1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Styrene
Product Number : 240869
Brand : Aldrich
Index-No. : 601-026-00-0
CAS-No. : 100-42-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO  63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
- Flammable liquids (Category 3), H226
- Acute toxicity, Inhalation (Category 4), H332
- Skin irritation (Category 2), H315
- Eye irritation (Category 2A), H319
- Carcinogenicity (Category 2), H351
- Reproductive toxicity (Category 2), H361
- Specific target organ toxicity - repeated exposure (Category 1), H372
- Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word : Danger
Hazard statement(s)
- H226 : Flammable liquid and vapour.
- H315 : Causes skin irritation.
- H319 : Causes serious eye irritation.
- H332 : Harmful if inhaled.
- H351 : Suspected of causing cancer.
- H361 : Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs through prolonged or repeated exposure.
H401 Toxic to aquatic life.

Precautionary statement(s)
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.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
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.
P332 + P313 If skin irritation occurs: Get medical advice/attention.
P370 + P313 If eye irritation persists: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P371 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.
P501 Dispose of contents/container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS
Lachrymator.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
Synonyms: Phenylethylene
Vinylbenzene

<table>
<thead>
<tr>
<th>Formula</th>
<th>C₈H₈C₈H₈</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular weight</td>
<td>104.15 g/mol</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>100-42-5</td>
</tr>
<tr>
<td>EC-No.</td>
<td>202-851-5</td>
</tr>
<tr>
<td>Index-No.</td>
<td>601-026-00-0</td>
</tr>
</tbody>
</table>

Hazardous components

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Styrene</td>
<td>Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; Repr. 2; STOT RE 1; Aquatic Acute 2; H226, H315, H319, H332, H351, H361, H372, H401</td>
<td>&lt;= 100 %</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.
4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

4.3 Indication of any immediate medical attention and special treatment needed
No data available.

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Container explosion may occur under fire conditions. Vapours may form explosive mixture with air.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.
7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

Light sensitive.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Styrene</td>
<td>100-42-5</td>
<td>TWA</td>
<td>50.000000 ppm 215.000000 mg/m3</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ST</td>
<td>100.000000 ppm 425.000000 mg/m3</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
</tr>
</tbody>
</table>

Remarks

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWA</td>
<td></td>
<td></td>
<td>100.000000 ppm</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Z37.15-1969</td>
<td></td>
</tr>
<tr>
<td>CEIL</td>
<td></td>
<td></td>
<td>200.000000 ppm</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Z37.15-1969</td>
<td></td>
</tr>
<tr>
<td>Peak</td>
<td></td>
<td></td>
<td>600.000000 ppm</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Z37.15-1969</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td></td>
<td></td>
<td>20.000000 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
</tbody>
</table>

Central Nervous System impairment
Upper Respiratory Tract irritation
Peripheral neuropathy
Substances for which there is a Biological Exposure Index or Indices (see BEI® section)
Not classifiable as a human carcinogen

<table>
<thead>
<tr>
<th>Component</th>
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<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEL</td>
<td></td>
<td></td>
<td>40.000000 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td></td>
<td></td>
<td>100 ppm</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-2</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Z37.15-1969</td>
<td></td>
</tr>
<tr>
<td>CEIL</td>
<td></td>
<td></td>
<td>200 ppm</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Z37.15-1969</td>
<td></td>
</tr>
</tbody>
</table>
Peak 600 ppm  USA. Occupational Exposure Limits (OSHA) - Table Z-2

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Parameters</th>
<th>Value</th>
<th>Biological specimen</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Styrene</td>
<td>100-42-5</td>
<td>Mandelic acid plus phenylglyoxyl acid</td>
<td>400mg/g Creatinine</td>
<td>Urine</td>
<td>ACGIH - Biological Exposure Indices (BEI)</td>
</tr>
</tbody>
</table>

**Remarks**: End of shift (As soon as possible after exposure ceases)

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
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<td>ACGIH - Biological Exposure Indices (BEI)</td>
</tr>
</tbody>
</table>

**Remarks**: End of shift (As soon as possible after exposure ceases)

8.2 **Exposure controls**

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

**Personal protective equipment**

**Eye/face protection**
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin protection**
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.

**Full contact**
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

**Splash contact**
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 32 min
Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**Body Protection**
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Control of environmental exposure**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

#### 9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Appearance</td>
<td>Form: liquid, clear</td>
</tr>
<tr>
<td></td>
<td>Colour: colourless</td>
</tr>
<tr>
<td>b) Odour</td>
<td>sweet</td>
</tr>
<tr>
<td>c) Odour Threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>d) pH</td>
<td>No data available</td>
</tr>
<tr>
<td>e) Melting point/freezing point</td>
<td>Melting point/range: -31 °C (-24 °F) - lit.</td>
</tr>
<tr>
<td>f) Initial boiling point and boiling range</td>
<td>145 - 146 °C (293 - 295 °F) - lit.</td>
</tr>
<tr>
<td>g) Flash point</td>
<td>32.0 °C (89.6 °F) - closed cup</td>
</tr>
<tr>
<td>h) Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>i) Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>j) Upper/lower flammability or explosive limits</td>
<td>Upper explosion limit: 8.9 % (V)</td>
</tr>
<tr>
<td></td>
<td>Lower explosion limit: 1.1 % (V)</td>
</tr>
<tr>
<td>k) Vapour pressure</td>
<td>6 hPa (5 mmHg) at 20 °C (68 °F)</td>
</tr>
<tr>
<td>l) Vapour density</td>
<td>3.6</td>
</tr>
<tr>
<td>m) Relative density</td>
<td>0.906 g/cm³ at 25 °C (77 °F)</td>
</tr>
<tr>
<td>n) Water solubility</td>
<td>0.05 g/l at 25 °C (77 °F) - slightly soluble</td>
</tr>
<tr>
<td>o) Partition coefficient: n-octanol/water</td>
<td>No data available</td>
</tr>
<tr>
<td>p) Auto-ignition temperature</td>
<td>490.0 °C (914.0 °F)</td>
</tr>
<tr>
<td></td>
<td>480.0 °C (896.0 °F)</td>
</tr>
<tr>
<td>q) Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>r) Viscosity</td>
<td>No data available</td>
</tr>
</tbody>
</table>
s) Explosive properties No data available

t) Oxidizing properties No data available

9.2 Other safety information
  Relative vapour density 3.6

10. STABILITY AND REACTIVITY

10.1 Reactivity
  No data available

10.2 Chemical stability
  Stable under recommended storage conditions.
  Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.
  Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
  Vapours may form explosive mixture with air.

10.4 Conditions to avoid
  May polymerize on exposure to light.
  Heat, flames and sparks.

10.5 Incompatible materials
  Oxidizing agents, Copper

10.6 Hazardous decomposition products
  Hazardous decomposition products formed under fire conditions.
  - Carbon oxides
  Other decomposition products - No data available
  In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

  Acute toxicity
  LD50 Oral - Rat - > 6,000 mg/kg
  LC50 Inhalation - Rat - 4 h - 12,000 mg/m3
  LD50 Dermal - Rat - male and female - > 2,000 mg/kg
  No data available

  Skin corrosion/irritation
  Skin - Rabbit
  Result: Skin irritation
  (OECD Test Guideline 404)

  Serious eye damage/eye irritation
  Eyes - Rabbit
  Result: Eye irritation - 24 h

  Respiratory or skin sensitisation
  Maximisation Test - Guinea pig
  Does not cause skin sensitisation.
  (OECD Test Guideline 406)

  Germ cell mutagenicity
  Laboratory experiments have shown mutagenic effects.

  Carcinogenicity
  This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

  IARC: 2B - Group 2B: Possibly carcinogenic to humans (Styrene)
  NTP: Reasonably anticipated to be a human carcinogen (Styrene)
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
Suspected of damaging the unborn child. Suspected human reproductive toxicant

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: WL3675000
Dermatitis, Central nervous system depression, Nausea, Dizziness, Headache, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Endocrine system.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
Toxicity to fish
NOEC - Pimephales promelas (fathead minnow) - 4 mg/l - 96 h
LC50 - Pimephales promelas (fathead minnow) - 32 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates
EC50 - Daphnia magna (Water flea) - 4.7 mg/l - 48 h
(OECD Test Guideline 202)

Toxicity to algae
IC50 - Pseudokirchneriella subcapitata (green algae) - 1.4 mg/l - 72 h

12.2 Persistence and degradability
Biodegradability aerobic - Exposure time 28 d
Result: > 60 % - Readily biodegradable

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.
14. TRANSPORT INFORMATION

DOT (US)
UN number: 2055  Class: 3  Packing group: III
Proper shipping name: Styrene monomer, stabilized
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 2055  Class: 3  Packing group: III  EMS-No: F-E, S-D
Proper shipping name: STYRENE MONOMER, STABILIZED

IATA
UN number: 2055  Class: 3  Packing group: III
Proper shipping name: Styrene monomer, stabilized

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-42-5</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-42-5</td>
<td>2007-07-01</td>
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</tbody>
</table>

Pennsylvania Right To Know Components

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-42-5</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

New Jersey Right To Know Components

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-42-5</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

- Acute Tox.  Acute toxicity
- Aquatic Acute  Acute aquatic toxicity
- Carc.  Carcinogenicity
- Eye Irrit.  Eye irritation
- Flam. Liq.  Flammable liquids
- H226  Flammable liquid and vapour.
- H315  Causes skin irritation.
- H319  Causes serious eye irritation.
- H332  Harmful if inhaled.
- H351  Suspected of causing cancer.
- H361  Suspected of damaging fertility or the unborn child.
- H372  Causes damage to organs through prolonged or repeated exposure.
H401  Toxic to aquatic life.

**HMIS Rating**
- Health hazard: 2
- Chronic Health Hazard: *
- Flammability: 3
- Physical Hazard 0

**NFPA Rating**
- Health hazard: 2
- Fire Hazard: 3
- Reactivity Hazard: 0

**Further information**
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**Preparation Information**
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.15  Revision Date: 06/02/2016  Print Date: 07/27/2016