SAFETY DATA SHEET

BENZENE

CAS No.: 71-43-2

This Safety Data Sheet is issued by Suraj Chemicals as the distributor/supplier of record, based on manufacturer and published GHS / regulatory reference data for this substance. Users should also consult the specific manufacturer's SDS where available.

1. IDENTIFICATION

GHS Product identifier

BENZENE
Synonyms: Benzol; Cyclohexatriene; Phenyl hydride
CAS: 71-43-2

Other means of identification

Not relevant

Recommended use of the chemical and restrictions on use

Relevant uses: Chemical intermediate for styrene, cumene, cyclohexane and other petrochemicals. Strictly for industrial/closed-system use only – not for use as a general solvent or in consumer products. For industrial user only.

Uses advised against: All uses not specified in this section or in section 7.3.

Supplier's details

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2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS:
Classification of this product has been carried out in accordance with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Flam. Liq. 2	Flammable liquid, Category 2, H225
Skin Irrit. 2	Skin irritation, Category 2, H315
Eye Irrit. 2	Eye irritation, Category 2, H319
Muta. 1B	Germ cell mutagenicity, Category 1B, H340
Carc. 1A	Carcinogenicity, Category 1A, H350
STOT RE 1	Specific target organ toxicity, repeated exposure, Category 1, H372
Asp. Tox. 1	Aspiration hazard, Category 1, H304

GHS label elements, including precautionary statements

GHS: Danger

Hazard statements

Flam. Liq. 2: H225 – Highly flammable liquid and vapour.
Skin Irrit. 2: H315 – Causes skin irritation.
Eye Irrit. 2: H319 – Causes serious eye irritation.
Muta. 1B: H340 – May cause genetic defects.
Carc. 1A: H350 – May cause cancer.
STOT RE 1: H372 – Causes damage to organs (blood, bone marrow, immune system) through prolonged or repeated exposure.
Asp. Tox. 1: H304 – May be fatal if swallowed and enters airways.

Precautionary statements

P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233: Keep container tightly closed.
P240: Ground/bond container and receiving equipment.
P260: Do not breathe vapours.
P264: Wash hands thoroughly after handling.
P271: Use only outdoors or in a well-ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301+P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P302+P352: IF ON SKIN: Wash with plenty of water.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313: IF exposed or concerned: Get medical advice/attention.
P331: Do NOT induce vomiting.
P370+P378: In case of fire, use foam, dry chemical, CO_2 or water spray to extinguish.
P405: Store locked up.
P501: Dispose of the contents/containers in accordance with regulations on hazardous waste.

Other hazards which do not result in classification

Vapours are heavier than air and may travel along the ground to an ignition source. No safe exposure threshold is established for the carcinogenic/mutagenic effect; exposure must be minimised as far as reasonably practicable using closed systems and engineering controls. Does not meet the PBT/vPvB criteria (volatile, not bioaccumulative), but is a substance of very high concern (SVHC) due to CMR properties.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Substances

Chemical description: Benzene (technical/industrial grade)

In accordance with Annex 4.3.3 of the GHS, the product contains:

Identification	Chemical Name / Classification	Concentration
CAS: 71-43-2	Benzene — Flam. Liq. 2: H225; Skin Irrit. 2: H315; Eye Irrit. 2: H319; Muta. 1B: H340; Carc. 1A: H350; STOT RE 1: H372; Asp. Tox. 1: H304 – Danger	≥ 99.5%

To obtain more information on the hazards of the substances, consult sections 11, 12 and 16.

Mixtures

Non-applicable

4. FIRST AID MEASURES

Description of necessary first-aid measures

Request medical assistance immediately, showing the SDS of this product.

By inhalation

Remove the person affected from the area of exposure immediately, provide fresh air and keep at rest. Seek immediate medical attention even for brief high exposures.

By skin contact

Remove contaminated clothing immediately, wash skin thoroughly with plenty of water and soap. Seek medical attention if irritation persists.

By eye contact

Rinse eyes thoroughly with lukewarm water for at least 15 minutes, holding eyelids open. Remove contact lenses if present and easy to do. Seek medical attention.

By ingestion/aspiration

Do NOT induce vomiting – high aspiration hazard into the lungs which can cause chemical pneumonitis. Rinse the mouth with water. Seek IMMEDIATE medical attention, showing the SDS of the product.

Most important symptoms/effects, acute and delayed

Acute and delayed effects are indicated in sections 2 and 11.

Indication of immediate medical attention and special treatment needed, if necessary

Ingestion or significant exposure requires prompt medical evaluation given aspiration and CMR hazards; inform medical personnel of the substance identity.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

Suitable: Foam (alcohol-resistant), dry chemical powder, carbon dioxide, water spray/fog for cooling containers
Unsuitable: Do not use a solid water jet as it may scatter and spread the fire

Specific hazards arising from the chemical

Highly flammable liquid and vapour. Vapours are heavier than air, may accumulate in low-lying areas and travel to an ignition source causing flash-back. Closed containers may rupture violently on heating.

Special protective actions for fire-fighters

Evacuate all non-essential personnel. Intervention only by capable personnel who are trained and aware of the hazards of the product. In all cases wear self-contained breathing apparatus. When intervention in close proximity, wear full protective chemical-resistant suit. After intervention, proceed to clean the equipment (take a shower, remove clothing carefully, clean and check).

Additional provisions

Cool fire-exposed containers with water spray from a safe distance. Approach from upwind. Use self-contained breathing apparatus due to toxic combustion products and inherent toxicity of the vapour.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Eliminate all ignition sources. Evacuate non-essential personnel. Ventilate the area. Contain the spill provided there is no additional risk, using appropriate respiratory and skin protection (see section 8) – this is a Category 1A carcinogen.

For emergency responders

Wear protective equipment. Keep unprotected persons away. See section 8.

Environmental precautions

Avoid release to drains, watercourses or soil. Contain spillage with inert absorbent material. Notify the relevant authority immediately in case of any environmental release.

Methods and materials for containment and cleaning up

Absorb with inert non-combustible absorbent material (sand, vermiculite) and place in a labelled, closed container for disposal by a licensed hazardous waste contractor. Ventilate the area thoroughly after clean-up.

Reference to other sections

See sections 8 and 13.

7. HANDLING AND STORAGE

Precautions for safe handling

A. General precautions for safe use

Handle only in closed systems with full engineering controls (local exhaust ventilation) to minimise exposure – this is a confirmed human carcinogen with no established safe exposure threshold. Keep away from heat, sparks, open flame and other ignition sources. Avoid all skin/eye contact and inhalation of vapours.

B. Technical recommendations for the prevention of fires and explosions

Store and handle in closed, grounded/bonded systems away from oxidizing agents and ignition sources; use explosion-proof electrical equipment.

C. Technical recommendations on general occupational hygiene

Do not eat or drink during the process; wash hands afterwards with suitable cleaning products.

D. Technical recommendations to prevent environmental risks

Provide tight electrical equipment well protected against corrosion. Avoid atmospheric emissions. Warn people about the dangers of the product. Follow the protective measures given in the exposure controls/personal protection section. In industrial installations, apply the rules for the prevention of major accidents (consult an expert).

Conditions for safe storage, including any incompatibilities

A. Specific storage requirements

Minimum Temp.	5°C
Maximum Temp.	35°C (cool, well-ventilated area, away from direct sunlight)
Maximum time	24 Months in original sealed packaging

B. General conditions for storage

Store in a cool, dry, well-ventilated, locked/access-controlled area, in tightly closed containers, away from heat, ignition sources and oxidizing agents, in accordance with local flammable liquid and carcinogen storage regulations. For additional information see subsection 10.5.

Specific end use(s)

Except for the instructions already specified, it is not necessary to provide any special recommendation regarding the uses of this product.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

Substances whose occupational exposure limits have to be assessed in the workplace, per the Factories Act, 1948 (Act No. 63 of 1948), as amended by the Factories (Amendment) Act, 1987 (Act 20 of 1987):

Identification	Occupational Exposure Limit Type	Value
Benzene CAS: 71-43-2	ACGIH TLV – TWA (8 hrs, skin notation, A1 confirmed human carcinogen)	0.5 ppm
Benzene CAS: 71-43-2	ACGIH TLV – STEL (15 min)	2.5 ppm

Appropriate engineering controls

It is recommended to use localized extraction in the work area as a collective protection measure to avoid exceeding occupational exposure limits, in addition to individual protective equipment (PPE) as needed. Consult the manufacturer's information leaflet for storage, use, cleaning and maintenance of PPE.

B. Respiratory protection

Supplied-air respirator or full-face respirator with organic vapour cartridge; engineering controls (closed systems, local exhaust ventilation) should be the primary control, with respiratory protection as a supplementary measure.

C. Specific protection for the hands

Chemical-resistant gloves (e.g. Viton®; nitrile/neoprene have limited breakthrough time against benzene). Replace frequently.

D. Eye and face protection

Chemical splash goggles and face shield.

E. Bodily protection

Chemical-resistant, flame-retardant/antistatic full-body protective clothing for operations with exposure potential.

F. Additional emergency measures

Emergency shower (ANSI Z358-1, ISO 3864-1:2011, ISO 3864-4:2011) and eyewash stations (DIN 12 899, ISO 3864-1:2011, ISO 3864-4:2011) should be available.

Environmental exposure controls

Avoid environmental spillage of both the product and its container. See subsection 7.1.D.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	
Physical state at 20°C	Liquid
Appearance	Clear, mobile liquid
Color	Colorless
Odor	Aromatic, sweet
Odour threshold	~1.5–5 ppm
Volatility	
Boiling point at atmospheric pressure	80.1°C
Vapour pressure at 20°C	~75 mmHg (10 kPa)
Evaporation rate (n-BuAc = 1)	~3.9 (fast)
Product Description	
Density / Relative density at 20°C	0.876 g/cm³
Dynamic / Kinematic viscosity at 20°C	~0.65 mPa·s
Concentration	≥ 99.5%
pH	Not applicable (neutral, non-aqueous)
Vapour density (air = 1)	~2.7
Partition coefficient n-octanol/water (log Pow)	2.13
Solubility in water at 20°C	~1.8 g/L (low)
Decomposition temperature	Not established
Melting point/freezing point	5.5°C
Flammability	
Flash Point	-11°C (closed cup)
Flammability (solid, gas)	Non-applicable (liquid); highly flammable
Autoignition temperature	498°C
Lower / Upper flammability limit	1.2% / 7.8% (vol. in air)
Particle Characteristics	
Median equivalent diameter	Non-applicable (liquid)

Other information

Explosive properties	Not classified as explosive; vapour/air mixtures are flammable within the flammability limits
Oxidising properties	Not an oxidizer
Corrosive to metals	Not classified
Heat of combustion	~41.8 kJ/g (approx.)
Surface tension at 20°C	~28.9 mN/m
Refraction index	~1.501

10. STABILITY AND REACTIVITY

Reactivity

No reactivity hazard under normal conditions of storage, handling and use. Reacts with strong oxidizing agents (fire/explosion risk).

Chemical stability

Chemically stable under the indicated conditions of storage, handling and use.

Possibility of hazardous reactions

Vapours can form explosive mixtures with air. Reaction with strong oxidizers can be vigorous/exothermic. Under recommended conditions no other hazardous reactions are expected.

Conditions to avoid

Shock/Friction	Contact with Air	Increase in Temperature	Sunlight	Humidity
Not applicable	Vapour/air mixtures flammable	Avoid heat/ignition sources	Not applicable	Not applicable

Incompatible materials

Strong Oxidizing Agents	Strong Acids (e.g. with catalysts)	Ignition Sources
Avoid contact – fire/explosion risk	Avoid contact under uncontrolled conditions	Avoid – highly flammable liquid/vapour

Hazardous decomposition products

Carbon monoxide and carbon dioxide on combustion; no hazardous decomposition under normal storage.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

In case of exposure that is repetitive, prolonged, or at concentrations higher than the recommended occupational exposure limits, adverse health effects may result depending on the means of exposure:

A. Ingestion (acute effect)

May be fatal if swallowed and enters the airways (aspiration hazard, H304). May cause central nervous system depression and gastrointestinal irritation.

B. Inhalation (acute effect)

Vapours cause irritation of the respiratory tract, headache, dizziness and, at high concentrations, central nervous system depression. Chronic inhalation exposure is strongly associated with bone marrow toxicity and leukaemia (see CMR section).

C. Contact with skin and eyes (acute effect)

Causes skin irritation and serious eye irritation.

D. CMR effects (carcinogenicity, mutagenicity, reproductive toxicity)

May cause cancer (Carc. 1A, H350) – benzene is a well-established human leukaemogen. May cause genetic defects (Muta. 1B, H340). IARC: Group 1 (carcinogenic to humans). No formal reproductive toxicity classification is currently harmonized, though caution is warranted.

E. Sensitizing effects

Classification criteria for respiratory or skin sensitisation are not met based on available data.

F. Specific target organ toxicity (STOT) – single exposure

Vapours can cause CNS depression (headache, dizziness, narcosis) at high acute concentrations; primary long-term concern is addressed under STOT RE/carcinogenicity classification.

G. Specific target organ toxicity (STOT) – repeated exposure

Causes damage to organs (blood, bone marrow, immune system) through prolonged or repeated exposure (H372) – well documented human haematotoxicity (aplastic anaemia, leukaemia risk) from chronic exposure.

H. Aspiration hazard

May be fatal if swallowed and enters airways (H304) due to low viscosity and aspiration risk.

Product-specific toxicological information

Identification	Acute Toxicity	Genus
Benzene (technical/industrial grade) CAS: 71-43-2	LD50 oral: 930 mg/kg	Rat
	LD50 dermal: >8260 mg/kg	Rabbit
	LC50 inhalation: 13700 ppm (4h)	Rat

12. ECOLOGICAL INFORMATION

Harmful to aquatic life; not formally classified for chronic aquatic hazard at current harmonized classification, but should be prevented from entering the environment given CMR properties.

Toxicity

Identification	Acute Toxicity	Species	Genus
Benzene CAS: 71-43-2	LC50: 5.3 mg/L (96h)	Pimephales promelas	Fish
	EC50: 8.76 mg/L (48h)	Daphnia magna	Crustacean

Persistence and degradability

Inherently biodegradable but volatilises rapidly from water; not considered persistent in the aquatic compartment due to volatilisation.

Bioaccumulative potential

Low-to-moderate bioaccumulation potential (log Pow 2.13); rapidly metabolised in most organisms.

Mobility in soil

Koc	Henry	Dry Soil	Moist Soil
~60–100	~5.5×10⁻³ atm·m³/mol (volatilises readily)	Volatilises	Low solubility, some dissolution

Results of PBT and vPvB assessment

This substance does not meet the PBT/vPvB criteria of Annex XIII.

Other adverse effects

Not described

13. DISPOSAL CONSIDERATIONS

Disposal methods

Recover/recycle where feasible under closed-system conditions. Otherwise incinerate in a licensed hazardous waste incinerator equipped for volatile organic/carcinogen combustion with emission control, in accordance with local regulations. For packaging: do not rinse; dispose of as hazardous waste, avoiding release of residual vapour.

Refer to national and local regulations on waste management, including the Hazardous and Other Wastes (Management and Transboundary Movement) Rules.

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14. TRANSPORT INFORMATION

Transport of dangerous goods by land (ADR 2023 / RID 2023)

14.1 UN number	UN1114
14.2 UN proper shipping name	BENZENE
14.3 Transport hazard class(es)	3
14.4 Packing group	II
14.5 Environmental hazard	No
14.6 Special precautions for user	Physico-chemical properties: see section 9
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

Transport of dangerous goods by sea (IMDG 41-22)

14.1 UN number	UN1114
14.2 UN proper shipping name	BENZENE
14.3 Transport hazard class(es)	3
14.4 Packing group	II
14.5 Marine pollutant	No
14.6 Special precautions for user	EmS Codes: F-E, S-D | Limited quantities: 1 L | Segregation group: Not relevant
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

Transport of dangerous goods by air (IATA/ICAO 2024)

14.1 UN number	UN1114
14.2 UN proper shipping name	BENZENE
14.3 Transport hazard class(es)	3
14.4 Packing group	II
14.5 Environmental hazard	No
14.6 Special precautions for user	Physico-chemical properties: see section 9
14.7 Transport in bulk (Annex II MARPOL 73/78, IBC Code)	Not relevant

15. REGULATORY INFORMATION

Safety, health and environmental regulations specific for the product in question

It is recommended to use the information included in this safety data sheet as data used in a risk evaluation of local circumstances, in order to establish the necessary risk prevention measures for the manipulation, use, storage and disposal of this product.

Other legislation

Manufacture, Storage and Import of Hazardous Chemicals Rules 1989
The Factories Act, 1948 (Act No. 63 of 1948), as amended by the Factories (Amendment) Act, 1987 (Act 20 of 1987)
The Chemical Accidents (Emergency Planning, Preparedness, and Response) Rules, 1996
Public Liability Insurance Act, 1991

16. OTHER INFORMATION

Legislation related to safety data sheets

This safety data sheet has been designed in accordance with Annex 4 – Guidance on the preparation of Safety Data Sheets of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Texts of the legislative phrases mentioned in sections 2 and 3

H225: Highly flammable liquid and vapour.
H315: Causes skin irritation.
H319: Causes serious eye irritation.
H340: May cause genetic defects.
H350: May cause cancer.
H372: Causes damage to organs through prolonged or repeated exposure.
H304: May be fatal if swallowed and enters airways.

The phrases indicated do not refer to the product itself; they are present merely for informative purposes and refer to the individual components which appear in section 3.

Advice related to training

Minimal training is recommended to prevent industrial risks for staff using this product, in order to facilitate their comprehension and interpretation of this safety data sheet, as well as the label on the product.

Principal bibliographical sources

The United Nations Economic Commission for Europe (UNECE); European Chemicals Agency (ECHA) classification and labelling inventory; ACGIH Threshold Limit Values.

Abbreviations and acronyms

ADR: European agreement concerning the international carriage of dangerous goods by road | IMDG: International maritime dangerous goods code | IATA: International Air Transport Association | ICAO: International Civil Aviation Organisation | COD: Chemical Oxygen Demand | BOD5: 5-day biochemical oxygen demand | BCF: Bioconcentration factor | LD50: Lethal Dose 50 | LC50: Lethal Concentration 50 | EC50: Effective Concentration 50 | Log-POW: Octanol-water partition coefficient | Koc: Partition coefficient of organic carbon | IARC: International Agency for Research on Cancer

Disclaimer: The information contained in this safety data sheet is based on sources, technical knowledge and current legislation, without being able to guarantee its accuracy. This information cannot be considered a guarantee of the properties of the product; it is simply a description of the security requirements. The occupational methodology and conditions for users of this product are not within Suraj Chemicals' awareness or control, and it is ultimately the responsibility of the user to take the necessary measures to obtain the legal requirements concerning the manipulation, storage, use and disposal of chemical products. The information on this safety data sheet only refers to this product, which should not be used for needs other than those specified.

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