

STYRENE

STY

CAUTIONARY RESPONSE INFORMATION

Common Synonyms Phenylethylene Styrol Styrolene Vinyl benzene	Watery liquid Colorless to light yellow Sweet pleasant odor
Floats on water. Flammable, irritating vapor is produced.	
<p>Keep people away. Avoid contact with liquid and vapor. Wear chemical protective suit with self-contained breathing apparatus. Shut off ignition sources and call fire department. Notify local health and pollution control agencies. Protect water intakes.</p>	
Fire	<p>FLAMMABLE CONTAINERS MAY EXPLODE IN FIRE. Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear chemical protective suit with self-contained breathing apparatus. Combat fires from safe distance or protected location. Extinguish with dry chemical, foam, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.</p>
Exposure	<p>CALL FOR MEDICAL AID.</p> <p>VAPOR Irritating to eyes, nose and throat. If inhaled, will cause dizziness or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.</p> <p>LIQUID Will burn skin and eyes. Harmful if swallowed. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk. DO NOT INDUCE VOMITING.</p>
Water Pollution	<p>HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. Fouling to shoreline. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.</p>

1. CORRECTIVE RESPONSE ACTIONS

Stop discharge
Contain
Collection Systems: Skim
Clean shore line
Salvage waterfowl

2. CHEMICAL DESIGNATIONS

2.1 **CG Compatibility Group:** 30; Olefin
 2.2 **Formula:** C₈H₈CH=CH₂
 2.3 **IMO/UN Designation:** 3.3/2055
 2.4 **DOT ID No.:** 2055
 2.5 **CAS Registry No.:** 100-42-5
 2.6 **NAERG Guide No.:** 128P
 2.7 **Standard Industrial Trade Classification:** 51125

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Air-supplied mask or approved canister; rubber or plastic gloves; boots; goggles or face shield.
- 3.2 **Symptoms Following Exposure:** Moderate irritation of eyes and skin. High vapor concentrations cause dizziness, drunkenness, and anesthesia.
- 3.3 **Treatment of Exposure:** INHALATION: remove to fresh air; keep warm and quiet; use artificial respiration if needed. INGESTION: do NOT induce vomiting; call physician; no known antidote. SKIN OR EYE CONTACT: flush with plenty of water; for eyes get medical attention.
- 3.4 **TLV-TWA:** 20 ppm
 3.5 **TLV-STEL:** 40 ppm
 3.6 **TLV-Ceiling:** Not listed.
 3.7 **Toxicity by Ingestion:** Grade 2; LD₅₀ = 0.5 to 5 g/kg
 3.8 **Toxicity by Inhalation:** Currently not available.
 3.9 **Chronic Toxicity:** Currently not available
- 3.10 **Vapor (Gas) Irritant Characteristics:** Vapors cause moderate irritation such that personnel will find high concentrations unpleasant. The effect is temporary.
- 3.11 **Liquid or Solid Characteristics:** Causes smarting of the skin and first-degree burns on short exposure; may cause secondary burns on long exposure.
- 3.12 **Odor Threshold:** 0.148 ppm
 3.13 **IDLH Value:** 700 ppm
 3.14 **OSHA PEL-TWA:** 100 ppm
 3.15 **OSHA PEL-STEL:** 600 ppm, 5 minute peak in any 3 hours
 3.16 **OSHA PEL-Ceiling:** 200 ppm
 3.17 **EPA AEGL:** Not listed

4. FIRE HAZARDS

- 4.1 **Flash Point:** 93°F O.C. 88°F C.C.
 4.2 **Flammable Limits in Air:** 1.1%-6.1%
 4.3 **Fire Extinguishing Agents:** Water fog, foam, carbon dioxide, or dry chemical
 4.4 **Fire Extinguishing Agents Not to Be Used:** Water may be ineffective.
 4.5 **Special Hazards of Combustion Products:** Not pertinent
 4.6 **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.
 4.7 **Auto Ignition Temperature:** 914°F
 4.8 **Electrical Hazards:** Class I, Group D
 4.9 **Burning Rate:** 5.2 mm/min.
 4.10 **Adiabatic Flame Temperature:** Currently not available
 4.11 **Stoichiometric Air to Fuel Ratio:** 47.6 (calc.)
 4.12 **Flame Temperature:** Currently not available
 4.13 **Combustion Molar Ratio (Reactant to Product):** 12.0 (calc.)
 4.14 **Minimum Oxygen Concentration for Combustion (MOCC):** N₂ diluent: 9.0%

5. CHEMICAL REACTIVITY

- 5.1 **Reactivity with Water:** No reaction
 5.2 **Reactivity with Common Materials:** No reaction
 5.3 **Stability During Transport:** Stable
 5.4 **Neutralizing Agents for Acids and Caustics:** Not pertinent
 5.5 **Polymerization:** May occur if heated above 150°F. Can cause rupture of container. Metal salts, peroxides, and strong acids may also cause polymerization.
 5.6 **Inhibitor of Polymerization:** Tertiary-butylcatechol, 10-15 ppm

6. WATER POLLUTION

- 6.1 **Aquatic Toxicity:** 22 ppm/96 hr/bluegill/TL_m/fresh water
 6.2 **Waterfowl Toxicity:** Currently not available
 6.3 **Biological Oxygen Demand (BOD):** 18% (theor.), 412 days
 6.4 **Food Chain Concentration Potential:** None
 6.5 **GESAMP Hazard Profile:**
 Bioaccumulation: T
 Damage to living resources: 3
 Human Oral hazard: 2
 Human Contact hazard: II
 Reduction of amenities: XXX

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** 99.5+%
 7.2 **Storage Temperature:** Ambient
 7.3 **Inert Atmosphere:** No requirement
 7.4 **Venting:** Open (flame arrester)
 7.5 **IMO Pollution Category:** B
 7.6 **Ship Type:** 3
 7.7 **Barge Hull Type:** 3

8. HAZARD CLASSIFICATIONS

- 8.1 **49 CFR Category:** Flammable liquid
 8.2 **49 CFR Class:** 3
 8.3 **49 CFR Package Group:** III
 8.4 **Marine Pollutant:** Yes
 8.5 **NFPA Hazard Classification:**
- | Category | Classification |
|----------------------|----------------|
| Health Hazard (Blue) | 2 |
| Flammability (Red) | 3 |
| Instability (Yellow) | 2 |
- 8.6 **EPA Reportable Quantity:** 1000 pounds
 8.7 **EPA Pollution Category:** C
 8.8 **RCRA Waste Number:** Not listed
 8.9 **EPA FWPCA List:** Yes

9. PHYSICAL & CHEMICAL PROPERTIES

- 9.1 **Physical State at 15° C and 1 atm:** Liquid
 9.2 **Molecular Weight:** 104.15
 9.3 **Boiling Point at 1 atm:** 293.4°F = 145.2°C = 418.4°K
 9.4 **Freezing Point:** -23.1°F = -30.6°C = 242.6°K
 9.5 **Critical Temperature:** 703.4°F = 373°C = 646.2°K
 9.6 **Critical Pressure:** 580 psia = 39.46 atm = 4.00 MN/m²
 9.7 **Specific Gravity:** 0.906 at 20°C (liquid)
 9.8 **Liquid Surface Tension:** 32.14 dynes/cm = 0.03214 N/m at 19°C
 9.9 **Liquid Water Interfacial Tension:** 35.48 dynes/cm = 0.03548 N/m at 19°C
 9.10 **Vapor (Gas) Specific Gravity:** Not pertinent
 9.11 **Ratio of Specific Heats of Vapor (Gas):** 1.074
 9.12 **Latent Heat of Vaporization:** 156 Btu/lb = 86.8 cal/g = 3.63 X 10⁵ J/kg
 9.13 **Heat of Combustion:** Not pertinent
 9.14 **Heat of Decomposition:** Not pertinent
 9.15 **Heat of Solution:** Not pertinent
 9.16 **Heat of Polymerization:** -277 Btu/lb = -154 cal/g = -6.45 X 10⁵ J/kg
 9.17 **Heat of Fusion:** Currently not available
 9.18 **Limiting Value:** Currently not available
 9.19 **Reid Vapor Pressure:** 0.27 psia

NOTES

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9.20 SATURATED LIQUID DENSITY		9.21 LIQUID HEAT CAPACITY		9.22 LIQUID THERMAL CONDUCTIVITY		9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit inch per hour-square foot-F	Temperature (degrees F)	Centipoise
40	57.430	0	0.389	15	1.087	40	0.950
50	57.120	5	0.391	20	1.090	50	0.872
60	56.800	10	0.393	25	1.074	60	0.803
70	56.490	15	0.395	30	1.067	70	0.742
80	56.180	20	0.397	35	1.060	80	0.688
90	55.870	25	0.399	40	1.054	90	0.639
100	55.560	30	0.401	45	1.047	100	0.595
110	55.240	35	0.403	50	1.040	110	0.556
120	54.930	40	0.405	55	1.033	120	0.521
130	54.620	45	0.407	60	1.027	130	0.488
140	54.310	50	0.409	65	1.020	140	0.459
150	54.000	55	0.411	70	1.013	150	0.433
160	53.680	60	0.413	75	1.006	160	0.408
170	53.370	65	0.415	80	1.000	170	0.386
180	53.060	70	0.417	85	0.993	180	0.366
190	52.750	75	0.419	90	0.986	190	0.347
200	52.430	80	0.421	95	0.980	200	0.330
210	52.120	85	0.423	100	0.973	210	0.314
		90	0.424	105	0.966		
		95	0.426	110	0.959		
		100	0.428	115	0.953		
		105	0.430	120	0.946		
		110	0.432				
		115	0.434				
		120	0.436				

9.24 SOLUBILITY IN WATER		9.25 SATURATED VAPOR PRESSURE		9.26 SATURATED VAPOR DENSITY		9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
68	0.300	40	0.034	40	0.00066	0	0.239
		50	0.049	50	0.00094	25	0.253
		60	0.070	60	0.00131	50	0.266
		70	0.099	70	0.00181	75	0.279
		80	0.137	80	0.00247	100	0.292
		90	0.188	90	0.00332	125	0.304
		100	0.254	100	0.00440	150	0.317
		110	0.339	110	0.00577	175	0.329
		120	0.447	120	0.00748	200	0.340
		130	0.583	130	0.00959	225	0.352
		140	0.753	140	0.01218	250	0.363
		150	0.963	150	0.01532	275	0.374
		160	1.221	160	0.01911	300	0.385
		170	1.534	170	0.02364	325	0.396
		180	1.912	180	0.02900	350	0.406
		190	2.365	190	0.03533	375	0.416
		200	2.905	200	0.04272	400	0.426
		210	3.542	210	0.05132	425	0.435
		220	4.292	220	0.06126	450	0.445
		230	5.167	230	0.07269	475	0.454
		240	6.183	240	0.08575	500	0.462
		250	7.358	250	0.10060	525	0.471
		260	8.709	260	0.11740	550	0.479
		270	10.250	270	0.13630	575	0.487
		280	12.010	280	0.15760	600	0.495
		290	14.010	290	0.18130		