

**Danger**



### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1. Product identifier

Trade name : Butadiene 1,3  
SDS no : SDS-013-CLP  
Chemical description : Butadiene 1,3  
CAS-No. : 106-99-0  
EC-No. : 203-450-8  
EC Index-No. : 601-013-00-X  
Registration-No. : 01-2119471988-16  
Chemical formula : C<sub>4</sub>H<sub>6</sub>

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.  
Test gas/Calibration gas.  
Laboratory use.  
Chemical reaction / Synthesis.  
Contact supplier for more information on uses.

Uses advised against : Consumer use.

#### 1.3. Details of the supplier of the safety data sheet

Company identification : Air Liquide UK Ltd  
Station Road, Coleshill  
Birmingham, B46 1JY

E-Mail address (competent person) : david.hopper@airliquide.com

#### 1.4. Emergency telephone number

Emergency telephone number : 01675 462695 (Available 24/7)

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

##### Classification according to Regulation (EC) No. 1272/2008 [CLP]

Physical hazards	Flammable gases, Category 1	H220
	Gases under pressure : Liquefied gas	H280
Health hazards	Germ cell mutagenicity, Category 1B	H340
	Carcinogenicity, Category 1A	H350

#### 2.2. Label elements

##### Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



Signal word (CLP) :

Danger

Hazard statements (CLP) :

H340 - May cause genetic defects.  
 H350 - May cause cancer.  
 H220 - Extremely flammable gas.  
 H280 - Contains gas under pressure; may explode if heated.

Precautionary statements (CLP)

- Prevention : P201 - Obtain special instructions before use.  
 P202 - Do not handle until all safety precautions have been read and understood.  
 P280 - Wear protective gloves/protective clothing/eye protection/face protection.  
 P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- 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 : P405 - Store locked up.  
 P403 - Store in a well-ventilated place.  
 P410+P403 - Protect from sunlight. Store in a well-ventilated place.
- Disposal considerations : P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

**2.3. Other hazards**

: None.

**SECTION 3: Composition/information on ingredients**

**3.1. Substances**

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Butadiene 1,3	(CAS-No.) 106-99-0 (EC-No.) 203-450-8 (EC Index-No.) 601-013-00-X (Registration-No.) 01-2119471988-16	100	Flam. Gas 1, H220 Press. Gas (Liq.), H280 Muta. 1B, H340 Carc. 1A, H350

*Contains no other components or impurities which will influence the classification of the product.*

**3.2. Mixtures**

: Not applicable

**SECTION 4: First aid measures**

**4.1. Description of first aid measures**

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.
- Skin contact : Adverse effects not expected from this product.

- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.

**4.2. Most important symptoms and effects, both acute and delayed**

- : In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation.
- In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination.

**4.3. Indication of any immediate medical attention and special treatment needed**

- : None.

**SECTION 5: Firefighting measures****5.1. Extinguishing media**

- Suitable extinguishing media : Water spray or fog.  
Dry powder.
- Unsuitable extinguishing media : Do not use water jet to extinguish.  
Carbon dioxide.

**5.2. Special hazards arising from the substance or mixture**

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : Incomplete combustion may form carbon monoxide.

**5.3. Advice for firefighters**

- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.  
If possible, stop flow of product.  
Use water spray or fog to knock down fire fumes if possible.  
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.  
Move containers away from the fire area if this can be done without risk.
- Special protective equipment for fire fighters : In confined space use self-contained breathing apparatus.  
Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.  
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.  
Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.

**SECTION 6: Accidental release measures****6.1. Personal precautions, protective equipment and emergency procedures**

- : Try to stop release.
- Evacuate area.
- Monitor concentration of released product.
- Consider the risk of potentially explosive atmospheres.
- Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
- Eliminate ignition sources.
- Ensure adequate air ventilation.
- Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
- Act in accordance with local emergency plan.
- Stay upwind.

### **6.2. Environmental precautions**

- : Try to stop release.

### **6.3. Methods and material for containment and cleaning up**

- : Ventilate area.
- Keep area evacuated and free from ignition sources until any spilled liquid has evaporated (ground free from frost).

### **6.4. Reference to other sections**

- : See also sections 8 and 13.

## **SECTION 7: Handling and storage**

### **7.1. Precautions for safe handling**

Safe use of the product

- : Do not breathe gas.
- Avoid release of product into atmosphere.
- The product must be handled in accordance with good industrial hygiene and safety procedures.
- Only experienced and properly instructed persons should handle gases under pressure.
- Consider pressure relief device(s) in gas installations.
- Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Do not smoke while handling product.
- Avoid exposure, obtain special instructions before use.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Avoid suck back of water, acid and alkalis.
- Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment.
- Purge air from system before introducing gas.
- Take precautionary measures against static discharge.
- Keep away from ignition sources (including static discharges).
- Consider the use of only non-sparking tools.

Safe handling of the gas receptacle : Refer to supplier's container handling instructions.

- Do not allow backfeed into the container.
- Protect cylinders from physical damage; do not drag, roll, slide or drop.
- When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
- Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
- If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.
- Never attempt to repair or modify container valves or safety relief devices.
- Damaged valves should be reported immediately to the supplier.
- Keep container valve outlets clean and free from contaminants particularly oil and water.
- Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
- Close container valve after each use and when empty, even if still connected to equipment.
- Never attempt to transfer gases from one cylinder/container to another.
- Never use direct flame or electrical heating devices to raise the pressure of a container.
- Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

**7.2. Conditions for safe storage, including any incompatibilities**

: Observe all regulations and local requirements regarding storage of containers.

- Containers should not be stored in conditions likely to encourage corrosion.
- Container valve guards or caps should be in place.
- Containers should be stored in the vertical position and properly secured to prevent them from falling over.
- Stored containers should be periodically checked for general condition and leakage.
- Keep container below 50°C in a well ventilated place.
- Store containers in location free from fire risk and away from sources of heat and ignition.
- Keep away from combustible materials.
- Segregate from oxidant gases and other oxidants in store.
- All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.

**7.3. Specific end use(s)**

: None.

**SECTION 8: Exposure controls/personal protection**

**8.1. Control parameters**

Butadiene 1,3 (106-99-0)	
United Kingdom - Occupational Exposure Limits	
WEL TWA (mg/m³)	22 mg/m³
WEL TWA (ppm)	10 ppm

Butadiene 1,3 (106-99-0)	
DNEL: Derived no effect level (Workers)	
Long-term - systemic effects, inhalation	2.21 mg/m³ 1 ppm
Long-term - local effects, dermal	324 mg/kg bw/day

**8.2. Exposure controls**

**8.2.1. Appropriate engineering controls**

- : Product to be handled in a closed system and under strictly controlled conditions.
- Provide adequate general and local exhaust ventilation.
- Preferably use permanent leak-tight installations (e.g. welded pipes).
- Systems under pressure should be regularly checked for leakages.
- Ensure exposure is below occupational exposure limits (where available).
- Gas detectors should be used when flammable gases/vapours may be released.
- Consider the use of a work permit system e.g. for maintenance activities.

**8.2.2. Individual protection measures, e.g. personal protective equipment**

- : A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered:
  - Protect eyes, face and skin from liquid splashes.
  - PPE compliant to the recommended EN/ISO standards should be selected.

## • Eye/face protection

- : Wear safety glasses with side shields.
- Wear goggles when transfilling or breaking transfer connections.
- Standard EN 166 - Personal eye-protection - specifications.

## • Skin protection

## - Hand protection

- : Wear working gloves when handling gas containers.
- Standard EN 388 - Protective gloves against mechanical risk.
- Wear chemically resistant protective gloves.
- Standard EN 374 - Protective gloves against chemicals.
- Permeation time: minimum >30min short term exposure: material / thickness [mm] Butyl rubber (IIR) 0,7.
- Permeation time: minimum >480min long term exposure: material / thickness [mm] Fluoroelastomer (FKM) 0,4.
- Consult glove manufacturer's product information on material suitability and material thickness.
- The breakthrough time of the selected gloves must be greater than the intended use period.

## - Other

- : Consider the use of flame resistant anti-static safety clothing.
- Standard EN ISO 14116 - Limited flame spread materials.
- Standard EN 1149-5 - Protective clothing: Electrostatic properties.
- Wear safety shoes while handling containers.
- Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

## • Respiratory protection

- : Gas filters may be used if all surrounding conditions e.g. type and concentration of the contaminant(s) and duration of use are known.
- Use gas filters with full face mask, where exposure limits may be exceeded for a short-term period, e.g. connecting or disconnecting containers.
- Recommended: Filter AX (brown).
- Consult respiratory device supplier's product information for the selection of the appropriate device.
- Gas filters do not protect against oxygen deficiency.
- Standard EN 14387 - Gas filter(s), combined filter(s) and standard EN136, full face masks .
- Keep self contained breathing apparatus readily available for emergency use.
- Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
- Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.

## • Thermal hazards

- : None necessary.

**8.2.3. Environmental exposure controls**

- : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

**SECTION 9: Physical and chemical properties**

**9.1. Information on basic physical and chemical properties**

## Appearance

- Physical state at 20°C / 101.3kPa : Gas
- Colour : Colourless.

Odour : Mildly aromatic. Poor warning properties at low concentrations.

Odour threshold : Odour threshold is subjective and inadequate to warn of overexposure.

pH : Not applicable.

Melting point / Freezing point : -109 °C

Boiling point : -4.5 °C

Flash point : Not applicable for gases and gas mixtures.

Evaporation rate : Not applicable for gases and gas mixtures.

Flammability (solid, gas) :

Explosive limits : 1.4 - 16.3 vol %

Vapour pressure [20°C] : 2.4 bar(a)

Vapour pressure [50°C] : 5.7 bar(a)

Relative density, liquid (water=1) : 0.65

Relative density, gas (air=1) : 1.9

Water solubility : 1025 mg/l

Partition coefficient n-octanol/water (Log Kow) : 1.99

Auto-ignition temperature : 415 °C

Viscosity : Not applicable.

Explosive properties : Not applicable.

Oxidising properties : None.

**9.2. Other information**

Molar mass : 54 g/mol

Critical temperature [°C] : 152 °C

Other data : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

**SECTION 10: Stability and reactivity****10.1. Reactivity**

: No reactivity hazard other than the effects described in sub-sections below.

**10.2. Chemical stability**

: Stable under normal conditions.

May polymerise.

Inhibitor usually added.

**10.3. Possibility of hazardous reactions**

: May react violently with oxidants.

Can form explosive mixture with air.

**10.4. Conditions to avoid**

: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

**10.5. Incompatible materials**

: Air, Oxidisers.

For additional information on compatibility refer to ISO 11114.

**10.6. Hazardous decomposition products**

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

**SECTION 11: Toxicological information****11.1. Information on toxicological effects**

<b>Acute toxicity</b>	: No known toxicological effects from this product.
<b>Skin corrosion/irritation</b>	: No known effects from this product.
<b>Serious eye damage/irritation</b>	: No known effects from this product.
<b>Respiratory or skin sensitisation</b>	: No known effects from this product.
<b>Germ cell mutagenicity</b>	: May have mutagenic effect.
<b>Carcinogenicity</b>	: May have carcinogenic effect.
<b>Toxic for reproduction : Fertility</b>	: No known effects from this product.
<b>Toxic for reproduction : unborn child</b>	: No known effects from this product.
<b>STOT-single exposure</b>	: No known effects from this product.
<b>STOT-repeated exposure</b>	: No known effects from this product.
<b>Aspiration hazard</b>	: Not applicable for gases and gas mixtures.

**SECTION 12: Ecological information****12.1. Toxicity**

EC50 48h - Daphnia magna [mg/l]	: 24 mg/l
EC50 72h - Algae [mg/l]	: 11 mg/l
LC50 96 h - Fish [mg/l]	: 43 mg/l

**12.2. Persistence and degradability**

Assessment : Not readily biodegradable.

**12.3. Bioaccumulative potential**

Assessment : Not expected to bioaccumulate due to the low log Kow (log Kow < 4).  
Refer to section 9.

**12.4. Mobility in soil**

Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution.

**12.5. Results of PBT and vPvB assessment**

Assessment : Not classified as PBT or vPvB.

**12.6. Other adverse effects**

Effect on the ozone layer : None.  
Effect on global warming : No known effects from this product.

**SECTION 13: Disposal considerations**



**13.1. Waste treatment methods**

Must not be discharged to atmosphere.  
Ensure that the emission levels from local regulations or operating permits are not exceeded.  
Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org> for more guidance on suitable disposal methods.

List of hazardous waste codes (from Commission Decision 2000/532/EC as amended)

: 16 05 04 \*: Gases in pressure containers (including halons) containing hazardous substances.

**13.2. Additional information**

: None.

**SECTION 14: Transport information****14.1. UN number**

UN-No. : 1010

**14.2. UN proper shipping name**

Transport by road/rail (ADR/RID) : BUTADIENES, STABILIZED

Transport by air (ICAO-TI / IATA-DGR) : Butadienes, stabilized

Transport by sea (IMDG) : BUTADIENES, STABILIZED

**14.3. Transport hazard class(es)**

Labelling :



2.1 : Flammable gases.

**Transport by road/rail (ADR/RID)**

Class : 2

Classification code : 2F

Hazard identification number : 239

Tunnel Restriction : B/D - Tank carriage : Passage forbidden through tunnels of category B, C, D and E. Other carriage : Passage forbidden through tunnels of category D and E

**Transport by air (ICAO-TI / IATA-DGR)**

Class / Div. (Sub. risk(s)) : 2.1

**Transport by sea (IMDG)**

Class / Div. (Sub. risk(s)) : 2.1

Emergency Schedule (EmS) - Fire : F-D

Emergency Schedule (EmS) - Spillage : S-U

**14.4. Packing group**

Transport by road/rail (ADR/RID) : Not applicable

Transport by air (ICAO-TI / IATA-DGR) : Not applicable

Transport by sea (IMDG) : Not applicable

**14.5. Environmental hazards**

Transport by road/rail (ADR/RID) : None.

Transport by air (ICAO-TI / IATA-DGR) : None.

Transport by sea (IMDG) : None.

**14.6. Special precautions for user****Packing Instruction(s)**

Transport by road/rail (ADR/RID) : P200

Transport by air (ICAO-TI / IATA-DGR)

Passenger and Cargo Aircraft : Forbidden.

Cargo Aircraft only : 200.

Transport by sea (IMDG) : P200

Special transport precautions

: Avoid transport on vehicles where the load space is not separated from the driver's compartment.

Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.

Before transporting product containers:

- Ensure there is adequate ventilation.
- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.

**14.7. Transport in bulk according to Annex II of Marpol and the IBC Code**

: Not applicable.

**SECTION 15: Regulatory information****15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****EU-Regulations**Restrictions on use : Restricted to professional users (Annex XVII REACH).  
Shall not be used as aerosol propellant (Annex XVII REACH).

Other information, restriction and prohibition regulations : Ensure all national/local regulations are observed.

Seveso Directive : 2012/18/EU (Seveso III) : Listed.

**National regulations**

No additional information available

**15.2. Chemical safety assessment**: A CSA has been carried out.  
Refer to section 8.2.**SECTION 16: Other information**

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 2015/830.

Training advice : Ensure operators understand the flammability hazard.  
The hazard of asphyxiation is often overlooked and must be stressed during operator training.  
Ensure operators understand the toxicity hazard.  
Users of breathing apparatus must be trained.

Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.

DISCLAIMER OF LIABILITY

: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.

Details given in this document are believed to be correct at the time of going to press.

Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.