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# MATERIAL SAFETY DATA SHEET

## POLYKLEAR STYRENE MONOMER

### Section 1. IDENTIFICATION OF THE MATERIAL

Product Name: **POLYKLEAR STYRENE MONOMER**  
Other Name: Phenyl Ethylene, Vinyl Benzene, Ethenyl Benzene  
Chemical Formula:  $C_8H_8$   
Synonyms: Magnesia, Calcined Magnesia, Calcined Magnesite, Fused Magnesia  
Product Use: Industrial Chemical Process/Animal Feed Supplement/Refractory Material

### Section 2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	% (wt/wt)	CAS No.	EINECS
Styrene Monomer	Main Constituent	100-42-5	202-851-5

	EC no.	Composition Percent (w/w)
2-Phenylpropene	202-705-0	0.011 – 0.4 max. 1000 ppm
Ethylbenzene	202-849-4	0.0068 – 0.3 max. 3000 ppm
Toluene	203-626-9	0.0 – 0.0010 max. 10 ppm
Cumene	202-704-5	80 – 230 ppm
Benzene	200-753-7	0.0 – 0.04 max 400 ppm
p-Xylene	203-396-5	< 120.0 ppm

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m-Xylene	203-576-3	< 200.0 ppm
o-Xylene	202-422-2	< 300.0 ppm
Propylbenzene	203-132-9	150.0 – 220.0 ppm
Hydrogen Peroxide	231-765-0	< 100.0 ppm
Phenylacetylene	208-645-1	< 300.0 pm
Benzaldehyde	202-860-4	< 200.0 pm
Ethyltoluene	247-093-6	< 200.0 pm

### Section 3. HAZARDS IDENTIFICATION

#### 3.1 Classification of the substance

##### 3.1 Classification according to Regulation (EC) 1272/2008

H226: Flammable liquid and vapor

H332: Harmful if inhaled

H319: Causes serious eye irritation

H335: May cause respiratory irritation

H315: Causes skin irritation

H372: Causes damage to organs through prolonged or repeated exposure (hearing)

H304: May be fatal if swallowed and enter airways

P210: Flammable liquid and vapor

P261: Harmful if inhaled

P264: Causes serious eye irritation

P261: May cause respiratory irritation

P264: Causes skin irritation

P260: Causes damage to organs through prolonged or repeated exposure (hearing)

P301: May be fatal if swallowed and enters airways

##### 3.1.2 Classification according to Directive 67/548/EEC

Indication of Danger: Xn harmful

R – phrases:

R10 flammable

R20 harmful by inhalation

R36/37/38 Irritating to eyes, respiratory system and skin

R48/20 harmful: danger of serious damage to health by prolonged exposure through inhalation

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### 3.2 Label elements

#### 3.2.1 Labeling according to Regulation (EC) 1272/2008

Signal word: Danger

Hazard pictograms:

GHS02: Flame



GHS08: Health Hazard



Hazard statements:

H226: Flammable liquid and vapour.

H332: Harmful if inhaled.

H319: Causes serious eye irritation.

H335: May cause respiratory irritation.

H315: Causes skin irritation.

H372: Causes damage to organs <or state all organs affected, if known> through prolonged or repeated exposure <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>. (hearing)

H304: May be fatal if swallowed and enters airways.

P261: Harmful if inhaled

P264: Causes serious eye irritation

P261: May cause respiratory irritation.

P264: Causes skin irritation.

P260: Causes damage to organs through prolonged or repeated exposure (hearing)

P301: May be fatal if swallowed and enters airways.

#### 3.2.2 Labeling according to (EC) 67/548

Indication of danger: Xn – harmful



R-phrases:

R10 - flammable

R20 - harmful by inhalation

R36/37/38 - irritating to eyes, respiratory system and skin

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R48/20 - harmful: danger of serious damage to health by prolonged exposure through inhalation

R65 - harmful: may cause lung damage if swallowed

S-phrases:

S23 - do not breathe gas/fumes/vapour/spray (appropriate wording to be specified by the manufacturer) (vapour)

S62 - if swallowed, do not induce vomiting: seek medical advice immediately and show this container or label

### 2.3 Other hazards

The substance does not meet the criteria for PBT or vPvB substance. No other hazards identified

## Section 4. FIRST AID MEASURES

### 4.1 Description of first aid measures

General advice:

Remove contaminated clothing. If danger of loss of consciousness, place patient in recovery position and transport accordingly. Apply artificial respiration if necessary.

If inhaled: Keep patient calm, remove to fresh air, and seek medical attention.

On skin contact: Wash thoroughly with soap and water.

On contact with eyes: Immediately wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On ingestion: Keep patient calm, remove to fresh air, seek medical attention.

### 4.2 Most important symptoms and effects, both acute and delayed

Aspiration into the lungs may cause chemical pneumonitis, which can be fatal. Harmful by inhalation; may cause lung damage. Irritating to skin and eyes. Headache, nausea, dizziness, narcosis.

Target organs: Central nervous system, auditory system, liver, respiratory system.

### 4.3 Indication of any immediate medical attention and special treatment needed

Follow the advises given in section 4.

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## Section 5. FIRE FIGHTING MEASURES

### 5.1.1 Suitable extinguishing media

dry extinguishing media, foam, carbon dioxide

### 5.2 Special hazards arising from the substance or mixture

Hazardous combustion products may include carbon monoxide and formaldehyde.

Will float and can be reignited on surface water. The vapor is heavier than air, spreads along the ground and distant ignition is possible.

### 5.2.1 Unsuitable extinguishing media

Unsuitable extinguishing media for safety reasons: water

### 5.3 Advice for firefighters

Special protective equipment: Wear self-contained breathing apparatus and chemical-protective clothing.

Further information: Keep containers cool by spraying with water if exposed to fire.

## Section 6. ACCIDENTAL RELEASE MEASURES

### 6.1 Personal precautions, protective equipment and emergency procedures

#### 6.1.1 For non-emergency personnel

Use breathing apparatus if exposed to vapours/aerosol.

Sources of ignition should be kept well clear.

Evacuate the area of all non-essential personnel. Shut off leaks, if possible without personal risk. Extinguish naked flames. Remove ignition sources. No smoking. Avoid sparks. Take precautionary measures against static discharge.

#### 6.1.2 For emergency responders

Avoid contact with skin, eyes, and clothing. Ventilate contaminated area thoroughly. Do not breathe vapor. Take off immediately all contaminated clothing.

### 6.2 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.

### 6.3 Methods and material for containment and cleaning up

Methods for cleaning up or taking up:

For small amounts: Pick up with suitable absorbent material. Dispose of absorbed material in accordance with regulations.

For large amounts: Dike spillage. Place into suitable container for disposal.

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For residues: Pick up with suitable absorbent material. Dispose of absorbed material in accordance with regulations.

#### **6.4 Reference to other sections**

For more information on exposure controls/personal protection or disposal considerations, please check section 8 and 13 of this safety data sheet.

### **Section 7. HANDLING AND STORAGE**

#### **7.1.1 Protective measures**

Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding all equipment. Do NOT use compressed air for filling, discharging or handling operations. Electrostatic charges may be generated during pumping.

Restrict line velocity during pumping in order to avoid generation of electrostatic discharge.

If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve.

Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks  
The vapour is heavier than air, spreads along the ground and distant ignition is possible

#### **7.1.2 Advice on general occupational hygiene**

Wear suitable protective clothing and gloves.

#### **7.2 Conditions for safe storage, including any incompatibilities**

Storage

Further information on storage conditions: Keep at temperature not exceeding 40 °C.

Storage stability: Storage temperature: < 40 °C

Check frequently to ensure that stabilizer content is adequate. additives: 4-tert-butyl catechol (CAS Number: 98-29-3) Precautions for safe handling

Unsuitable materials for containers: brass, copper

### **Section 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

Control parameters

**DN(M)ELs for workers**

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Acute - systemic effects, inhalation 289 mg/m<sup>3</sup>  
 Acute - local effects, inhalation 306 mg/m<sup>3</sup>  
 Long-term - systemic effects, dermal 406 mg/kg bw/day  
 Long-term - systemic effects, inhalation 85 mg/m<sup>3</sup>

**DN(M)ELs for the general population**

Acute - systemic effects, inhalation 174.25 mg/m<sup>3</sup>  
 Acute - local effects, inhalation 182.75 mg/m<sup>3</sup>  
 Long-term - systemic effects, dermal 343 mg/kg bw/day  
 Long-term - systemic effects, inhalation 10.2 mg/m<sup>3</sup>  
 Long-term - systemic effects, oral 2.1 mg/kg bw/day

**Consumer -DNEL long-term inhalation:**

The consumer DNEL long-term inhalation route 17 ppm

**Humans via environment DNEL long-term inhalation:**

effects on colour vision DNEL long-term inhalation via environment 6.0 ppm (25.5 mg/m<sup>3</sup>)  
 ototoxicity DNEL long-term inhalation via environment: 2.4 ppm (10.2 mg/m<sup>3</sup>)

**PNEC water**

PNEC aqua (freshwater): 0.028 mg/L  
 PNEC aqua (marine water): 0.0028 mg/L  
 PNEC aqua (intermittent releases): 0.04 mg/L

**PNEC sediment**

PNEC sediment (freshwater): 0.614 mg/kg sediment dw  
 PNEC sediment (marine water): 0.0614 mg/kg sediment dw

**Section 9. PHYSICAL AND CHEMICAL PROPERTIES****9.1 Information on basic physical and chemical properties**

Property	Results	Discussion
Physical state at 20°C and 1013 hPa	liquid Colour: Colorless to yellowish	-
Melting / freezing point	-31° C	Melting point is not relevant because the value is below -20° C.

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Boiling point	145° C at 1013 hPa	
Relative density	0.9 - 0.91 at 20° C.	Relative density (d20/4). Result is a range of eighteen values.
Vapour pressure	6.67 hPa at 20° C.	
Surface tension	not applicable	Based on chemical structure, no surface activity is predicted.
Water solubility	320 mg/l at 25° C.	-
Partition coefficient n-octanol/water (log value)	log Pow= 2.96 at 25° C	-
Flash point	31° C at 1013 hPa	-
Flammability	Flammable liquid	Substance is a flammable liquid, GHS-Category 3. (FP: > 23° C and < 60°C). Flammability derived from flash point. Based on chemical structure pyrophoric properties and flammability in contact with water are not to be expected.
Explosive properties	non explosive	There are no chemical groups associated with explosive properties present in the molecule as cited in the ECHA Guidance R7a, table 7.1-28
Self-ignition temperature	490° C at 1013 hPa	-
Oxidising properties	no oxidising properties	Substance is incapable of reacting exothermically with combustible materials.
Granulometry	Not applicable	Substance is marketed or used in a non-solid or granular form.
Stability in organic solvents and identity of relevant degradation products	not applicable	The stability of the substance is not considered as critical.

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Dissociation constant	not applicable	The substance does not contain any ionisable structure.
Viscosity	0.696 mPa/s (dynamic) at 25°C	

## Section 10. STABILITY and REACTIVITY

### 10.1 Reactivity

Reacts violently with strong oxidizing agents. Oxidizes on contact with air. Polymerizes exothermically on exposure to light, heat and most halides. In case of contact with water the inhibitor concentration might decrease and cause polymerization.

### 10.2 Chemical stability

Check frequently to ensure that stabilizer content is adequate. Additives: 4-tert-butyl catechol (CAS Number: 98-29-3)

Unsuitable materials for containers: brass, copper

### 10.3 Possibility of hazardous reactions

Hazardous reactions are not expected during normal storage.

### 10.4 Conditions to avoid

Heat, flames and sparks.

Exposure to air, exposure to sunlight.

### 10.5 Incompatible materials

Unsuitable materials for containers: brass, copper

Strong oxidizing agents, halides

### 10.6 Hazardous decomposition products

Hazardous decomposition products are not expected to form during normal storage

## Section 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

#### Acute toxicity :

Oral

low toxicity,

Dermal low toxicity

LD50: > 2000 mg/kg bw

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#### Inhalation

study with 6 human volunteers exposed for 7 hours: NOAEC = 100 ppm; no effects on the central nervous system (CNS) function at this concentration. Acute inhalation toxicity: rat, 4 h inhalation: LC50 = 2770 ppm (11.8 mg/l)

Based on the physical-chemical properties of styrene, the substance fulfills the requirements to be classified as Category 1 for aspiration hazard according to GHS-CLP criteria (1272/2008/EC) and as Xn, R65 according to EU-DSD criteria (67/548/EEC).

#### Irritation / corrosion:

Styrene is not corrosive.

Eye irritation: rabbit: irritating

Skin irritation: rabbit: irritating

Respiratory irritation: human: NOAEC = 216 ppm

Styrene fulfills the requirements to be classified as Category 2 for skin irritation according to GHS-CLP criteria (1272/2008/EC) and as Xi, R38 according to EU-DSD criteria (67/548/EEC).

Styrene fulfills the requirements to be classified as Category 2A for eye irritation according to GHS-CLP criteria (1272/2008/EC) and as Xi, R36 according to EU-DSD criteria (67/548/EEC).

Styrene fulfills the requirements to be classified as STOT single exposure Category 3 for respiratory irritation according to GHS-CLP criteria (1272/2008/EC) and as Xi, R37 according to EU-DSD criteria (67/548/EEC).

#### Sensitization

Dermal: not skin sensitizing

Respiratory tract: not respiratory sensitizing

#### Repeated dose toxicity

- human: effects on color vision after long-term inhalation: NOAEC = 50 ppm (8-hr TWA)

#### Inhalation:

- human: ototoxicity after long-term inhalation: NOAEC = 20 ppm

- rat: ototoxicity after long-term inhalation: NOAEC = 500 ppm

- rat: developmental toxicity after long-term inhalation: NOAEC = 500 ppm

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Dermal: corrected NOAEL = 615 mg/kg/d, resulting from route-to-route extrapolation (inhalation to dermal route)

Styrene causes a specific adverse effect on hearing in laboratory animals after long-term exposure. Additionally, there is an indication for styrene-induced hearing losses in humans.

Classification of styrene as Xn, R48 according to EU-criteria (67/548/EE) and as STOT RE Category 1 according to GHS-criteria (1272/2008/EC) is warranted for ototoxic effects.

#### Mutagenicity

There is no convincing evidence that styrene possesses significant mutagenic/clastogenic potential in vivo from the available data in experimental animals.

Classification for mutagenicity according to EU-criteria (67/548/EEC) and to GHS-criteria (1272/2008/EC) is not warranted for styrene.

#### Carcinogenicity

There is no convincing evidence that styrene possesses significant carcinogenic potential in humans.

Classification for carcinogenicity according to EU-criteria (67/548/EEC) and to GHS-criteria (1272/2008/EC) is not warranted for styrene.

#### Toxicity for reproduction

There is no convincing evidence that styrene possesses a significant potential for causing effects on fertility or developmental toxicity in humans.

## **Section 12. ECOLOGICAL INFORMATION**

### **12.1 Toxicity**

#### **12.1.1 Acute/Prolonged toxicity to fish**

Short term toxicity to freshwater fish

LC50 for freshwater fish: 4.02 mg/L

#### **12.1.2 Acute/Prolonged toxicity to aquatic invertebrates**

Acutely toxic for aquatic invertebrates

EC50/LC50 for freshwater invertebrates: 4.7 mg/L

Long term toxicity for aquatic invertebrates

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EC10/LC10 or NOEC for freshwater invertebrates: 1.01 mg/L

### 12.1.3 Acute/Prolonged toxicity to aquatic plants

Acutely toxic to aquatic algae.

EC50/LC50 for freshwater algae: 4.9 mg/L

### 12.1.4 Toxicity to sediment organisms

The substance is not persistent in the sediment compartment. The equilibrium partitioning method has been used for assessing the hazard to sediment organisms.

### 12.1.5 Toxicity to micro-organisms e.g. bacteria

EC50/LC50 for aquatic micro-organisms: 500 mg/L

### 12.1.6 Chronic toxicity to aquatic organisms

### 12.1.7 Toxicity to soil dwelling organisms

No data on chronic terrestrial toxicity are available. The substance is not persistent in the soil compartment. The equilibrium partitioning method has been used for assessing the hazard to soil organisms.

### 12.1.8 Toxicity to terrestrial plants

No data on chronic terrestrial toxicity are available. The substance is not persistent in the soil compartment. The equilibrium partitioning method has been used for assessing the hazard to soil organisms.

### 12.1.9 General effect

## 12.2 Persistence and degradability

Hydrolysis: According to structural properties, hydrolysis is not expected

Phototransformation in air: After evaporation or exposure to the air, the product will be rapidly degraded by photochemical processes.

Phototransformation in water: Indirect photolysis is not a relevant degradation process in water in comparison to volatilisation and biotransformation.

Biodegradation in water and in soil: Styrene can be readily degraded in water under aerobic conditions. Rate of microbial mineralisation is rapid also in sewage, mineral soils and organic

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soils under aerobic conditions. Styrene degrades more slowly in groundwater than in surface waters.

### 12.3 Bioaccumulative potential

Significant accumulation in organisms is not to be expected

### 12.4 Mobility in soil

Adsorption to solid soil phase is possible. Koc at 20°C: 35

## Section 13 –DISPOSAL CONSIDERATIONS

### 13.1 Waste treatment methods

Recover or recycle if possible. Otherwise: incineration

The recommendations given are considered appropriate for safe disposal. However, local regulations may be more stringent and these must be complied with.

## Section 14. TRANSPORT INFORMATION

Road/Rail transport ADR/RID

### 14.1 UN-Number

UN-2055

### 14.2 UN proper shipping name

STYRENE MONOMER, STABILIZED

### 14.3 Transport hazard class(es)

Class 3

Classification code F1

### 14.4 Packing group

III

### 14.5 Environmental hazards

Non marine pollutant

### 14.6 Special precautions for user

None

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#### 14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Category B (Y)

IBC 3

#### Section 15. REGULATORY INFORMATION

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

EC label/EC number : 202-851-5

EC Label name: STYRENE

EC classification : Harmful. Flammable.

EC symbols: (Xn) Harmful.

EC Risk Phrases: (R10) Flammable.

(R20) Harmful by inhalation.

(R36/38) Irritating to eyes and skin.

EC Safety Phrases: (S23) Do not breathe vapour.

TSCA (USA): Listed.

AICS (Australia): Listed.

DSL (Canada): Listed.

EC Annex I number: 601-026-00-0

EINECS (EC): 202-851-5

METI (Japan): 3-4

15.2 Chemical safety assessment

A chemical safety assessment has been carried out for this substance.

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## 16. OTHER INFORMATION

Data are based on our latest knowledge but do not constitute a guarantee for any specific product features and do not establish a legally valid contractual relationship.

### 16.1 Hazard Statement

Please check section 2 of the present document

### 16.2 Precautionary Statement

Please check under section 2 of the present document

### 16.3 Risk Phrases

Please check under section 2 of the present document

### 16.4 Safety Phrases

Please check under section 2 of the present document

### 16.5 Revision

Date of creation 23 November 2010

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SEA Olympus Marketing, Inc. reserves the right to change the information given herein without prior notice. We believe this information to be reliable, but do not guarantee its applicability to the user's process or assume liability for occurrence arising out of its use. The user, by accepting products described herein agrees to be responsible for thoroughly testing any application before committing to production. ©20

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# TECHNICAL DATA SHEET

## POLYKLEAR STYRENE MONOMER

### PRODUCT DESCRIPTION

**Polyklear Styrene Monomer** is a clear liquid used for resin dilution (to reduce its viscosity). It is widely used in polyester and vinyl ester resins.

### TYPICAL PROPERTIES OF STYRENE MONOMER

Appearance	Bright and Clear
Color	10 Max ( ASTM D1209 )
Polymer Content ( PPM wt )	10 Max ( ASTM D2121 )
Inhibitor ( TBC ppm )	100 ppm ( ASTM D4590 )
Purity ( % wt )	99.7 Min ( ASTM D2119 )
Aldehydes ( Benzaldehyde ) PPM	200 Max ( ASTM D2119 )
Perodixes ( Hydrogen )	100 Max ( ASTM D2340 )
Packing	190kg/drum

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