Safety Data Sheet

16 Component mix in Butane

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878
Reference number: SDS 01162
Issue date: 2/5/2020 Revision date: 11/8/2023 Supersedes version of: 1/13/2023 Version: 4.0

Danger

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

1.1. Product identifier

SDS no : SDS 01162

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

Relevant identified uses : Industrial and professional uses. Perform risk assessment prior to use.
Uses advised against : Consumer use.
Uses other than those listed above are not supported, contact your supplier for more information on other uses.

1.3. Details of the supplier of the safety data sheet

Air Liquide UK Ltd.
Station Road Coleshill
B46 1JY Birmingham
United Kingdom
safety.aluk@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 1A	H220
	Gases under pressure : Liquefied gas	H280
Health hazards	Germ cell mutagenicity, Category 1B	H340
	Carcinogenicity, Category 1A	H350
Environmental hazards	Hazardous to the aquatic environment – Chronic Hazard, Category 3	H412

2.2. Label elements

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

Hazard pictograms (CLP) :

GHS02 GHS04 GHS08

Signal word (CLP) : Danger
Hazard statements (CLP) : H220 - Extremely flammable gas.
H280 - Contains gas under pressure; may explode if heated.
H340 - May cause genetic defects.
H350 - May cause cancer.
H412 - Harmful to aquatic life with long lasting effects.

Precautionary statements (CLP)

- Prevention : P280 - Wear protective gloves, protective clothing, eye protection.
  P273 - Avoid release to the environment.
  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.
- Response : P308+P313 - IF exposed or concerned: Get medical advice/attention.
- Storage : P403 - Store in a well-ventilated place.

Supplemental information : Restricted to professional users.

2.3. Other hazards

Contact with liquid may cause cold burns/frostbite.
Not classified as PBT or vPvB.

SECTION 3: Composition/information on ingredients

3.1. Substances Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Isobutane	CAS-No.: 75-28-5 EC-No.: 200-857-2 EC Index-No.: 601-004-00-0 REACH-no: 01-2119485395-27	20	Flam. Gas 1A, H220 Press. Gas (Liq.), H280
Butane n-	CAS-No.: 106-97-8 EC-No.: 203-448-7 EC Index-No.: 601-004-00-0 REACH-no: 01-2119474691-32	18	Flam. Gas 1A, H220 Press. Gas (Liq.), H280
Propane	CAS-No.: 74-98-6 EC-No.: 200-827-9 EC Index-No.: 601-003-00-5 REACH-no: 01-2119486944-21	17.5	Flam. Gas 1A, H220 Press. Gas (Liq.), H280
Butadiene 1,3	CAS-No.: 106-99-0 EC-No.: 203-450-8 EC Index-No.: 601-013-00-X REACH-no: 01-2119471988-16	5	Flam. Gas 1A, H220 Press. Gas (Liq.), H280 Muta. 1B, H340 Carc. 1A, H350
Butene 1-	CAS-No.: 106-98-9 EC-No.: 203-449-2 EC Index-No.: 601-012-00-4 REACH-no: 01-2119456615-34	5	Flam. Gas 1A, H220 Press. Gas (Liq.), H280
Isobutene	CAS-No.: 115-11-7 EC-No.: 204-066-3 EC Index-No.: 601-012-00-4 REACH-no: 01-2119456616-32	5	Flam. Gas 1A, H220 Press. Gas (Liq.), H280
Isopentane	CAS-No.: 78-78-4 EC-No.: 201-142-8 EC Index-No.: 601-006-00-1	5	Flam. Liq. 1, H224 Asp. Tox. 1, H304 STOT SE 3, H336 Aquatic Chronic 2, H411
n-Pentane	CAS-No.: 109-66-0 EC-No.: 203-692-4 EC Index-No.: 601-006-00-1	5	Flam. Liq. 2, H225 STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Chronic 2, H411

Propylene	CAS-No.: 115-07-1 EC-No.: 204-062-1 EC Index-No.: 601-011-00-9 REACH-no: 01-2119447103-50	5	Flam. Gas 1A, H220 Press. Gas (Liq.), H280
Butene cis	CAS-No.: 590-18-1 EC-No.: 209-673-7 EC Index-No.: 601-012-00-4 REACH-no: *3	4	Flam. Gas 1A, H220 Press. Gas (Liq.), H280
Butene trans-	CAS-No.: 624-64-6 EC-No.: 210-855-3 EC Index-No.: 601-012-00-4 REACH-no: *3	4	Flam. Gas 1A, H220 Press. Gas (Liq.), H280
Ethane	CAS-No.: 74-84-0 EC-No.: 200-814-8 EC Index-No.: 601-002-00-X REACH-no: 01-2119486765-21	2	Flam. Gas 1A, H220 Press. Gas (Liq.), H280
Neopentane	CAS-No.: 463-82-1 EC-No.: 207-343-7 EC Index-No.: 601-005-00-6 REACH-no: *3	2	Flam. Gas 1A, H220 Press. Gas (Liq.), H280 Aquatic Chronic 2, H411
n-hexane	CAS-No.: 110-54-3 EC-No.: 203-777-6 EC Index-No.: 601-037-00-0	1	Flam. Liq. 2, H225 Repr. 2, H361f Asp. Tox. 1, H304 STOT RE 2, H373 Skin Irrit. 2, H315 STOT SE 3, H336 Aquatic Chronic 2, H411
Acetylene (dissolved)	CAS-No.: 74-86-2 EC-No.: 200-816-9 EC Index-No.: 601-015-00-0 REACH-no: 01-2119457406-36	0.5	Flam. Gas 1A - Chem. Unst. Gas A, H220;H230 Press. Gas (Diss.), H280
Propadiene 1,2	CAS-No.: 463-49-0 EC-No.: 207-335-3 EC Index-No.: --- REACH-no: *3	0.5	Flam. Gas 1A - Chem. Unst. Gas B, H220;H231 Press. Gas (Liq.), H280
Methyl acetylene	CAS-No.: 74-99-7 EC-No.: 200-828-4 EC Index-No.: ---	0.5	Flam. Gas 1A - Chem. Unst. Gas B, H220;H231 Press. Gas (Liq.), H280

Name	**Product identifier**	**Specific concentration limits (%)**
n-hexane	CAS-No.: 110-54-3 EC-No.: 203-777-6 EC Index-No.: 601-037-00-0	(5 ≤ C < 100) STOT RE 2, H373

Full text of H- and EUH-statements: see section 16

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

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

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

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 : In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- 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.
See section 11.

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

None.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Shutting off the source of the gas is the preferred method of control.
- Unsuitable extinguishing media : 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 : 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 : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
Standard EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Act in accordance with local emergency plan.
Try to stop release.
Evacuate area.
Eliminate ignition sources.
Ensure adequate air ventilation.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Stay upwind.
See section 8 of the SDS for more information on personal protective equipment.

For emergency responders : 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.
See section 5.3 of the SDS for more information.

6.2. Environmental precautions

Try to stop release.

6.3. Methods and material for containment and cleaning up

Ventilate area.

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 regularily) 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.
Ensure equipment is adequately earthed.

Safe handling of the gas receptacle : Refer to supplier's container handling instructions.
Do not allow backfeed into the container.
Protect containers 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 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 content of the container.
Suck back of water into the container must be prevented.
Open valve slowly to avoid pressure shock.

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

Acetylene (dissolved) (74-86-2)	
Switzerland - Occupational Exposure Limits	
Remark	Kritische Toxizität: Asphyxie
USA - ACGIH - Occupational Exposure Limits	
Local name	Acetylene
Remark (ACGIH)	TLV® Basis: Simple Asphyxiant
Regulatory reference	ACGIH 2019

Butadiene 1,3 (106-99-0)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	1,3-Butadiene
IOEL TWA	2.2 mg/m³ (BOEL)
IOEL TWA [ppm]	1 ppm (BOEL)
Regulatory reference	DIRECTIVE (EU) 2019/130 (amending Directive 2004/37/EC)
Austria - Occupational Exposure Limits	
MAK (mg/m³)	34 mg/m³
MAK (OEL TWA) [ppm]	15 ppm
MAK (OEL STEL)	136 mg/m³
MAK (OEL STEL) [ppm]	60 ppm
Bulgaria - Occupational Exposure Limits	
OEL STEL	100 mg/m³
Germany - Occupational Exposure Limits (TRGS 910)	
Equivalence value for acceptable concentration	10 µg/g creatinine
Equivalence value for tolerance concentration	80 µg/g creatinine
Parameter	2-Hydroxy-3-butenyl-merkaptursäure (MHBMA)
North Macedonia - Occupational Exposure Limits	
OEL TWA	11 mg/m³ друго
OEL TWA [ppm]	5 ppm друго
USA - ACGIH - Occupational Exposure Limits	
Local name	1,3-Butadiene
ACGIH OEL TWA [ppm]	2 ppm
Remark (ACGIH)	TLV® Basis: Cancer. Notations: A2 (Suspected Human Carcinogen)
Regulatory reference	ACGIH 2019

Butene 1- (106-98-9)	
USA - ACGIH - Occupational Exposure Limits	
Local name	n-Butene
ACGIH OEL TWA [ppm]	250 ppm
Remark (ACGIH)	TLV® Basis: Body weight eff
Regulatory reference	ACGIH 2019

Butene cis (590-18-1)	
USA - ACGIH - Occupational Exposure Limits	
Local name	cis-2-Butene

ACGIH OEL TWA [ppm]	250 ppm
Remark (ACGIH)	TLV® Basis: Body weight eff
Regulatory reference	ACGIH 2019

Ethane (74-84-0)	
Switzerland - Occupational Exposure Limits	
Remark	Kritische Toxizität: Formal
USA - ACGIH - Occupational Exposure Limits	
Local name	Ethane
Remark (ACGIH)	TLV® Basis: Simple Asphyxiant
Regulatory reference	ACGIH 2019

n-hexane (110-54-3)	
Spain - Biological limit values	
BLV	0.2 mg/l Parámetro: 2,5-Hexanodiona - Medio: Orina - Momento de muestreo: Final de la semana laboral - Notas: Sin hidrólisis

Isobutane (75-28-5)	
Austria - Occupational Exposure Limits	
Local name	Butan (beide Isomeren): Isobutan (R 600a)
MAK (mg/m³)	1900 mg/m³
MAK (OEL TWA) [ppm]	800 ppm
MAK (OEL STEL)	3800 mg/m³
MAK (OEL STEL) [ppm]	1600 ppm
Regulatory reference	BGBl. II Nr. 186/2015
Ireland - Occupational Exposure Limits	
OEL STEL	1000 mg/m³
Switzerland - Occupational Exposure Limits	
Remark	Kritische Toxizität: ZNS
USA - ACGIH - Occupational Exposure Limits	
Local name	Isobutane
ACGIH OEL STEL [ppm]	1000 ppm (EX - Explosion hazard)
Remark (ACGIH)	TLV® Basis: CNS impair
Regulatory reference	ACGIH 2019

Isobutene (115-11-7)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Isobutene
ACGIH OEL TWA [ppm]	250 ppm
Remark (ACGIH)	TLV® Basis: URT irr; body weight eff. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2019

Isopentane (78-78-4)	
Ireland - Occupational Exposure Limits	
OEL TWA [1]	3000 mg/m³

Methyl acetylene (74-99-7)	
Austria - Occupational Exposure Limits	
Local name	Methylacetylen
MAK (mg/m³)	1650 mg/m³
MAK (OEL TWA) [ppm]	1000 ppm
MAK (OEL STEL)	3300 mg/m³
MAK (OEL STEL) [ppm]	2000 ppm
Regulatory reference	BGBl. II Nr. 186/2015
USA - ACGIH - Occupational Exposure Limits	
Local name	Methylacetylene
ACGIH OEL TWA [ppm]	1000 ppm (EX - Explosion hazard)
Remark (ACGIH)	TLV® Basis: CNS impair
Regulatory reference	ACGIH 2019

Neopentane (463-82-1)	
Austria - Occupational Exposure Limits	
Local name	tert-Pentan (2,2-Dimethylpropan)
MAK (mg/m³)	1800 mg/m³
MAK (OEL TWA) [ppm]	600 ppm
MAK (OEL STEL)	3600 mg/m³
MAK (OEL STEL) [ppm]	1200 ppm
Regulatory reference	BGBl. II Nr. 186/2015
USA - ACGIH - Occupational Exposure Limits	
Local name	Neopentane
ACGIH OEL TWA [ppm]	1000 ppm

Remark (ACGIH)	TLV® Basis: Narcosis; resp tract irr
Regulatory reference	ACGIH 2019

Propane (74-98-6)	
Austria - Occupational Exposure Limits	
Local name	Propan (R 290)
MAK (mg/m³)	1800 mg/m³
MAK (OEL TWA) [ppm]	1000 ppm
MAK (OEL STEL)	3600 mg/m³
MAK (OEL STEL) [ppm]	2000 ppm
Regulatory reference	BGBl. II Nr. 186/2015
USA - ACGIH - Occupational Exposure Limits	
Local name	Propane
Remark (ACGIH)	TLV® Basis: Simple Asphyxiant
Regulatory reference	ACGIH 2019

Propylene (115-07-1)	
Switzerland - Occupational Exposure Limits	
Remark	Kritische Toxizität: OAW, Asphyxie
USA - ACGIH - Occupational Exposure Limits	
Local name	Propylene
ACGIH OEL TWA [ppm]	500 ppm
Remark (ACGIH)	TLV® Basis: Asphyxia; URT irr. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2019

Butene trans- (624-64-6)	
USA - ACGIH - Occupational Exposure Limits	
Local name	trans-2-Butene
ACGIH OEL TWA [ppm]	250 ppm
Remark (ACGIH)	TLV® Basis: Body weight eff
Regulatory reference	ACGIH 2019

Butane n- (106-97-8)	
Croatia - Occupational Exposure Limits	
Remark	F+ (vrlo lako zapaljivo)

Ireland - Occupational Exposure Limits	
OEL TWA [2]	1000 ppm
Switzerland - Occupational Exposure Limits	
Remark	Kritische Toxizität: ZNS
USA - ACGIH - Occupational Exposure Limits	
Local name	Butane
ACGIH OEL STEL [ppm]	1000 ppm (EX - Explosion hazard)
Remark (ACGIH)	TLV® Basis: CNS impair
Regulatory reference	ACGIH 2019

Acetylene (dissolved) (74-86-2)	
DNEL: Derived no effect level (Workers)	
Acute - systemic effects, inhalation	2675 mg/m³
Long-term - systemic effects, inhalation	2675 mg/m³

Butadiene 1,3 (106-99-0)	
DNEL: Derived no effect level (Workers)	
Long-term - systemic effects, inhalation	2.21 mg/m³

Butene 1- (106-98-9)	
DNEL: Derived no effect level (Workers)	
Long-term - local effects, inhalation	1530 mg/m³
Long-term - systemic effects, inhalation	769 mg/m³

Isobutene (115-11-7)	
DNEL: Derived no effect level (Workers)	
Long-term - local effects, inhalation	768.7 mg/m³
Long-term - systemic effects, inhalation	769 mg/m³

Propylene (115-07-1)	
PNEC: Predicted no effect concentration	
Aqua (freshwater)	1.38 mg/l
Aqua (marine water)	1.38 mg/l

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

• Eye/face protection : 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, performance level 1 or higher.
Wear cold insulating gloves when transfilling or breaking transfer connections.
Standard EN 511 - Cold insulating gloves.

- 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.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
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.
Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.

• Thermal hazards : None in addition to the above sections.

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 : Odour threshold is subjective and inadequate to warn of overexposure.
Mixture contains one or more component(s) which have the following odour:
Garlic like. Sweetish. Mildly aromatic. Stenchant often added.

Melting point / Freezing point : Not applicable for gas mixtures.

Boiling point : Not applicable for gas mixtures.
It is technically not possible to determine the boiling point or range of this mixture.
Component with lowest boiling point: Ethane -88.6 °C

Flammability	:	Extremely flammable gas.
Lower explosion limit	:	Calculated value: 1.49%
Upper explosion limit	:	No test data or calculation method available.
Flash point	:	Not applicable for gases and gas mixtures.
Auto-ignition temperature	:	Not known. Auto ignition temperature for mixtures is not available. Component with lowest auto-ignition temperature : Propadiene 1,2 > 54 °C
Decomposition temperature	:	Not applicable.
pH	:	Not applicable for gases and gas mixtures.
Viscosity, kinematic	:	No reliable data available.
Water solubility [20°C]	:	Mixture is partially soluble in water
Partition coefficient n-octanol/water (Log Kow)	:	Not applicable for gas mixtures.
Vapour pressure [20°C]	:	Not known. Component with lowest volatility : Neopentane 1.5 bar(a) Component with highest volatility: Acetylene (dissolved) 44 bar(a)
Vapour pressure [50°C]	:	Not available.
Density and/or relative density	:	Not applicable.
Relative vapour density (air=1)	:	Heavier than air.
Particle characteristics	:	Not applicable.

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Explosive properties	:	Not applicable.
Explosion limits	:	Flammability range not available.
Oxidising properties	:	Not applicable.

9.2.2. Other safety characteristics

Molar mass	:	Not applicable for gas mixtures.
Evaporation rate	:	Not applicable for gases and gas mixtures.
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.
Data for mixture are not available.
This mixture contains components with the following reactivity : May decompose violently at high temperature and/or pressure or in the presence of a catalyst. Can form explosive mixture with air. May react violently with oxidants. May react explosively even in the absence of air.

10.2. Chemical stability

Stable under normal conditions.

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.
Avoid moisture in installation systems.

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 hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity : Classification criteria are not met.

Isobutane (75-28-5)	
LC50 Inhalation - Rat [ppm]	3125 ppm/4h

Propane (74-98-6)	
LC50 Inhalation - Rat [ppm]	20000 ppm/4h

Skin corrosion/irritation : Classification criteria are not met.

Serious eye damage/irritation : No known effects from this product.

Respiratory or skin sensitisation : No known effects from this product.

Germ cell mutagenicity : May cause genetic defects.

Carcinogenicity : May cause cancer.

Toxic for reproduction : Fertility : Classification criteria are not met.

Toxic for reproduction : unborn child : No known effects from this product.

STOT-single exposure : Classification criteria are not met.

STOT-repeated exposure : Classification criteria are not met.

Aspiration hazard : Not applicable for gases and gas mixtures.

11.2. Information on other hazards

No additional information available

SECTION 12: Ecological information

12.1. Toxicity

Assessment : Harmful to aquatic life with long lasting effects.

EC50 48h - Daphnia magna [mg/l] : No data available.

EC50 72h - Algae [mg/l] : No data available.

LC50 96 h - Fish [mg/l] : No data available.

Acetylene (dissolved) (74-86-2)	
EC50 48h - Daphnia magna [mg/l]	242 mg/l
EC50 72h - Algae [mg/l]	57 mg/l
LC50 96 h - Fish [mg/l]	545 mg/l

Propadiene 1,2 (463-49-0)	
EC50 48h - Daphnia magna [mg/l]	No data available.
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	No data available.

Butadiene 1,3 (106-99-0)	
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

Butene 1- (106-98-9)	
EC50 48h - Daphnia magna [mg/l]	11 mg/l
EC50 72h - Algae [mg/l]	6.5 mg/l
LC50 96 h - Fish [mg/l]	19 mg/l

Butene cis (590-18-1)	
EC50 48h - Daphnia magna [mg/l]	No data available.
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	No data available.

Ethane (74-84-0)	
EC50 48h - Daphnia magna [mg/l]	7.02 - 69.43 mg/l
EC50 72h - Algae [mg/l]	7.71 - 16.5 mg/l
LC50 96 h - Fish [mg/l]	24.11 - 147.54 mg/l

n-hexane (110-54-3)	
EC50 48h - Daphnia magna [mg/l]	No data available.
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	No data available.

Isobutane (75-28-5)	
EC50 48h - Daphnia magna [mg/l]	14.22 - 69.43 mg/l
EC50 72h - Algae [mg/l]	7.71 - 19.37 mg/l
LC50 96 h - Fish [mg/l]	24.11 - 147.54 mg/l

Isobutene (115-11-7)	
EC50 48h - Daphnia magna [mg/l]	No data available.
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	No data available.

Isopentane (78-78-4)	
EC50 48h - Daphnia magna [mg/l]	No data available.
EC50 72h - Algae [mg/l]	No data available.

Isopentane (78-78-4)	
LC50 96 h - Fish [mg/l]	No data available.

Methyl acetylene (74-99-7)	
EC50 48h - Daphnia magna [mg/l]	No data available.
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	No data available.

Neopentane (463-82-1)	
EC50 48h - Daphnia magna [mg/l]	No data available.
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	No data available.

n-Pentane (109-66-0)	
EC50 48h - Daphnia magna [mg/l]	No data available.
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	No data available.

Propane (74-98-6)	
EC50 48h - Daphnia magna [mg/l]	27.1 mg/l
EC50 72h - Algae [mg/l]	11.9 mg/l
LC50 96 h - Fish [mg/l]	49.9 mg/l

Propylene (115-07-1)	
EC50 48h - Daphnia magna [mg/l]	28.2 mg/l
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	51.7 mg/l

Butene trans- (624-64-6)	
EC50 48h - Daphnia magna [mg/l]	No data available.
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	No data available.

Butane n- (106-97-8)	
EC50 48h - Daphnia magna [mg/l]	14.2 mg/l
EC50 72h - Algae [mg/l]	7.7 mg/l
LC50 96 h - Fish [mg/l]	24.1 mg/l

12.2. Persistence and degradability

Assessment : No data available.

12.3. Bioaccumulative potential

Assessment : No data available.

12.4. Mobility in soil

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

12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

12.6. Endocrine disrupting properties

Assessment :

12.7. Other adverse effects

Other adverse effects : No known effects from this product.
Effect on the ozone layer : No effect on the ozone layer.
Effect on global warming : Contains greenhouse gas(es).

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Contact supplier if guidance is required.
Do not discharge into areas where there is a risk of forming an explosive mixture with air.
Waste gas should be flared through a suitable burner with flash back arrestor.
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.
Return unused product in original container to supplier.

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

External treatment and disposal of waste should comply with applicable local and/or national regulations.

SECTION 14: Transport information

14.1. UN number or ID number

In accordance with ADR / RID / IMDG / IATA / ADN
UN-No. : 1965

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S. (Isobutane, Propane)
Transport by air (ICAO-TI / IATA-DGR) : Hydrocarbon gas mixture, liquefied, n.o.s. (Isobutane, Propane)
Transport by sea (IMDG) : HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S. (Isobutane, Propane)

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	:	23
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 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. Maritime transport in bulk according to IMO instruments

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). Contains no substance on the REACH candidate list.
Other information, restriction and prohibition regulations	:	Contains no substance subject to Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals.
Seveso Directive : 2012/18/EU (Seveso III)	:	Covered.

National regulations

Water hazard class (WGK)	:	2 - Significantly hazardous to water.
Regulatory reference	:	Ensure all national/local regulations are observed.

15.2. Chemical safety assessment

A CSA does not need to be carried out for this product.

SECTION 16: Other information

Indication of changes : Safety data sheet in accordance with commission regulation (EU) No 2020/878.

Section	Changed item	Change	Comments
	Supersedes version of	Modified	
	Revision date	Modified	
	Carriage permitted (ADN)	Added	
	Properties and observations (IMDG)	Added	
	Proper Shipping Name (RID)	Modified	
	Special provisions (RID)	Modified	
	Stowage category (IMDG)	Modified	
	Special provisions (IMDG)	Modified	
	Proper Shipping Name (IMDG)	Modified	
	Special provisions (IATA)	Modified	
	Proper Shipping Name (IATA)	Modified	
	UN-No. (RID)	Modified	
14.1	UN-No. (ADN)	Modified	
14.1	UN-No. (ADR)	Modified	
14.1	UN-No. (IMDG)	Modified	
14.1	UN-No. (IATA)	Modified	
14.2	Proper Shipping Name (ADN)	Modified	
14.2	Proper Shipping Name (ADR)	Modified	
14.6	Special provisions (ADN)	Modified	
14.6	Special provisions (ADR)	Modified	

Abbreviations and acronyms : ATE - Acute Toxicity Estimate.
CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008.
REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006.
EINECS - European Inventory of Existing Commercial Chemical Substances.
CAS# - Chemical Abstract Service number.
PPE - Personal Protection Equipment.
LC50 - Lethal Concentration to 50 % of a test population.
RMM - Risk Management Measures.
PBT - Persistent, Bioaccumulative and Toxic.
vPvB - Very Persistent and Very Bioaccumulative.
STOT- SE : Specific Target Organ Toxicity - Single Exposure.
CSA - Chemical Safety Assessment.
EN - European Standard.
UN - United Nations.
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road.
IATA - International Air Transport Association.
IMDG code - International Maritime Dangerous Goods.
RID - Regulations concerning the International Carriage of Dangerous Goods by Rail.
WGK - Water Hazard Class.
STOT - RE : Specific Target Organ Toxicity - Repeated Exposure.
UFI : Unique Formula Identifier.

Training advice : Ensure operators understand the flammability hazard.

Further information : Classification using data from databases maintained by the European Industrial Gases Association (EIGA). Data is maintained in EIGA doc 169 : 'Classification and Labelling Guide', downloadable at : http://www.eiga.eu.
Classification in accordance with the procedures and calculation methods of Regulation (EC) 1272/2008 (CLP).

Full text of H- and EUH-statements	
Aquatic Chronic 2	Hazardous to the aquatic environment – Chronic Hazard, Category 2
Aquatic Chronic 3	Hazardous to the aquatic environment – Chronic Hazard, Category 3
Asp. Tox. 1	Aspiration hazard, Category 1
Carc. 1A	Carcinogenicity, Category 1A
Flam. Gas 1A	Flammable gases, Category 1A
Flam. Gas 1A - Chem. Unst. Gas A	Flammable gases, Category 1A, Chemically unstable gas A
Flam. Gas 1A - Chem. Unst. Gas B	Flammable gases, Category 1A, Chemically unstable gas B
Flam. Liq. 1	Flammable liquids, Category 1
Flam. Liq. 2	Flammable liquids, Category 2
H220	Extremely flammable gas.
H224	Extremely flammable liquid and vapour.
H225	Highly flammable liquid and vapour.
H230	May react explosively even in the absence of air.
H231	May react explosively even in the absence of air at elevated pressure and/or temperature.
H280	Contains gas under pressure; may explode if heated.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.

H340	May cause genetic defects.
H350	May cause cancer.
H361f	Suspected of damaging fertility.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.
Muta. 1B	Germ cell mutagenicity, Category 1B
Press. Gas (Diss.)	Gases under pressure : Dissolved gas
Press. Gas (Liq.)	Gases under pressure : Liquefied gas
Repr. 2	Reproductive toxicity, Category 2
Skin Irrit. 2	Skin corrosion/irritation, Category 2
STOT RE 2	Specific target organ toxicity – Repeated exposure, Category 2
STOT SE 3	Specific target organ toxicity – Single exposure, Category 3, Narcosis

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.

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