BENZENE

CAUTIONARY RESPONSE INFORMATION

Common Synonyms: Benzo, Benzene

Wetted liquid Colorless Gasoline-like odor

Flots on water. Flammable, irritating vapor is produced. Freezing point is 42°F.

Restrict access.

Avoid contact with liquid and vapor.

Wear goggles and self-contained breathing apparatus.

Shut off ignition sources and call fire department.

Stay upwind and use water sprays to "knock down" vapor.

Notify local health and pollution control agencies.

Protect water intakes.

Fire

FLAMMABLE.

Flashback along vapor trail may occur. Vapor may explode if ignited in an enclosed area. Wear goggles and self-contained breathing apparatus. Extinguish with dry chemical, foam, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

VAPOR

Irritating to eyes, nose and throat. If inhaled, will cause headache, difficult breathing, or loss of consciousness. Move to fresh air. If breathing has stopped, give artificial respiration. If breathing is difficult, give oxygen.

LIQUID

Irritating to 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.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.

May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.

1. CORRECTIVE RESPONSE ACTIONS

Stop discharge

Contain

Collection Systems: Skim

Chemical and Physical Treatment: Burn

Salvage wastewater

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: 32; Aromatic Hydrocarbon

2.2 Formula: C₆H₆

2.3 IMOS/UN No.: 71-43-2

2.4 DOT ID No.: 1114

2.5 CAS Registry No.: 71-43-2

2.6 NAERG Guide No.: 130

2.7 Standard Industrial Trade Classification: 51122

3. HEALTH HAZARDS

3.1 Personal Protective Equipment: Self-contained positive pressure breathing apparatus; protective gloves and clothing.

3.2 Symptoms Following Exposure: Dizziness, excitation, pallor; followed by flushing, weakness, headache, breathlessness, chest constriction, nausea, and vomiting. Come and possible death.

3.3 Treatment of Exposure: SKIN: flush with water followed by soap and water; remove contaminated clothing and wash skin. EYES: flush with plenty of water until irritation subsides. INHALATION: remove from exposure immediately. Call a physician. If breathing is irregular or stopped, start resuscitation, administer oxygen.

3.4 TLV-TWA: 0.5 ppm

3.5 TLV-STEL: 2.5 ppm

3.6 TLV-Ceiling: Not listed

3.7 Toxicity by Ingestion: Grade 3; LD₅₀ = 50 to 500 mg/kg

3.8 Toxicity by Inhalation: Not currently available.

3.9 Chronic Toxicity: Leukemia.

3.10 Vapor (Gas) Irritant Characteristics: If present in high concentrations, vapors may cause irritation of eyes or respiratory system. The effect is temporary.

3.11 Liquid or Solid Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smearing and reddening of the skin.

3.12 Odor Threshold: 4.68 ppm

3.13 IDLH Value: 500 ppm

3.14 OSHA PEL-TWA: 1 ppm

3.15 OSHA PEL-STEL: 5 ppm

3.16 OSHA PEL-Ceiling: Not listed

3.17 EPA AEGL: Not listed

4. FIRE HAZARDS

4.1 Flash Point: 12°F C.C.

4.2 Flammable Limits in Air: 1.3%–7.9%

4.3 Fire Extinguishing Agents: Dry chemical, foam, or carbon dioxide.

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.

4.7 Auto Ignition Temperature: 109°F

4.8 Electrical Hazards: Class I, Group D

4.9 Burning Rate: 6.0 mm/min.

4.10 Abnormal Flame Temperature: Currently not available.

4.11 Stoichiometric Air to Fuel Ratio: 35.7 (calc.)

4.12 Flame Temperature: Currently not available.

4.13 Combustion Molar Ratio (Reactant to Product): 9.0 (calc.)

4.14 Minimum Oxygen Concentration for Combustion (MOCC): Not listed

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: Not pertinent.

5.6 Inhibitor of Polymerization: Not pertinent.

6. WATER POLLUTION

6.1 Aquatic Toxicity: currently not available

6.2 Waterfowl Toxicity: Currently not available

6.3 Biological Oxygen Demand (BOD): 1.2 lb/ft³, 10 days

6.4 Food Chain Concentration Potential: None.

6.5 Gesamp Hazard Profile: Bioaccumulation: 0 Damage to living resources: 2 Human Oral hazard: 1 Human Contact hazard: II Reduction of amenities: XXX

6.6.1 Aquatic toxicity: 5 ppm/6 h in marine/esth/dissolved water 20 ppm/24 h in surf/shelf/TL/est/dissolved water 62 Waterfowl toxicity: Currently not available 63 Biological oxygen demand: 1.2 lb/ft³, 10 days 64 Food chain concentration potential: None. 65 Gesamp hazard profile: Bioaccumulation: 0 Damage to living resources: 2 Human oral hazard: 1 Human contact hazard: II Reduction of amenities: XXX

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7. SHIPPING INFORMATION

7.1 Grades of Purity: Industrial pure – 99%; Thionphene free – 95%; Nitrification – 99%; Industrial – 95%; 85–89%; Reagent – 99%;

7.2 Storage Temperature: Ambient.

7.3 Inert Atmosphere: No requirement.

7.4 Venting: Pressure-vacuum.

7.5 IMO Pollution Category: C

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: II

8.4 Marine Pollutant: No

8.5 NPPA Hazard Classification:

Category Classification Health Hazard (Blue): 710 Flammability (Red): 710 Health Hazard (Blue): 710 Flammability (Red): 710

8.6 EPA Reportable Quantity: 10 pounds

8.7 EPA Pollution Category: A

8.8 RQRA Waste Number: 0019

8.9 EPA FWPCA List: Yes

9. PHYSICAL & CHEMICAL PROPERTIES

9.1 Physical State at 15°C: Liquid

9.2 Molecular Weight: 78.11

9.3 Boiling Point at 1 atm: 176°F / 79.0°C = 413.7K

9.4 Freezing Point: 42.0°F / 5.5°C = 278.7K

9.5 Critical Temperature: 552.0°F / 288.9°C = 585.1K

9.6 Critical Pressure: 710 psia / 4.9 atm = 4.89 MPa

9.7 Specific Gravity: 0.697 at 20°C (liquid)

9.8 Liquid Surface Tension: 28.9 dynes/cm = 0.0289 N/m at 20°C

9.9 Liquid Interfacial Tension: 35.0 dynes/cm = 0.035 N/m at 20°C

9.10 Vapor (Gas) Specific Gravity: 2.8

9.11 Ratio of Specific Heats of Vapor (Gas): 1.061

9.12 Latent Heat of Vaporization: 169 Btu/lb = 894 cal/g = 3.94 X 10³ J/g

9.13 Heat of Combustion: –17,460 Btu/lb = –9698 cal/g = –406.0 X 10³ J/g


9.15 Heat of Solution: Not pertinent.

9.16 Heat of Polymerization: Not pertinent.

9.17 Heat of Fusion: 30.45 cal/g

9.18 Limiting Value: Currently not available

9.19 Reid Vapor Pressure: 3.22 psi

NOTES

JUNE 1999
# BENZENE

## 9.20 SATURATED LIQUID DENSITY

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<th>Pounds per cubic foot</th>
<th>Temperature (degrees F)</th>
<th>British thermal unit per pound-F</th>
<th>Temperature (degrees F)</th>
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## 9.21 LIQUID HEAT CAPACITY

## 9.22 LIQUID THERMAL CONDUCTIVITY

## 9.23 LIQUID VISCOSITY

## 9.24 SOLUBILITY IN WATER

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## 9.25 SATURATED VAPOR PRESSURE

## 9.26 SATURATED VAPOR DENSITY

## 9.27 IDEAL GAS HEAT CAPACITY