or be disposed of into the environment. Do not discharge extinguishing waters into the aquatic environment. Do not dispose of tank water bottoms by allowing them to drain into the ground. This will result in soil and groundwater contamination. Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand. Disposal should be in accordance with applicable regional, national, and local laws and regulations.

Local regulations may be more stringent than regional or national requirements and must be complied with.

MARPOL - see International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) which provides technical aspects at controlling pollutions from ships.

Contaminated packaging : Drain container thoroughly.
After draining, vent in a safe place away from sparks and fire.
Residues may cause an explosion hazard.
Do not puncture, cut, or weld uncleaned drums.
Send to drum recoverer or metal reclaimer.

SECTION 14. TRANSPORT INFORMATION

TDG

UN number	:	2055
Proper shipping name	:	STYRENE MONOMER, STABILIZED
Class	:	3
Packing group	:	III
Labels	:	3
Marine pollutant	:	no

International Regulations

IATA-DGR

UN/ID No.	:	UN 2055
Proper shipping name	:	STYRENE MONOMER, STABILIZED
Class	:	3
Packing group	:	III
Labels	:	3

IMDG-Code

UN number	:	UN 2055
Proper shipping name	:	STYRENE MONOMER, STABILIZED
Class	:	3
Packing group	:	III
Labels	:	3
Marine pollutant	:	no

Maritime transport in bulk according to IMO instruments

Pollution category	:	Y
Ship type	:	3; Must be Double Hulled
Product name	:	Styrene monomer

Special precautions for user

Remarks : Special Precautions: Refer to Section 7, Handling & Storage, for special precautions which a user needs to be aware of or

needs to comply with in connection with transport.

Additional Information : This product may be transported under nitrogen blanketing. Nitrogen is an odourless and invisible gas. Exposure to nitrogen enriched atmospheres displaces available oxygen which may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined space entry. Transport in bulk according to Annex II of Marpol and the IBC Code
Classified under TDG regulations for domestic road and rail transport, if shipped by vessel or air please ensure that the DG classification is compliant for the mode of transport being used.

SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all the information required by the HPR.

The components of this product are reported in the following inventories:

AIIC	:	Listed
DSL	:	Listed
IECSC	:	Listed
ENCS	:	Listed
KECI	:	Listed
NZIoC	:	Listed
PICCS	:	Listed
TSCA	:	Listed
TCSI	:	Listed

SECTION 16. OTHER INFORMATION

Full text of other abbreviations

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR -

Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

A vertical bar (|) in the left margin indicates an amendment from the previous version.

Sources of key data used to compile the Safety Data Sheet	:	The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID date base, EC 1272 regulation, etc).
Revision Date	:	2023-06-12

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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