SAFETY DATA SHEET.

According to OSHA Hazard Communication Standard, 29 CFR 1910.1200

Butadiene

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SECTION 1. IDENTIFICATION

Product name : Butadiene
Product code : 002D7477

Manufacturer or supplier's details

Manufacturer/Supplier : **Shell Trading (US) Company**
P. O. BOX 4604
Houston, TX 77210-4604
USA

SDS Request : 877-276-7285
Customer Service :

Emergency telephone number
Spill Information : NORTH AMERICA - 1-800-424-9300
INTERNATIONAL - +1-703-527-3887
Health Information : ; 1-877-504-9351

Recommended use of the chemical and restrictions on use
Recommended use :
Base chemical.
Raw material for use in the chemical industry.
Restrictions on use : This product must not be used in applications other than those listed in Section 1 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)
Flammable gases : Category 1A

Gases under pressure : Liquefied gas

Carcinogenicity : Category 1A

Germ cell mutagenicity : Category 1B

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.
HEALTH HAZARDS:
H340 May cause genetic defects.
H350 May cause cancer.
ENVIRONMENTAL HAZARDS:
Not classified as an environmental hazard under GHS criteria.

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, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection.

Response:

P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 In case of leakage, eliminate all ignition sources.

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 are heavier than air. Vapours may travel across the ground and reach remote ignition sources causing a flashback fire danger.
May form flammable/explosive vapour-air mixture.
High gas concentrations will displace available air; unconsciousness and death may occur suddenly from lack of oxygen.

Slightly irritating to respiratory system.
Rapid release of gases which are liquids under pressure may cause frost burns of exposed tissues (skin, eye) due to evaporative cooling.
Exposure to rapidly expanding gases may cause frost burns to eyes and/or skin.
Slightly irritating to the eye.
Possibility of organ or organ system damage from prolonged exposure; see Section 11 for details.
Target organ(s):

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance
Substance name : 106-99-0

CAS-No. : 106-99-0

Components

Chemical name	Synonym	CAS-No.	Concentration (% w/w)
1,3-butadiene	buta-1,3-diene	106-99-0	>= 99.5 - <= 100

SECTION 4. FIRST-AID MEASURES

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

If inhaled : Call emergency number for your location / facility.
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.

In case of skin contact : 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 : Flush eye with copious quantities of water.
Remove contact lenses, if present and easy to do. Continue rinsing.
If persistent irritation occurs, obtain medical attention.
In the event of frostbite, slowly warm the exposed area by rinsing with warm water.
Transport to the nearest medical facility for additional treatment.

If swallowed : In the unlikely event of ingestion, obtain medical attention immediately.

Most important symptoms and effects, both acute and : High gas concentrations will displace available air; unconsciousness and death may occur suddenly from lack of oxy-

delayed		gen. Rapid release of gases which are liquids under pressure may cause frost burns of exposed tissues (skin, eye) due to evaporative cooling. 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.
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. Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Shut off supply. If not possible and no risk to surroundings, let the fire burn itself out. Carbon dioxide (CO2) Dry chemical Keep containers and surroundings cool with water spray. Large fires should only be fought by properly trained fire fighters.
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). The vapour is heavier than air, spreads along the ground and distant ignition is possible. Contents are under pressure and can explode when exposed to heat or flames. As the vapours become lighter than air, the vapours may reach ignition sources at ground or elevated locations. Hazardous combustion products may include: Carbon monoxide may be evolved if incomplete combustion occurs.
Specific extinguishing methods	:	Standard procedure for chemical fires.
Special protective equipment for firefighters	:	Wear full protective clothing and self-contained breathing apparatus.
Further information	:	Clear fire area of all non-emergency personnel. Keep adjacent containers cool by spraying with water. Use extinguishing measures that are appropriate to local cir-

cumstances and the surrounding environment.
If possible remove containers from the danger zone.
If the fire cannot be extinguished the only course of action is to evacuate immediately.

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. Be ready for fire or possible exposure. Stay upwind and keep out of low areas. 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 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. Observe all relevant local and international regulations.
Methods and materials for containment and cleaning up	:	Allow to evaporate. Attempt to disperse the vapour or to direct its flow to a safe location, for example by using fog sprays. 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. 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. 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. The vapour is heavier than air. Beware of accumulation in pits and confined spaces. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Bulk storage tanks should be diked (bunded). Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. 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.
Avoidance of contact	:	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.
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. Must be stored in a diked (bunded) well- ventilated area, away from sunlight, ignition sources and other sources of heat. Must be kept inhibited during storage and shipment as material can polymerise. Vapours from tanks should not be released to atmosphere. Breathing losses during storage should be controlled by a suitable vapour treatment system. 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. Storage Temperature: Ambient. Nitrogen blanket recommended. 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. Stable under recommended storage conditions.
Packaging material	:	Suitable material: For containers, or container linings use mild steel, stainless steel. Unsuitable material: Copper., Copper alloys., Magnesium., Mercury., Monel., Silver.

Specific end use(s)

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
		PEL	1 ppm	OSHA CARC
		STEL	5 ppm	OSHA CARC
		TWA	1 ppm	OSHA Z-1
		STEL	5 ppm	OSHA Z-1

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
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

Biological occupational exposure limits

No biological limit allocated.

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 Securité, (INRS), France http://www.inrs.fr/accueil

Engineering measures : 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:
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.
Eye washes and showers for emergency use.

General Information
Define procedures for safe handling and maintenance of controls.
Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned.
Practice good housekeeping.
Educate and train workers in the hazards and control measures relevant to normal activities associated with this product.
Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation.
Drain down system prior to equipment break-in or maintenance.
Retain drain downs in sealed storage pending disposal or for subsequent recycle.

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 apparatus. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. All respiratory protection equipment and use must be in accordance with local regulations. 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. Neoprene rubber. Nitrile 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	:	Chemical and cold resistant gloves/gauntlets, boots, and apron.

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

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

9.1 Information on basic physical and chemical properties

Physical state	:	Liquid under pressure.
Colour	:	colourless
Odour	:	aromatic
Odour Threshold	:	1.3 ppm
Freezing point	:	-109 °C Method: Unspecified
Pour point		Method: ASTM D5950 Not applicable
Boiling point/boiling range	:	-4.4 °C Method: Unspecified
Flammability (solid, gas)	:	Extremely flammable.
Upper explosion limit / Upper flammability limit	:	ca. 12 %(V)
Lower explosion limit / Lower flammability limit	:	ca. 2 %(V)
Flash point	:	-79 °C

		Method: Unspecified
Auto-ignition temperature	:	> 325 °C
Decomposition temperature	:	Data not available
pH	:	Data not available
Viscosity		
Viscosity, kinematic	:	0.288 mm2/s (0 °C) Method: Unspecified
		Method: Unspecified Not applicable
		Method: Unspecified Not applicable
Solubility(ies)		
Water solubility	:	slightly soluble
Solubility in other solvents	:	Data not available
Partition coefficient: n-octanol/water	:	Data not available
Vapour pressure	:	Method: Unspecified
		580 kPa (50.0 °C) Method: Unspecified
Relative density	:	1.9
Density	:	620 - 624 kg/m3 (20 °C) Method: Unspecified
Relative vapour density	:	Data not available
Particle characteristics		
Particle size	:	Data not available

9.2 Other information

No data available

SECTION 10. STABILITY AND REACTIVITY

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

Acute toxicity

Components:

1,3-butadiene:

Acute oral toxicity	:	Remarks: No data available
Acute inhalation toxicity	:	LC 50 (Mouse): > 20,000 mg/l Exposure time: 2 h Test atmosphere: gas Method: Literature data 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: No data available

Skin corrosion/irritation

Components:

1,3-butadiene:

Remarks	:	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

Components:

1,3-butadiene:

Remarks : 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

Components:

1,3-butadiene:

Remarks : No data available

Germ cell mutagenicity

Components:

1,3-butadiene:

Genotoxicity in vitro : Method: OECD Test Guideline 471
Remarks: May cause genetic defects.

Method: OECD Test Guideline 473

Method: OECD Test Guideline 476

Genotoxicity in vivo : Species: mice
Method: Test(s) equivalent or similar to OECD Test Guideline 474
Remarks: May cause genetic defects.

Method: OECD Test Guideline 478

Germ cell mutagenicity - Assessment : May cause genetic defects.

Carcinogenicity

Components:

1,3-butadiene:

Species : Mouse, male and female
Application Route : Inhalation
Method : Test(s) equivalent or similar to OECD Test Guideline 453
Remarks : May cause cancer.
OSHA has concluded that there is strong evidence that workplace exposure to butadiene poses an increased risk of death from cancers of the lymphohematopoietic (blood-forming)

system.

Carcinogenicity - Assessment : May cause cancer.

IARC	Group 1: Carcinogenic to humans	
	1,3-butadiene	106-99-0
OSHA	OSHA specifically regulated carcinogen	
	1,3-butadiene	106-99-0
NTP	Known to be human carcinogen	
	1,3-butadiene	106-99-0

Reproductive toxicity

Components:

1,3-butadiene:

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

Reproductive toxicity

STOT - single exposure

Components:

1,3-butadiene:

Remarks : Based on available data, the classification criteria are not met.
Inhalation of vapours or mists may cause irritation to the respiratory system.

STOT - repeated exposure

Components:

1,3-butadiene:

Remarks : Based on available data, the classification criteria are not met.
Blood-forming organs: repeated exposure affects the bone marrow.
Reproductive system: repeated exposure affects the ovaries and testes in mice.

Repeated dose toxicity

Components:

1,3-butadiene:

Species	:	Rat, male and female
Application Route	:	Inhalation
Test atmosphere	:	Gas
Method	:	Test(s) equivalent or similar to OECD Test Guideline 453
Target Organs	:	No specific target organs noted

Aspiration toxicity

Components:

1,3-butadiene:

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

Further information

Components:

1,3-butadiene:

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

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

1,3-butadiene:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 45 mg/l Exposure time: 96 h Method: Based on quantitative structure-activity relationship (QSAR) modelling Remarks: Based on available data, the classification criteria are not met.
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 33 mg/l Exposure time: 48 h Method: Based on quantitative structure-activity relationship (QSAR) modelling Remarks: Based on available data, the classification criteria are not met.
Toxicity to algae/aquatic	:	EC50 (green algae): 33 mg/l

plants		Exposure time: 72 h Method: Based on quantitative structure-activity relationship (QSAR) modelling Remarks: Based on available data, the classification criteria are not met.
Toxicity to fish (Chronic toxicity)	:	Remarks: No data available
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	Remarks: No data available
Toxicity to microorganisms	:	Remarks: No data available

Persistence and degradability

Components:

1,3-butadiene:

Biodegradability	:	Remarks: Not readily biodegradable. Oxidises rapidly by photo-chemical reactions in air.
Photodegradation	:	Remarks: Oxidises rapidly by photo-chemical reactions in air.

Bioaccumulative potential

Components:

1,3-butadiene:

Bioaccumulation	:	Remarks: Does not bioaccumulate significantly.

Mobility in soil

Components:

1,3-butadiene:

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

Other adverse effects

Components:

1,3-butadiene:

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.

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. After draining, vent in a safe place away from sparks and fire. 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
ERG Code	:	116P
Marine pollutant	:	no.

International Regulations

IATA-DGR

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

IMDG-Code

UN number	:	UN 1010
Proper shipping name	:	BUTADIENES, STABILIZED
Class	:	2.1
Packing group	:	Not Assigned
Labels	:	2.1
Marine pollutant	:	no.

Maritime transport in bulk according to IMO instruments

Ship type	:	2G/2PG
Product name	:	Butadiene (all isomers)

Special precautions for user

Not applicable

Additional Information **:** Transport in bulk according to the IGC code
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.

SECTION 15. REGULATORY INFORMATION

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

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

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
1,3-butadiene	106-99-0	10	10

CERCLA Reportable Quantity

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
Carcinogenicity
Germ cell mutagenicity

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 %

Clean Water Act

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

US State Regulations

Massachusetts Right To Know

1,3-butadiene	106-99-0

Pennsylvania Right To Know

1,3-butadiene	106-99-0

California Prop. 65

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

California List of Hazardous Substances

1,3-butadiene	106-99-0

California Regulated Carcinogens

1,3-butadiene	106-99-0

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

TSCA : All components 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
ACGIH / TWA	:	8-hour, time-weighted average
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

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; 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 Harmonised System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; 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 Organisation; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardisation; 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; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organisation 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; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; 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

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 date base, EC 1272 regulation, etc).

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