



Material Safety Data Sheet

Section 1. Chemical Product and Company Identification

Product name	Benzene	<u>In Case of Emergency</u>	Chemtec: (800) 424-9300 Total Petrochemicals & Refining USA, Inc.: (800) 322-3462
Supplier	Total Petrochemicals & Refining USA, Inc. P O Box 674411 Houston, TX 77267-4411	<u>Technical Information</u>	For non-emergency product information: email product.stewardship@total.com
Chemical Family	Aromatic.	MSDS#	BC0002
CAS Registry Number	71-43-2	Validation Date	1/1/2013
		Print Date	1/1/2013
Synonym	Benzene, Benzol		

Section 2. Hazards Identification

Emergency Overview	EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. CAN CAUSE DAMAGE TO THE FOLLOWING SPECIFIC ORGAN(S) AND SYSTEM(S): (blood, the central nervous system, mucous membranes, gastro-intestinal tract, upper respiratory tract, skin, eyes). ASPIRATION HAZARD IF SWALLOWED. CAN ENTER LUNGS AND CAUSE DAMAGE. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION.
Routes of Entry	Eye contact. Ingestion. Inhalation. Skin contact.
Potential Acute Health Effects	<i>Eyes</i> Irritating to eyes. <i>Skin</i> Irritating to skin. Harmful if absorbed through the skin. Skin inflammation is characterized by itching, scaling, reddening or, occasionally, blistering. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis. <i>Inhalation</i> Material is irritating to mucous membranes and upper respiratory tract. May be fatal if inhaled in very high concentrations. Can cause central nervous system (CNS) depression. Headaches, dizziness, irritation of eyes, nose, and throat, fatigue & excitation followed by depression. <i>Ingestion</i> Aspiration hazard if swallowed. Can enter lungs and cause damage. May be fatal if swallowed. Dizziness, headaches, and breathing difficulties, diarrhea, vomiting, possible pneumonia (if vomited).
Potential Chronic Health Effects	The primary target for adverse systemic effects of benzene following low-level chronic exposure is the hematological (blood forming) system and myelodysplastic syndrome (disease that affects the bone marrow and blood). CARCINOGENIC EFFECTS: Classified A1 (Confirmed for humans.) by ACGIH, 1 (Proven for humans.) by IARC, 1 (Known to be human carcinogens.) by NTP, + (Proven.) by OSHA, + (Proven.) by NIOSH, 1 (Proven for humans.) by European Union, PROVEN by NIH. MUTAGENIC EFFECTS: Classified 2 by European Union.
Medical Conditions Aggravated by Overexposure	Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.
Overexposure /Signs/ Symptoms	Dizziness, excitation, pallor, followed by flushing, weakness, headache, breathlessness, chest constriction. Irritation of eyes, skin, nose, respiratory system. Nausea, staggered gait, fatigue.

See Toxicological Information (Section 11)

Section 3. Composition and Information on Ingredients

Occupational exposure limits, if available, are listed in Section 8.

Substance Name	CAS #	% by Weight
Benzene	71-43-2	~100

Section 4. First Aid Measures

Eye Contact	Check for and remove any contact lenses. IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. DO NOT use an eye ointment. Seek medical attention.
Skin Contact	If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. Wash thoroughly with soap and water. Launder contaminated clothes.
Inhalation	Allow the victim to rest in a well ventilated area. Seek immediate medical attention. If the victim is not breathing, perform mouth-to-mouth resuscitation.
Ingestion	DO NOT induce vomiting or give liquids. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Section 5. Fire Fighting Measures

Flammability of the Product	Flammable.
Auto-ignition Temperature	591.65°C (1097°F)
Flash Points	Closed cup: -11.15°C (11.9°F). (Tagliabue.) Open cup: -11°C (12.2°F).
Flammable Limits	LOWER: 1.3% UPPER: 7.1%
Products of Combustion	These products are carbon oxides (CO, CO2).
Fire Hazards in Presence of Various Substances	Extremely flammable in presence of open flames and sparks, or heat.
Explosion Hazards in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not expected. Risks of explosion of the product in presence of static discharge: Expected.
Fire Fighting Media and Instructions	Flammable liquid. SMALL FIRE: Use DRY chemicals, CO2, alcohol foam, water spray, or halon. LARGE FIRE: Use alcohol foam, water spray or fog.
Protective Clothing (Fire)	Wear MSHA/NIOSH approved self-contained breathing apparatus or equivalent and full protective gear.
Special Remarks on Fire Hazards	Extremely flammable liquid. Do not use near open flames, electric sparks or on hot surfaces.

Section 6. Accidental Release Measures

Small Spill and Leak	Absorb with an inert material and put the spilled material in an appropriate waste disposal.
Large Spill and Leak	Flammable liquid. Contain spill and safely stop the flow. Warn personnel to move away. Eliminate all sources of ignition. Ventilate. Absorb with DRY earth, sand or other non-combustible material. Do not allow any potentially contaminated water, including rain water, runoff from fire fighting or spills, to enter any waterway, sewer or drain. Dike spill area and do not allow product to reach sewage system or surface or ground water. Notify any reportable spill to authorities. (See section 12 for environmental risks and 13 for disposal information.)

Section 7. Handling and Storage

Handling	Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. Dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.
Storage	<p>Keep container tightly closed. Keep in a cool, well-ventilated place. Flammable materials should be stored in a separate safety storage cabinet or room. Avoid all possible sources of ignition (spark or flame). Take precautionary measures against static discharges.</p> <p>All efforts should be made to prevent any leaks or spills. Storage tanks containing should be engineered to prevent contact with water resources, as this material could contaminate the water resources. Surface spills can reach groundwater through porous soil or cracked surfaces. The storage tanks should be monitored regularly for leaks. Where spills or leaks are possible, a comprehensive response plan should be developed and implemented.</p>

Section 8. Exposure Controls/Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection	<p><i>Eyes</i> Safety glasses with side shields.</p> <p><i>Body</i> Flame retardant clothing covering the entire body.</p> <p><i>Respiratory</i> Utilize respiratory protection in accordance with 29CFR 1910.134 & 29CFR 1910.1028 (Benzene).</p> <p><i>Hands</i> Gloves (impervious).</p> <p><i>Feet</i> Shoes.</p>

Protective Clothing (Pictograms)



Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
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Product Name	Exposure Limits
Benzene	<p>ACGIH TLV (United States, 1/2011). TWA: 0.5 ppm 8 hour(s). STEL: 2.5 ppm 15 minute(s).</p> <p>NIOSH REL (United States, 6/2008). TWA: 0.1 ppm 10 hour(s). STEL: 1 ppm 15 minute(s).</p> <p>OSHA PEL (United States, 11/2006). TWA: 1 ppm 8 hour(s). STEL: 5 ppm 15 minute(s). See 29 CFR 1910.1028</p>

Consult local authorities for acceptable exposure limits.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Liquid. Clear.
Color	Clear Colorless.
Odor	Sweet (aromatic) odor.
Odor Threshold	61 ppm
Molecular Weight	78 g/mole
Molecular Formula	C6H6
Boiling/Condensation Point	80°C (176°F)
Melting/Freezing Point	5.5°C (41.9°F)
Critical Temperature	288.9°C (552°F)
Specific Gravity	0.88 (Water = 1)
Vapor Pressure	99 mm of Hg (@ 25°C)
Vapor Density	2.7 (Air = 1)
Volatility	100% (v/v).
Evaporation Rate	5.1
VOC	100 (%)
Solubility in Water	0.06 %

Section 10. Stability and Reactivity

Stability and Reactivity	The product is stable.
Conditions of Instability	Avoid heat, sparks, & static electricity.
Incompatibility with Various Substances	Extremely reactive or incompatible with oxidizing agents, nitric acid, and many fluorides & perchlorates.
Hazardous Decomposition Products	Carbon monoxide & carbon dioxide.
Hazardous Polymerization	No.

Section 11. Toxicological Information

Toxicity to Animals	Product/ingredient name	Result	Species	Dose	Exposure
	Benzene	LD50 Dermal	Rabbit	>9400 uL/kg	-
		LD50 Intraperitoneal	Rat	1100 ug/kg	-
		LD50 Oral	Rat	930 mg/kg	-
		LD50 Oral	Rat	1 mL/kg	-
		LD50 Oral	Rat	6400 mg/kg	-
		LD50 Oral	Rat	1800 mg/kg	-
		LC50 Inhalation Gas.	Rat	10000 ppm	7 hours

Chronic Effects on Humans: The primary target for adverse systemic effects of benzene following low-level chronic exposure is the hematological (blood forming) system and myelodysplastic syndrome (disease that affects the bone marrow and blood).

CARCINOGENIC EFFECTS:

Classified
 A1 (Confirmed for humans.) by ACGIH,
 1 (Proven for humans.) by IARC,
 1 (Known to be human carcinogens.) by NTP,
 + (Proven.) by OSHA,
 + (Proven.) by NIOSH,
 1 (Proven for humans.) by European Union,
 PROVEN by NIH.

MUTAGENIC EFFECTS: Classified 2 by European Union.

	It is not known what effects exposure to benzene might have on the developing fetus in pregnant women or on fertility in men. Studies with pregnant animals show that breathing benzene has harmful effects on the developing fetus. These effects include low birth weight, delayed bone formation, and bone marrow damage.
Other Toxic Effects on Humans	The primary target organs for acute exposure are the hematopoietic (blood forming) system, nervous system, and immune system. Intentional misuse involving repeated and prolonged inhalation exposure to high concentrations of vapor can result in central nervous system damage and eventually death .
Special Remarks on Chronic Effects on Humans	Carcinogen: Known to cause acute myeloid leukemia in humans who have been repeatedly exposed to high airborne concentrations.
Special Remarks on Other Toxic Effects on Humans	Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.



Section 12. Ecological Information

Ecotoxicity	Not expected to significantly adsorb to sediment, bioconcentrate in aquatic organisms, or hydrolyze.
Biodegradable/OECD	May be subject to biodegradation in base-rich para-brownish soil at concentrations of 20 ppm during a time frame of 1 to 10 weeks. Biodegradation may also occur in shallow, aerobic groundwaters, but usually not under anaerobic conditions. The reported biodegradation half-life in an aerobic river die-away test is 16 days. In marine ecosystems, biodegradation occurs within 2 days after an acclimation period of 2 days and 2 weeks in the summer and spring, respectively, whereas no degradation occurs in winter.
Mobility	When released in soil, may rapidly volatilize near the surface. Unvaporized remnants are highly mobile in the soil and may leach into groundwater. In the atmosphere it exists predominantly in the vapor phase. It reacts with photochemically produced hydroxyl radicals with a half-life of 13.4 days. The reaction time in polluted atmospheres containing nitrogen oxides or sulfur dioxide shortens the half-life to 4-6 hours. Products of photooxidation include phenol, nitrophenol, nitrobenzene, formic acid, and peroxyacetyl nitrate. Benzene is relatively soluble in water and is removed from the atmosphere in rain.

Section 13. Disposal Considerations

Waste Information	Recover free liquid. Transfer to a safe disposal area in accordance with federal, state, and local regulations.
Waste Stream	The classification of the product may meet the criteria for a hazardous waste.
<i>Consult your local or regional authorities.</i>	

Section 14. Transport Information (for domestic bulk shipments, non-bulk shipments may differ)

DOT Classification for Bulk Shipments (non bulk shipments may differ)	DOT CLASS 3: Flammable liquid.	
Proper Shipping Name/Description	UN1114, Benzene, 3, PG II RQ	
UN Number	UN1114	
Packing Group	II	
Marine Pollutant	Not listed in Appendix B to 49CFR172.101	
Hazardous Substances Reportable Quantity	10.0 lbs. (4.54 kg)	
Special Provisions for Transport	See codes as shown in 49 CFR 172.101 Column 7.	
TDG Classification	3	
IMO/IMDG Classification	3	
ICAO/IATA Classification	3	
USCG Proper Shipping Name	Benzene	

Section 15. Regulatory Information	
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HCS Classification	Flammable liquid Carcinogen Target organ effects						
U.S. Federal Regulations	TSCA inventory: Benzene SARA 302/304/311/312 extremely hazardous substances: To the best of our knowledge, there are no substances that would be at reportable levels for this regulation in this product. SARA 302/304 emergency planning and notification: To the best of our knowledge, there are no substances that would be at reportable levels for this regulation in this product. SARA 302/304/311/312 hazardous chemicals: Benzene SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Benzene: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard SARA 313 Supplier Notification This product contains the following EPCRA section 313 chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (40 CFR 372 -Table 372.65). <table border="1"> <thead> <tr> <th><u>Product name</u></th> <th><u>CAS number</u></th> <th><u>Concentration (%)</u></th> </tr> </thead> <tbody> <tr> <td>Benzene</td> <td>71-43-2</td> <td>100</td> </tr> </tbody> </table> Clean Water Act (CWA) 307: Benzene Clean Water Act (CWA) 311: Benzene	<u>Product name</u>	<u>CAS number</u>	<u>Concentration (%)</u>	Benzene	71-43-2	100
<u>Product name</u>	<u>CAS number</u>	<u>Concentration (%)</u>					
Benzene	71-43-2	100					
International Regulations	<p>WHMIS (Canada) Class B-2: Flammable liquid Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).</p> <p>CEPA Toxic substances: This material is listed. Canadian ARET: To the best of our knowledge, this product does not contain listed substances at reportable levels. Canadian NPRI: This material is listed. Alberta Designated Substances: To the best of our knowledge, this product does not contain listed substances at reportable levels. Ontario Designated Substances: To the best of our knowledge, this product does not contain listed substances at reportable levels. Quebec Designated Substances: To the best of our knowledge, this product does not contain listed substances at reportable levels.</p>						
EINECS	200-753-7						
DSCL (EEC)	R11- Highly flammable. R36/38- Irritating to eyes and skin. R45- May cause cancer. R46- May cause heritable genetic damage. R48/23/24/25- Also toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed. R65- Also harmful: may cause lung damage if swallowed.						
CEPA DSL/NDSL	This material is listed or exempted.						
International Lists	Australia inventory (AICS): This material is listed or exempted. China inventory (IECSC): This material is listed or exempted. Japan inventory (ENCS): This material is listed or exempted. Japan inventory (ISHL): Not determined. Korea inventory (KECI): This material is listed or exempted. New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted. Philippines inventory (PICCS): This material is listed or exempted.						
State Regulations	Massachusetts Substances: This material is listed. New Jersey Hazardous Substances: This material is listed. New York Acutely Hazardous Substances: This material is listed. Pennsylvania RTK Hazardous Substances: This material is listed. California Prop. 65 WARNING: This product contains a chemical or chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. : Benzene						

Section 16. Other Information

Label requirements EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE.

CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER.

CAN CAUSE DAMAGE TO THE FOLLOWING SPECIFIC ORGAN(S) AND SYSTEM(S): (blood, the central nervous system, mucous membranes, gastro-intestinal tract, upper respiratory tract, skin, eyes).

ASPIRATION HAZARD IF SWALLOWED. CAN ENTER LUNGS AND CAUSE DAMAGE. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION.

**Hazardous Material
Information System
(U.S.A.)**

Health	*	2
Fire Hazard		3
Reactivity		0
Personal Protection		

**National Fire
Protection
Association
(U.S.A.)**


References Chemtox Database
HSDB - Hazardous Substances Data Bank
ATSDR toxicological profile

Other Special Considerations No additional remark.

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Chemtec:
(800) 424-9300
Total Petrochemicals & Refining USA, Inc.:
(800) 322-3462

Notice to Reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

MSDS Name Benzene

MSDS Code

BENZENE

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To obtain an electronic copy of this MSDS, please email: product.stewardship@total.com.