

Material Safety Data Sheet



Benzene

Section 1. Chemical product and company identification

Product Name	: Benzene
Supplier	: AIRGAS INC., on behalf of its subsidiaries 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
Synonym	: benzol; cyclohexatriene; phenyl hydride; phene; coal naphtha; pyrobenzol
Material uses	: Other non specified industry: ETHYLBENZENE (FOR STYRENE MONOMER); DODECYLBENZENE (FOR DETERGENTS); CYLOHEXANE (FOR NYLON); PHENOL; NITROBENZENE (FOR ANILINE); MALEIC ANHYDRIDE; CHLOROBENZENE; DIPHENYL; BENZENE HEXACHLORIDE; BENZENE-SULFONIC ACID; SOLVENT.
MSDS#	: 001062
Date of Preparation/Revision	: 6/4/2007.
In case of emergency	: 1-866-734-3438

Section 2. Hazards identification

Physical state	: Liquid. (COLORLESS TO PALE YELLOW WATERY LIQUID WITH A GASOLINE-LIKE ODOR)
Emergency overview	: Danger! CANCER HAZARD. CAN CAUSE CANCER. HIGHLY FLAMMABLE LIQUID AND VAPOR. HARMFUL IF INHALED OR SWALLOWED. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. CAUSES DAMAGE TO THE FOLLOWING ORGANS: BLOOD, RESPIRATORY TRACT, SKIN, EYES, BONE MARROW, CENTRAL NERVOUS SYSTEM, EYE, LENS OR CORNEA. VAPOR MAY CAUSE FLASH FIRE. MAY CAUSE SKIN IRRITATION. Do not ingest. Avoid contact with skin and clothing. Avoid breathing vapor or mist. Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Risk of cancer depends on duration and level of exposure.

Potential acute health effects

Eyes	: Irritating to eyes.
Skin	: Moderately irritating to the skin.
Inhalation	: Toxic by inhalation. Irritating to respiratory system.
Ingestion	: Toxic if swallowed.

Potential chronic health effects	: CARCINOGENIC EFFECTS Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC, 1 (Known To Be Human Carcinogens.) by NTP, + (Proven.) by OSHA, + (Proven.) by NIOSH, 1 (Proven for human.) by European Union. MUTAGENIC EFFECTS Not available. TERATOGENIC EFFECTS : Not available.
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Medical conditions aggravated by overexposure	: Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
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See toxicological Information (section 11)

Section 3. Composition, Information on Ingredients

United States

Benzene 71-43-2 100

Exposure limits

ACGIH TLV (United States, 5/2004). Skin

STEL: 8 mg/m³ 15 minute(s). Form: All forms

STEL: 2.5 ppm 15 minute(s). Form: All forms

TWA: 1.6 mg/m³ 8 hour(s). Form: All forms

TWA: 0.5 ppm 8 hour(s). Form: All forms

NIOSH REL (United States, 6/2001). Notes:

See Appendix A - NIOSH Potential

Occupational Carcinogen

STEL: 1 ppm 15 minute(s). Form: All forms

TWA: 0.1 ppm 10 hour(s). Form: All forms

OSHA PEL (United States, 6/1993).

STEL: 5 ppm 15 minute(s). Form: All forms

TWA: 1 ppm 8 hour(s). Form: All forms

OSHA PEL Z2 (United States, 6/2002).

AMP: 50 ppm 10 minute(s). Form: All forms

CEIL: 25 ppm Form: All forms

TWA: 10 ppm 8 hour(s). Form: All forms

Section 4. First aid measures

- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
- Ingestion** : Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Section 5. Fire fighting measures

- Flammability of the product** : Flammable.
- Auto-ignition temperature** : 591.65°C (1097°F)
- Flash point** : Closed cup: -11.15°C (11.9°F).
- Flammable limits** : Lower: 1.3% Upper: 7.1%
- Products of combustion** : These products are carbon oxides (CO, CO₂).
- Fire fighting media and instructions** : In case of fire, use water spray (fog), foam, dry chemicals, or CO₂.

Highly flammable liquid and vapor. Vapor may cause flash fire. Vapors may accumulate in low or confined areas, travel considerable distance to source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

- Special protective equipment for fire-fighters** : Fire fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full facepiece operated in positive pressure mode.

Section 6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Do not touch or walk through spilled material.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Benzene

Methods for cleaning up : If emergency personnel are unavailable, contain spilled material. For small spills add absorbent (soil may be used in the absence of other suitable materials) and use a non-sparking or explosion proof means to transfer material to a sealed, appropriate container for disposal. For large spills dike spilled material or otherwise contain material to ensure runoff does not reach a waterway. Place spilled material in an appropriate container for disposal.

Section 7. Handling and storage

Handling : Do not ingest. Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Avoid breathing vapor or mist. Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling.

Storage : Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

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 occupational exposure limits. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal protection

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Chemical-resistant, impervious gloves or gauntlets complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Personal protection in case of a large spill : Splash goggles. Full suit. Vapor 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.

Product name

United States

Benzene

Exposure limits

ACGIH TLV (United States, 5/2004). Skin

STEL: 8 mg/m³ 15 minute(s). Form: All forms

STEL: 2.5 ppm 15 minute(s). Form: All forms

TWA: 1.6 mg/m³ 8 hour(s). Form: All forms

TWA: 0.5 ppm 8 hour(s). Form: All forms

NIOSH REL (United States, 6/2001). Notes: See Appendix A - NIOSH Potential Occupational Carcinogen

STEL: 1 ppm 15 minute(s). Form: All forms

TWA: 0.1 ppm 10 hour(s). Form: All forms

OSHA PEL (United States, 6/1993).

STEL: 5 ppm 15 minute(s). Form: All forms

TWA: 1 ppm 8 hour(s). Form: All forms

OSHA PEL Z2 (United States, 6/2002).

AMP: 50 ppm 10 minute(s). Form: All forms

CEIL: 25 ppm Form: All forms

TWA: 10 ppm 8 hour(s). Form: All forms

Benzene

Section 9. Physical and chemical properties

Physical state	: Liquid. (COLORLESS TO PALE YELLOW WATERY LIQUID WITH A GASOLINE-LIKE ODOR)
Odor	: ODOR; CHARACTERISTIC ODOR
Molecular weight	: 78.12 g/mole
Molecular formula	: C ₆ H ₆
Boiling/condensation point	: 80°C (176°F)
Melting/freezing point	: 5.56°C (42°F)
Critical temperature	: 289°C (552.2°F)
Specific gravity	: 0.879 (Water = 1)
Vapor density	: 2.77 (Air = 1)
Evaporation rate	: 3.5 compared to Butyl acetate.

Section 10. Stability and reactivity

Stability and reactivity	: The product is stable.
Incompatibility with various substances	: Highly reactive with oxidizing agents.

Section 11. Toxicological information

Toxicity data

<u>Ingredient name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Benzene	LD50	930 mg/kg	Oral	Rat
	LD50	4700 mg/kg	Oral	Mouse
	LD50	5700 mg/kg	Oral	Mammal
	LD50	48 mg/kg	Dermal	Mouse
	LDLo	50 mg/kg	Oral	man
	LC50	10000 ppm (7 hour(s))	Inhalation	Rat

IDLH : 500 ppm

Chronic effects on humans : **CARCINOGENIC EFFECTS** Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC, 1 (Known To Be Human Carcinogens.) by NTP, + (Proven.) by OSHA, + (Proven.) by NIOSH, 1 (Proven for human.) by European Union. Causes damage to the following organs: blood, upper respiratory tract, skin, eyes, bone marrow, central nervous system (CNS), eye, lens or cornea.

Other toxic effects on humans : No specific information is available in our database regarding the other toxic effects of this material for humans.

Specific effects

Carcinogenic effects : Can cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenic effects : No known significant effects or critical hazards.

Reproduction toxicity : No known significant effects or critical hazards.

Section 12. Ecological information

<u>Ingredient name</u>	<u>Species</u>	<u>Period</u>	<u>Result</u>
Benzene	Daphnia magna (EC50)	48 hour(s)	9.23 mg/l
	Daphnia magna (EC50)	48 hour(s)	10 mg/l
	Daphnia magna (EC50)	48 hour(s)	11.73 mg/l
	Oncorhynchus mykiss (LC50)	96 hour(s)	5.3 mg/l
	Oncorhynchus mykiss (LC50)	96 hour(s)	5.9 mg/l
	Oncorhynchus mykiss (LC50)	96 hour(s)	9.2 mg/l

Products of degradation : These products are carbon oxides (CO, CO₂) and water.

Toxicity of the products of biodegradation : The products of degradation are less toxic than the product itself.




Benzene

Section 13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

Consult your local or regional authorities.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1114	BENZENE	3	II		Reportable quantity 10 lbs. (4.536 kg) Limited quantity Yes. Packaging instruction Passenger Aircraft Quantity limitation: 5 L Cargo Aircraft Quantity limitation: 60 L Special provisions IB2, T4, TP1
TDG Classification	UN1114	BENZENE	3	II		Explosive Limit and Limited Quantity Index 1 Passenger Carrying Road or Rail Index 5
Mexico Classification	UN1114	BENZENE	3	II		Reportable quantity 10 lbs. (4.536 kg) Limited quantity Yes. Packaging instruction Passenger Aircraft Quantity

Benzene						
						limitation: 5 L Cargo Aircraft Quantity limitation: 60 L Special provisions IB2, T4, TP1

Section 15. Regulatory information

United States

HCS Classification : Flammable liquid
Toxic material
Irritating material
Carcinogen
Target organ effects

U.S. Federal regulations : TSCA 8(b) inventory: Benzene
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
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
Clean Water Act (CWA) 307: Benzene
Clean Water Act (CWA) 311: Benzene
Clean air act (CAA) 112 accidental release prevention: No products were found.
Clean air act (CAA) 112 regulated flammable substances: No products were found.
Clean air act (CAA) 112 regulated toxic substances: No products were found.

SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
Form R - Reporting requirements	: Benzene	71-43-2	100
Supplier notification	: Benzene	71-43-2	100

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations : Pennsylvania RTK: Benzene: (special hazard, environmental hazard, generic environmental hazard)
Massachusetts RTK: Benzene
New Jersey: Benzene

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

<u>Ingredient name</u>	<u>Cancer</u>	<u>Reproductive</u>	<u>No significant risk level</u>	<u>Maximum acceptable dosage level</u>
Benzene	Yes.	Yes.	6.4 µg/day (ingestion) 13 µg/day (inhalation)	Yes.

Canada

WHMIS (Canada) : Class B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
Class D-2A: Material causing other toxic effects (VERY TOXIC).
CEPA DSL: Benzene

Section 16. Other information

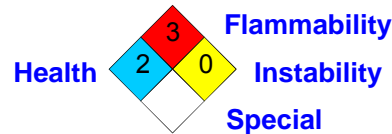
Label Requirements

: CANCER HAZARD.
 CAN CAUSE CANCER.
 HIGHLY FLAMMABLE LIQUID AND VAPOR.
 HARMFUL IF INHALED OR SWALLOWED.
 CAUSES RESPIRATORY TRACT AND EYE IRRITATION.
 CAUSES DAMAGE TO THE FOLLOWING ORGANS: BLOOD, RESPIRATORY TRACT,
 SKIN, EYES, BONE MARROW, CENTRAL NERVOUS SYSTEM, EYE, LENS OR
 CORNEA.
 VAPOR MAY CAUSE FLASH FIRE.
 MAY CAUSE SKIN IRRITATION.

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

Health	*	2
Fire hazard		3
Reactivity		0
Personal protection		C

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



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.