

## Material safety data sheet (MSDS)

### SECTION-1: Identification of the Substance/ Preparation and Company

Product name	Styrene
Product Code	Q9211 Q9215
Manufacturer	Grand Pacific Petrochemical Corporation
Address	No. 4 Hsing Kung RD. Ta-She Industrial District Kaohsiung, Taiwan, R.O.C.
Information Phone Number	886-2-23458998 Ext. 297
Emergency Phone Number	886-7-3513911

### SECTION-2: Composition/ Information on Ingredients

Substance Formal Name	Styrene
Common Name	Styrene, SM, Styrene Monomer
Substance Chemical Family	Aromatic Hydrocarbon
Synonyms	No. 4 Hsing Kung RD. Ta-She Industrial District Kaohsiung, Taiwan, R.O.C.
CAS No.	100-42-5
Other Information	Inhibited with Tertiary Butyl Catechol

### SECTION-3: Hazards Identification

Human Health Hazards	Aspiration into the lungs may cause chemical pneumonitis which can be fatal. Harmful by inhalation, irritating to eyes and skin.
Safety Hazards	Flammable. In use, may form flammable/explosive vapor-air mixture. Electrostatic charges may be generated during handling.
Environmental Hazards	Classified under the INDG code as a Marino Pollutant. Annex I substance under review by the BU commission.

### SECTION-4: First Aid Measures

Symptoms and Effects	Irritation of the skin, eyes and respiratory tract headache nausea dizziness narcosis.
First Aid- Inhalation	Remove to fresh air. If rapid recovery does not occur, obtain medical attention.
First Aid- Skin	Remove contaminated clothing. Wash skin with water using soap if available. If persistent irritation occurs, obtain medical attention.
First Aid- Eye	DO NOT DELAY. Flash eye with water. OBTAIN MEDICAL ATTENTION IMMEDIATELY
First Aid- Indigestion	Do not induce vomiting. Give nothing by mouth. In the unlikely event of ingestion, obtain medical attention immediately.
Advice to Physicians	Dermatitis may result from prolonged or repeated exposure. Aspiration into the lungs may cause chemical pneumonitis causes central nervous system depression.

### SECTION-5: Fire Fighting Measures

Specific Hazards	Hazardous combustion products may include carbon monoxide will float and can be reignited on surface water. The vapor is heavier than air, spreads along the ground and distant ignition is possible.
Extinguishing Media	Foam dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

Unsuitable Extinguishing Media	Water in a jet.
Protective Equipment	Full protective clothing and self-contained breathing apparatus.

SECTION-6: Accidental Release Measures

Personal Precautions	Avoid contact with skin, eyes, clothing. Ventilate contaminated area thoroughly. Do not breathe vapor. Take off immediately all contaminated clothing. Extinguish naked flames. Removes ignition sources. No smoking. Avoid sparks. Take precautionary measures.
Personal Protection	Wear neoprene or nitrile rubber gloves, PVC one-piece suit with integral hood, safety boots-rubber, knee length. Wear full face-piece respirator with organic vapor canister and built-in particulate filter NPF 400 (gas only)
Environmental Precautions	Prevent contamination of soil and water. Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers.
Clean-Up Methods- Small Spillage	Absorb or contain liquid with sand, earth or spill control material. Shovel up and place in a labeled, sealable container for subsequent safe disposal. Put leaking containers in labeled drum or overdrum. Scrub contaminated surfaces with detergent solution. Retain washing as contaminated waste.
Clean-Up Methods- Large Spillage	Transfer to a labeled, sealable container for product recovery or safe disposal. Treat residues as for small spillage.
Other information	Risk of explosion. Inform the emergency services if liquid enters surface water drains. Vapor may form an explosive mixture with air. Local authorities should be advised if significant spillages cannot be contained. See Section 13 for information on disposal.

SECTION-7: Handling and Storage

Handling	Avoid contact with skin, eyes and clothing. Do not breathe vapor. Only use in well ventilated areas. Use local exhaust extraction sources. Extinguish any naked flames. Remove ignition sources. Avoid sparks. Do not smoke, Take precautionary measures against static discharges. Earth all equipment. Do not empty into drains.
Handling Temperatures	Ambient.
Storage	Keep away from direct sunlight and other sources of heat of ignition. Do not smoke in storage areas.
Storage Temperatures	25°C maximum
Product Transfer	Take precautionary measures against static discharge. Earth all equipment. Avoid splash filling. Do not use compressed air for filling, discharging or handling. If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge. Refer to supplier for further product transfer instructions if required.
Recommended Materials	For containers or container linings, use stainless steel, zinc silicate, epoxy resins.
Unspoilable, material	Natural, butyl, neoprene or nitrile, rubbers PVC brass copper.

SECTION-8: Exposure Control/ Personal Protection

## Occupational Exposure Standards

TLV (EH40)	MBL/TWA(8h) =100 ppm
Styrene	MEL/TWA(8h) =430 mg/ m3
	MEL/TWA(15 min) =250 ppm
	MEL/TWA (15 min)=1080 mg/m3
	* MEL = Maximum Exposure Limit
	Circuit type NPF 2000.
Engineering Control Measures	Use local exhaust ventilation
Respiratory Protection	Where local exhaust ventilation is not practicable wear: half mask respirator with organic vapor cartridge and built-in particulate filter NPF 20 (gas only).
Hand Protection	Neoprene or nitrile rubber gloves
Eye Protection	Monogoggles
Body Protection	Safety shoes or boots- chemical resistant standard issue work clothes.

## SECTION-9: Physical and Chemical Properties

Physical State	Liquid
Color	Colorless
Odor	Sweet Sharp
Boiling Point	145°C
Melting/ Freezing Point	31°C
Flash Point	32°C (Abel)
Auto-ignition Temperature	490°C
Explosion/ Flammability Limits in air	Lower: 1.1 upper: 6.1%(v/v)
Vapor pressure	670 Pa at 20°C
	5300 Pa at 60°C
	36000 Pa at 110°C
Relative Evaporation Rate	12.4 (ASTM D3539, nBuAc=1)
Density	906 Kg/m3 at 20°C
Vapor Density (Air=1)	3.6
Solubility in Water	0.29 Kg/m3 at 20°C
n-Octanol/ Water Partition Coefficient (log Pow)	2.95
Dynamic Viscosity	0.7 mPa at 25°C
Odor Threshold	0.1 ppm
Molecular Mass	104.15
Electrical Conductivity	<50 pS/m
Surface Tension	34 mN/m

## SECTION-10: Stability/ Reactivity

Stability	Reacts violently with strong oxidizing agents. Oxidizes on contact with air. Polymerises endothermically on exposure to light, heat, and most halides.
Conditions to avoid	Heat, flames and sparks. Exposure to air. Exposure to sunlight.
Materials to avoid	Strong oxidizing agents. Halides.
Hazardous Decomposition Products	Hazardous decomposition products are not expected to form during normal storage.

## SECTION-11: Toxicological Information

Basis for Assessment	Information given is based on product data
Acute Toxicity Oral	Low Toxicity, LD50>2000 mg/Kg
Acute Toxicity Dermal	Expected to be of low toxicity, ID50>2000 mg/Kg
Acute Toxicity Inhalation	Low toxicity, LC50 > 5 mg/l
Skin Irritation	Irritant
Eye Irritation	Slightly irritating to the eyes. Classified as irritant by the European Commission.
Skin Sensitization	Not a skin sensitizer.
Repeated Dose Toxicity	Can cause liver damage. Repeated exposure affects the respiratory system. Repeated exposure affects the nervous system.
Mutagenicity	Not considered to be a mutagenic hazard.
Carcinogenicity	Limited evidence of carcinogenicity.
Fertility Impairment	Not expected to be a reproductive toxicant.
Development Toxicity	May cause slight foetotoxicity at doses which are maternally toxic.

## SECTION-12: Stability/ Reactivity

Mobility	Floats on water. Dissolved material evaporates rapidly. Evaporates within a day from water or soil surfaces. If product enters soil, it will be mobile and may contaminate groundwater.
Persistence /Degradability	Readily biodegradable meeting the 10 day window criterion. Oxidizes rapidly by photo – chemical reactions in air.
Bioaccumulation	Does not bioaccumulate significantly
Acute Toxicity- Fish	Toxic, 1, LC/EC/IC 50 B 10mg/l
Acute Toxicity- Invertebrates	Toxic, 1, LC/EC/IC 50 B 10mg/l
Acute Toxicity- Algae	Toxic, 1, LC/EC/IC 50 B 10mg/l
Acute Toxicity- Bacteria	Toxic, 1, LC/EC/IC 50 B 10mg/l
Sewage	Expected to be T Toxic, 1, LC/EC/IC 50 B 10mg/l
Other Information	In view of the high rate of loss from solution, the product is unlikely to pose a significant hazard to aquatic life

## SECTION-13: Disposal Considerations

Precautions	Refer to section 7 before handling the product or containers.
Water Disposal	Recover or recycle if possible. Otherwise: incineration.
Product Disposal	Recover or recycle if possible. Otherwise: incineration.
Local Logistic	The recommendations given are considered appropriate for safe disposal. However, local regulations may be more stringent and those must be complied with.

## SECTION-14: Transport Information

## Road/ Rail Transport ADR/RID

Class	3
Item	31 (C)/ III
Hazard Symbol	Flammable liquid
Eye Irritation	Styrene Monomer (Inhibited)
Kemler Number	39
UN No.	2055

## Maritime Transport IMO

UN No.	2055
Class	3.3
Packing Group	III
Hazard Symbol	Flammable liquid
Marine Pollutant	Yes, Marine Pollutant mark required.
Proper Shipping Name	Styrene Monomer, Inhibited, Marine Pollutant
Air Transport ICAO/IATA	
UN No.	2055
Class	3
Packing Group	III
Hazard Symbol	Flammable liquid
Proper Shipping Name	Styrene Monomer (Inhibited)

## Air Transport ICAO/IATA

UN No.	2055
Class	3
Packing Group	III
Hazard Symbol	Flammable liquid
Proper Shipping Name	Styrene Monomer (Inhibited)

## SECTION-15: Regulatory Information

EC Label/EC Number	202-851-5
EC Label Name	Styrene
EC Classification	Harmful, Flammable
EC Symbols	(X0) Harmful
EC Risk Phrases	(R10) Flammable
	(R20) Harmful by inhalation.
	(R36/38) Irritating to eyes and skin.
EC Safety Phrases	(S23) Do not breathe vapor.
TSCA (USA)	Listed
AICS (Australia)	Listed
DSL (Canada)	Listed
EC Annex I Number	601-026-00-0
BINBCS (BC)	202-851-5
MITI (Japan)	3 月 4 日

## SECTION-16: Other Information

Uses and Restrictions	Base chemical for the production of polystyrene, rubbers and resins.
SDS Distribution	The information in the documents should be made available to all who may handle the product. The content and format of this safety data sheet is in accordance with Commission Directive 93/112/EC of 10 December 1993 amending Commission Directive 91/155/EEC.

## Disclaimer

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environment requirements only. It should not therefore be construed as guaranteeing and property of the product.