

1.3 Butadiene**013****SECTION 1. Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Trade name : 1.3 Butadiene , 1.3 BUTADIEN (N25)
SDS no : 013
Chemical description : Butadiene 1,3
CAS No :106-99-0
EC No :203-450-8
Index No :601-013-00-X
Registration-No. : 01-2119471988-16-
Chemical formula : C4H6

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. Chemical reaction / Synthesis. Laboratory use.
Contact supplier for more uses information.
Uses advised against : Consumer use.

1.3. Details of the supplier of the safety data sheet

Company identification : AIR LIQUIDE Deutschland GmbH
Hans-Günther-Sohl-Straße 5
D-40235 Düsseldorf GERMANY
Telefon: +49 (0)211 6699-0 - Fax: +49 (0)211 6699-222
E-Mail address (competent person) : Info.SDB@AirLiquide.de

1.4. Emergency telephone number

Emergency telephone number : +49 (0)2151 398668
- Availability : (24 / 7)

SECTION 2. Hazards identification**2.1. Classification of the substance or mixture****Hazard Class and Category Code(s), Regulation (EC) No 1272/2008 (CLP)**

- Health hazards : Germ cell mutagenicity - Category 1B - Danger - (CLP : Muta. 1B) - H340
Carcinogenicity - Category 1A - Danger - (CLP : Carc. 1A) - H350
- Physical hazards : Flammable gases - Category 1 - Danger - (CLP : Flam. Gas 1) - H220
Gases under pressure - Liquefied gas - Warning - (CLP : Press. Gas) - H280

2.2. Label elements**Labelling Regulation EC 1272/2008 (CLP)**

- Hazard pictograms



- Hazard pictograms code : GHS02 - GHS08 - GHS04
- Signal words : Danger
- Hazard statements : H220 - Extremely flammable gas.
H280 - Contains gas under pressure; may explode if heated.
H350 - May cause cancer.
H340 - May cause genetic defects.
- Precautionary statements



SAFETY DATA SHEET in accordance with REACH regulation 1907/2006/EC

Page : 2 / 10

Revised edition no : 2 - 03

Date : 18 / 7 / 2016

Supersedes : 22 / 9 / 2010

1.3 Butadiene

013

SECTION 2. Hazards identification (continued)

- Prevention : P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.
No smoking.
P202 - Do not handle until all safety precautions have been read and understood.
- Response : P308+P313 - If exposed or concerned : get medical advice.
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 - Eliminate all ignition sources if safe to do so.
- Storage : P403 - Store in a well-ventilated place.
P405 - Store locked up.

2.3. Other hazards

Other hazards : None.

SECTION 3. Composition/information on ingredients

3.1. Substance / 3.2. Mixture

Substance.

Substance name	Content [Vol-%]	CAS No EC No Index No Registration no.	Classification(DSD)	Classification(CLP)
Butadiene 1,3	100 %	106-99-0 203-450-8 601-013-00-X 01-2119471988-16-		Flam. Gas 1 (H220) Carc. 1A (H350) Muta. 1B (H340) Liq. Gas (H280)

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

* 1: Listed in Annex IV / V REACH, exempted from registration.

* 2: Registration deadline not expired.

* 3: Registration not required: Substance manufactured or imported < 1t/y

Full text of R-phrases see chapter 16. Full text of H-statements see chapter 16

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. Apply artificial respiration 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.

1.3 Butadiene**013****SECTION 5. Fire-fighting measures****5.1. Extinguishing media**

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

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 : Move containers away from the fire area if this can be done without risk.
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
If possible, stop flow of product.
Use fire control measures appropriate to 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.
Use water spray or fog to knock down fire fumes if possible.
- Special protective equipment for fire fighters : In confined space use self-contained breathing apparatus.
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**

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

6.2. Environmental precautions

- : Try to stop release.

6.3. Methods and material for containment and cleaning up

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

6.4. Reference to other sections

- Reference to other sections : See also sections 8 and 13.

1.3 Butadiene**013****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.
- Take precautionary measures against static discharge.
- Keep away from ignition sources (including static discharges).
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Purge air from system before introducing gas.
- Avoid exposure, obtain special instructions before use.
- Do not smoke while handling product.
- Avoid suck back of water, acid and alkalis.
- Only experienced and properly instructed persons should handle gases under pressure.
- Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Assess the risk of potentially explosive atmosphere and the need for explosion-proof equipment.
- Consider the use only non-sparking tools.
- The product must be handled in accordance with good industrial hygiene and safety procedures.
- Consider pressure relief device(s) in gas installations.

Safe handling of the gas receptacle

- : Refer to supplier's container handling instructions.
- Do not allow backfeed into the container.
- Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
- Protect cylinders from physical damage; do not drag, roll, slide or drop.
- Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.
- 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.
- Close container valve after each use and when empty, even if still connected to equipment.
- Never attempt to repair or modify container valves or safety relief devices.
- Keep container valve outlets clean and free from contaminants particularly oil and water.
- 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.
- Damaged valves should be reported immediately to the supplier.

7.2. Conditions for safe storage, including any incompatibilities

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

7.3. Specific end use(s)

- : None.

1.3 Butadiene**013****SECTION 8. Exposure controls/personal protection****8.1. Control parameters****Occupational Exposure Limits****Butadiene 1,3**

- : AGW (8h) - Germany [mg/m³] TRGS 900 : 11 AGW exposure limit for orientation: former MAK-value 01/2004; listed in checklist TRGS 900 of UAIII
- : AGW (8h) - Germany [ppm] TRGS 900 : 5 AGW exposure limit for orientation: former MAK-value 01/2004; listed in checklist TRGS 900 of UAIII
- : Exceeding factor AGW - Germany TRGS 900 : 4 For orientation: former value 01/2004; listed in checklist TRGS 900 of UAIII

PNEC: Predicted no effect concentration

- : No data available.

8.2. Exposure controls**8.2.1. Appropriate engineering controls**

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

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. PPE compliant to the recommended EN/ISO standards should be selected.

• Eye/face protection

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

• Skin protection**- Hand protection**

- : Standard EN 374 - Protective gloves against chemicals. Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk. Wear chemically resistant protective gloves.
Permeation time: minimum >480min long term exposure; material / thickness [mm]:
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.
Butyl rubber (IIR) / 0,7
Fluoroelastomer (FKM) / 0,4
Permeation time: minimum >30min short term exposure; material / thickness [mm]:

- Other

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

• Respiratory protection

- : Keep self contained breathing apparatus readily available for emergency use. Use gas filters and full face mask, where exposure limits may be exceeded for a short-term period, e.g. connecting or disconnecting containers. Gas filters do not protect against oxygen deficiency. Gas filters may be used if all surrounding conditions e.g. type and concentration of the contaminant(s) and duration of use are known.
Standard EN 14387 - Gas filter(s), combined filter(s) and full face mask - EN 136.
Consult respiratory device supplier's product information for the selection of the appropriate device.
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

1.3 Butadiene**013****SECTION 8. Exposure controls/personal protection (continued)**

- Thermal hazards : None necessary.
- 8.2.3. Environmental exposure controls : expected, e.g. during maintenance activities on installation systems.
Recommended: Filter AX (brown).
: 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 for overexposure.
- pH value** : Not applicable.
- Molar mass [g/mol]** : 54
- Melting point [°C]** : -109
- Boiling point [°C]** : -4.5
- Critical temperature [°C]** : 152
- Flash point [°C]** : Not applicable for gases and gas-mixtures.
- Evaporation rate (ether=1)** : Not applicable for gases and gas-mixtures.
- Flammability range [vol% in air]** : 1.4 to 16.3
- Vapour pressure [20°C]** : 2.4 bar
- Relative density, gas (air=1)** : 1.9
- Relative density, liquid (water=1)** : 0.65
- Solubility in water [mg/l]** : 1025
- Partition coefficient n-octanol/water [log Pow]** : 1.99
- Auto-ignition temperature [°C]** : 415
- Viscosity at 20°C [mPa.s]** : Not applicable.
- Explosive Properties** : Not applicable.
- Oxidising properties** : None.

9.2. Other information

- 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

- : May polymerise.
Stable under normal conditions.
Inhibitor usually added.

1.3 Butadiene**013****SECTION 10. Stability and reactivity (continued)****10.3. Possibility of hazardous reactions**

- : Can form explosive mixture with air.
- May react violently with oxidants.

10.4. Conditions to avoid

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

10.5. Incompatible materials

- : Air, Oxidiser.
- 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**

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

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

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

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

- : Not classified as PBT or vPvB.

1.3 Butadiene**013****SECTION 12. Ecological information (continued)****12.6. Other adverse effects**

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

SECTION 13. Disposal considerations**13.1. Waste treatment methods**

: Must not be discharged to atmosphere.
Refer to the code of practice of EIGA (Doc. 30/10 "Disposal of Gases, downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods
Ensure that the emission levels from local regulations or operating permits are not exceeded.

List of hazardous waste codes (from Commission Decision 2001/118/EC) : 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

13.2. Additional information

: None.

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

UN number : 1010
Labelling ADR, IMDG, IATA



: 2.1 : flammable gas.

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : BUTADIENE, STABILIZED
Transport by air (ICAO-TI / IATA-DGR) : BUTADIENE, STABILIZED
Transport by sea (IMDG) : BUTADIENE, STABILIZED

14.3. Transport hazard class(es)

Transport by road/rail (ADR/RID)
Class : 2
Classification code : 2 F
H.I. nr : 239
Tunnel Restriction : B/D Tank carriage: Passage forbidden through tunnels of category B, C, D
Transport by air (ICAO-TI / IATA-DGR)
Transport by sea (IMDG)
Emergency Schedule (EmS) - Fire : F-D
Emergency Schedule (EmS) - Spillage : S-U

14.4. Packing group

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



SAFETY DATA SHEET in accordance with REACH regulation 1907/2006/EC

Page : 9 / 10

Revised edition no : 2 - 03

Date : 18 / 7 / 2016

Supersedes : 22 / 9 / 2010

1.3 Butadiene

013

SECTION 14. Transport information (continued)

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) : No

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 : DO NOT LOAD IN PASSENGER AIRCRAFT.

Cargo Aircraft only : Allowed.

Packing instruction - Cargo Aircraft only : 200

Transport by sea (IMDG) : P200

Special precautions for user : - Ensure there is adequate ventilation.
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 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.
Avoid transport on vehicles where the load space is not separated from the driver's compartment.

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

Transport in bulk according to Annex II of MARPOL 73/78 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 legislation

Restrictions on use : Restricted to professional users (Annex XVII REACH).
Shall not be used as aerosol propellant (Annex XVII REACH)

Seveso directive 96/82/EC : Listed.

National legislation

: Ensure all national/local regulations are observed.

: [German regulations]

BetriebssicherheitsV mit TRBSen insbesondere TRBS 3145 / TRGS 725 "Ortsbewegliche Druckgasbehälter", TRBS 2141, BGR Regel 500 Teil 2.33: "Umgang mit Gasen", GefahrstoffV mit Technischen Regeln Gefährliche Stoffe TRGS insbesondere TRGS 407 "Tätigkeiten mit Gasen - Gefährdungsbeurteilung", TRGS 400, 500, 510, 900.
BGR 104, TRBS 2152.

- 4. BlmschV (Germany) : Listed.

- Water hazard class (WGK) : WGK Germany: 2 - Hazard to waters.

15.2. Chemical safety assessment



AIR LIQUIDE

**SAFETY DATA SHEET
in accordance with REACH
regulation 1907/2006/EC**

Page : 10 / 10

Revised edition no : 2 - 03

Date : 18 / 7 / 2016

Supersedes : 22 / 9 / 2010

1.3 Butadiene

013

SECTION 15. Regulatory information (continued)

: A Chemical safety assessment (CSA) has been carried out for this product.
Refer to section 8.2.

SECTION 16. Other information

- Indication of changes** : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010
- Training advice** : The hazard of asphyxiation is often overlooked and must be stressed during operator training.
Ensure operators understand the flammability hazard.
Users of breathing apparatus must be trained.
Ensure operators understand the toxicity hazard.
- Further information** : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
- List of full text of H-statements in section 3.** : H220 - Extremely flammable gas.
H280 - Contains gas under pressure; may explode if heated.
H340 - May cause genetic defects.
H350 - May cause cancer.
- 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.

End of document