SAFETY DATA SHEET

According to OSHA Hazard Communication Standard, 29 CFR 1910.1200

C Butene

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SECTION 1. IDENTIFICATION

Product name : C Butene

Product code : V1499

Synonyms : Butylene, alpha-; Ethyl ethylene; SHOP C4 Olefin

CAS-No. : 106-98-9

Manufacturer or supplier's details

Company : **Shell Chemical LP**
PO Box 576
HOUSTON TX 77001
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)

Flammable gases : Category 1

Gases under pressure : Liquefied gas

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:
Not classified as a health hazard under GHS criteria.
ENVIRONMENTAL HAZARDS:
Not classified as an environmental hazard under GHS criteria.

Precautionary statements :

Prevention:

P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P243 Take precautionary measures against static discharge.

Response:

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 Eliminate all ignition sources if safe to do so.

Storage:

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

Disposal:

No precautionary phrases.

Other hazards

This product is a simple asphyxiant.

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.
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.
This material is shipped under pressure.
High gas concentrations will displace available air; unconsciousness and death may occur suddenly from lack of oxygen.
Exposure to rapidly expanding gases may cause frost burns to eyes and/or skin.
Inhalation of vapours or mists may cause irritation to the respiratory system.
Vapours may cause drowsiness and dizziness.
The classification of this material is based on OSHA HCS 2012 criteria.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Hazardous components

Chemical name	Synonyms	CAS-No.	Concentration (% w/w)
but-1-ene	but-1-ene	106-98-9	<= 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	:	Slowly warm the exposed area by rinsing with warm water. Transport to the nearest medical facility for additional treatment.
In case of eye contact	:	Slowly warm the exposed area by rinsing with warm water. Transport to the nearest medical facility for additional treatment.
If swallowed	:	In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.
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. Rapid release of gases which are liquids under pressure may cause frost burns of exposed tissues (skin, eye) due to evaporative cooling. No specific hazards under normal use conditions. Ingestion may result in nausea, vomiting and/or diarrhoea.
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	:	IMMEDIATE TREATMENT IS EXTREMELY IMPORTANT! Artificial respiration and/or oxygen may be necessary. Call a doctor or poison control center for guidance. Treat symptomatically. Potential for cardiac sensitisation, particularly in abuse situations. Hypoxia or negative inotropes may enhance these effects. Consider: oxygen therapy. Narcotic at high vapour concentrations.

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.
Unsuitable extinguishing media	:	Do not use water in a jet.
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.
Specific extinguishing methods	:	Standard procedure for chemical fires.
Further information	:	Clear fire area of all non-emergency personnel. 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).

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Observe the relevant local and international regulations Risk of explosion. Inform the emergency services if liquid enters surface water drains. 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 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. Attempt to disperse the vapour or to direct its flow to a safe location, for example by using fog sprays. Otherwise treat as for small spillage.
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.

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.
Advice on safe handling	:	Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Avoid inhaling vapour and/or mists. Avoid contact with skin, eyes and clothing. 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.

The vapour is heavier than air. Beware of accumulation in pits and confined spaces.

Avoidance of contact : Strong oxidising agents.

Product Transfer : Refer to guidance under Handling section.

Further information on storage stability : Keep away from aerosols, flammables, oxidizing agents, corrosives and from products 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.
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.

Packaging material : Suitable material: For containers, or container linings use mild steel, stainless steel.

Container Advice : Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.

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 AND PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
but-1-ene	106-98-9	TWA	250 ppm	ACGIH

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 : 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.
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:
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.
Define procedures for safe handling and maintenance of controls.
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.
Purge system prior to equipment break-in or maintenance.

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.
If air-filtering respirators are suitable for conditions of use: Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.

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. 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	:	Chemical and cryogenic gloves/gauntlets, boots, and apron. Wear antistatic and flame-retardant clothing.
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	:	Gas., Liquid under pressure.
Colour	:	colourless
Odour	:	Mild hydrocarbon
Odour Threshold	:	Data not available
pH	:	Data not available
Melting / freezing point	:	-185 °C / -301 °F
Boiling point/boiling range	:	-6.3 °C / 20.7 °F
Flash point	:	-79 °C / -110 °F
Evaporation rate	:	Data not available
Flammability		
Flammability (solid, gas)	:	Extremely flammable.
Lower explosion limit and upper explosion limit / flammability limit		
Upper explosion limit / upper flammability limit	:	10 %(V)
Lower explosion limit / Lower flammability limit	:	1.6 %(V)
Vapour pressure	:	255 kPa (21 °C / 70 °F)
Relative vapour density	:	1.93

Relative density	:	0.588 Method: ASTM D4052
Density	:	588 kg/m3 (25 °C / 77 °F) Method: ASTM D4052 Liquid at saturation pressure.
Solubility(ies)		
Water solubility	:	220 mg/l (22 °C / 72 °F)
Partition coefficient: n-octanol/water	:	log Pow: 2.4
Auto-ignition temperature	:	385 °C / 725 °F
Decomposition temperature	:	Data not available
Viscosity		
Viscosity, dynamic	:	0.156 mPa.s (20 °C / 68 °F) Method: ASTM D445
Viscosity, kinematic	:	ca. 0.265 mm2/s Method: ASTM D445
Explosive properties	:	Material that is readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures.
Oxidizing properties	:	Data not available
Surface tension	:	13.1 mN/m
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 semi-conductive, 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	:	56 g/mol
Particle size	:	Data not available

SECTION 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	:	Stable under normal conditions of use.

Possibility of hazardous reactions	:	Reacts violently with strong oxidising agents. Polymerisation may occur at elevated temperatures.
Conditions to avoid	:	Heat, flames, and sparks. Exposure to air. In certain circumstances product can ignite due to static electricity.
Incompatible materials	:	Strong oxidising agents.
Hazardous decomposition products	:	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.

SECTION 11. TOXICOLOGICAL INFORMATION

Basis for assessment	:	Information given is based on product data and on data on the components and the toxicology of similar products. 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
Inhalation is the primary route of exposure.

Acute toxicity

Components:

but-1-ene:

Acute inhalation toxicity	:	LC 50 (Rat, male): > 2500 - <= 20000 ppm Exposure time: 4 h Test atmosphere: gas Method: OECD Test Guideline 403 Remarks: Information given is based on data obtained from similar substances. Based on available data, the classification criteria are not met.

Skin corrosion/irritation

Components:

but-1-ene:
Remarks: Based on available data, the classification criteria are not met.

Serious eye damage/eye irritation

Components:

but-1-ene:
Remarks: Based on available data, the classification criteria are not met.

Respiratory or skin sensitisation

Components:

but-1-ene:
Remarks: Based on available data, the classification criteria are not met.

Germ cell mutagenicity

Components:

but-1-ene:

Genotoxicity in vitro	:	Method: Literature data Remarks: Based on available data, the classification criteria are not met.
	:	Method: OECD Test Guideline 473 Remarks: Based on available data, the classification criteria are not met.
Germ cell mutagenicity- Assessment	:	This product does not meet the criteria for classification in categories 1A/1B.

Carcinogenicity

Components:

but-1-ene:
Remarks: Based on available data, the classification criteria are not met.

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

IARC	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.
NTP	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Components:

but-1-ene:

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: Rat, female
Application Route: Inhalation
Method: OECD Test Guideline 414
Remarks: Information given is based on data obtained from similar substances., 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

Components:

but-1-ene:
Remarks: Inhalation of vapours or mists may cause irritation to the respiratory system., Based on available data, the classification criteria are not met.

STOT - repeated exposure

Components:

but-1-ene:
Remarks: Based on available data, the classification criteria are not met.

Repeated dose toxicity

Components:

but-1-ene:
Species: rat, male and female
Application Route: Inhalation
Test atmosphere: Gas
Method: OECD Test Guideline 422
Target Organs: No specific target organs noted

Aspiration toxicity

Components:

but-1-ene:
Based on available data, the classification criteria are not met.

Further information

Components:

but-1-ene:
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

Components:

but-1-ene:

Toxicity to fish (Acute toxicity) : LC50: 19 mg/l
Exposure time: 96 h
Method: Based on quantitative structure-activity relationship (QSAR) modelling
Remarks: LL/EL/IL50 10-100 mg/l

Toxicity to daphnia and other aquatic invertebrates (Acute toxicity) : LC50 (Daphnia (water flea)): 16 mg/l
Exposure time: 48 h
Method: Based on quantitative structure-activity relationship (QSAR) modelling
Remarks: LL/EL/IL50 10-100 mg/l

Toxicity to algae (Acute toxicity) : EC50 (green algae): 6.9 mg/l
Exposure time: 96 h
Method: Based on quantitative structure-activity relationship (QSAR) modelling
Remarks: LL/EL/IL50 1-10 mg/l

Toxicity to fish (Chronic toxicity) : Chronic Toxicity Value: 2 mg/l
Exposure time: 30 d
Method: Based on quantitative structure-activity relationship (QSAR) modelling

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : Chronic Toxicity Value (Daphnia (water flea)): 1.6 mg/l
Method: Based on quantitative structure-activity relationship (QSAR) modelling

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

Persistence and degradability

Components:

but-1-ene:

Biodegradability : Method: Based on quantitative structure-activity relationship (QSAR) modelling
Remarks: Readily biodegradable.

Oxidises rapidly by photo-chemical reactions in air.

Bioaccumulative potential

Components:

but-1-ene:

Bioaccumulation : Remarks: Does not bioaccumulate significantly.

Mobility in soil

Components:

but-1-ene:

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

Other adverse effects

Components:

but-1-ene:

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.

MARPOL - see International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) which provides technical aspects at controlling pollutions from ships.

Contaminated packaging : Data not available

SECTION 14. TRANSPORT INFORMATION

National Regulations

US Department of Transportation Classification (49 CFR Parts 171-180)

UN/ID/NA number	:	UN 1075
Proper shipping name	:	PETROLEUM GASES, LIQUEFIED
Class	:	2.1
Packing group	:	Not Assigned
Labels	:	2.1
ERG Code	:	115
Marine pollutant	:	no
Remarks	:	NON ODORIZED

International Regulations

IATA-DGR

UN/ID No.	:	UN 1012
Proper shipping name	:	Butylene
Class	:	2.1
Packing group	:	Not Assigned
Labels	:	2.1

IMDG-Code

UN number	:	UN 1012
Proper shipping name	:	BUTYLENE
Class	:	2.1
Packing group	:	Not Assigned
Labels	:	2.1
Marine pollutant	:	no

Maritime transport in bulk according to IMO instruments

Pollution category	:	Not applicable
Ship type	:	Not applicable
Product name	:	Not applicable

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.
The corrosiveness of the gas does not exceed the limitations

for classification 1 of the ASTM Copper Strip Classifications when tested in accordance with ASTM D 1838

SECTION 15. REGULATORY INFORMATION

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

*: This material does not contain any components with a CERCLA RQ.

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

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

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

Pennsylvania Right To Know

but-1-ene	106-98-9

California Prop. 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

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:

AIIC	:	Listed
DSL	:	Listed
IECSC	:	Listed
ENCS	:	Listed
KECI	:	Listed
NZIoC	:	Listed

PICCS	:	Listed
TSCA	:	Listed
TCSI	:	Listed

SECTION 16. OTHER INFORMATION

Further information

NFPA Rating (Health, Fire, Reactivity): 2, 4, 1

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
ACGIH / TWA	:	8-hour, time-weighted average
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.

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	:	06/16/2023

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