

SECTION 1: Identification

1.1. Identification

Product form : Substance
 Trade name : benzene
 IUPAC name : benzene
 CAS-No. : 71-43-2
 Formula : C6H6

1.2. Recommended use and restrictions on use

Use of the substance/mixture : Use as an intermediate
 Formulation & (re)packing of substances and mixtures

1.3. Supplier

US office:
 Braskem S.A.
 5100 Westheimer Rd - Suite 495
 Houston, 77056 - USA
 Tel: 713 255 4747
 Fax: 713 255 4740

Manufacturer:
 Braskem S.A.
 Av. Presidente Costa e Silva, 1178 – Capuava
 09270-001 – Santo André – SP – Brasil
 Tel. (+55 11) 4478-1777

1.4. Emergency telephone number

Emergency number : 1 800-424-9300
 Chemtrec (Outside USA) +1 703-527-3887

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

Flammable liquids Category 2	Highly flammable liquid and vapor
Skin corrosion/irritation Category 2	Causes skin irritation
Serious eye damage/eye irritation Category 2A	Causes serious eye irritation
Germ cell mutagenicity Category 1B	May cause genetic defects
Carcinogenicity Category 1A	May cause cancer
Specific target organ toxicity (repeated exposure) Category 1	Causes damage to organs (hematopoietic system) through prolonged or repeated exposure.
Aspiration hazard Category 1	May be fatal if swallowed and enters airways

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US) :



Signal word (GHS US) : Danger

Hazard statements (GHS US) : Highly flammable liquid and vapor
 May be fatal if swallowed and enters airways
 Causes skin irritation
 Causes serious eye irritation
 May cause genetic defects
 May cause cancer
 Causes damage to organs (hematopoietic system) through prolonged or repeated exposure.

Precautionary statements (GHS US) : Obtain special instructions before use.
 Do not handle until all safety precautions have been read and understood.
 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Keep container tightly closed.
 Ground/Bond container and receiving equipment.
 Use explosion-proof electrical, lighting, ventilating equipment.
 Use only non-sparking tools.
 Take precautionary measures against static discharge.
 Do not breathe fume, gas, mist, spray, vapors, dust.
 Wash hands thoroughly after handling.
 Do not eat, drink or smoke when using this product.
 Wear eye protection, protective clothing, protective gloves.
 If swallowed: Immediately call a doctor, a POISON CENTER.
 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 If exposed or concerned: Get medical advice/attention.
 Get medical advice/attention if you feel unwell.
 Do NOT induce vomiting.
 If skin irritation occurs: Get medical advice/attention.
 If eye irritation persists: Get medical advice/attention.
 Take off contaminated clothing and wash it before reuse.
 In case of fire: Use alcohol resistant foam, dry extinguishing powder to extinguish.
 Store in a well-ventilated place. Keep cool.
 Store locked up.
 Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type : Mono-constituent

Name	Product identifier	%	GHS US classification
Benzene (Main constituent)	(CAS-No.) 71-43-2	100	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Eye Irrit. 2A, H319 Muta. 1B, H340 Carc. 1A, H350 STOT RE 1, H372 Asp. Tox. 1, H304

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : IF exposed or concerned: Get medical advice/attention.
 First-aid measures after inhalation : Remove casualty to fresh air and keep warm and at rest. In case of irregular breathing or respiratory arrest provide artificial respiration. In case of breathing difficulties administer oxygen. Immediately get medical attention.
 First-aid measures after skin contact : Rinse immediately with plenty of water (for at least 15 minutes). Immediately get medical attention. Discard contaminated clothing.
 First-aid measures after eye contact : Rinse immediately and plentifully with water, also under the eyelids, for at least 20 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately get medical attention.
 First-aid measures after ingestion : Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person. Immediately get medical attention.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects : May cause cancer. May cause genetic defects.
 Symptoms/effects after inhalation : Inhalation may affect the nervous system causing headache, possibly dizziness, nausea, weakness, loss of coordination and unconsciousness.

Symptoms/effects after skin contact	: Causes skin irritation. Prolonged/repetitive skin contact may cause skin defatting or dermatitis. Repeated exposure may cause skin dryness or cracking. Redness.
Symptoms/effects after eye contact	: Irritating to eyes.
Symptoms/effects after ingestion	: May cause gastrointestinal irritation, nausea, vomiting and diarrhea. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis.
Chronic symptoms	: Chronic inhalation may result in chronic solvent encephalopathy or "chronic painter's syndrome" a central nervous system disorder that can follow many years of heavy exposure to solvents.

4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media	: carbon dioxide (CO ₂), dry chemical powder, foam. Water fog.
Unsuitable extinguishing media	: Do not use a solid water stream as it may scatter and spread fire.

5.2. Specific hazards arising from the chemical

Fire hazard	: Highly flammable liquid and vapor. This material can accumulate static charge by flow or agitation and can be ignited by static discharge. vapors may cause fire/explosion if source of ignition is present. Heavier than air, vapors may travel long distances along ground, ignite and flash back to source. Will float and can be reignited on water surface. Under fire conditions closed containers may rupture or explode. On combustion forms: Carbon monoxide. Carbon dioxide. Formaldehyde. ketone.
Explosion hazard	: Vapors may form explosive mixtures with air.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions	: Do not approach fire except upwind and only with proper skin and respiratory protection (supplied air only). Cool closed containers exposed to fire with water spray.
Protection during firefighting	: Extra personal protection: complete protective clothing including self-contained breathing apparatus. In case of fire: Wear self-contained breathing apparatus. Refer to chapter 8.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures	: Evacuate unnecessary personnel.
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6.1.1. For non-emergency personnel

Protective equipment	: Wear suitable protective clothing, gloves and eye/face protection. Refer to chapter 8.
Emergency procedures	: Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment	: Wear suitable protective clothing, gloves and eye/face protection. Refer to chapter 8.
Emergency procedures	: Eliminate leaks immediately. Eliminate all ignition sources if safe to do so. Ventilate affected area. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

6.2. Environmental precautions

Avoid discharge to the environment. Do not flush down sewers. Do not allow to enter into surface water or drains. Do not allow run-off from fire fighting to enter drains or water courses. Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

6.3. Methods and material for containment and cleaning up

For containment	: Stop leak if safe to do so. Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Ventilate affected area.
Methods for cleaning up	: Prevent spread over a wide area (e.g. by containment or oil barriers). Take up liquid spill into dry absorbent material e.g.: dry sand/earth/vermiculite. Collect spills and put it into appropriated container. Keep the recovered product for subsequent recycling.
Other information	: Bioremediation of contaminated water bodies using granulated activated charcoal has been demonstrated to be the best method of removal from contaminated water bodies. Recovery and remediation of polluted soil and water can be accomplished through the Fenton reaction.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For disposal of residues refer to section 13 : "Disposal considerations".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Precautions for safe handling : Spilled product must never be returned to the original container for recycling. Use grounded electrical/mechanical equipment. Ground/bond container and receiving equipment. Avoid producing mist or vapors by heating of opened receptacle/container.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Always wash hands and face immediately after handling this product, and once again before leaving the workplace.

7.2. Conditions for safe storage, including any incompatibilities

- Technical measures : Ground/bond container and receiving equipment.
- Storage conditions : Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep in original containers closed. Keep stored the least quantity possible. Store at room temperature. Store in dry, cool, well-ventilated area.
- Incompatible materials : Oxidizing agents. Strong acid. Halogenated compounds.
- Packaging materials : stainless steel. Carbon steel. PVC.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

benzene (71-43-2)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Benzene
ACGIH TWA (ppm)	0.5 ppm
ACGIH STEL (ppm)	2.5 ppm
Remark (ACGIH)	Leukemia
Regulatory reference	ACGIH 2020
USA - ACGIH - Biological Exposure Indices	
Local name	BENZENE
Biological Exposure Indices (BEI)	25 µg/g Kreatinin Parameter: S-Phenylmercapturic acid - Medium: urine - Sampling time: End of shift - Notations: B 500 µg/g Kreatinin Parameter: t,t-Muconic acid - Medium: urine - Sampling time: End of shift - Notations: B
Regulatory reference	ACGIH 2020
USA - OSHA - Occupational Exposure Limits	
Local name	Benzene
OSHA PEL (TWA) (ppm)	10 ppm 1 ppm
OSHA PEL (STEL) (ppm)	5 ppm (see 29 CFR 1910.1028)
OSHA PEL (Ceiling) (ppm)	25 ppm
Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift	50 ppm Peak (10 minutes)
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-2
USA - IDLH - Occupational Exposure Limits	
US IDLH (ppm)	500 ppm
USA - NIOSH - Occupational Exposure Limits	
NIOSH REL (TWA) (ppm)	0.1 ppm
NIOSH REL (STEL) (ppm)	1 ppm

8.2. Appropriate engineering controls

- Appropriate engineering controls : Local exhaust and general room ventilation are both essential to prevent accumulation of flammable vapor. Use explosion-proof equipment.
- Environmental exposure controls : Avoid release to the environment.

8.3. Individual protection measures/Personal protective equipment

Hand protection:

Impermeable protective gloves. It is recommended that the glove supplier be consulted to ensure the protective gloves are resistant to chemicals in this product

Eye protection:

Chemical goggles or face shield with safety glasses

Skin and body protection:

Wear suitable protective clothing or Rubber apron

Respiratory protection:

Approved organic vapor respirator. An approved organic vapor respirator/supplied air or self-contained breathing apparatus must be used when vapor concentration exceeds applicable exposure limits

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Color	: Clear to light yellow
Odor	: characteristic aromatic hydrocarbons
Odor threshold	: No data available
pH	: No data available
Melting point	: 5.51 °C
Freezing point	: 5.51 °C
Boiling point	: 80.1 °C
Critical temperature	: 288.9 °C
Critical pressure	: 4894 kPa (48.3 atm)
Flash point	: -11 °C (Closed cup)
Relative evaporation rate (butyl acetate=1)	: 2.8
Flammability (solid, gas)	: Flammable
Vapor pressure	: 77 mm Hg at 20 °C
Relative vapor density at 20 °C	: 2.77
Relative density	: No data available
Specific gravity / density	: 0.88
Molecular mass	: 78.11 g/mol
Solubility	: soluble in most organic solvents. Water: sparingly soluble.
Partition coefficient n-octanol/water (Log Pow)	: 1.18 – 1.9 (also reported 2.13 – 2.15)
Auto-ignition temperature	: 498 °C
Decomposition temperature	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosion limits	: 1.3 – 8 vol %
Explosive properties	: No data available
Oxidizing properties	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Reacts violently with (some) halogens.

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

10.3. Possibility of hazardous reactions

None known under normal conditions of use.

10.4. Conditions to avoid

Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Avoid static electricity discharges.

10.5. Incompatible materials

oxidizing agents. Strong acids. Halogenated compounds.

10.6. Hazardous decomposition products

Carbon dioxide (CO₂). Carbon monoxide. Formaldehyde. ketone.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral) : Not classified (Based on available data, the classification criteria are not met)
 Acute toxicity (dermal) : Not classified (Based on available data, the classification criteria are not met)
 Acute toxicity (inhalation) : Not classified (Based on available data, the classification criteria are not met)

benzene (71-43-2)	
LD50 oral rat	> 2000 mg/kg
LD50 dermal rabbit	> 8260 mg/kg
LC50 inhalation rat (mg/l)	43.767 mg/l air Animal: rat, Animal sex: female, Guideline: OECD Guideline 403 (Acute Inhalation Toxicity), 95% CL: 41690 - 45939

Skin corrosion/irritation : Causes skin irritation.
 Serious eye damage/irritation : Causes serious eye irritation.
 Respiratory or skin sensitization : Not classified (Based on available data, the classification criteria are not met)
 Germ cell mutagenicity : May cause genetic defects.
 Carcinogenicity : May cause cancer.

benzene (71-43-2)	
IARC group	1 - Carcinogenic to humans
National Toxicity Program (NTP) Status	Known Human Carcinogens

Reproductive toxicity : Not classified (Based on available data, the classification criteria are not met)
 STOT-single exposure : Not classified (Based on available data, the classification criteria are not met)
 STOT-repeated exposure : Causes damage to organs (hematopoietic system) through prolonged or repeated exposure.

benzene (71-43-2)	
NOAEL (oral, rat, 90 days)	100 mg/kg body weight Animal: rat, Animal sex: male, Guideline: OECD Guideline 408 (Repeated Dose 90-Day Oral Toxicity in Rodents)
NOAEC (inhalation, rat, vapor, 90 days)	0.096 mg/l air Animal: rat, Guideline: OECD Guideline 412 (Subacute Inhalation Toxicity: 28-Day Study), Guideline: OECD Guideline 413 (Subchronic Inhalation Toxicity: 90-Day Study)

Aspiration hazard : May be fatal if swallowed and enters airways.
 Viscosity, kinematic : No data available
 Likely routes of exposure : Ingestion. Inhalation. Skin and eye contact.
 Symptoms/effects : May cause cancer. May cause genetic defects.
 Symptoms/effects after inhalation : Inhalation may affect the nervous system causing headache, possibly dizziness, nausea, weakness, loss of coordination and unconsciousness.
 Symptoms/effects after skin contact : Causes skin irritation. Prolonged/repetitive skin contact may cause skin defatting or dermatitis. Repeated exposure may cause skin dryness or cracking. Redness.
 Symptoms/effects after eye contact : Irritating to eyes.
 Symptoms/effects after ingestion : May cause gastrointestinal irritation, nausea, vomiting and diarrhea. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis.
 Chronic symptoms : Chronic inhalation may result in chronic solvent encephalopathy or "chronic painter's syndrome" a central nervous system disorder that can follow many years of heavy exposure to solvents.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

benzene (71-43-2)

Partition coefficient n-octanol/water (Log Pow)	1.18 – 1.9 (also reported 2.13 – 2.15)
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12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods

- Regional legislation (waste) : Dispose of contents/container to comply with applicable local, national and international regulations. Consult the appropriate authorities about waste disposal.
- Product/Packaging disposal recommendations : Dispose of this material and its container at hazardous or special waste collection point.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

- Transport document description : UN1114 Benzene, 3, II
- UN-No.(DOT) : UN1114
- Proper Shipping Name (DOT) : Benzene
- Class (DOT) : 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120
- Packing group (DOT) : II - Medium Danger
- Hazard labels (DOT) : 3 - Flammable liquid



Other information : No supplementary information available.

Transportation of Dangerous Goods

- Transport document description : UN1114 BENZENE (BENZENE), 3, II
- UN-No. (TDG) : UN1114
- Proper Shipping Name (Transportation of Dangerous Goods) : BENZENE
- TDG Primary Hazard Classes : 3 - Class 3 - Flammable Liquids
- Packing group : II - Medium Danger

Transport by sea

- Transport document description (IMDG) : UN 1114 BENZENE, 3, II (-11°C c.c.)
- UN-No. (IMDG) : 1114
- Proper Shipping Name (IMDG) : BENZENE
- Class (IMDG) : 3 - Flammable liquids
- Packing group (IMDG) : II - substances presenting medium danger
- Limited quantities (IMDG) : 1 L

Air transport

- Transport document description (IATA) : UN 1114 Benzene, 3, II
- UN-No. (IATA) : 1114
- Proper Shipping Name (IATA) : Benzene
- Class (IATA) : 3 - Flammable Liquids

Packing group (IATA)

: II - Medium Danger

SECTION 15: Regulatory information

15.1. US Federal regulations

benzene (71-43-2)		
Listed on the United States TSCA (Toxic Substances Control Act) inventory Subject to reporting requirements of United States SARA Section 313 Listed on EPA Hazardous Air Pollutant (HAPS)		
CERCLA RQ	10 lb received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule	
All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory		
Chemical(s) subject to the reporting requirements of Section 313 or Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372.		
Benzene	CAS-No. 71-43-2	100%

15.2. International regulations

CANADA

benzene (71-43-2)	
Listed on the Canadian DSL (Domestic Substances List)	
Toxic Substance (CEPA – Schedule I)	Yes

EU-Regulations

benzene (71-43-2)	
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)	

National regulations

benzene (71-43-2)	
Listed on IARC (International Agency for Research on Cancer)	
Listed on the AICS (Australian Inventory of Chemical Substances)	
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)	
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory	
Listed on the Japanese ISHL (Industrial Safety and Health Law)	
Listed on KECL/KECI (Korean Existing Chemicals Inventory)	
Listed on NZIoC (New Zealand Inventory of Chemicals)	
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)	
Japanese Pollutant Release and Transfer Register Law (PRTR Law)	
Listed as carcinogen on NTP (National Toxicology Program)	
Listed on INSQ (Mexican National Inventory of Chemical Substances)	
Listed on the TCSI (Taiwan Chemical Substance Inventory)	

15.3. US State regulations

benzene (71-43-2)	
U.S. - California - Proposition 65 - Carcinogens List	Yes
U.S. - California - Proposition 65 - Developmental Toxicity	Yes
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	Yes
No significant risk level (NSRL)	6.4 µg/day (oral)
Maximum allowable dose level (MADL)	24 µg/day oral
State or local regulations	U.S. - Maine - Chemicals of Concern

WARNING: This product can expose you to Benzene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

SECTION 16: Other information

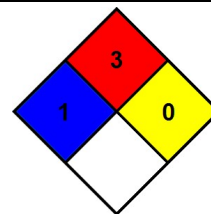
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date : 31 July 2020

Abbreviations and acronyms:

ACGIH	ACGIH (American Conference of Government Industrial Hygienists)
IARC	IARC (International Agency for Research on Cancer)
PVC	PVC (Polyvinyl chloride).
SDS	SDS - Safety Data Sheet
TWA	TWA- Time Weighted Average
STEL	Short-Term Exposure Limit
PEL	PEL- Permissible Exposure
OSHA	OSHA - Occupational Safety and Health Administration

- NFPA health hazard : 1 - Materials that, under emergency conditions, can cause significant irritation.
- NFPA fire hazard : 3 - Liquids and solids (including finely divided suspended solids) that can be ignited under almost all ambient temperature conditions.
- NFPA reactivity : 0 - Material that in themselves are normally stable, even under fire conditions.



Braskem - SDS_US_GHS_HazCom_2012 (modified 200127)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product. It warns that the handling of any chemical substance requires the previous knowledge of its hazards for the user. It is up to the user of the product company providing this SDS to and promote the training of its employees about possible risks come upon of the product. The information contained herein is not absolute, but only general information on the use of the chemical and indication of safety and security measures.