SAFETY DATA SHEETS

According to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Sixth revised edition

Version: 1.0

Creation Date: Jun 13, 2017

Revision Date: Jun 13, 2017

1. Identification

1.1 GHS Product identifier

Product name	MFE 711 vinyl ester resin

1.2 Other means of identification

Product number	-
Other names	-

1.3 Recommended use of the chemical and restrictions on use

Identified uses	corrosion resistance resin designed to produce Fiberglass Reinforced Plastics. Volatile organic compounds
Uses advised against	no data available

1.4 Supplier's details

Company	Sino Polymer Co., Ltd.
Address	No. 130, Muhua Road, Shanghai Chemical Industry Park, Shanghai, China
Telephone	+862164252619
Fax	+862164250084

1.5 Emergency phone number

Emergency phone number	+862164252619(available in working hours GMT+8 time: 9:00-17:00 from Monday to Friday)
Service hours	Monday to Friday, 9am-5pm (Standard time zone: UTC/GMT +8 hours).

2. Hazard identification

2.1 Classification of the substance or mixture

Flammable liquids, Category 3

Skin irritation, Category 2

Eye irritation, Category 2

Acute toxicity - Inhalation, Category 4

Specific target organ toxicity – repeated exposure, Category 1

Reproductive toxicity, Category 2

2.2 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

H361d

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.

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.

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood.

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 ... to extinguish.

P302+P352 IF ON SKIN: Wash with plenty of water/...

P321 Specific treatment (see ... on this label).

P332+P313 If skin irritation occurs: Get medical advice/attention.

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.

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.

P314 Get medical advice/attention if you feel unwell.

P308+P313 IF exposed or concerned: Get medical advice/ attention.

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

Disposal P501 Dispose of contents/container to ...

2.3 Other hazards which do not result in classification

none

3. Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Styrene	Styrene	100-42-5	202-851-5	42-48%

4. First-aid measures

4.1 Description of necessary first-aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

Fresh air, rest. Refer for medical attention.

In case of skin contact

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

In case of eye contact

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

If swallowed

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

4.2 Most important symptoms/effects, acute and delayed

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)

Moderate irritation of eyes and skin. High vapor concentrations cause dizziness, drunkeness, and anesthesia. (USCG, 1999)

4.3 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/

5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

Use water spray to cool unopened containers.

5.2 Specific hazards arising from the chemical

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)

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)

5.3 Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

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.

6.3 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.

7. Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid exposure - obtain special instructions before use.Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.

7.2 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.

8. Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

Recommended Exposure Limit: 15 Minute Short-Term Exposure Limit: 100 ppm (425 mg/cu m).

Recommended Exposure Limit: 10 Hour Time-Weighted Average: 50 ppm (215 mg/cu m). **Biological limit values**

no data available

8.2 Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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

Eye/face protection

Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Wear impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique(without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Respiratory protection

Wear dust mask when handling large quantities.

Thermal hazards

no data available

9. Physical and chemical properties

Physical state	Insoluble in water and less dense than water. Contact may cause irritate skin, eyes, and mucous membranes. May be toxic by ingestion.
Colour	Colorless to yellowish, oily liquid
Odour	Extremely penetrating
Melting point/ freezing point	240°C
Boiling point or initial boiling point and boiling range	293 to 146.11°C at 760 mm Hg
Flammability	Class IC Flammable Liquid: Fl.P. at or above 22.78°C and below 37.78°C.Flammable. Gives off irritating or toxic fumes (or gases) in a fire.
Lower and upper explosion limit / flammability limit	Lower flammable limit: 0.9% by volume; Upper flammable limit: 6.8% by volume
Flash point	33°C
Auto-ignition temperature	490°C
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	0.696 cP at 25°C
Solubility	less than 1 mg/mL at 18.89°C
Partition coefficient n-octanol/water (log value)	log Kow = 2.95
Vapour pressure	4.3 mm Hg at 15°C ; 9.5 mm Hg at 30°C; 10 mm Hg at 35°C
Density and/or relative density	1.04 to 1.65 at 20°C
Relative vapour density	3.6 (Air = 1)
Particle characteristics	no data available

10. Stability and reactivity

10.1 Reactivity

no data available

10.2 Chemical stability

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

10.3 Possibility of hazardous reactions

Flammable liquid.POLYSTYRENE BEADS are incompatible with strong oxidizing agents. Attacked by hydrocarbon solvents.

10.4 Conditions to avoid

no data available

10.5 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].

10.6 Hazardous decomposition products

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

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

no data available

STOT-repeated exposure

no data available

Aspiration hazard

no data available

12. Ecological information

12.1 Toxicity

- Toxicity to fish: LC50; Species: Lepomis macrochirus (Bluegill) length 3.8-6.4 cm, weight 1 -2 g; Conditions: freshwater, static, 25°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°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°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

12.2 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) .

12.3 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) .

12.4 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).

12.5 Other adverse effects

no data available

13. Disposal considerations

13.1 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.

14. Transport information

14.1 UN Number

ADR/RID: UN1866 IMDG: UN1866 IATA: UN1866

14.2 UN Proper Shipping Name

ADR/RID: RESIN SOLUTION, flammable
IMDG: RESIN SOLUTION, flammable
IATA: RESIN SOLUTION, flammable

14.3 Transport hazard class(es)

ADR/RID: 3 IMDG: 3 IATA: 3

14.4 Packing group, if applicable

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: no IMDG: no IATA: no

14.6 Special precautions for user

no data available

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

no data available

15. Regulatory information

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

Chemical name	Common names and synonyms	CAS number	EC number
Styrene	Styrene	100-42-5	202-851-5
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.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.

16. Other information

Information on revision

Creation Date Jun 13, 2017
Revision Date Jun 13, 2017

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/

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