**Section 1 - Product and Company Information**

<table>
<thead>
<tr>
<th>Product Name</th>
<th>STYRENE, 99%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Number</td>
<td>S4972</td>
</tr>
<tr>
<td>Brand</td>
<td>ALDRICH</td>
</tr>
<tr>
<td>Company</td>
<td>Sigma-Aldrich</td>
</tr>
<tr>
<td>Street Address</td>
<td>3050 Spruce Street</td>
</tr>
<tr>
<td>City, State, Zip, Country</td>
<td>SAINT LOUIS MO 63103 US</td>
</tr>
<tr>
<td>Technical Phone:</td>
<td>314 771 5765</td>
</tr>
<tr>
<td>Emergency Phone:</td>
<td>414 273 3850 Ext. 5996</td>
</tr>
<tr>
<td>Fax:</td>
<td>800 325 5052</td>
</tr>
</tbody>
</table>

**Section 2 - Composition/Information on Ingredient**

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td>STYRENE</td>
<td>100-42-5</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Formula: C8H8
Synonyms: Benzene, vinyl- * Cinnamene * Ethenylbenzene *
Ethylene, phenyl- * NCI-C02200 * Phenethylene *
Phenylethene * Phenylethylene (OSHA) * Stirolo (Italian) * Styreen (Dutch) * Styren (Czech) *
Styrene (OSHA) * Styrene, monomer (ACGIH) *
Styrol (German) * Styrole * Styrolene *
Vinylbenzen (Czech) * Vinylbenzene * Vinyl benzene (OSHA) * Vinylbenzol

RTECS Number: WL3675000

**Section 3 - Hazards Identification**

**EMERGENCY OVERVIEW**
Flammable. Harmful.
Harmful by inhalation. Irritating to eyes, respiratory system and skin. Limited evidence of a carcinogenic effect.
Possible Carcinogen (US). Lachrymator. Target organ(s): Central nervous system. Blood.

**HMIS RATING**
- HEALTH: 2*
- FLAMMABILITY: 3
- REACTIVITY: 1

**NFPA RATING**
- HEALTH: 2
- FLAMMABILITY: 3
- REACTIVITY: 1

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

**Section 4 - First Aid Measures**
ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

FLAMMABLE HAZARDS
Flammable Hazards: Yes

EXPLOSION HAZARDS
Container explosion may occur under fire conditions. Forms explosive mixtures in air.

FLASH POINT
89.6 °F   32 °C   Method: closed cup

EXPLOSION LIMITS
Lower: 1.1 %   Upper: 8.9 %

AUTOIGNITION TEMP
480 °C

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.
Unsuitable: Water may be effective for cooling, but may not effect extinguishment.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Specific Hazard(s): Vapor may travel considerable distance to source of ignition and flash back. Flammable liquid.
Specific Method(s) of Fire Fighting: Use water spray to cool fire-exposed containers.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area. Shut off all sources of ignition.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing.

STORAGE
Suitable: Keep tightly closed. Keep away from heat, sparks, and open flame.
Store at 2-8°C

SPECIAL REQUIREMENTS
Light sensitive.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Use only in a chemical fume hood. Safety shower and eye bath. Use nonsparking tools.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Government approved respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>STEL</td>
<td>40 PPM</td>
</tr>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>TWA</td>
<td>20 PPM</td>
</tr>
<tr>
<td>USA</td>
<td>MSHA Standard-air</td>
<td>TWA</td>
<td>100 PPM (420 MG/M3)</td>
</tr>
<tr>
<td>USA</td>
<td>OSHA.</td>
<td>PEL</td>
<td>8H TWA 100 PPM; CL 200; PK 600/5</td>
</tr>
</tbody>
</table>

New Zealand OEL
Remarks: check ACGIH TLV

| USA     | NIOSH  | TWA   | 50 PPM  |
|         |        | STEL  | 100 PPM  |

EXPOSURE LIMITS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>NDS</td>
<td></td>
<td>50 MG/M3</td>
</tr>
<tr>
<td>Poland</td>
<td>NDSCh</td>
<td></td>
<td>200 MG/M3</td>
</tr>
<tr>
<td>Poland</td>
<td>NDSP</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
<td>104.15 AMU</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>BP/BP Range</td>
<td>145 - 146 ºC</td>
<td>760 mmHg</td>
</tr>
<tr>
<td>MP/MP Range</td>
<td>-31 ºC</td>
<td></td>
</tr>
<tr>
<td>Freezing Point</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>4.3 mmHg</td>
<td>15 ºC</td>
</tr>
</tbody>
</table>
Vapor Density           3.6 g/l
Saturated Vapor Conc.   N/A
SG/Density              0.906 g/cm3
Bulk Density            N/A
Odor Threshold          N/A
Volatile%               N/A
VOC Content             N/A
Water Content           N/A
Solvent Content         N/A
Evaporation Rate        N/A
Viscosity               N/A
Surface Tension         N/A
Partition Coefficient   N/A
Decomposition Temp.     N/A
Flash Point             89.6 °F 32 °C Method: closed cup
Explosion Limits        Lower: 1.1 %
                        Upper: 8.9 %
Flammability            N/A
Autoignition Temp       480 °C
Refractive Index        1.547
Optical Rotation        N/A
Miscellaneous Data      N/A
Solubility              Solubility in Water: Insoluble.

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Conditions to Avoid: May polymerize on exposure to light.
Materials to Avoid: Oxidizing agents Copper, Copper alloys.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

STABILIZERS PRESENT
Inhibited with 10-15 ppm 4-tert-butylcatechol.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: May occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: Causes skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes eye irritation. Lachrymator.
Inhalation: Material is irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)
Central nervous system. Blood. Lymphatic system. Endocrine system.

SIGNS AND SYMPTOMS OF EXPOSURE
Exposure can cause: Dermatitis. CNS depression. Nausea, dizziness, and headache.

TOXICITY DATA
Inhalation
Human
10,000 ppm
LCLO

Oral
Rat
2650 mg/kg
LD50
Liver: Other changes.

Inhalation
Rat
12,000 mg/m3
LC50

Intraperitoneal
Rat
898 MG/KG
LD50

Oral
Mouse
316 mg/kg
LD50

Inhalation
Mouse
9,500 mg/m3
LC50

Intraperitoneal
Mouse
660 MG/KG
LD50

Intravenous
Mouse
90 MG/KG
LD50

Oral
Mammal
> 1500 mg/kg
LD50

IRRITATION DATA

Skin
Human
500 mg

Skin
Rabbit
500 mg
Remarks: Open irritation test

Skin
Rabbit
100 %
Remarks: Moderate irritation effect
Eyes
Rabbit
100 mg
Remarks: Severe irritation effect

Eyes
Rabbit
100 mg
24H
Remarks: Moderate irritation effect

CHRONIC EXPOSURE - CARCINOGEN
Result: This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Species: Rat
Route of Application: Oral
Dose: 1520 MG/KG
Exposure Time: 43W
Frequency: I
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.

Species: Rat
Route of Application: Inhalation
Dose: 100 PPM
Exposure Time: 4H/5D/1Y
Frequency: I
Result: Tumorigenic:Carcinogenic by RTECS criteria. Skin and Appendages: Other: Tumors. Blood:Leukemia

Species: Mouse
Route of Application: Inhalation
Dose: 160 PPM
Exposure Time: 6H/2Y
Frequency: I
Result: Tumorigenic:Carcinogenic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

IARC CARCINOGEN LIST
Rating: Group 2B

NTP CARCINOGEN LIST
Rating: Inadequate studies
Species: Mouse/rat
Route: Gavage

ACGIH CARCINOGEN LIST
Rating: A4

CHRONIC EXPOSURE - TERATOGEN
Species: Rat
Dose: 4 GM/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death,
e.g., stunted fetus).

Species: Rat
Dose: 11470 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Urogenital system.

Species: Rat
Dose: 1500 UG/M3/24H
Route of Application: Inhalation
Exposure Time: (1-22D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

CHRONIC EXPOSURE - MUTAGEN
Result: Laboratory experiments have shown mutagenic effects.

Species: Human
Dose: 100 UMOL/L
Cell Type: lymphocyte
Mutation test: Unscheduled DNA synthesis

Species: Human
Dose: 28 MMOL/L
Cell Type: HeLa cell
Mutation test: DNA inhibition

Species: Human
Dose: 300 MG/KG
Cell Type: lymphocyte
Mutation test: Body fluid assay

Species: Human
Route: Inhalation
Dose: 7500 PPB/8H/5D-I
Mutation test: Cytogenetic analysis

Species: Human
Dose: 300 PPM
Exposure Time: 72H
Cell Type: lymphocyte
Mutation test: Cytogenetic analysis

Species: Human
Route: Inhalation
Dose: 1204 MG/M3/5Y-I
Mutation test: Sister chromatid exchange

Species: Human
Dose: 10 UMOL/L
Cell Type: lymphocyte
Mutation test: Sister chromatid exchange

Species: Rat
Dose: 145 UG/PLATE
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Rat
Dose: 3 MMOL/L
Cell Type: liver
Mutation test: DNA damage
Species: Rat
Dose: 3800 UMOL/L
Cell Type: liver
 Mutation test: Unscheduled DNA synthesis
Species: Rat
Route: Inhalation
Dose: 300 PPM
Exposure Time: 8W
Mutation test: Cytogenetic analysis
Species: Rat
Route: Intraperitoneal
Dose: 750 MG/KG
Mutation test: Sister chromatid exchange
Species: Rat
Route: Intraperitoneal
Dose: 40 GM/KG
Exposure Time: 8W
Mutation test: sperm
Species: Mouse
Route: Intraperitoneal
Dose: 250 MG/KG
Mutation test: Micronucleus test
Species: Mouse
Route: Intraperitoneal
Dose: 10 MMOL/KG
Mutation test: DNA damage
Species: Mouse
Route: Intraperitoneal
Dose: 450 MG/KG
Mutation test: Sister chromatid exchange
Species: Mouse
Route: Inhalation
Dose: 125 PPM
Exposure Time: 4D
Mutation test: Sister chromatid exchange
Species: Mouse
Dose: 1 GM/KG
Cell Type: S. cerevisiac
Mutation test: Host-mediated assay
Species: Mouse
Dose: 1 GM/KG
Cell Type: S. pombe
Mutation test: Host-mediated assay
Species: Mouse
Route: Intraperitoneal
Dose: 3500 MG/KG
Exposure Time: 7W
Mutation test: sperm
Species: Hamster
Dose: 240 UMOL/PLATE (+S9)
Cell Type: lung
Mutation test: Mutation in microorganisms

Species: Hamster
Dose: 100 MG/L
Cell Type: lung
Mutation test: Cytogenetic analysis

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 8600 MG/KG
Route of Application: Oral
Exposure Time: (1-22D PREG/21D POST)
Result: Effects on Newborn: Behavioral.

Species: Rat
Dose: 5575 MG/KG
Route of Application: Oral
Exposure Time: (MULTIGENERATIONS)
Result: Effects on Newborn: Viability index (e.g., # alive at day 4 per # born alive). Effects on Newborn: Weaning or lactation index (e.g., # alive at weaning per # alive at day 4).

Species: Rat
Dose: 293 PPM/6H
Route of Application: Inhalation
Exposure Time: (7-21D PREG)
Result: Effects on Newborn: Behavioral.

Species: Rat
Dose: 5 MG/M3/24H
Route of Application: Inhalation
Exposure Time: (1-22D PREG)
Result: Effects on Newborn: Stillbirth. Effects on Newborn: Weaning or lactation index (e.g., # alive at weaning per # alive at day 4).

Species: Rat
Dose: 1500 UG/M3/24H
Route of Application: Inhalation
Exposure Time: (1-7D PREG)
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea). Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Rat
Dose: 50 PPM/6H
Route of Application: Inhalation
Exposure Time: (7-12D PREG)
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Species: Mouse
Dose: 500 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-16D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
Species: Hamster
Dose: 1000 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-18D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: LC50 Fish
Species: Leuciscus idus
Time: 48 h
Value: 17 - 66 mg/l

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 24 h
Value: 182 mg/l

ELIMINATION

Elimination: 60 %

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Styrene monomer, inhibited
UN#: 2055
Class: 3
Packing Group: Packing Group III
Hazard Label: Flammable liquid
PIH: Not PIH

IATA
Proper Shipping Name: Styrene monomer, stabilized
IATA UN Number: 2055
Hazard Class: 3
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: Xn
Indication of Danger: Harmful.
R: 10 20 36/38
Risk Statements: Flammable. Harmful by inhalation. Irritating to eyes and skin.
S: 23
Safety Statements: Do not breathe vapor.
US CLASSIFICATION AND LABEL TEXT

Risk Statements: Harmful by inhalation. Irritating to eyes, respiratory system and skin. Limited evidence of a carcinogenic effect.
Safety Statements: Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes
DEMINIMIS: 0.1 %
NOTES: This product is subject to SARA section 313 reporting requirements.
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2004 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.