

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Benzene Concentrate

Product code : Q9197, Q9258

Synonyms : Aromatic hydrocarbons, C6-8, naphtha-raffinate pyrolyzate-derived

CAS-No. : 68475-70-7

Manufacturer or supplier's details

Supplier : SHELL EASTERN CHEMICALS (S)
A REGISTERED BUSINESS OF SHELL EASTERN
TRADING (PTE) LTD (UEN:198902087C)
9 North Buona Vista Drive , #07-01
The Metropolis Tower 1
Singapore 138588
Singapore

Telephone : +65 6384 8737

Telefax : +65 6384 8454

Emergency telephone number : +800 2537 8747 (ALERT SGS- toll Free) or +65 6542 9595 (ALERT SGS)

Recommended use of the chemical and restrictions on use

Recommended use : Raw material for use in the chemical industry.

Restrictions on use : This product must not be used in applications other than the above without first seeking the advice of the supplier.

2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquids : Category 2

Aspiration hazard : Category 1

Skin irritation : Category 2

Eye irritation : Category 2

Specific target organ toxicity - single exposure : Category 3 (Narcotic effects)

Germ cell mutagenicity : Category 1B

Carcinogenicity : Category 1A

Reproductive toxicity : Category 2

Specific target organ toxicity - repeated exposure : Category 1 (Blood, Blood-forming organs, Immune system)

Specific target organ toxicity - repeated exposure : Category 2 (Central nervous system (CNS), Auditory system, Respiratory system, Visual system, Peripheral nervous system)

Short-term (acute) aquatic hazard : Category 2

Long-term (chronic) aquatic hazard : Category 2

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

GHS label elements

Hazard pictograms

:



Signal word

:

Danger

Hazard statements

:

PHYSICAL HAZARDS:
H225 Highly flammable liquid and vapour.
HEALTH HAZARDS:
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.
H340 May cause genetic defects.
H350 May cause cancer.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs (Blood, Blood forming organs, Immune system) through prolonged or repeated exposure.
H373 May cause damage to organs (Central nervous system, Auditory system, Respiratory system, Visual system, Peripheral nervous system) through prolonged or repeated exposure.
ENVIRONMENTAL HAZARDS:
H401 Toxic to aquatic life.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements

:

Prevention:

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash hands thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P273 Avoid release to the environment.

Response:

P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P370 + P378 In case of fire: Use appropriate media to extinguish.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P331 Do NOT induce vomiting.

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

P302 + P352 IF ON SKIN: Wash with plenty of water and soap.
P332 + P313 If skin irritation occurs: Get medical advice/attention.

P362 + P364 Take off contaminated clothing and wash it before reuse.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337 + P313 If eye irritation persists: Get medical advice/attention.

P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312 Call a POISON CENTER/doctor if you feel unwell.

P308 + P313 IF exposed or concerned: Get medical advice/attention.

P391 Collect spillage.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

P235 Keep cool.

P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards which do not result in classification

In use, may form flammable/explosive vapour-air mixture. This material is a static accumulator. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. Slightly irritating to respiratory system.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Hazardous components

| Chemical name | CAS-No. | Classification | Concentration (% w/w) |
|---|------------|---|-----------------------|
| Aromatic hydrocarbons, C6-8, naphtha-raffinate pyrolyzate-derived | 68475-70-7 | Flam. Liq.1; H224 Skin Irrit.2; H315 Asp. Tox.1; H304 Repr.2; H361 Muta.1B; H340 Carc.1B; H350 STOT SE3; H336 Aquatic Acute2; H401 Aquatic Chronic2; H411 | <= 100 |

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

For explanation of abbreviations see section 16.

Further information

Contains:

| Chemical name | Identification number | Concentration (% w/w) |
|---------------|-----------------------|-----------------------|
| Benzene | 71-43-2 | 60 - 80 |
| Toluene | 108-88-3 | 15 - 20 |
| n-Hexane | 110-54-3 | 1 - 3 |
| Ethylbenzene | 100-41-4 | 0 - 1 |

4. FIRST-AID MEASURES

- General advice : Not expected to be a health hazard when used under normal conditions.
- If inhaled : Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment.
- In case of skin contact : Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.
- In case of eye contact : Immediately flush eye(s) with plenty of water. Remove contact lenses, if present and easy to do. Continue rinsing. Transport to the nearest medical facility for additional treatment.
- If swallowed : Call emergency number for your location / facility. If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing.
- Most important symptoms and effects, both acute and delayed : Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

breath, chest congestion or continued coughing or wheezing. The onset of respiratory symptoms may be delayed for several hours after exposure.

Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing.

Damage to blood-forming organs may be evidenced by: a) fatigue and anaemia (RBC), b) decreased resistance to infection, and/or excessive bruising and bleeding (platelet effect).

Immunotoxicity may be evidenced by decreased resistance to infection.

Peripheral nerve damage may be evidenced by impairment of motor function (incoordination, unsteady walk, or muscle weakness in the extremities, and/or loss of sensation in the arms and legs).

Auditory system effects may include temporary hearing loss and/or ringing in the ears.

Visual system disturbances may be evidenced by decreases in the ability to discriminate between colours.

Protection of first-aiders : When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.

Notes to physician : IMMEDIATE TREATMENT IS EXTREMELY IMPORTANT!
Call a doctor or poison control center for guidance.
Potential for chemical pneumonitis.
Treat symptomatically.
Potential for cardiac sensitisation, particularly in abuse situations. Hypoxia or negative inotropes may enhance these effects. Consider: oxygen therapy.
Consider: oxygen therapy.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

Unsuitable extinguishing media : Do not use water in a jet.

Specific hazards during firefighting : Clear fire area of all non-emergency personnel.
Hazardous combustion products may include:
A complex mixture of airborne solid and liquid particulates and gases (smoke).
Carbon monoxide.
Unidentified organic and inorganic compounds.
Flammable vapours may be present even at temperatures below the flash point.
The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Will float and can be reignited on surface water.

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

- | | |
|---|--|
| Specific extinguishing methods | : Standard procedure for chemical fires. Keep adjacent containers cool by spraying with water. |
| Special protective equipment for firefighters | : Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469). |

6. ACCIDENTAL RELEASE MEASURES

- | | |
|---|--|
| Personal precautions, protective equipment and emergency procedures | : Observe all relevant local and international regulations. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained. : Avoid contact with skin, eyes and clothing. Isolate hazard area and deny entry to unnecessary or unprotected personnel. Do not breathe fumes, vapour. Do not operate electrical equipment. |
| Environmental precautions | : Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Monitor area with combustible gas indicator. |
| Methods and materials for containment and cleaning up | : For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. Ventilate contaminated area thoroughly. If contamination of site occurs remediation may require specialist advice. |

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

Additional advice : For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.
For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet.

7. HANDLING AND STORAGE

General Precautions : Avoid breathing of or direct contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.
Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Ensure that all local regulations regarding handling and storage facilities are followed.

Advice on safe handling : Avoid inhaling vapour and/or mists.
Avoid contact with skin, eyes and clothing.
Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks.
Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.
Bulk storage tanks should be diked (bunded).
When using do not eat or drink.

The vapour is heavier than air, spreads along the ground and distant ignition is possible.

Avoidance of contact : Strong oxidising agents.

Product Transfer : Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges. These include but are not limited to pumping (especially turbulent flow), mixing, filtering, splash filling, cleaning and filling of tanks and containers, sampling, switch loading, gauging, vacuum truck operations, and mechanical movements. These activities may lead to static discharge e.g. spark formation. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 1 m/s until fill pipe submerged to twice its diameter, then ≤ 7 m/s). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations.

Refer to guidance under Handling section.

Storage

Conditions for safe storage : Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

Other data

: Storage Temperature:
Ambient.

Bulk storage tanks should be diked (bunded).
Locate tanks away from heat and other sources of ignition.
Cleaning, inspection and maintenance of storage tanks is a specialist operation, which requires the implementation of strict procedures and precautions.
Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat.
Keep away from aerosols, flammables, oxidizing agents, corrosives and from other flammable products which are not harmful or toxic to man or to the environment.
Electrostatic charges will be generated during pumping.
Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk.
The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable.

Packaging material

: Suitable material: For containers, or container linings use mild steel, stainless steel., For container paints, use epoxy paint, zinc silicate paint.
Unsuitable material: Avoid prolonged contact with natural, butyl or nitrile rubbers.

Container Advice

: Do not cut, drill, grind, weld or perform similar operations on or near containers.

Specific use(s)

: Not applicable

See additional references that provide safe handling practices for liquids that are determined to be static accumulators:
American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or
National Fire Protection Agency 77 (Recommended Practices on Static Electricity).
IEC/TS 60079-32-1: Electrostatic hazards, guidance

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Components with workplace control parameters

| Components | CAS-No. | Value type (Form of exposure) | Control parameters / Permissible concentration | Basis |
|---|------------|----------------------------------|---|----------|
| Aromatic hydrocarbons, C6-8, naphtha-raffinate pyrolyzate-derived | 68475-70-7 | TWA | 500 ppm 2,000 mg/m ³ | OSHA Z-1 |
| Benzene | 71-43-2 | PEL (long term) | 1 ppm 3.18 mg/m ³ | SG OEL |

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

| | | | | |
|--------------|----------|------------------|------------------------|--|
| Benzene | 71-43-2 | TWA | 0.5 ppm 1.6 mg/m3 | Shell Internal Standard (SIS) for 8-12 hour TWA. |
| Benzene | | STEL | 2.5 ppm 8 mg/m3 | Shell Internal Standard (SIS) for 15 min (STEL) |
| Benzene | 71-43-2 | TWA | 0.5 ppm | ACGIH |
| Benzene | | STEL | 2.5 ppm | ACGIH |
| Benzene | | PEL | 1 ppm | OSHA CARC |
| Benzene | | STEL | 5 ppm | OSHA CARC |
| Benzene | | TWA | 10 ppm | OSHA Z-2 |
| Benzene | | CEIL | 25 ppm | OSHA Z-2 |
| Benzene | | Peak | 50 ppm | OSHA Z-2 |
| Toluene | 108-88-3 | PEL (long term) | 50 ppm 188 mg/m3 | SG OEL |
| Toluene | 108-88-3 | TWA | 20 ppm | ACGIH |
| Toluene | | TWA | 200 ppm | OSHA Z-2 |
| Toluene | | CEIL | 300 ppm | OSHA Z-2 |
| Toluene | | Peak | 500 ppm | OSHA Z-2 |
| n-Hexane | 110-54-3 | PEL (long term) | 50 ppm 176 mg/m3 | SG OEL |
| n-Hexane | 110-54-3 | TWA | 500 ppm 1,800 mg/m3 | OSHA Z-1 |
| n-Hexane | | TWA | 50 ppm | ACGIH |
| Ethylbenzene | 100-41-4 | PEL (long term) | 100 ppm 434 mg/m3 | SG OEL |
| Ethylbenzene | | PEL (short term) | 125 ppm 543 mg/m3 | SG OEL |
| Ethylbenzene | 100-41-4 | TWA | 20 ppm | ACGIH |
| Ethylbenzene | | TWA | 100 ppm 435 mg/m3 | NIOSH REL |
| Ethylbenzene | | ST | 125 ppm 545 mg/m3 | NIOSH REL |
| Ethylbenzene | | TWA | 100 ppm 435 mg/m3 | OSHA Z-1 |

Biological occupational exposure limits

| Component | CAS-No. | Control parameters | Biological specimen | Sampling time | Permissible concentration | Basis |
|-----------|----------|---------------------------------|---------------------|---------------------------------|---------------------------|---------|
| Benzene | 71-43-2 | s-phenylmercapturic acid (spma) | Urine | End-of-shift | 45.µg/g creatinine | SG BTLV |
| Benzene | | tt-muconic acid (ttma) | Urine | End-of-shift | 1.6.mg/g Creatinine | SG BTLV |
| Toluene | 108-88-3 | toluene | Blood | Prior to last shift of workweek | 0.05 mg/l | SG BTLV |

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

Monitoring Methods

Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.

Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory.

Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.

National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods <http://www.cdc.gov/niosh/>

Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods <http://www.osha.gov/>

Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances <http://www.hse.gov.uk/>

Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA) , Germany <http://www.dguv.de/inhalt/index.jsp>

L'Institut National de Recherche et de Sécurité, (INRS), France <http://www.inrs.fr/accueil>

Engineering measures

- : Use sealed systems as far as possible.
- Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.
- Local exhaust ventilation is recommended.
- Firewater monitors and deluge systems are recommended.
- Eye washes and showers for emergency use.
- Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.
- The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances.
- Appropriate measures include:

General Information:

Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when there is potential for inhalation; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Personal protective equipment

Protective measures

Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

- Respiratory protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. If air-filtering respirators are suitable for conditions of use: Select a filter suitable for organic gases and vapours [Type A boiling point >65°C (149°F)].
- Hand protection : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. Longer term protection: Viton. Incidental contact/Splash protection: Nitrile rubber.
- Remarks : For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
- Eye protection : Wear goggles for use against liquids and gas. Wear full face shield if splashes are likely to occur.
- Skin and body protection : Wear chemical resistant gloves/gauntlets and boots. Where risk of splashing, also wear an apron. Wear antistatic and flame-retardant clothing, if a local risk assessment deems it so.
- Hygiene measures : Wash hands before eating, drinking, smoking and using the toilet. Launder contaminated clothing before re-use. Do not ingest. If swallowed, then seek immediate medical

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020
assistance.

Print Date 03.09.2022

Environmental exposure controls

General advice : Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.
Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.
Information on accidental release measures are to be found in section 6.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Liquid.

Colour : amber

Odour : Aromatic hydrocarbon

Odour Threshold : Data not available

pH : Data not available

Melting point/freezing point : < -15 °C / < 5 °F

Boiling point/boiling range : 80.0 - 93.3 °C / 176.0 - 200.0 °F

Flash point : 4 °C / 39 °F

Evaporation rate : Data not available

Upper explosion limit : no data available

Lower explosion limit : Data not available

Vapour pressure : 167.0 hPa (37.8 °C / 100.0 °F)

Relative vapour density : 2.0

Relative density : 0.88

Density : no data available

Solubility(ies)

Water solubility : negligible

Partition coefficient: n-octanol/water : Data not available

Auto-ignition temperature : Data not available

Decomposition temperature : no data available

Viscosity

Viscosity, dynamic : Data not available

Viscosity, kinematic : < 20.5 mm²/s

Explosive properties : Not applicable

Oxidizing properties : Data not available

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

| | |
|------------------|---|
| Surface tension | : Data not available |
| Conductivity | : Low conductivity: < 100 pS/m, The conductivity of this material makes it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10,000 pS/m., Whether a liquid is nonconductive or semiconductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid |
| Particle size | : Data not available |
| Molecular weight | : Data not available |

10. STABILITY AND REACTIVITY

| | |
|------------------------------------|--|
| Reactivity | : The product does not pose any further reactivity hazards in addition to those listed in the following sub-paragraph. |
| Chemical stability | : No hazardous reaction is expected when handled and stored according to provisions Stable under normal conditions of use. |
| Possibility of hazardous reactions | : Reacts with strong oxidising agents. |
| Conditions to avoid | : Avoid heat, sparks, open flames and other ignition sources. In certain circumstances product can ignite due to static electricity. |
| Incompatible materials | : Strong oxidising agents. |
| Hazardous decomposition products | : Hazardous decomposition products are not expected to form during normal storage. Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases including carbon monoxide, carbon dioxide, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation. |

11. TOXICOLOGICAL INFORMATION

| | |
|--|---|
| Basis for assessment | : Information given is based on data obtained from similar substances. |
| Information on likely routes of exposure | : Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion. |

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

Acute toxicity

Product:

- Acute oral toxicity : LD 50 Rat, male and female: > 5,000 mg/kg
Method: Other guideline method.
Remarks: Based on available data, the classification criteria are not met.
- Acute inhalation toxicity : LC 50 Rat, male and female: > 20 mg/l
Exposure time: 4 h
Test atmosphere: vapour
Method: Test(s) equivalent or similar to OECD Test Guideline 403
Remarks: Based on available data, the classification criteria are not met.
- Acute dermal toxicity : LD 50 Rabbit, male and female: > 2,000 mg/kg
Method: Other guideline method.
Remarks: Based on available data, the classification criteria are not met.

Skin corrosion/irritation

Product:

Species: Rabbit
Method: OECD Test Guideline 404
Remarks: Causes skin irritation.

Serious eye damage/eye irritation

Product:

Species: Rabbit
Method: Other guideline method.
Remarks: Causes serious eye irritation.

Respiratory or skin sensitisation

Product:

Species: Guinea pig
Method: Other guideline method.
Remarks: Based on available data, the classification criteria are not met.

Germ cell mutagenicity

Product:

- Genotoxicity in vitro : Method: Test(s) equivalent or similar to OECD Guideline 471
Remarks: Based on available data, the classification criteria are not met.
- : Method: Test(s) equivalent or similar to OECD Test Guideline 473
Remarks: Based on available data, the classification criteria are not met.

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

: Test species: Mouse
Method: OECD Test Guideline 474
Remarks: May cause heritable genetic damage, Contains benzene.

Germ cell mutagenicity-
Assessment

: May cause genetic defects.

Carcinogenicity

Product:

Species: Rat, (male and female)

Application Route: Oral

Method: Other guideline method.

Remarks: Known human carcinogen., May cause leukaemia (AML - acute myelogenous leukaemia)., Causes cancer in laboratory animals., Contains benzene.

Species: Rat, (male and female)

Application Route: Inhalation

Method: Test(s) equivalent or similar to OECD Test Guideline 453

Remarks: Known human carcinogen., May cause leukaemia (AML - acute myelogenous leukaemia)., Causes cancer in laboratory animals., Contains benzene.

Carcinogenicity -
Assessment

: May cause cancer.

| Material | GHS/CLP Carcinogenicity Classification |
|---|--|
| Aromatic hydrocarbons, C6-8, naphtha-raffinate pyrolyzate-derived | Carcinogenicity Category 1B |
| Benzene | Carcinogenicity Category 1A |
| Toluene | No carcinogenicity classification. |
| n-Hexane | No carcinogenicity classification. |
| Ethylbenzene | No carcinogenicity classification. |

| Material | Other Carcinogenicity Classification |
|---|---|
| Aromatic hydrocarbons, C6-8, naphtha-raffinate pyrolyzate-derived | IARC: Group 2B: Possibly carcinogenic to humans |
| Benzene | IARC: Group 1: Carcinogenic to humans |
| Toluene | IARC: Group 3: Not classifiable as to its carcinogenicity to humans |
| Ethylbenzene | IARC: Group 2B: Possibly carcinogenic to humans |

Reproductive toxicity

Product:

:
Remarks: Suspected of damaging fertility or the unborn child., Affects reproductive system in animals at doses which

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

produce other toxic effects., Contains n-Hexane, CAS # 110-54-3., Causes foetotoxicity in animals at doses which are maternally toxic., Contains Toluene, CAS # 108-88-3.

Effects on foetal development

: Species: Rat, female
Application Route: Inhalation
Remarks: Suspected of damaging fertility or the unborn child., Affects reproductive system in animals at doses which produce other toxic effects., Contains n-Hexane, CAS # 110-54-3., Causes foetotoxicity in animals at doses which are maternally toxic., Contains Toluene, CAS # 108-88-3.

Reproductive toxicity - Assessment

: This product does not meet the criteria for classification in categories 1A/1B.

STOT - single exposure

Product:

Exposure routes: Inhalation

Target Organs: Central nervous system

Remarks: May cause drowsiness and dizziness., Inhalation of vapours or mists may cause irritation to the respiratory system.

STOT - repeated exposure

Product:

Exposure routes: Oral

Target Organs: Blood-forming organs, Immune system, Central nervous system, Auditory system, Respiratory system, Visual system, Peripheral nervous system

Remarks: Causes damage to blood, blood-forming organs and immune system., Blood: may cause haemolysis of red blood cells and/or anaemia., Blood-forming organs: repeated exposure affects the bone marrow., Immune System: animal studies on this material or its components have demonstrated immunotoxicity., Contains benzene., May cause damage to central nervous system, respiratory system, visual system, and auditory system through prolonged or repeated exposure., Central nervous system: repeated exposure affects the nervous system., Effects were seen at high doses only., Auditory system: prolonged and repeated exposures to high concentrations have resulted in hearing loss in rats. , Visual system: may cause decreased color perception. , These subtle changes have not been found to lead to functional colour vision deficits., Respiratory system: repeated exposure affects the respiratory system. Effects were seen at high doses only., Contains Toluene, CAS # 108-88-3., Peripheral nervous system: repeated exposure causes peripheral neuropathy in animals., Contains n-Hexane, CAS # 110-54-3.

Repeated dose toxicity

Product:

Rat, male and female:

Application Route: Oral

Method: Test(s) equivalent or similar to OECD Test Guideline 408

Target Organs: hematopoietic system

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

Rat, male and female:

Application Route: Inhalation

Test atmosphere: vapour

Method: Test(s) equivalent or similar to OECD Test Guideline 413

Target Organs: No specific target organs noted

Rabbit, female:

Application Route: Dermal

Method: Test(s) equivalent or similar to OECD Test Guideline 410

Target Organs: No specific target organs noted

Aspiration toxicity

Product:

Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.

Further information

Product:

Remarks: Classifications by other authorities under varying regulatory frameworks may exist.

12. ECOLOGICAL INFORMATION

Basis for assessment : Incomplete ecotoxicological data are available for this product. The information given below is based partly on a knowledge of the components and the ecotoxicology of similar products.

Ecotoxicity

Product:

Toxicity to fish (Acute toxicity) : LC50 (Oncorhynchus mykiss (rainbow trout)): 1 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: Toxic
LL/EL/IL50 > 1 <= 10 mg/l

Toxicity to crustacean (Acute toxicity) : EC50 (Daphnia magna (Water flea)): 1.2 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Remarks: Toxic
LL/EL/IL50 > 1 <= 10 mg/l

Toxicity to algae/aquatic plants (Acute toxicity) : EC50 (Pseudokirchneriella subcapitata (algae)): 1.3 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 201
Remarks: Toxic
LL/EL/IL50 > 1 <= 10 mg/l

Toxicity to fish (Chronic toxicity) : Remarks: Data not available

Toxicity to crustacean : Remarks: Data not available

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

(Chronic toxicity)

Toxicity to microorganisms

(Acute toxicity)

: (Tetrahymena pyriformis): 76.7 mg/l

Exposure time: 72 h

Method: Based on quantitative structure-activity relationship

(QSAR) modelling

Remarks: Harmful

LL/EL/IL50 >10 <= 100 mg/l

Persistence and degradability

Product:

Biodegradability

: Biodegradation: 7.3 %

Exposure time: 28 d

Method: OECD Test Guideline 301F

Remarks: Not readily biodegradable.

Bioaccumulative potential

Product:

Bioaccumulation

: Species: Pimephales promelas (fathead minnow)

Bioconcentration factor (BCF): 0.73 - 4.15

Method: Based on quantitative structure-activity relationship

(QSAR) modelling

Remarks: Contains components with the potential to bioaccumulate.

Partition coefficient: n-octanol/water

: Remarks: Data not available

Mobility in soil

Product:

Mobility

: Remarks: Floats on water., If the product enters soil, one or more constituents will or may be mobile and may contaminate groundwater.

Other adverse effects

Product:

Results of PBT and vPvB assessment

: The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB.

Additional ecological information

: In view of the high rate of loss from solution, the product is unlikely to pose a significant hazard to aquatic life.

13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues

: Recover or recycle if possible.

It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

Do not dispose into the environment, in drains or in water courses

Waste product should not be allowed to contaminate soil or ground water, or be disposed of into the environment.

Waste, spills or used product is dangerous waste.

Disposal should be in accordance with applicable regional, national, and local laws and regulations.

Local regulations may be more stringent than regional or national requirements and must be complied with.

Contaminated packaging : Drain container thoroughly.
After draining, vent in a safe place away from sparks and fire.
Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums.
Send to drum recoverer or metal reclaimer.
Comply with any local recovery or waste disposal regulations.

14. TRANSPORT INFORMATION

International Regulations

ADR

UN number : 1993
Proper shipping name : FLAMMABLE LIQUID, N.O.S.
Class : 3
Packing group : II
Labels : 3
Hazard Identification Number : 33
Environmentally hazardous : yes

IATA-DGR

UN/ID No. : UN 1993
Proper shipping name : FLAMMABLE LIQUID, N.O.S.
(BENZENE, C6-8 AROMATIC HYDROCARBONS)
Class : 3
Packing group : II
Labels : 3

IMDG-Code

UN number : UN 1993
Proper shipping name : FLAMMABLE LIQUID, N.O.S.
(BENZENE, C6-8 AROMATIC HYDROCARBONS)
Class : 3
Packing group : II
Labels : 3
Marine pollutant : yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Pollution category : Y

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

Ship type : 3
Product name : Benzene and mixtures having 10% benzene or more (i)

Special precautions for user

Remarks : Special Precautions: Refer to Section 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

Additional Information : This product may be transported under nitrogen blanketing. Nitrogen is an odourless and invisible gas. Exposure to nitrogen enriched atmospheres displaces available oxygen which may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined space entry.

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

Local Regulations

| | |
|--|--|
| Workplace Safety and Health Act & Workplace Safety and Health (General Provision) Regulations | This product is subject to the SDS, Labelling, PEL and other requirements in the Act/ Regulations. |
| Fire Safety Act and Fire Safety (Petroleum & Flammable Materials) Regulations | This product is subject to the requirements in the Act/ Regulations. |
| Maritime and Port Authority of Singapore (Dangerous Goods, Petroleum and Explosives) Regulations | This product is subject to the requirements of this regulation. |
| Environmental Protection and Management Act and Environmental Protection and Management (Hazardous Substances) Regulations | This product is not subject to the requirements in the Act/Regulations. |

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Other international regulations

The components of this product are reported in the following inventories:

AIIC : Listed
DSL : Listed
TSCA : Listed

16. OTHER INFORMATION

Full text of H-Statements

H224 Extremely flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

| | |
|------|--|
| H315 | Causes skin irritation. |
| H336 | May cause drowsiness or dizziness. |
| H340 | May cause genetic defects. |
| H350 | May cause cancer. |
| H361 | Suspected of damaging fertility or the unborn child. |
| H401 | Toxic to aquatic life. |
| H411 | Toxic to aquatic life with long lasting effects. |

Full text of other abbreviations

| | |
|-----------------|--|
| Aquatic Acute | Short-term (acute) aquatic hazard |
| Aquatic Chronic | Long-term (chronic) aquatic hazard |
| Asp. Tox. | Aspiration hazard |
| Carc. | Carcinogenicity |
| Flam. Liq. | Flammable liquids |
| Muta. | Germ cell mutagenicity |
| Repr. | Reproductive toxicity |
| Skin Irrit. | Skin irritation |
| STOT SE | Specific target organ toxicity - single exposure |

Abbreviations and Acronyms

AICS - Australian Inventory of Chemical Substances; AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

Further information

Training advice : Provide adequate information, instruction and training for operators.

SAFETY DATA SHEET

Benzene Concentrate

Version 4.3

Revision Date 01.10.2020

Print Date 03.09.2022

Other information : A vertical bar (|) in the left margin indicates an amendment from the previous version.

Sources of key data used to compile the Safety Data Sheet : The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID data base, EC 1272 regulation, etc).

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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