



Material Safety Data

**Product Name :STYRENE
MONOMER**

긴급전화번호 (Emerhency Telephone Number)
061 - 688 - 6117 (24 hours)

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1. Product

- Product Name : STYRENE MONOMER
- UN NO. : 2055

2. Advisable use and Restriction

- Advisable use : Raw Material of Polystyrene resin, synthetic rubber, polyethylene resin, ABS resin, ion exchange resin, synthetic resin paint
- Restriction : Do not handle until all safety precautions have been read and understood.

3. Manufacturer information

- Manufacture company : YEOCHUN NCC
- Address: 2 Yeosusandan-3ro(205-6,Pyeongyeo-dong), Yeosu, Jeollanam-Do, Korea (555-210)
- Telephone: 82-61-688-6117

2. HAZARD IDENTIFICATION

1. Hazard classification

- FLAMMABLE LIQUIDS Category 3
- ACUTE TOXICITY(Inhalation:Vapours) Category 4
- SKIN CORROSION/IRRITATION Category 2
- SERIOUS EYE DAMAGE/EYE IRRITATION Category 2
- CARCINOGENICITY Category 2
- GERM CELL MUTAGENICITY Category 2
- REPRODUCTIVE TOXICITY Category 2
- SPECIFIC TARGET ORGAN TOXICITY SINGLE EXPOSURE Category 3(Respiratory tract irritation)
- SPECIFIC TARGET ORGAN TOXICITY REPEATED EXPOSURE Category 1
- ASPIRATION HAZARD Category 1

2. Allocation label elements

- Symbol



- Signal Word : Danger

- Hazard statements
 - H226 Flammable liquid and vapour.
 - 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.
 - H341 Suspected of causing genetic defects.
 - H351 Suspected of causing cancer
 - H361 Suspected of damaging fertility or the unborn child
 - H372 Cause damage to organs (lung) through prolonged or repeated exposure.

- Precautionary statements
 - Prevention
 - P201 Obtain special instructions before use.
 - P202 Do not handle until all safety precautions have been read and understood.
 - P210 Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
 - P233 Keep container tightly closed.
 - P240 Ground/bond container and receiving equipment.
 - P241 Use explosion–proof electrical/ventilating/lighting/ equipment.
 - P242 Use only non–sparking tools.
 - P243 Take precautionary measures against static discharge.
 - P260 Do not breathe dust/fume/gas/mist/vapours/spray.
 - P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
 - P264 Wash thoroughly after handling.
 - P271 Use only outdoors or in a well–ventilated area.
 - P280 Wear protective gloves/protective clothing/eye protection/face protection.

 - Response
 - P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
 - P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

 - P303 + P361 + P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

 - P304 + P340 IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

 - P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

 - P308 + P313 IF exposed or concerned: Get medical advice/attention.
 - P312 Call a POISON CENTER or doctor/physician if you feel unwell.
 - P314 Get medical advice/attention if you feel unwell.
 - P321 Specific treatment (see on this label).
 - P331 Do not induce vomiting.
 - P332 + P313 If skin irritation occurs: Get medical advice/attention.
 - P337 + P313 If eye irritation persists: Get medical advice/attention.
 - P362 + P364 Take off contaminated clothing and wash it before reuse.
 - P370 + P378 In case of fire: Use alcohol foam, carbon dioxide or water spray for extinction.

- Storage
 - P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
 - P403 + P235 Store in a well-ventilated place. Keep cool.
 - P405 Store locked up.
- Disposal
 - P501 Dispose of contents/container to (in accordance with local/ regional/ national/ international regulation)

3. Other hazard information not included in hazard classification (NFPA)

Chemical Name	NFPA Level		
	Health	Flammability	Reactivity
STYRENE	2	3	2

3. INGREDIENT INFORMATION

Components	Common name	CAS No.	PCT(W%)
STYRENE	STYRENE	100-42-5	99.6 ~ 100

4. FIRST AID MEASURES

1. Following eye contact

- Get medical aid immediately.
- In case of contact with material, immediately flush eyes with running water for at least 15 minutes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Seek immediate medical assistance.

2. Following skin contact

- For hot product, immediately immerse in or flush the affected area with large amounts of cold water to dissipate heat.
- For minor skin contact, avoid spreading material on unaffected skin.
- Get medical aid immediately.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- In case of contact with material, immediately flush skin with running water for at least 15 minutes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Launder contaminated clothing and shoes before re-use.
- Remove and isolate contaminated clothing and shoes.
- Seek immediate medical assistance.
- Wash skin with soap and water.

3. Following inhalation

- Administer oxygen if breathing is difficult.
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Give artificial respiration if victim is not breathing.

- Keep victim warm and quiet.
- Move to fresh air.
- Seek immediate medical assistance.

4. Following ingestion

- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Get medical aid immediately.
- If unconscious but breathing, never give anything by mouth.
- Seek immediate medical assistance.

5. Advice to physician

- Do not apply drugs of the adrenaline ephedrine group.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Exposures require specialized first aid with contact and medical follow-up .

5. FIRE FIGHTING MEASURES

1. Suitable/Unsuitable extinguishing media

○ Suitable extinguishing media

- CO2.
- Dry chemical.
- For mixtures containing alcohol or polar solvent: Alcohol-resistant foam.
- Regular foam.
- Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
- Use dry sand or earth to smother fire.
- Water spray.

○ Unsuitable extinguishing media

- Direct water.

2. Specific hazards arising from the chemical

○ Pyrolytic product

- Can decompose at high temperatures forming toxic gases.
- During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

○ Risk of fire and explosion

- Can form explosive mixtures at temperatures at or above the flashpoint.
- Containers may explode when heated.
- Fire may produce irritating and/or toxic gases.
- Flammable liquid and vapour.
- HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
- May be ignited from heat, friction or contamination.
- May violently polymerize and result in fire and explosion.
- Runoff may create fire or explosion hazard.
- Some may burn but none ignite readily.
- Vapor explosion hazard indoors, outdoors or in sewers.
- Vapors may form explosive mixtures with air.

- Vapors may travel to source of ignition and flash back.
 - When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
3. Special protective equipment for firefighters
- Cautions : Most of liquids are lighter than water.
 - Contact may cause burns to skin and eyes.
 - Dike fire-control water for later disposal; do not scatter the material.
 - Evacuate area and fight fire from a safe distance.
 - Fire involving Tanks: ALWAYS stay away from tanks engulfed in fire.
 - Fire involving Tanks: Cool containers with flooding quantities of water until well after fire is out.
 - Fire involving Tanks: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
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- Fire involving Tanks: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
 - Fire involving Tanks: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
 - Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
 - Move containers from fire area if you can do it without risk.
 - Rescuers should put on appropriate protective gear.
 - Runoff may cause pollution.
 - Substance may be transported hot.

6. ACCIDENTAL RELEASE MEASURES

1. Health considerations and protective equipment
- A vapor suppressing foam may be used to reduce vapors.
 - All equipment used when handling the product must be grounded.
 - Clean up spills immediately, observing precautions in Protective Equipment section.
 - Cover with plastic sheet to prevent spreading.
 - Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
 - Do not touch or walk through spilled material.
 - ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
 - Please note that materials and conditions to be avoided.
 - Stop leak if you can do it without risk.
 - The very fine particles can cause a fire or explosion, eliminate all ignition sources.
 - Ventilate the contaminated area.
2. Environmental precautions
- Prevent entry into waterways, sewers, basements or confined areas.
3. For cleaning up
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
 - Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container.
 - Absorb the liquid and scrub the area with detergent and water.
 - Dike and collect water used to fight fire.
 - Large Spill: Dike far ahead of liquid spill for later disposal.
 - Small Spill: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.

- Small Spill: Flush area with flooding quantities of water.
- Use clean non-sparking tools to collect absorbed material.
- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

7. HANDLING AND STORAGE

1. Precautions for safe handling

- Avoid any skin and eye contact when insert undiluted solution. Wash ... thoroughly after handling.
- Caution: Dangerous fire hazard when exposed to heat, or flame, sparks.
- Use adequate machine for prevention when package handling.
- Wear an appropriate Personal protection. (See Exposure Controls/Personal Protection section.)

2. Conditions for safe storage (including any incompatibilities)

- Choose a place that can be protected from strong oxidizers and acid.
- Drum Handling: Must work at safe place., Loading more than 3 stack is prohibited.
- Store containers: AVOID the place where can be damage and contamination.
- Store in a cool/low-temperature, well-ventilated {dry} place {away from heat and ignition sources}
- To prevent the polymerization of styrene, analyze the concentration of anti-polymer (TBC) periodically and maintain it at the level of 10 to 15 ppm.
- Styrene may occur due to increased temperature caused by light or heat, resulting in a self-concentration and a heavy-traffic neutral reaction (at approximately 65°C or higher). Perform periodic temperature monitoring when storing.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1. Exposure exposure limits, Biological exposure standard :

Components	Occupational exposure	ACGIH	Biological standard
STYRENE	TWA : 20ppm STEL : 40ppm	TWA 20 ppm STEL 40 ppm	Mandelic acid + phenyllysoxylic acid 600 mg / g crea

2. Appropriate engineering controls

- Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
- If user operations generate dust, fume, or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
- Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
- Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

3. Personal protection equipment

○ Respiratory protection

- If high frequency of use or exposure, wear air respirator.
- Wear breathing protection, which needs a confirmation from the Korea Occupational Safety and Health Agency.
- Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
- Provide emergency showers and eyewash.

- Wear face shield to protect eyes from scattering dust or hazardous liquid.
- Wear suitable protective goggles and face shields.
- Hand protection
 - Wear Non-moisture permeable chemical resistance protective gloves(latex, nitrile rubber, PC) for prevent skin contact.
 - Wear insulated gloves.
 - Wear suitable protective gloves.
- Body protection
 - Wear suitable protective clothing.
 - When contact is likely wear chemical resistant, oil and grease resistant, non-moisture permeable shoes and clothes.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless liquid
Odour	Sweet, almost floral odor
Odour threshold	No data available
pH Values	N/A
Melting point/freezing point	-30.6 °C
Initial boiling point and boiling range	145 °C
Flash point	31 °C
Evaporation rate	No data available
Flammability(solid, gas)	Flammable liquid
Upper/lower flammability or explosive limits	0.9~6.8 Vol %
Vapour pressure	$6.7 \times 10^{(-1)}$ kPa(20°C)
Solubility(ies)	$3.1 \times 10^{(-2)}$ g/100ml 310 mg/l(25°C, Water)
Vapor Densities	3.59 (Air = 1)
Relative density	0.9060 (20°C)
n-octanol/water partition coefficient	2.95 (Log Kow)
Auto ignition temperature	-4395.63 K
Decomposition temperature	No data available
Viscosity	0.696 cP(25°C)
Molecular weight(mass)	104.15

10. STABILITY AND REACTIVITY

1. Stability and hazardous reactivity

- Can decompose at high temperatures forming toxic gases.
- Can form explosive mixtures at temperatures at or above the flashpoint.
- Containers may explode when heated.

- Fire may produce irritating and/or toxic gases.
 - Fire may produce irritating, corrosive and/or toxic gases.
 - Flammable liquid and vapour.
 - HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.
 - May cause toxic effects if inhaled.
 - May violently polymerize and result in fire and explosion.
 - When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
 - Runoff may create fire or explosion hazard.
 - Some liquids produce vapors that may cause dizziness or suffocation.
 - Some may burn but none ignite readily.
 - Stable under normal temperatures and pressures.
 - Vapor explosion hazard indoors, outdoors or in sewers.
 - Vapors may form explosive mixtures with air.
2. Conditions to avoid
- Ignition source(heat, spark, flame, etc.).
3. Materials to avoid
- Combustibles, reducing material.
 - Irritating and/or toxic gas.
4. Hazardous decomposition products
- Corrosive/toxic fume.
 - During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
- Irritating, corrosive and/or toxic gas.

11. TOXICOLOGICAL INFORMATION

1. Exposure route information
- Oral, Dermal, Inhalation exposure is possible since Volatile liquid.
2. Health hazard information
- ※ No data of the product. thus data was described by the product component.
 - Acute toxicity
 - Oral PRODUCT : N/A
 - STYRENE : N/A / LD50 5000 mg/kg Rat
 - Dermal PRODUCT : N/A
 - STYRENE : N/A / LD50 > 2000 mg/kg Rat
 - Inhalation-Gases PRODUCT : N/A
 - STYRENE : N/A
 - Inhalation-Vapours PRODUCT : Category 4
 - STYRENE : Category 4 / LC50 11.8 mg/L/4h Rat
 - Inhalation-Dust/mist PRODUCT : N/A
 - STYRENE : N/A
 - SKIN CORROSION/IRRITATION PRODUCT : Category 2

- STYRENE : Category 2 / Irritating Rabbit
- SERIOUS EYE DAMAGE/EYE IRRITATION PRODUCT : Category 2
 - STYRENE : Category 2 / Irritating Rabbit
- RESPIRATORY SENSITIZATION PRODUCT : No data
 - STYRENE : No data
- SKIN SENSITIZATION PRODUCT : N/A
 - STYRENE : N/A / Not sensitising Guinea pig
- CARCINOGENICITY PRODUCT : Category 2
 - STYRENE : Category 2 / 2
 - OSHA : No data
 - Notice of Employment and Labor : No data
 - NTP : No data
 - IARC : 2B
 - EU CLP : No data
 - ACGIH : A4
- GERM CELL MUTAGENICITY PRODUCT : Category 2
 - STYRENE : Category 2 / Test results for returning stools using bacteria in test tubes (OECD TG 471) are positive
- REPRODUCTIVE TOXICITY PRODUCT : Category 2
 - STYRENE : Category 2 / In pregnant hamsters, maternal toxicity, such as death, confusion, weight loss, etc., was observed at high concentrations on a single exposure for eight days.
- SPECIFIC TARGET ORGAN TOXICITY SINGLE EXPOSURE PRODUCT : Category 3(Respiratory tract irritation)
 - STYRENE : Category 3(Respiratory tract irritation) / Respiratory system stimulation, central nervous system effects, lung stimulation. Target organs: central nervous system.
- SPECIFIC TARGET ORGAN TOXICITY REPEATED EXPOSURE PRODUCT : Category 1
 - STYRENE : Category 1 / The results of repeated oral toxicity test using a mouse show the effect on epithelial cells at the end of the trachea in three mice above "100 mg/kg bw/day", Significant increase in frequency of s-phrase cells in terminal trachea in 100 or 200 mg/kg group. (NOAEL=10 mg/kg bw/day)
- ASPIRATION HAZARD PRODUCT : Category 1
 - STYRENE : Category 1 / Aspiration of styrene into the lung can cause pulmonary edema and hemorrhage.

12. ECOLOGICAL INFORMATION

1. Aquatic toxicity PRODUCT

- ACUTE AQUATIC HAZARD : Not classified, LONG-TERM AQUATIC HAZARD : Not classified

- Fish
 - STYRENE : LC50 10 mg/L/96h Fish(Pimephales promelas) (OECD Guideline 203, GLP)
- Crustacea
 - STYRENE : EC50 4.7 mg/L/48h Aquatic invertebrates(Daphnia magna) (OECD TG 202, GLP)
- Aquatic algae
 - STYRENE : EC50 4.9 mg/L/72h Aquatic algae(Selenastrum capricornutum) (EPA OTS 797.1050, GLP)

2. Persistence and degradation

- Degradation
 - STYRENE : No data
- n-octanol water partition coefficient
 - STYRENE : 2.95 log Kow

3. Bioaccumulative potential

- Bioaccumulation
 - STYRENE : 74
- Biodegradation
 - STYRENE : 100 % 28 day (ISO DIS 9408 aerobic biodegradation test, GLP)

4. Mobility in soil

- Soil adsorption coefficient(Koc)
 - STYRENE : 352 Koc

5. Other adverse effects

- Hazardous to ozone layer
 - STYRENE : N/A
- Others
 - STYRENE : No data

13. DISPOSAL CONSIDERATIONS

1. Disposal methods

- Separating oil and water / Burning oil components / remaining water is treated in the water pollution control facilities.
- Dispose of container and unused contents in accordance with all applicable regulations.
- Marine Environment Management Act.

2. Precautions (including disposal of contaminated container of package)

- Do not allow spill material to enter sewers, storm water drains, soil, etc.
- Empty containers may explode and residues can be ignited when pressured, cut, weld, heated.
- Empty containers may rupture when pressured.
- Empty containers recycled under environmental laws.
- Wear an appropriate Personal protection. (See Exposure Controls/Personal Protection section.)

14. TRANSPORT INFORMATION

1. UN No : 2055
2. Proper shipping name : STYRENE MONOMER, STABILIZED
3. Class or division : 3
4. Packing group : III
5. Marine pollutant : Not established
6. Special safety response for transportation or transportation measure :

- Emergency measures in case of fire : F-E
- Emergency measures in the effluent : S-D

15. REGULATORY INFORMATION

- EU Classification (CLASSIFICATION) PRODUCT : Not established
 - STYRENE : R10 Xn; R20 Xi; R36/38
- EU Classification (Risk Phrases) PRODUCT : Not established
 - STYRENE : R10, R20, R36/38
- EU Classification (Safety Phrases) PRODUCT : Not established
 - STYRENE : S:(2)-23
- 2006/507/EC PRODUCT : Not established
 - STYRENE : Not established
- 689/2008/EC PRODUCT : Not established
 - STYRENE : Not established
- Designation, Reportable Quantities, and Notification PRODUCT : Not established
 - STYRENE : 1000 lb final RQ; 454 kg final RQ
- Emergency Planning and Notification PRODUCT : Not established
 - STYRENE : Not established
- Toxic Chemical Release Reporting – Community Right-to-Know PRODUCT : Not established
 - STYRENE : 0.1 % de minimis concentration
- Process Safety Management of Highly Hazardous Chemicals PRODUCT : Not established
 - STYRENE : Not established

16. OTHER INFORMATION

1. Reference

- ACGIH
- ASTDR
- ATSDR
- Acta Dermatovener (Soccholm) 58: 121-124
- Arch Environ Health. Vol. 18: 878-882.
- CAMEO
- EU CLP
- Environmental and Molecular Mutagenesis 22: 85-92
- HSDB
- IARC
- IUCLID
- Institute for Health and Consumer Protection, European Chemicals Bureau, Existing Substances, 1st Priority List Volume 27: i-viii, 1-88

- NTP
- OSHA
- Publication
- Scandinavian Journal of Work, Environment & Health 4 (Suppl. 2): 53-59
- Study report

2. Prepare date : 2000. 01. 01 CREATION

3. Revised date

- 0.0.0 : 2000.01.01
- 1.0.0 : 2010.05.20
- 2.0.0 : 2014.02.27
- 3.0.0 : 2017.03.16
- 4.0.0 : 2018.01.31
- 5.0.0 : 2020.12.01

4. Other

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.