# SAFETY DATA SHEET

According to OSHA Hazard Communication Standard, 29 CFR 1910.1200

# Shell Polymers Monaca De-ethanizer Bottoms

| Version | Revision Date: | SDS Number: | Print Date: 03/13/2025 |
|---|---|---|---|
| 7.0 | 03/06/2025 | 800010035383 | Date of last issue: 03/25/2024 |

## SECTION 1. IDENTIFICATION

| | | |
|---|---|---|
| Product name | : | Shell Polymers Monaca De-ethanizer Bottoms |
| Product code | : | E7003, X3434 |
| Synonyms | : | C3+ |
| CAS-No. | : | 68955-28-2 |

**Manufacturer or supplier's details**

| | | |
|---|---|---|
| Company | : | **Shell Chemical LP**<br>PO Box 576<br>HOUSTON TX 77001<br>USA |
| SDS Request | : | 1-800-240-6737 |
| Customer Service | : | 1-855-697-4355 |

**Emergency telephone number**

| | | |
|---|---|---|
| Chemtrec Domestic (24 hr) | : | 1-800-424-9300 |
| Chemtrec International (24 hr) | : | 1-703-527-3887 |

**Recommended use of the chemical and restrictions on use**

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

## SECTION 2. HAZARDS IDENTIFICATION

**GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)**

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|---|---|---|
| Flammable gases | : | Category 1 |
| Gases under pressure | : | Liquefied gas |
| Aspiration hazard | : | Category 1 |
| Skin irritation | : | Category 2 |
| Eye irritation | : | Category 2A |
| Germ cell mutagenicity | : | Category 1B |

| | | |
|---|---|---|
| Carcinogenicity | : | Category 1 |
| Specific target organ toxicity - repeated exposure | : | Category 1 |

**GHS label elements**

Hazard pictograms :

Signal word : Danger

Hazard statements :

PHYSICAL HAZARDS:
H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H304 May be fatal if swallowed and enters airways.
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.

Precautionary statements :

**Prevention:**

P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P270 Do not eat, drink or smoke when using this product.

**Response:**

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 Eliminate all ignition sources if safe to do so.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P331 Do NOT induce vomiting.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
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.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P314 Get medical advice/ attention if you feel unwell.

**Storage:**

P410 + P403 Protect from sunlight. Store in a well-ventilated place.
P405 Store locked up.

**Disposal:**

P501 Dispose of contents and container to appropriate waste site or reclaimer in accordance with local and national regulations.

**Other hazards which do not result in classification**

Vapours may cause drowsiness and dizziness.
Slightly irritating to respiratory system.
Exposure to rapidly expanding gases may cause frost burns to eyes and/or skin.
Vapours may be irritating to the eye.
Possibility of organ or organ system damage from prolonged exposure; see Section 11 for details.
Target organ(s):
Blood forming organs
Reproductive system.
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.
Highly reactive.
May form explosive peroxides.
The vapour is heavier than air, spreads along the ground and distant ignition is possible.
May form flammable/explosive vapour-air mixture.
The classification of this material is based on OSHA HCS 2012 criteria.

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Chemical nature : This product may contain trace levels of Naturally Occurring Radioactive Materials (NORM) as Radon 222 (CAS No. 14859-67-7) and its decay products Lead 210 (CAS No. 14255-04-0) and Polonium 210 (CAS No. 13981-52-7). Refer to Sections 7 and 11 for additional information.

**Hazardous components**

| Chemical name | Synonyms | CAS-No. | Concentration (% w/w) |
|---|---|---|---|
| gases (petroleum, light steam-cracked, butadiene conc. | Gases (petroleum), light steam-cracked, butadiene conc. | 68955-28-2 | 100 |

Contains an antioxidant (stabiliser) and antipolymerant

**Further information**

Contains:

| Chemical name | Identification number | Concentration (% w/w) |
|---|---|---|
| propylene | 115-07-1 | 30 |
| propane | 74-98-6 | 4 |
| 1,3-butadiene | 106-99-0 | >40 |
| butane | 106-97-8 | 5 |
| but-1-ene | 106-98-9 | 3 |
| Toluene | 108-88-3 | 0.2 |
| Benzene | 71-43-2 | 11 |
| Isoprene | 78-79-5 | 0.1 |
| cyclopentadiene | 542-92-7 | 4 |
| Cyclopentene | 142-29-0 | 1 |

## SECTION 4. FIRST AID MEASURES

General advice : Not expected to be a health hazard when used under normal conditions.

If inhaled : Remove to fresh air. Do not attempt to rescue the victim unless proper respiratory protection is worn. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting, or unresponsive, give 100% oxygen with rescue breathing or Cardio-Pulmonary Resuscitation as required and transport to the nearest medical facility.
Inhalation of vapours require immediate medical attention.
Call emergency number for your location / facility.

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.
Slowly warm the exposed area by rinsing with warm water.
Transport to the nearest medical facility for additional treatment.
In the event of frostbite, slowly warm the exposed area by rinsing with warm water.
Seek medical advice.
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.
Slowly warm the exposed area by rinsing with warm water.
Transport to the nearest medical facility for additional treatment.

If swallowed : 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.

Rinse mouth.
Call emergency number for your location / facility.
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 : Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing.
Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, lightheadedness, 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.
Rapid release of gases which are liquids under pressure may cause frost burns of exposed tissues (skin, eye) due to evaporative cooling.
Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision.
Ingestion may result in nausea, vomiting and/or diarrhoea.
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 breath, chest congestion or continued coughing or wheezing.
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).

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.

Indication of any immediate medical attention and special treatment needed : Potential for cardiac sensitisation, particularly in abuse situations. Hypoxia or negative inotropes may enhance these effects. Consider: oxygen therapy.
Artificial respiration and/or oxygen may be necessary.
Treat symptomatically.
Call a doctor or poison control center for guidance.
IMMEDIATE TREATMENT IS EXTREMELY IMPORTANT!
Potential for chemical pneumonitis.

## SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Shut off supply. If not possible and no risk to surroundings, let the fire burn itself out.

Unsuitable extinguishing media : Data not available

| | | |
|---|---|---|
| Specific hazards during fire-fighting | : | Sustained fire attack on vessels may result in a Boiling Liquid Expanding Vapor Explosion (BLEVE).<br>The vapour is heavier than air, spreads along the ground and distant ignition is possible.<br>Contents are under pressure and can explode when exposed to heat or flames.<br>As the vapours become lighter than air, the vapours may reach ignition sources at ground or elevated locations. |
| Specific extinguishing methods | : | Standard procedure for chemical fires. |
| Further information | : | Clear fire area of all non-emergency personnel.<br>Keep adjacent containers cool by spraying with water. |
| Special protective equipment for firefighters | : | Wear full protective clothing and self-contained breathing apparatus. |

## SECTION 6. ACCIDENTAL RELEASE MEASURES

| | | |
|---|---|---|
| Personal precautions, protective equipment and emergency procedures | : | Avoid contact with spilled or released material. Immediately remove all contaminated clothing. 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.<br>Be ready for fire or possible exposure.<br>Stay upwind and keep out of low areas.<br>Avoid contact with skin, eyes and clothing.<br>Isolate hazard area and deny entry to unnecessary or unprotected personnel.<br>Do not breathe fumes, vapour.<br>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 and evacuate all personnel. Attempt to disperse the gas 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 meter. |
| Methods and materials for containment and cleaning up | : | Allow to evaporate.<br>Attempt to disperse the vapour or to direct its flow to a safe location, for example by using fog sprays.<br><br>Observe all relevant local and international regulations. |
| Additional advice | : | For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.<br>Risk of explosion. Inform the emergency services if liquid enters surface water drains. |

For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet.
Vapour may form an explosive mixture with air.

Notify authorities if any exposure to the general public or the environment occurs or is likely to occur.
U.S. regulations may require reporting releases of this material to the environment which exceed the reportable quantity (refer to Section 15) to the National Response Center at (800) 424-8802.

## SECTION 7. HANDLING AND STORAGE

| | | |
|---|---|---|
| Technical measures | : | 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.<br>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.<br>Ensure that all local regulations regarding handling and storage facilities are followed. |
| Advice on safe handling | : | Avoid inhaling vapour and/or mists.<br>Avoid contact with skin, eyes and clothing.<br>Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks.<br>The vapour is heavier than air. Beware of accumulation in pits and confined spaces.<br>Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.<br>Bulk storage tanks should be diked (bunded).<br>Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.<br>Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.<br>If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.<br>Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges.<br>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.<br>These activities may lead to static discharge e.g. spark formation.<br>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.<br>Do NOT use compressed air for filling, discharging, or handling operations. |

Radon-222 decay products may accumulate in processing equipment (e.g., pumps, filters, piping, etc.) to a point where gamma radiation is detected outside of this equipment during normal operations. This equipment may contain internal surface deposits of radioactive radon decay products. Equipment should be checked externally while in service for gamma radiation above background levels, and internally prior to maintenance work requiring opening or entry to the equipment, and prior to disposal. Equipment emitting gamma radiation should be presumed to be internally contaminated with alpha-emitting decay products (i.e., Lead-210, Polonium-210). Equipment and piping should be checked for possible decontamination prior to maintenance or disposal. Protective equipment (e.g., disposable coveralls, gloves (rubber/leather), and a respirator with HEPA or P100 filters, or supplied air) should be worn and good personal hygiene practices should be followed by personnel entering a vessel or working on contaminated process equipment to prevent skin contamination, ingestion, or inhalation of any NORM contaminated residue.

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| Avoidance of contact | : | Strong oxidising agents.<br>If copper, copper alloys, monel, silver, mercury or magnesium is used during construction or maintenance, the formation of explosive acetylides can occur as a result of contact with butadiene. If Teflon® or Delrin® is used, polymer formation may result. |
| Product Transfer | : | Refer to guidance under Handling section. |
| Further information on storage stability | : | 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.<br>Must be stored in a diked (bunded) well- ventilated area, away from sunlight, ignition sources and other sources of heat.<br>Must be kept inhibited during storage and shipment as material can polymerise.<br>Vapours from tanks should not be released to atmosphere.<br>Breathing losses during storage should be controlled by a suitable vapour treatment system.<br>Electrostatic charges will be generated during pumping.<br>Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk.<br>The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable.<br>Storage Temperature:<br>Ambient.<br>Nitrogen blanket recommended.<br>The product is normally supplied in a stabilized form. If the permissible storage period and/or storage temperature is noticeably exceeded, the product may polymerise with heat evolution.<br>Stable under recommended storage conditions. |

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| Packaging material | : | Suitable material: For containers, or container linings use mild steel, stainless steel.<br>Unsuitable material: Copper., Copper alloys., Magnesium., Mercury., Monel., Silver. |
| Specific use(s) | : | Not applicable |

Ensure that all local regulations regarding handling and storage facilities are followed.
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

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Components with workplace control parameters**

| Components | CAS-No. | Value type (Form of exposure) | Control parameters / Permissible concentration | Basis |
|---|---|---|---|---|
| 1,3-butadiene | 106-99-0 | TWA | 2 ppm | ACGIH |
| 1,3-butadiene | | PEL | 1 ppm | OSHA CARC |
| 1,3-butadiene | | STEL | 5 ppm | OSHA CARC |
| 1,3-butadiene | | TWA | 1 ppm | OSHA Z-1 |
| 1,3-butadiene | | STEL | 5 ppm | OSHA Z-1 |
| propylene | 115-07-1 | TWA | 500 ppm | ACGIH |
| Benzene | 71-43-2 | TWA | 0.25 ppm<br>0.8 mg/m3 | Shell Internal Standard (SIS) for 8-12 hour TWA. |
| Benzene | | STEL | 2.5 ppm<br>8 mg/m3 | Shell Internal Standard (SIS) for 15 min (STEL) |
| Benzene | | TWA | 0.02 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<br>(10 minutes) | OSHA Z-2 |
| butane | 106-97-8 | STEL | 1,000 ppm | ACGIH |
| propane | 74-98-6 | TWA | 1,000 ppm<br>1,800 mg/m3 | OSHA Z-1 |
| cyclopentadiene | 542-92-7 | TWA | 0.5 ppm | ACGIH |

| | | | | |
|---|---|---|---|---|
| cyclopentadiene | | STEL | 1 ppm | ACGIH |
| cyclopentadiene | | TWA | 75 ppm<br>200 mg/m3 | OSHA Z-1 |
| but-1-ene | 106-98-9 | TWA | 250 ppm | ACGIH |
| 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<br>(10 minutes) | OSHA Z-2 |
| Isoprene | 78-79-5 | TWA | 3 ppm<br>8.4 mg/m3 | Shell Internal Standard (SIS) for 8 hour TWA. |

**Biological occupational exposure limits**

| Components | CAS-No. | Control parameters | Biological specimen | Sampling time | Permissible concentration | Basis |
|---|---|---|---|---|---|---|
| 1,3-butadiene | 106-99-0 | 1,2 Dihydroxy-4-(N-acetylcysteinyl)-butane | Urine | End of shift (As soon as possible after exposure ceases) | 2.5 mg/l | ACGIH BEI |
| | | Mixture of N-1 and N-2(hydroxybutenyl)valine | Hemoglobin (Hb) adducts in blood | Not critical | 2.5 picomoles per gram Hemoglobin | ACGIH BEI |
| Toluene | 108-88-3 | Toluene | In blood | Prior to last shift of workweek | 0.02 mg/l | ACGIH BEI |
| | | Toluene | Urine | End of shift (As soon as possible after exposure ceases) | 0.03 mg/l | ACGIH BEI |
| | | o-Cresol | Urine | End of shift (As soon as possible after exposure ceases) | 0.3 mg/g creatinine | ACGIH BEI |
| Benzene | 71-43-2 | S-Phenylmercapturic acid | Urine | End of shift (As soon as possible after exposure ceases) | 25 µg/g creatinine | ACGIH BEI |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | t,t-Muconic acid | Urine | End of shift (As soon as possible after exposure ceases) | 500 µg/g creatinine | ACGIH BEI |
| 1,3-butadiene | 106-99-0 | 1,2 Dihydroxy-4-(N-acetylcysteinyl)-butane | Urine | End of shift (As soon as possible after exposure ceases) | 2.5 mg/l | ACGIH BEI |
| | | Mixture of N-1 and N-2(hydroxybutenyl)valine | Hemoglobin (Hb) adducts in blood | Not critical | 2.5 picomoles per gram Hemoglobin | ACGIH BEI |
| Toluene | 108-88-3 | Toluene | In blood | Prior to last shift of workweek | 0.02 mg/l | ACGIH BEI |
| | | Toluene | Urine | End of shift (As soon as possible after exposure ceases) | 0.03 mg/l | ACGIH BEI |
| | | o-Cresol | Urine | End of shift (As soon as possible after exposure ceases) | 0.3 mg/g creatinine | ACGIH BEI |
| Benzene | 71-43-2 | S-Phenylmercapturic acid | Urine | End of shift (As soon as possible after exposure ceases) | 25 µg/g creatinine | ACGIH BEI |
| | | t,t-Muconic acid | Urine | End of shift (As soon as possible after exposure ceases) | 500 µg/g creatinine | ACGIH BEI |

**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 con-

trols. 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 Securité, (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.
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**

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 appa-

ratus.
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 AX boiling point ≤65°C (149°F)].

Respirator selection, use and maintenance should be in accordance with the requirements of the OSHA Respiratory Protection Standard, 29 CFR 1910.134.

Hand protection

| | | |
|---|---|---|
| Remarks | : | 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. When prolonged or frequent repeated contact occurs. Viton. For incidental contact/splash protection - Neoprene rubber. If contact with liquefied product is possible or anticipated, gloves should be thermally insulated to prevent cold burns. 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, combined with face shield with chin guard. |
| Skin and body protection | : | Wear antistatic and flame-retardant clothing.<br>Chemical and cryogenic gloves/gauntlets, boots, and apron. |
| Protective measures | : | Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers. |
| Thermal hazards | : | When handling cold material that can cause frost burns, wear cryogenic gloves, safety hat and visor, cold resistant overalls (with cuffs over gloves and legs over boots) and heavy duty boots e.g. leather for cold resistance. |

Hygiene measures : Wash hands before eating, drinking, smoking and using the toilet.
Launder contaminated clothing before re-use.

**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.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

| | | |
|---|---|---|
| Appearance | : | Liquid under pressure. |
| Colour | : | Data not available |
| Odour | : | strong |
| Odour Threshold | : | Data not available |
| pH | : | No data available |
| | : | Data not available |
| Boiling point/boiling range | : | -65.5 - 97.3 °C / -85.9 - 207.1 °F<br>(1000 hPa) |
| Flash point | : | estimated value(s) -108 °C / -162 °F |
| Evaporation rate | : | Data not available |

Flammability
Lower explosion limit and upper explosion limit / flammability limit

| | | |
|---|---|---|
| Upper explosion limit / Upper flammability limit | : | Data not available |
| Lower explosion limit / Lower flammability limit | : | Data not available |
| Vapour pressure | : | estimated value(s) 5.7 bar (25 °C / 77 °F) |
| Relative vapour density | : | estimated value(s) 1.75 (25 °C / 77 °F) |
| Relative density | : | estimated value(s) 0.59<br>Method: ASTM D4052 |
| Density | : | estimated value(s) 0.590 g/cm3 (40 °C / 104 °F) |

| | | |
|---|---|---|
| | | Method: ASTM D4052 |
| Solubility(ies) | | |
| Water solubility | : | negligible |
| Solubility in other solvents | : | Data not available |
| Partition coefficient: n-octanol/water | : | Data not available |
| Auto-ignition temperature | : | Data not available |
| Decomposition temperature | : | Data not available |
| Viscosity | | |
| Viscosity, dynamic | : | estimated value(s) 0.139 mPa.s (40 °C / 104 °F) |
| | | Method: ASTM D445 |
| Viscosity, kinematic | : | estimated value(s) 0.236 mm2/s (40 °C / 104 °F) |
| | | Method: ASTM D445 |
| Explosive properties | : | No data available |
| Oxidizing properties | : | Data not available |
| 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 |
| Molecular weight | : | Data not available |
| Particle size | : | Data not available |

## SECTION 10. STABILITY AND REACTIVITY

| | | |
|---|---|---|
| Reactivity | : | Reacts violently with strong oxidising agents. |
| Chemical stability | : | Oxidises on contact with air to form unstable peroxides.<br>Unstable at elevated temperatures. |
| Possibility of hazardous reactions | : | Polymerisation may occur at elevated temperatures. |
| Conditions to avoid | : | Heat, flames, and sparks.<br>Exposure to air. |

Incompatible materials : Strong oxidising agents.
If copper, copper alloys, monel, silver, mercury or magnesium is used during construction or maintenance, the formation of explosive acetylides can occur as a result of contact with butadiene. If Teflon® or Delrin® is used, polymer formation may result.

## SECTION 11. TOXICOLOGICAL INFORMATION

Basis for assessment : Information given is based on product testing, and/or similar products, and/or components.
Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

**Information on likely routes of exposure**
Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

**Acute toxicity**

**Product:**

Acute oral toxicity : Remarks: May be harmful if swallowed.
LD50 >2000 - <=5000 mg/kg

Acute inhalation toxicity : Remarks: Based on available data, the classification criteria are not met.

Acute dermal toxicity : Remarks: Based on available data, the classification criteria are not met.

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**

Acute oral toxicity : Remarks: Acute oral toxicity
Not applicable

Acute inhalation toxicity : LC 50 (Rat, male and female): > 2311 ppm
Exposure time: 4 h
Test atmosphere: gas
Method: Test(s) equivalent or similar to OECD Test Guideline 403
Remarks: Based on available data, the classification criteria are not met.
High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death.

Acute dermal toxicity : Remarks: Acute dermal toxicity
Not applicable

**Skin corrosion/irritation**

**Product:**

Remarks: Irritating to skin.

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**
Species: Rabbit
Method: Acceptable non-standard method.
Remarks: Slightly irritating to skin., Insufficient to classify., Rapid release of gases which are liquids under pressure may cause frost burns of exposed tissues (skin, eye) due to evaporative cooling.

**Serious eye damage/eye irritation**

**Product:**

Remarks: Eye irritation

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**
Species: Rabbit
Method: Acceptable non-standard method.
Remarks: Based on available data, the classification criteria are not met., Rapid release of gases which are liquids under pressure may cause frost burns of exposed tissues (skin, eye) due to evaporative cooling.

**Respiratory or skin sensitisation**

**Product:**

Remarks: Based on available data, the classification criteria are not met.

**Germ cell mutagenicity**

**Product:**

Genotoxicity in vitro : Remarks: May cause genetic defects.

Genotoxicity in vivo : Remarks: May cause heritable genetic damage

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**
Genotoxicity in vitro : Method: Test(s) equivalent or similar to OECD Guideline 471
Test substance: 1,3-Butadiene
Remarks: May cause genetic defects.

: Method: Test(s) equivalent or similar to OECD Test Guideline 476
Test substance: 1,3-Butadiene
Remarks: May cause genetic defects.

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

476
Test substance: 1,3-Butadiene
Remarks: May cause genetic defects.

: Method: OECD Test Guideline 482
Test substance: 1,3-Butadiene
Remarks: May cause genetic defects.

Genotoxicity in vivo : Test species: Mouse
Method: OECD Test Guideline 474
Test substance: 1,3-Butadiene
Remarks: May cause genetic defects.

Test species: Mouse
Method: Test(s) equivalent or similar to OECD Test guideline 478
Test substance: 1,3-Butadiene
Remarks: May cause genetic defects.

Germ cell mutagenicity- Assessment : May cause genetic defects.

**Carcinogenicity**

**Product:**

Remarks: Known human carcinogen., May cause leukaemia (AML - acute myelogenous leukaemia)., May cause MDS (Myelodysplastic Syndrome).

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**
Species: Mouse, (male and female)
Application Route: Inhalation
Method: Test(s) equivalent or similar to OECD Test Guideline 453
Test substance: 1,3-Butadiene
Remarks: May cause cancer.

Species: Rat, (male and female)
Application Route: Inhalation
Method: Test(s) equivalent or similar to OECD Test Guideline 453
Test substance: 1,3-Butadiene
Remarks: May cause cancer.

Carcinogenicity - Assessment : May cause cancer.

| | | |
|---|---|---|
| **IARC** | Group 1: Carcinogenic to humans | |
| | 1,3-butadiene | 106-99-0 |
| | Benzene | 71-43-2 |

| | | |
|---|---|---|
| | Group 2B: Possibly carcinogenic to humans | |
| | Isoprene | 78-79-5 |
| **OSHA** | OSHA specifically regulated carcinogen | |
| | 1,3-butadiene | 106-99-0 |
| | Benzene | 71-43-2 |
| **NTP** | Known to be human carcinogen | |
| | 1,3-butadiene | 106-99-0 |
| | Benzene | 71-43-2 |
| | Reasonably anticipated to be a human carcinogen | |
| | Isoprene | 78-79-5 |

**Reproductive toxicity**

**Product:**

Effects on fertility : Remarks: Based on available data, the classification criteria are not met.

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**

Effects on fertility : Species: Rat
Sex: male and female
Application Route: Inhalation

Method: OECD Test Guideline 422
Remarks: Based on available data, the classification criteria are not met.

Effects on foetal development : Species: Mouse, female
Application Route: Inhalation
Method: Other guideline method.
Remarks: Based on available data, the classification criteria are not met.

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

**STOT - single exposure**

**Product:**

Remarks: Based on available data, the classification criteria are not met.

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**
Remarks: Based on available data, the classification criteria are not met., Inhalation of vapours or mists may cause irritation to the respiratory system., Not classified due to data which are conclusive although insufficient for classification.

**STOT - repeated exposure**

**Product:**

Remarks: Blood-forming organs: repeated exposure affects the bone marrow., Contains benzene.

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**
Remarks: Based on available data, the classification criteria are not met., Contains 1,3-butadiene., Blood-forming organs: repeated exposure affects the bone marrow., Reproductive system: repeated exposure affects the ovaries and testes in mice., Exposure to very high concentrations of similar materials has been associated with irregular heart rhythms and cardiac arrest., Not classified due to data which are conclusive although insufficient for classification.

**Repeated dose toxicity**

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**
Species: Rat, male and female
Application Route: Oral
Method: Test(s) equivalent or similar to OECD Test Guideline 407
Target Organs: No specific target organs noted

Species: Rat, male and female
Application Route: Inhalation
Test atmosphere: vapour
Method: OECD Test Guideline 422
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.

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**
Based on available data, the classification criteria are not met.

**Further information**

**Product:**

Remarks: Rapid release of gases which are liquids under pressure may cause frost burns of

exposed tissues (skin, eye) due to evaporative cooling.

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

Remarks: This product may contain trace amounts of NORM as Radon and its decay products. Carcinogenicity: IARC classification / Group 1 carcinogen.

Radon rapidly decays to form other radioactive elements including lead 210, polonium 210, and bismuth 210. Therefore, processing equipment may contain build-up of radioactive contamination. The radon decay products are solids and therefore may attach to dust particles or form films in equipment. Inhalation, ingestion, or skin contact with radon decay products can lead to the deposit of radioactive material in the respiratory tract, bone or blood forming organs, intestinal tract, and kidney, which may lead to certain cancers.

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**
Remarks: Classifications by other authorities under varying regulatory frameworks may exist.

## SECTION 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. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

**Ecotoxicity**

**Product:**

Toxicity to fish (Acute toxicity) :
Remarks: Physical properties indicate that hydrocarbon gases will rapidly volatilise from the aquatic environment and that acute and chronic effects would not be observed in practice.

Toxicity to daphnia and other aquatic invertebrates (Acute toxicity) :
Remarks: Physical properties indicate that hydrocarbon gases will rapidly volatilise from the aquatic environment and that acute and chronic effects would not be observed in practice.

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

Toxicity to microorganisms (Acute toxicity) : Remarks: Data not available

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**

Toxicity to fish (Acute toxici- : LC50: 19 mg/l

| | | |
|---|---|---|
| ty) | | Exposure time: 96 h<br>Method: Information given is based on data obtained from similar substances.<br>Remarks: Data not available |
| Toxicity to daphnia and other aquatic invertebrates (Acute toxicity) | : | LC50 (Daphnia (water flea)): 11 mg/l<br>Exposure time: 48 h<br>Method: Information given is based on data obtained from similar substances.<br>Remarks: Data not available |
| Toxicity to algae (Acute toxicity) | : | EC50: 7.7 mg/l<br>Exposure time: 96 h<br>Method: Information given is based on data obtained from similar substances.<br>Remarks: Data not available |
| Toxicity to fish (Chronic toxicity) | : | Remarks: Data not available |
| Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) | : | Remarks: Data not available |
| Toxicity to microorganisms (Acute toxicity) | : | Remarks: Data not available |

**Persistence and degradability**

**Product:**

| | | |
|---|---|---|
| Biodegradability | : | Remarks: The volatile constituents will oxidize rapidly by photochemical reactions in air. |

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**

| | | |
|---|---|---|
| Biodegradability | : | Biodegradation: 50 %<br>Exposure time: 3.5 d<br>Method: Information given is based on data obtained from similar substances.<br>Remarks: Readily biodegradable. |

**Bioaccumulative potential**

**Product:**

| | | |
|---|---|---|
| Bioaccumulation | : | Remarks: Data not available |

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**

| | | |
|---|---|---|
| Bioaccumulation | : | Remarks: Does not have the potential to bioaccumulate significantly. |

**Mobility in soil**

**Product:**

Mobility : Remarks: Because of their extreme volatility, air is the only environmental compartment that hydrocarbon gases will be found.

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**

Mobility : Remarks: Because of their extreme volatility, air is the only environmental compartment that petroleum gases will be found.

**Other adverse effects**

**Product:**

Additional ecological information : Physical properties indicate that hydrocarbon gases will rapidly volatilise from the aquatic environment and that acute and chronic effects would not be observed in practice.

**Components:**

**gases (petroleum, light steam-cracked, butadiene conc.:**

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 : Physical properties indicate that petroleum gases will rapidly volatilise from the aquatic environment and that acute and chronic effects would not be observed in practice.

## SECTION 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.

Do not dispose into the environment, in drains or in water courses.
Waste product should not be allowed to contaminate soil or water.

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.<br>After draining, vent in a safe place away from sparks and fire.<br>Send to drum recoverer or metal reclaimer. |

## SECTION 14. TRANSPORT INFORMATION

### National Regulations

**49 CFR**

| | | |
|---|---|---|
| UN/ID/NA number | : | UN 1010 |
| Proper shipping name | : | Butadienes, stabilized |
| Class | : | 2.1 |
| Packing group | : | Not Assigned |
| Labels | : | 2.1 |
| Reportable quantity | | 1,3-Butadiene<br>(10 lb) |
| ERG Code | : | 116P |
| Marine pollutant | : | no |

### International Regulations

**IATA-DGR**

| | | |
|---|---|---|
| UN/ID No. | : | UN 1010 |
| Proper shipping name | : | BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED |
| Class | : | 2.1 |
| Packing group | : | Not Assigned |
| Labels | : | 2.1 |

**IMDG-Code**

| | | |
|---|---|---|
| UN number | : | UN 1010 |
| Proper shipping name | : | BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED |
| Class | : | 2.1 |
| Packing group | : | Not Assigned |
| Labels | : | 2.1 |
| Marine pollutant | : | no |

### Maritime transport in bulk according to IMO instruments

| | | |
|---|---|---|
| Pollution category | : | Data not available |
| Ship type | : | Data not available |
| Product name | : | Data not available |

### 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. |

## SECTION 15. REGULATORY INFORMATION

**EPCRA - Emergency Planning and Community Right-to-Know Act**

**CERCLA Reportable Quantity**

| Components | CAS-No. | Component RQ (lbs) | Calculated product RQ (lbs) |
|---|---|---|---|
| **Benzene** | **71-43-2** | **10** | **90** |
| **propylene** | **115-07-1** | **100** | **333** |
| **butane** | **106-97-8** | **100** | **2000** |
| **propane** | **74-98-6** | **100** | **2500** |
| **Isoprene** | **78-79-5** | **100** | ***** |
| **Toluene** | **108-88-3** | **1000** | ***** |
| **1,3-butadiene** | **106-99-0** | **10** | **10*** |

*: Calculated RQ exceeds reasonably attainable upper limit.
Calculated RQ exceeds reasonably attainable upper limit., The components with RQs are given for information.

**SARA 304 Extremely Hazardous Substances Reportable Quantity**

This material does not contain any components with a section 304 EHS RQ.

**SARA 302 Extremely Hazardous Substances Threshold Planning Quantity**

This material does not contain any components with a section 302 EHS TPQ.

**SARA 311/312 Hazards** : Flammable (gases, aerosols, liquids, or solids)
Gases under pressure
Aspiration hazard
Skin corrosion or irritation
Serious eye damage or eye irritation
Germ cell mutagenicity
Carcinogenicity
Specific target organ toxicity (single or repeated exposure)

**SARA 313** : The following components are subject to reporting levels established by SARA Title III, Section 313:

| | | |
|---|---|---|
| 1,3-butadiene | 106-99-0 | >= 90 - <= 100 % |
| propylene | 115-07-1 | >= 30 - < 50 % |
| Benzene | 71-43-2 | >= 10 - < 20 % |
| Isoprene | 78-79-5 | >= 0.1 - < 1 % |

**Clean Water Act**

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

| | | |
|---|---|---|
| Toluene | 108-88-3 | 0.2 % |
| Benzene | 71-43-2 | 11 % |
| Isoprene | 78-79-5 | 0.1 % |

**US State Regulations**

**Pennsylvania Right To Know**

| | |
|---|---|
| 1,3-butadiene | 106-99-0 |
| propylene | 115-07-1 |
| Benzene | 71-43-2 |
| butane | 106-97-8 |
| cyclopentadiene | 542-92-7 |
| propane | 74-98-6 |
| but-1-ene | 106-98-9 |
| Cyclopentene | 142-29-0 |
| Toluene | 108-88-3 |
| Isoprene | 78-79-5 |

**California Prop. 65**

WARNING: This product can expose you to chemicals including Isoprene, Benzene, 1,3-butadiene, which is/are known to the State of California to cause cancer, and Benzene, Toluene, 1,3-butadiene, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

**California List of Hazardous Substances**

| | |
|---|---|
| 1,3-butadiene | 106-99-0 |
| propylene | 115-07-1 |
| Benzene | 71-43-2 |
| butane | 106-97-8 |
| cyclopentadiene | 542-92-7 |

**California Regulated Carcinogens**

| | |
|---|---|
| 1,3-butadiene | 106-99-0 |
| Benzene | 71-43-2 |

**Other regulations:**

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

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

| | | |
|---|---|---|
| TSCA | : | Listed |
| DSL | : | Listed |
| ENCS | : | Listed |
| NZIoC | : | Listed |
| PICCS | : | Listed |
| TCSI | : | Listed |

## SECTION 16. OTHER INFORMATION

**Further information**

| | |
|---|---|
| NFPA Rating (Health, Fire, Reactivity) | 2, 4, 2 |

**Full text of other abbreviations**

| | | |
|---|---|---|
| ACGIH | : | USA. ACGIH Threshold Limit Values (TLV) |
| ACGIH BEI | : | ACGIH - Biological Exposure Indices (BEI) |
| OSHA CARC | : | OSHA Specifically Regulated Chemicals/Carcinogens |
| OSHA Z-1 | : | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
| OSHA Z-2 | : | USA. Occupational Exposure Limits (OSHA) - Table Z-2 |
| ACGIH / TWA | : | 8-hour, time-weighted average |
| ACGIH / STEL | : | Short-term exposure limit |
| OSHA CARC / PEL | : | Permissible exposure limit (PEL) |
| OSHA CARC / STEL | : | Excursion limit |
| OSHA Z-1 / TWA | : | 8-hour time weighted average |
| OSHA Z-1 / STEL | : | Short Term Exposure Limit |
| OSHA Z-2 / TWA | : | 8-hour time weighted average |
| OSHA Z-2 / CEIL | : | Acceptable ceiling concentration |
| OSHA Z-2 / Peak | : | Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift |
| Abbreviations and Acronyms | : | The standard abbreviations and acronyms used in this document can be looked up in reference literature (e.g. scientific dictionaries) and/or websites. |

ACGIH = American Conference of Governmental Industrial Hygienists
ADR = European Agreement concerning the International Carriage of Dangerous Goods by Road
AICS = Australian Inventory of Chemical Substances
ASTM = American Society for Testing and Materials
BEL = Biological exposure limits
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
CAS = Chemical Abstracts Service
CEFIC = European Chemical Industry Council
CLP = Classification Packaging and Labelling
COC = Cleveland Open-Cup
DIN = Deutsches Institut fur Normung
DMEL = Derived Minimal Effect Level
DNEL = Derived No Effect Level
DSL = Canada Domestic Substance List
EC = European Commission
EC50 = Effective Concentration fifty
ECETOC = European Center on Ecotoxicology and Toxicology Of Chemicals
ECHA = European Chemicals Agency
EINECS = The European Inventory of Existing Commercial Chemical Substances
EL50 = Effective Loading fifty
ENCS = Japanese Existing and New Chemical Substances Inventory
EWC = European Waste Code
GHS = Globally Harmonised System of Classification and Labelling of Chemicals
IARC = International Agency for Research on Cancer

IATA = International Air Transport Association
IC50 = Inhibitory Concentration fifty
IL50 = Inhibitory Level fifty
IMDG = International Maritime Dangerous Goods
INV = Chinese Chemicals Inventory
IP346 = Institute of Petroleum test method N° 346 for the determination of polycyclic aromatics DMSO-extractables
KECI = Korea Existing Chemicals Inventory
LC50 = Lethal Concentration fifty
LD50 = Lethal Dose fifty per cent.
LL/EL/IL = Lethal Loading/Effective Loading/Inhibitory loading
LL50 = Lethal Loading fifty
MARPOL = International Convention for the Prevention of Pollution From Ships
NOEC/NOEL = No Observed Effect Concentration / No Observed Effect Level
OE_HPV = Occupational Exposure - High Production Volume
PBT = Persistent, Bioaccumulative and Toxic
PICCS = Philippine Inventory of Chemicals and Chemical Substances
PNEC = Predicted No Effect Concentration
REACH = Registration Evaluation And Authorisation Of Chemicals
RID = Regulations Relating to International Carriage of Dangerous Goods by Rail
SKIN_DES = Skin Designation
STEL = Short term exposure limit
TRA = Targeted Risk Assessment
TSCA = US Toxic Substances Control Act
TWA = Time-Weighted Average
vPvB = very Persistent and very Bioaccumulative

A vertical bar (|) in the left margin indicates an amendment from the previous version.
There has been a significant change in transport classification in section 14.

| | | |
|---|---|---|
| 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 date base, EC 1272 regulation, etc). |
| Revision Date | : | 03/06/2025 |

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.

US / EN