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This Material Safety Data Sheet is available for professional users.

Material and Safety Data Sheet of 22/04/2016, revision no. 5

1 - Identification of the substance/mixture and of the company/undertaking

1.1 - Product identifier:

1.1.1	Chemical product:	**Substance**
1.1.2	Trade name:	**Isobutane (>95%); SynthAir IB95 (>95%); SynthAir IB97 (>97%); SynthAir IB98 (>98%); SynthFreeze R600a 97 (>97%); SynthFreeze R600a 2.0 (>99%); SynthFreeze R600a 2.5 (>99,5%); SynthFreeze R600a 3.0 (>99,9); SynthCell IB95 (>95%); SynthCell IB97 (>97%); SynthCell IB98 (>98%); R600a (97%÷99,9%); SynthFreeze R600a (97%÷99,9%)**
1.1.3	REACH Registration number:	01-2119485395-27-0026
1.1.4	EINECS No.:	601-004-00-0
1.1.5	CE No.:	200-857-2
1.1.6	CAS No.:	75-28-5
1.1.7	Synonyms:	Iso-butane; i-Butane

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

1.2.1 Main sector of use:

- **Industrial use:**

Manufacture of substance (SU3, SU4, SU8, SU9, SU10, SU12, SU24, PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC12, PROC14, PROC15, ERC1, ERC2, ERC3, ERC4, ERC5, ERC7, ERC8a, ERC9a, ERC10a, ERC11a)
Distribution of substance (SU3, SU4, SU8, SU9, SU10, SU12, SU24, PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC9, PROC12, PROC14, PROC15, ERC1, ERC2, ERC3, ERC4, ERC5, ERC7, ERC8a, ERC8c, ERC8d, ERC9a, ERC10a, ERC11a)
Propellants (SU3, SU4, SU10, PROC3, PROC7, PROC9, ERC2, ERC8a, ERC8d)
Use a fuel (SU3, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC16, ERC7)
Blowing agent (SU3, SU4, SU12, PROC1, PROC2, PROC3, PROC4, PROC8b, PROC9, PROC12, PROC14, ERC3, ERC4, ERC5)
Formulation & (re)packing of Substances and Mixtures (SU3, SU10, PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, ERC2)
Polymer production (SU3, SU8, SU9, SU10, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC16, ERC4, ERC6c)
Polymer processing (SU3, SU10, PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC13, PROC14, ERC4)
Functional fluid (SU3, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, ERC7)

- **Professional use:**

Use a fuel (SU22, PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC16, ERC9a, ERC9b)
Propellants (SU22, PROC11, ERC8a, ERC8d)
Polymer processing (SU22, PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC14, PROC21, ERC8a)
Functional fluid (SU22, PROC1, PROC2, PROC3, PROC8a, PROC9, PROC20, ERC9a, ERC9b)

- **Consumer use:**

Use a fuel (PC13, SU21, ERC9a, ERC9b)
Propellants (PC1, PC3, PC4, PC6, PC8, PC9a, PC12, PC23, PC24, PC25, PC28, PC29, PC31, PC32, PC34, PC35, PC39, SU21, ERC8a, ERC8d, ERC9a, ERC10a)
Functional fluid (PC21, SU21, ERC9a, ERC9b)
Blowing agent (PC32, SU21, ERC10a, ERC11a)

1.2.2 Uses advised against: **This product is advised against any industrial, professional or consumer use differing from the above-listed Identified Uses.**

1.3 - Details of the supplier of the safety data sheet:

SYNTHESIS CHIMICA SRL
Strada Statale 494 km 48
27030-Castello d'Agogna (PV) - Italy

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Email address:	info@synthesischimica.com
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Sito internet: http://www.synthesischimica.com e-mail: info@synthesischimica.com

Internet website: www.synthesischimica.com

1.4 - Emergency number: +39 0384-56022 (office hours)

Poison Control Center:
Ospedale Niguarda - Milan
Tel. +39 02-66101029
C.N.I.T. - Pavia
Tel.+39 0382-24444
(see section 16 for the complete list of the International poison control centers)

2 - Hazards identification

2.1 - Classification of the substance or mixture

2.1.1 Classification according to Regulation (EC) No. 1272/2008

Classification	Flammable gas Category 1	Gas under pressure
GHS pictograms	 GHS02	 GHS04
Warning	Hazard	Warning
Hazard statement	H220: Extremely flammable gas	H280: Contains gas under pressure; may explode if heated

The substance contains less than 0,1% w/w 1,3-butadiene.

2.2 - Label elements

2.2.1 Labelling according to Regulation (EC) No. 1272/2008
Labelling for the substance packed in refillable cylinders or in non-refillable cartridges within the scope of EN 417 shall consist of the following elements *:

Classification	Flammable gases Category 1	Gas under pressure*
GHS pictograms	 GHS02	 GHS04*
Warning	Hazard	
Hazard statement	H220: Extremely flammable gas	H280: Contains gas under pressure; may explode if heated
Precautionary statement - Prevention	P102:Keep out of reach of children **P210:Keep away from heat/sparks/open flames/hot surfaces. — No smoking** **P243:Take precautionary measures against static discharge**	
Precautionary statement - Response	**P320:Specific treatment is urgent (see … on this label)** **P377:Leaking gas fire: Do not extinguish, unless leak can be stopped safely** **P381:Eliminate all ignition sources if safe to do so**	
Precautionary statement - Storage	**P410+P403:Protect from sunlight. Store in a well-ventilated place**	
Precautionary statement - Disposal	P501:Dispose of contents/container to in accordance with local/regional/national/ international regulation	

NOTES:
*** Labelling is simplified** by virtue of the derogation Annex 1, Section 1.3.2.1 of Regulation 1272/2008 thereof:
If propane, butane and liquefied petroleum gas (LPG) or a mixture containing these substances classified in accordance with the criteria of this Annex, is placed on the market in closed refillable cylinders or in non-refillable cartridges within the scope of EN 417 as fuel gases which are only released for combustion (current edition of EN 417, relating to 'Non-refillable metallic gas cartridges for liquefied petroleum gases, with or without a valve, for use with portable appliances; construction, inspection, testing and marking'), **these cylinders or cartridges shall only be labelled with the appropriate pictogram and the hazard and precautionary statements concerning flammability.**

The most important precautionary statements indicated by the supplier are highlighted in bold, those not highlighted are optional. As foreseen by art. 28 par. 3 of Regulation (EC) no. 1272/2008, no more than six precautionary statements shall be indicated.

CONTAINS: ISOBUTANE.

2.3 - Other hazards

HEALTH RISKS: The vapors at high concentrations can cause narcotic effects. It is a simple asphyxiant gas, dangerous as it removes the oxygen from the atmosphere. Contact with the liquid causes freezing.
*PHYSICAL AND CHEMICAL HAZARDS/FIRE AND EXPLOSION HAZARD:*It is a highly flammable gas, is under pressure may explode if heated. Liquefied gases under pressure, highly flammable, with danger of explosion with air if released in enclosed or delimited.
In case of release, the leaking liquid from the container quickly evaporates, absorbing heat, it mixes with the air to form an explosive mixture and creates the danger of fire and / or explosion with air.
The gas is heavier than air, spreads close to the ground and can collect in confined areas (sewers, drains, basements, ...), it is invisible, but it produces a mist in the presence of moist air.
The strong heating of the container (for example in case of fire) causes a substantial increase in the volume and pressure of the liquid, with risk of bursting of the receptacle that contains it. In this case the material can decompose producing CO2 (carbon dioxide) and CO (carbon monoxide is a highly toxic).

2.3.1 Other
Results of PBT and vPvB assessment:
In accordance with the criteria set forth in the Annex XIII of the REACH Regulation, the substance is not defined as persistent, bioaccumulative and harmful to the environment.

| 3 - Composition/Information on ingredients

3.1 - Substances

Substances	Registration No.	CAS No. CE No. INDEX No.	Classification according to Regulation (EC) No. 1272/2008	%
Isobutane *Update 01/03/2016*	01-2119485395-27-0026	75-28-5 200-857-2 601-004-00-0	 * Flam. Gas 1,H220 Press. Gas,H280	> 95

Components contributing to product hazard:

Substances	Registration No.	CAS No. CE No. INDEX No.	Classification according to Regulation (EC) No. 1272/2008	%
Butane *Update 01/03/2016*	01-2119474691-32-0035	106-97-8 203-448-7 601-004-00-0	 Flam. Gas 1,H220 Press. Gas,H280	< 3
Propane *Update 20/04/2016*	01-2119486944-21-0046	74-98-6 200-827-9 601-003-00-5	 Flam. Gas 1,H220 Press. Gas,H280	< 2

H phrases description (1272/2008)
H220-Extremely flammable gas
H280-Contains gas under pressure; may explode if heated

**Substance contains less than 0,1% w/w 1,3-butadiene (EINECS no. 203-450-8).*
Applicable Note K : The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w 1,3-butadiene (EINECS No 203-450-8). If the substance is not classified as a carcinogen or mutagen, at least the precautionary statements (P102-)P210-P403

Applicable Note U: When put on the market gases have to be classified as 'Gases under pressure', in one of the groups compressed gas, liquefied gas, refrigerated liquefied gas or dissolved gas. The group depends on the physical state in which

the gas is packaged and therefore has to be assigned case by case.

3.2 - Mixtures
Not applicable. This product is treated like a substance.

4 - First aid measures

4.1 - Description of first aid measures
The product is a highly flammable gas. Asphyxiant at high concentrations, depletes oxygen can be fatal. The contact with the product in liquid form may cause frostbite. Before providing relief to the accident, isolate the area from potential sources of ignition including disconnecting electrical supply. Ensure adequate ventilation and check that it is healthy, the atmosphere should be breathable before entering enclosed spaces. Make sure that the protective devices do not become contaminants. Use a positive-pressure breathing apparatus approved full face.
In case of incident, consult a doctor, providing the information contained on the label and in this sheet. The medication and use of medical equipment shall be carried out under strict control of the medical personnel. The first intervention – in case of accident – shall be carried out by trained and skilful personnel in order to avoid further complications or damage to the injured person. If the injured person is in a fainting state, do not supply beverages or administer any medicine by mouth. Move away the victim from the accident area, remove all contaminated clothes and the victim in a warm and well-ventilated place until symptoms disappear.
First responders shall wear suitable personal protective equipment.

4.1.1 Inhalation
In case of inhalation of product, administer first aid as follows:
- move the casualty to an open air area as quickly as possible
- do not leave the casualty alone
- keep warm, comfortable and at rest
- place in the recovery position
- seek medical attention promptly
- if breathing is difficult, administer oxygen, if available, or give assisted ventilation
- in the event of cardiac arrest (no pulse), give cardiopulmonary resuscitation.

4.1.2 Accidental eye contact
In case of accidental contact with eyes, administer first aid as follows:
- remove contact lenses, if present and easy to do
- thoroughly rinse for at least 10-15 minutes, keep eyes well open while rinsing
- in the event of frostbite, pain, swelling, lacrimation or persistent photophobia, or in case of damage due to high-pressure jets, the patient must be taken to a suitably equipped hospital.

4.1.3 Accidental skin contact
In case of accidental contact with the skin of the product, administer first aid as follows:
- do not remove the clothing clinging to the body due to frostbite or freeze burns
- immediately flush the part affected with plenty of lukewarm water (NOT hot)
- go on for at least 15 minutes
- in the presence of frostbite – such as skin whitening or redness or burning or tingling sensation – do not rub, massage or compress the injured part
- take the casualty to the hospital.

4.1.4 Ingestion
Not expected to be a likely exposure source. Frostbite symptoms may occur on lips, mouth in case of contact with the liquid product.

4.2 - Main symptoms and effects, both acute and delayed
4.2.1 Symptoms/lesions after inhalation: Lack of oxygen linked to exposure to high concentrations may cause asphyxia.
4.2.2 Symptoms/lesions after eye contact: contact with product may cause frostbite.
4.2.3 Symptoms/lesions after skin contact: contact with product may cause frostbite.

4.3 - Indication of the possibilty of consulting a physician or resorting to special treatments
It is an asphyxiating gas at standard temperature and pressure.
No specific antidote is known.
In the event of contact with liquid product, treat as frostbite.

5 - Fire fighting measures

5.1 - Extinguishing media

The product is an extremely flammable gas. It contains gas under pressure and may explode if heated.

5.1.1 Suitable extinguishing media

Water fog (only duly trained and qualified personnel), dry chemical powder, Carbon dioxide (CO_2), foam (only duly trained and qualified personnel), sand or earth.

5.1.2 Unsuitable extinguishing media

Do not direct a solid stream of water/do not use direct water jets on the burning product. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

5.2 - Special hazard deriving from the substance or mixture

Substance is stable under normal conditions at room temperature, and if released into the environment. No decomposition if stored normally. Carbon monoxide, sulphur dioxide and nitrogen oxide – as well as additional and undetermined inorganic compounds of their elements - may be formed as a result of combustion.

5.3 - Advice for firefighters

Arrange for a quick evacuation of containers.
In case of fire in the vicinity, move away the containers exposed to fire.
Cool down containers/drums with water spray.
Equip the fire-fighters with the following protective equipment:

- heat-resistant and flameproof suit
- Helmet with visor or hood with shield
- Fire-resistant gloves
- Fire-resistant shoes
- Self-contained breathing apparatus or anti-gas mask
- Mask with filter against acids and/or organic vapours with regard to the risks reported in the previous items, the fire size and its localization (open/closed place)
- Suitable fire-fighting protective equipment.

6 - Accidental release measures

6.1 - Personal precautions, protective equipment and emergency procedures

6.1.1 *For non-emergency personnel*

In case of accidental spill/release, use the following PPE:

- self-contained breathing apparatus (SCBA) may be used according to the extent of spill and predictable amount of exposure
- product spill generates a great volume of extremely flammable gas which is heavier than air. It will accumulate near the ground
- when the presence of dangerous amounts of H_2S around the spilled/leaked product is suspected or proved, additional or special actions may be assured including access restrictions, use of special protective equipment, procedures and duly trained personnel
- stop the spillage at the origin, if it can be accomplished without any risk
- avoid direct contact with spilled/leaked material
- stay upwind
- keep away people not engaged in stopping spillage. Notify emergency team
- enter area only if strictly necessary
- a combustible gas may be used as flammable gas or vapour detector
- remove all ignition sources, if it can be done without risk (such as electricity, sparks, heat, flames)
- if required notify competent authorities in accordance with all the applicable regulations
- it is recommended to use suitable sensors to detect flammable gases or vapours
- where appropriate, use water spray jets to disperse the gas or vapour
- containers must be grounded
- liquid leaks generate great volumes of flammable vapour which is heavier than air, this may travel across the ground and reach remote sources of ignition (e.g. along drainage systems, sewers, water courses, etc…)
- pay attention to signs of fatigue or dizziness; it is possible to expose to hazardous concentrations of gas without any warning symptoms
- static discharge may cause gas to ignite explosively, in case of leakage

6.1.2 *For emergency responders*
During interventions use:
- mask with filter against organic vapours
- Suitable protective goggles, face shield, gloves, boots and aprons

6.2 - Environmental precautions
In case of accidental release/spill:
- intervene to remove or detect the spill and apply the procedures of containment and recovery according to the indications reported in paragraph 6.3.
- in the case of pollution inform the competent authorities in accordance with local law
- stop leak if it can be done without risk
- spillages of material generate large volumes of extremely flammable gas that rises like air and will accumulate near the ground
- ensure adequate ventilation in confined spaces, especially in basements
- the spillage of liquid product into water will likely result in a fast and complete evaporation
- cordon off the area and prevent fire/explosion hazards from boats or other structures, according to wind direction and speed, until the product is completely dispersed
- prevent the product from reaching sewers, drains, rivers or other watercourses, underground spaces (tunnels, basements, etc…)

6.3 - Methods and material for containment and cleaning up
Comply with the following procedures of containment and recovery:
- use the protective equipment reported in paragraph 6.1
- use non-sparking tools
- ventilate closed spaces and allow the product to evaporate, thus promoting its dispersion. If need be, flush with suitable water and/or detergent. Avoid using solvents
- substance entirely dissipates in the atmosphere

6.4 - Reference to other sections
Refer to section 8 for personal protective equipment.
Refer to section 13 for disposal according to the local or National directives.

7 - Handling and Storage

7.1 - Precautions for safe handling

7.1.1 Reccomendations for safe handling
- risk of explosive vapour air mixture
- a specific assessment of inhalation risks from the presence of H_2S in tank headspaces, confined spaces, product residue, tank waste and wastewater, and unintentional releases must be made to help determine control appropriate to local circumstances
- take advanced techniques and process improvement into account (including automations) to eliminate releases
- cleaning and cleaning equipment, whenever possible, before maintenance
- take the necessary risk assessment into account based on health surveillance
- regularly check, test and keep all the control measures
- use only outdoors or in a well-ventilated area
- avoid all sources of ignition, oxidizing agents, chlorine and hydrogen chloride or hydrogen fluoride
- take precautionary measures against static electricity
- cleaning, inspections and maintenance of internal structure of storage tanks must be carried out only by properly equipped and qualified personnel as defined by national, local or company regulations
- handle empty containers carefully; residual vapours may explode
- do not weld, drill, cut or perform similar operations on or near containers
- dispose of rinse water in accordance with local and national regulations
- vapour is heavier than air
- be particularly careful of accumulation in pits and confined spaces
- use pipes and equipment conceived and designed to stand pressures
- use a check valve or other protective device to avoid the inverse flow
- make sure all proper regulations and instructions concerning explosive atmospheres and handling and storage of flammable products are abided by
- prevent water/humidity

7.1.2 Hygiene measures
During handling use the protective equipment indicated in paragraph 8 of this sheet and the following procedures:
- do not eat, drink or smoke while working

- wear personal protective equipment. Avoid wearing synthetic clothing
- avoid contact with skin
- thoroughly wash hands after handling
- do not wear contaminated clothing again
- for maintenance and conservation, empty tanks must be cleaned and filled with inert gas (e.g. nitrogen)

7.2 - Conditions for safe storage, including any incompatibilities
Observe the following precautions when storing the product:
- keep the preparation chemical-physical characteristics in mind to avoid any interactions with other products (see paragraph 10)
- store only in supplied cylinders or approved ships
- cylinders must be held in a vertical position and safely transported in a well-ventilated vehicle or trolley
- cylinders which were used must be carefully sealed and held upright
- containers must be protected from sunlight and stored in a well-ventilated place
- do not work or store near sources of ignition. Do not smoke
- equipment, electrical systems and operating procedures must comply with the relevant regulations in force
- store separately from oxidizing agents, strongly acid or alkaline products
- fixed containers must comply with the requirements laid down by the regulations in force for pressure equipment
- movable vessels shall comply with the requirements set forth in ADR regulations
- handle cylinders vertically, tightly fastened and with safety valve installed. Do not drag, roll, or slide cylinders. Protect cylinders against physical damage
- keep full and empty cylinders separate
- in case of doubt, contact the supplier of substance
- while using, do not heat cylinders by any means to increase the discharge rate of gas from the cylinder
- check for leaks by means of the suitable leak detection solution – never use an open flame – and, whenever possible, rotate cylinder so that gas comes out, not the liquid
- equip cylinder rooms with suitable extinguishing media
- after use, fully close the main cylinder valve, put the valve protection cap and the suitable tag duly filled in, decontaminating in case of inert gas (e.g. nitrogen)
- cleaning, inspections and maintenance of internal structure of storage tanks must be carried out only by properly equipped and qualified personnel and by decontaminating the areas where the intervention with inert gas is carried out (e.g. nitrogen).
- assess the oxygen content and flammability degree by means of the suitable tools
- keep away from heat sources/sparks/open flames/hot surfaces and observe the recommendations for combined storage

Temperature class of materials: T2
Suitable materials for the working structures: mild steel.

Material suitability: It melts fat and attacks natural rubber. Compatible with metal materials.
Suitable materials and coatings: metals of appropriate thickness.
The compatibility with plastic materials may vary; we recommend testing before use.
Containers normally employed for transportation: tankers for gas, cylinders, tubes, pressure drums, bundles of cylinders.

The containers, including the empties, must be stored in well-ventilated areas, with safety catch on.

OTHER WARNINGS: The container is still a danger even when emptied of the product contained. Continue to observe all precautions.

7.3 - Specific end uses
The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s) (if available).

8 - Exposure control and personal protection

The following information refers to industrial handling of the product.

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

Use the product according to the indications reported in this sheet, paying particular attention to the indications contained in paragraph 7.1. Use the protective equipment described in paragraph 8.2.
It is recommended an air extraction system when the product is in confined spaces as well as it is heated at a temperature higher than the room temperature.

The Safety Data Sheet (SDS) is an informative document that takes into account the chemical nature of a hazardous substance or preparation and the negative effects it may cause.
PPE stands for Personal Protective Equipment and shall be compulsorily used when facing a "Residual Risk". The "Residual Risk" belongs to a working situation and it is tightly linked to the conditions in the working environment and the organization of the work.
The references to the PPE to be used – contained in the Safety Data Sheet – can only be informative, they cannot hence go beyond the limits imposed by the attributions of responsibilities.
The responsibility of choice of the suitable PPE according to the risk conditions in the working environment shall be on the EMPLOYER.

8.1 – Control parameters
This product contains the following substance, which has the following exposure limits:

Isobutane (75-28-5)		
Austria	MAK (mg/m^3)	1900 mg/m^3
Austria	MAK (ppm)	800 ppm
Austria	MAK Acute/short term exposure (mg/m^3)	3800 mg/m^3
Austria	MAK Acute/short term exposure (ppm)	1600 ppm
Belgium	Limit value (ppm)	1000 ppm (gas)
Estonia	OEL TWA (mg/m^3)	1900 mg/m^3
Estonia	OEL TWA (ppm)	800 ppm
Finland	HTP-arvo (8h) (ppm)	800 ppm
Finland	HTP-arvo (15 min)	2400 mg/m^3
Finland	HTP-arvo (15 min) (ppm)	1000 ppm
Germany	TRGS 900 Professional exposure limits value (mg/m^3)	2400 mg/m^3
Germany	TRGS 900 Professional exposure limits value (ppm)	1000 ppm
Slovenia	OEL TWA (mg/m^3)	2400 mg/m^3
Slovenia	OEL TWA (ppm)	1000 ppm
Slovenia	OEL STEL (mg/m^3)	9600 mg/m^3
Slovenia	OEL STEL (ppm)	4000 ppm
Switzerland	VME (mg/m^3)	1900 mg/m^3
Switzerland	VME (ppm)	800 ppm
Switzerland	VLE (mg/m^3)	7200 mg/m^3
Switzerland	VLE (ppm)	3200 ppm
USA - ACGIH	ACGIH STEL (ppm)	1000 ppm
USA - NIOSH	NIOSH REL (TWA) (mg/m^3)	1900 mg/m^3
USA - NIOSH	NIOSH REL (TWA) (ppm)	800 ppm

Propane (74-98-6)		
Austria	MAK (mg/m^3)	1800 mg/m^3
Austria	MAK (ppm)	1000 ppm
Austria	MAK Acute/short term exposure (mg/m^3)	3600 mg/m^3
Austria	MAK Acute/short term exposure (ppm)	2000 ppm
Belgium	Limit value (ppm)	1000 ppm (gas)
Bulgaria	OEL TWA (mg/m^3)	1800,0 mg/m^3
Denmark	Grænseværdie (langvarig) (mg/m^3)	1800 mg/m^3
Denmark	Grænseværdie (langvarig) (ppm)	1000 ppm
Estonia	OEL TWA (mg/m^3)	1800 mg/m^3
Estonia	OEL TWA (ppm)	1000 ppm
Finland	HTP-arvo (8h) (mg/m^3)	1500 mg/m^3
Finland	HTP-arvo (8h) (ppm)	800 ppm
Finland	HTP-arvo (15 min)	2000 mg/m^3
Finland	HTP-arvo (15 min) (ppm)	1100 ppm
Germany	TRGS 900 Professional exposure limits value (mg/m^3)	1800 mg/m^3
Germany	TRGS 900 Professional exposure limits value (ppm)	1000 ppm
Greece	OEL TWA (mg/m^3)	1800 mg/m^3
Greece	OEL TWA (ppm)	1000 ppm
Ireland	OEL (8 hours ref) (ppm)	1000 ppm

Ireland	OEL (15 min ref) (ppm)	3000 ppm (calculated)
Latvia	OEL TWA (mg/m^3)	1800 mg/m^3
Latvia	OEL TWA (ppm)	1000 ppm
Poland	NDS (mg/m^3)	1800 mg/m^3
Portugal	OEL TWA (ppm)	1000 ppm
Romania	OEL TWA (mg/m^3)	1400 mg/m^3
Romania	OEL TWA (ppm)	778 ppm
Romania	OEL STEL (mg/m^3)	1800 mg/m^3
Romania	OEL STEL (ppm)	1000 ppm
Slovenia	OEL TWA (mg/m^3)	1800 mg/m^3
Slovenia	OEL TWA (ppm)	1000 ppm
Slovenia	OEL STEL (mg/m^3)	7200 mg/m^3
Slovenia	OEL STEL (ppm)	4000 ppm
Norway	Grenserverdier (AN) (mg/m^3)	900 mg/m^3
Norway	Grenserverdier (AN) (ppm)	500 ppm
Norway	Grenserverdier (Korttidsverdi) (mg/m^3)	900 mg/m^3
Norway	Grenserverdier (Korttidsverdi) (ppm)	500 ppm
Switzerland	VME (mg/m^3)	1800 mg/m^3
Switzerland	VME (ppm)	1000 ppm
Switzerland	VLE (mg/m^3)	7200 mg/m^3
Switzerland	VLE (ppm)	4000 ppm
Canada (Québec)	VEMP (mg/m^3)	1800 mg/m^3
Canada (Québec)	VEMP (ppm)	1000 ppm
USA - IDLH	US IDLH (ppm)	2100 ppm (10% LEL)
USA - NIOSH	NIOSH REL (TWA) (mg/m^3)	1800 mg/m^3
USA - NIOSH	NIOSH REL (TWA) (ppm)	1000 ppm
USA - OSHA	OSHA PEL (TWA) (mg/m^3)	1800 mg/m^3
USA - OSHA	OSHA PEL (TWA) (ppm)	1000 ppm

Butane (106-97-8)		
Austria	MAK (mg/m^3)	1900 mg/m^3
Austria	MAK (ppm)	800 ppm
Austria	MAK Acute/short term exposure (mg/m^3)	3800 mg/m^3
Austria	MAK Acute/short term exposure (ppm)	1600 ppm
Belgium	Limit value (ppm)	1000 ppm (gas)
Bulgaria	OEL TWA (mg/m^3)	1900 mg/m^3
Croatia	GVI (granična vrijednost izloženosti) (mg/m^3)	1450 mg/m^3 22 mg/m^3 (containing >= 0.1% 1,3-Butadiene)
Croatia	GVI (granična vrijednost izloženosti) (ppm)	600 ppm 10 ppm (containing >= 0.1% 1,3-Butadiene)
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (mg/m^3)	1810 mg/m^3
Croatia	KGVI (kratkotrajna granična vrijednost izloženosti) (ppm)	750 ppm
Denmark	Grænseværdie (langvarig) (mg/m^3)	1200 mg/m^3
Denmark	Grænseværdie (langvarig) (ppm)	500 ppm
Estonia	OEL TWA (mg/m^3)	1500 mg/m^3
Estonia	OEL TWA (ppm)	800 ppm
Finland	HTP-arvo (8h) (ppm)	800 ppm
Finland	HTP-arvo (15 min) (ppm)	1000 ppm
France	VME (mg/m^3)	1900 mg/m^3
France	VME (ppm)	800 ppm
Germany	TRGS 900 Professional exposure limits value (mg/m^3)	2400 mg/m^3
Germany	TRGS 900 Professional exposure limits value (ppm)	1000 ppm
Greece	OEL TWA (mg/m^3)	2350 mg/m^3
Greece	OEL TWA (ppm)	1000 ppm
Hungary	AK-érték	2350 mg/m^3

Hungary	CK-érték	9400 mg/m^3
Ireland	OEL (8 hours ref) (ppm)	1000 ppm
Ireland	OEL (15 min ref) (ppm)	3000 ppm (calculated)
Latvia	OEL TWA (mg/m^3)	300 mg/m^3
Poland	NDS (mg/m^3)	1900 mg/m^3
Poland	NDSCh (mg/m^3)	3000 mg/m^3
Slovenia	OEL TWA (mg/m^3)	2400 mg/m^3 (containing ≥ 0.1% 1,3-Butadiene)
Slovenia	OEL TWA (ppm)	1000 ppm (containing ≥ 0.1% 1,3-Butadiene)
Slovenia	OEL STEL (mg/m^3)	9600 mg/m^3 (containing ≥ 0.1% 1,3-Butadiene)
Slovenia	OEL STEL (ppm)	4000 ppm (containing ≥ 0.1% 1,3-Butadiene)
United Kingdom	WEL TWA (mg/m^3)	1450 mg/m^3
United Kingdom	WEL TWA (ppm)	600 ppm
United Kingdom	WEL STEL (mg/m^3)	1810 mg/m^3
United Kingdom	WEL STEL (ppm)	750 ppm
Norway	Grenserverdier (AN) (mg/m^3)	600 mg/m^3
Norway	Grenserverdier (AN) (ppm)	250 ppm
Norway	Grenserverdier (Korttidsverdi) (mg/m^3)	600 mg/m^3
Norway	Grenserverdier (Korttidsverdi) (ppm)	250 ppm
Switzerland	VME (mg/m^3)	1900 mg/m^3
Switzerland	VME (ppm)	800 ppm
Switzerland	VLE (mg/m^3)	7200 mg/m^3
Switzerland	VLE (ppm)	3200 ppm
Australia	TWA (mg/m^3)	1900 mg/m^3
Australia	TWA (ppm)	800 ppm
Canada (Québec)	VEMP (mg/m^3)	1900 mg/m^3
Canada (Québec)	VEMP (ppm)	800 ppm
USA - ACGIH	ACGIH STEL (ppm)	1000 ppm
USA - NIOSH	NIOSH REL (TWA) (mg/m^3)	1900 mg/m^3
USA - NIOSH	NIOSH REL (TWA) (ppm)	800 ppm

It is recommended to work with natural or mechanical ventilation to ensure that the gas does not exceed 25% of the LEL.
Hazardous concentrations due to professional inhalation – beyond which an exposure damage is expected, - are supplied by ACGIH TLV 2010 tables as follows:
Butane:
TLV-TWA: weighted average concentration for an 8-hour work-day (chronic exposure) under which it is believed that nearly all workers may be repeatedly exposed day after day with no adverse health effects:
800 ppm (1900 mg/m³)
ACGIH believes that even biologically inert particles – without a TLV value – may have adverse effects and recommends that airborne concentration should be kept below 3 mg/m³ respirable particles; below 10 mg/m³ inhalable particles.
For monitoring/control procedures, refer to the regulations in force.

DNEL (Derived No-Effect Levels) and DMEL (Derived Minimum Effect Levels):
Not derived, since the mixture does not contain components hazardous to health.
It is recommended to follow the values in accordance with the exposure limits mentioned above for all applications (refer to Section 15).

PNEC(S) (Predicted No-Effect Concentration):

PNEC(S) aqua (continuous releases):
Not derived, since the mixture does not contain components dangerous for the environment (see section 15).

PNEC(S) aqua (intermittent releases):
Not derived, since the mixture does not contain components dangerous for the environment (see section 15).

PNEC(S) soil:
Not derived, since the mixture does not contain components dangerous for the environment (see section 15).

PNEC(S) sediment:
Not derived, since the mixture does not contain components dangerous for the environment (see section 15).

PNEC(S) STP (sewage treatment plant):
Not derived, since the mixture does not contain components dangerous for the environment (see section 15).

Monitoring procedures:
Measurement of airborne oxygen concentration, according to the regulations in force.

8.2 - Exposure controls

Consumer exposure control:
The substances contained in this mixture are handled under Strictly Controlled Conditions in accordance with REACH regulation Article 17(3) for on-site isolated intermediates. In case the substances are transported to other sites for further processing, the substances should be handled at these sites under the Strictly Controlled Conditions as specified in REACH regulation Article 18(4). Site documentation to support safe handling arrangements including the selection of engineering, administrative and personal protective equipment controls in accordance with risk-based management systems is available at each Manufacturing site. Written confirmation of application of Strictly Controlled Conditions has been received from every affected Distributor and Downstream Manufacturer/User of the Registrant's intermediate.

8.2.1 *Appropriate engineering controls*
In the open circuit systems – where the contact with the product may occur – wear safety goggles, clothing with long sleeves and chemical impermeable gloves. In the event that the product concentration in the air should exceed the limits reported in this section and if the systems, operational procedures and other means to limit the exposure of workers should not be adequate, a protective equipment of the respiratory tract is necessary.
Ensure adequate ventilation, especially in confined areas.

8.2.2 *Individual protection measures, such as personal protective equipment*
The choice of the personal protective equipment shall be consistent with good occupational hygiene practices and varies according to the conditions of potential exposure such as applications, handling procedures, concentration and ventilation. Information provided below on the choice of the proper equipment is based upon the regular employment set out herein.
PRECAUTION MEASURES:
Workplace must be equipped with showers.
SPECIFIC HYGIENE MEASURES:
Always observe good personal hygiene measures, such as washing 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.
PERSONAL HYGIENE:
provide the working environment with structures suitable for allowing people to wash. Change the suits, overalls, the clothing wore under suits and shoes.
WORKING METHOD:
both the use and choice of the personal protective equipment depend on the product risk, the working conditions and the processing. In general, it is recommended to use the safety goggles with side shields, working clothes that protect the arms, legs and body as minimum protection. Moreover, every visitor entering the area where the product is handled should at least wear safety goggles with side shields.
EXPOSURE CONTROL:
keep the hygiene of the working place, use correct working methods and, in the event that the product is used by operators with dry skin or in cold environments, follow the instructions of the next passage.
Change the gloves which were used (polyvinyl chloride, polyethylene, neoprene, non-natural rubber) when there are wear signs, cracks or internal contaminations.
In the event that the concentrations in air may exceed the limits given in this section, it is recommended to use a mask with filter to protect from overexposure through inhalation. The filter typology depends on the quantity and type of chemicals which are handled in the workplace.
SKIN CARE:
personal hygiene is the most effective protection factor. Do not use abrasives or solvents. The use of repair creams after working is advisable to regenerate the lipid layer and it is recommended in the wintertime for those operators with dry skin. In fact, low temperatures and humidity may cause skin abrasions, thus making the workers more vulnerable to the action of the existing chemicals.

Eyes/face protection
During handling protect your eyes with:
- wear shielded safety glasses, visor or face shield to protect against splashes of liquid (refer to UNI EN 166). It must be provided a means to wash with water the eyes.

Skin protection
Hand protection:
- in the event of possible skin contact, use leather gloves/crust (eg. Characterized by neoprene, PVA, Nitrile), heat resistant/insulating characteristics with the gauntlets for any emergency (It is suggested to refer to UNI EN 374) . Wear gloves after thorough hand washing. Gloves should be changed when they show wear. The choice of protective gloves depends also on the conditions of use, it must take into account the manufacturer's instructions and the knowledge of the operator of their allergies.

Skin and body protection:
- use of suitable materials work clothes, antistatic complete, also acts to hold the upper and lower limbs. Change it immediately in case of contamination, if conditions permit, and wash clothing before reuse. It should maintain good personal hygiene practices and clothing of work. Replace the clothes of work at the first signs of wear. It is suggested to refer to UNI EN 465, EN 466, EN 467.

Respiratory protection
Where the procedures and other means to limit the exposure of workers should not be adequate - in order to respect the exposure limits - are needed other means of respiratory protection: mask with filter for gas, organic vapor and dust type UNI EN141, UNI EN143, EN371 UNI. In confined spaces, it is suggested the use of respirators with filter AX (brown for organic gases and vapors); in the case of high concentrations of gas/vapors, use breathing apparatus (EN 529).
For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Asphyxiant at high concentrations, depletes oxygen can be fatal.

Thermal hazards
The product is a gas under pressure, may explode if heated.

8.2.3 *Environmental exposure controls*
Avoid release to the environment.

9 - Physical and chemical properties

9.1 - Information on basic physical and chemical properties

9.1.1 **Appearance (at room temperature):** gas
Physical state (at room temperature): gas
Colour: colourless

9.1.2 **Odour:** characteristic

9.1.3 **Odour threshold:** no data available

9.1.4 **pH:** N.A

9.1.5 **Melting point/ Freezinf point:** -159,6°C

9.1.6 **Initial boiling point and boiling range:** -11,7°C (literature data)

9.1.7 **Flash point:** <-56°C (literature data)

9.1.8 **Evaporation rate:** Not applicable. The substance is extremely volatile at room temperature.

9.1.9 **Inflammability (solid, gas):** Not applicable. The substance is extremely volatile at room temperature.

9.1.10 **Lower flammability or explosive limits:** 1,5 vol %

9.1.11 **Upper flammability or explosive limits:** 8,5 vol %

9.1.12 **Vapours tension:** 540 Pa max

9.1.3 **Relative density (air=1):** Higher than 1

9.1.4 **Density:** 0,56 – 0,59 g/cm³ at 15°C (literature data)

9.1.13 **Solubility:** < 1 g/l

9.1.14 N-octanol/water partition coefficient: ≤ 2,8 (literature data)

9.1.15 Auto-ignition temperature: 460°C

9.1.16 Decomposition temperature: data not available.

9.1.17 Viscosity: $15x10^{-5}$ Pa x s a 15°C (liquid phase)

9.1.18 Explosive properties: The product is not classified as explosive under normal conditions of use. Gas under pressure; may explode if heated.

9.1.19 Oxidising properties: data not available.

9.2 – Other information:

9.2.1 Critical temperature: 134,6°C

9.2.2 Critical pressure: 36500 hPa

9.2.3 Gas group: liquefied gas

N.B.: Data reported herein are typical average values and not specification limits.

10 - Stability and reactivity

10.1 - Reactivity
The substance is stable under normal conditions at room temperature, and if released into the environment, does not polymerize.

10.2 - Chemical stability
The product is to be considered:
- stable under normal conditions, but may become unstable under particular conditions (see paragraphs 10.3 and 10.4).
- it tends to decompose at temperatures above 400°C

10.3 - Possibility of hazardous reactions
The substance is stable under normal operating conditions of work and when used for the purposes intended.
Contact with strong oxidizers (peroxides, chromates, chlorates, perchlorates, ...) or other substances (nitrates, liquid oxygen, fluorine,...) can form explosive mixtures with air and can cause fire hazards under certain conditions (ignition sources). The presence of strong acids or alkalis can cause corrosion of the containers resulting in leakage of the substance.

10.4 - Conditions to avoid
Avoid intense heating of the product and containers.
Avoid rapid decompression of the containers.
Avoid spills and leakage.
Avoid accumulation of the substance in confined places.
Keep away from strong oxidizing agents, strong acids or alkalis.
Keep away from heat/open flames/hot surfaces. Not smoking.
Avoid static buildup.
Avoid shocks, falls, conditions clutch container formations resulting friction and/or sparks.
Avoid exposure of containers at elevated temperatures or in direct sunlight (above 50°C).

10.5 - Incompatible materials
Mixture with nitrates or with other strong oxidants (eg. Chlorates, perchlorates, liquid oxygen) may create an explosive mass, reactions with alkali metals.
Strong acids and alkalis.

10.6 - Hazardous decomposition products
Carbon monoxide, sulphur dioxide and nitrogen oxide – as well as additional and undetermined inorganic compounds of their elements - may be formed as a result of (incomplete) combustion. No decomposition if stored properly.

| 11 - Toxicological information

11.1 - Information on toxicological effects

Literature data relating to toxicokinetic studies concerning the alkanes short chain (C1-C4), show how the latter, which exist in the form of vapor at room temperature, are poorly absorbed. If the exposure involves an absorption (situation of higher concentrations), the latter would not be particularly relevant: there is a little evidence of metabolism, as this substance if it were absorbed, would normally be quickly exhaled.
Also in studies, it would appear that the absorption would tend to increase with increasing molecular weight. Unbranched molecules would be more easily absorbed than branched and the aromatic molecules would be more easily absorbed than paraffin.
The main toxicological studies were conducted on rats.

11.1.1 Acute toxicity

The substance at room temperature and atmospheric pressure, is presented as colorless and odorless gas. Therefore, the information relating to the toxicity Acute oral and inhalation are not particularly relevant.

Acute oral toxicity
According to point 2 of Annex XI of the EC Regulation No. 1907/2006 (REACH), this test may be omitted because the substance occurs in a gaseous state at room temperature and atmospheric pressure.
Highly volatile and flammable at room temperature, it tends to form explosive mixtures with air. A high risk of fire and explosion would be associated with any testing at significant concentrations.

Acute inhalation toxicity
LC50 rat [inhalation]: 658 mg / l 4 h (literature value)
Without prior mark - related to substance: butane

Isobutane:
Inhalation (LC_{50}): 52 000 ppm (hours, 2 rat)

Vapors may cause narcotic effects.
High concentrations in the air inhaled can lead to unconsciousness and asphyxiation from lack of oxygen.

Acute dermal toxicity
According to point 2 of Annex XI of the EC Regulation No. 1907/2006 (REACH), this test may be omitted because the substance occurs in a gaseous state at room temperature and atmospheric pressure.
Highly volatile and flammable at room temperature, it tends to form explosive mixtures with air. A high risk of fire and explosion would be associated with any testing at significant concentrations.

11.1.2 Skin corrosion/Skin irritation

According to point 2 of Annex XI of the EC Regulation No. 1907/2006 (REACH), this test may be omitted because the substance occurs in a gaseous state at room temperature and atmospheric pressure.
Highly volatile and flammable at room temperature, it tends to form explosive mixtures with air. A high risk of fire and explosion would be associated with any testing at significant concentrations.
Literature data on dose-response studies conducted in humans have shown that propane and butane have irritant and corrosive to skin and mucous membranes.
Compressed gas causes cold burns.
The contact with liquid or gaseous form – which expands quickly – causes cold burns/frostbite.

11.1.3 Serious eye damage/irritation

According to point 2 of Annex XI of the EC Regulation No. 1907/2006 (REACH), this test may be omitted because the substance occurs in a gaseous state at room temperature and atmospheric pressure.
Highly volatile and flammable at room temperature, it tends to form explosive mixtures with air. A high risk of fire and explosion would be associated with any testing at significant concentrations.
Contact with liquefied gas can cause cold burns.

11.1.4 Respiratory or skin sensitisation

Respiratory sensitization
Studies indicating this type of effect are not available.

Skin sensitization
In accordance with section 2 of the Annex XI of Regulation (EC) no. 1907/2006 (REACH), such study shall not be conducted, since this substance is a gas at atmospheric temperature and pressure.

Extremely volatile and flammable at ambient temperature, it tends to form explosive mixtures with air. A high risk of fire and explosion would be associated with any test at significant concentrations.
The contact with liquefied gas may cause cold burns/frostbite.

11.1.5 CMR effects

Mutagenicity assessment
No evidence of genotoxicity was observed: in vitro testing and tests conducted in animals. Moreover, the substance might contain <0,1% of 1,3-butadiene as impurity, therefore it is not classified as mutagenic pursuant to regulations on hazardous substances

Carcinogenicity assessment
No evidence of carcinogenicity. According to the results of tests for mutagenicity and toxicity of repeated administration, cancerogenic effects are not to be expected based on our current state of knowledge.
Moreover, the substance might contain <0,1% of 1,3-butadiene as impurity, therefore it is not classified as carcinogenic pursuant to regulations on hazardous substances.

Reproductive toxicity
Reproductive toxicity:
Most studies did not show any consistent evidence of toxicity to fertility, therefore the substance is not classified as toxic to reproduction pursuant to the regulations on hazardous substances.

Screening for reproductive/developmental toxicity
Rat inhalation (males/females)
Number of exposures: daily
NOAEL (No Observed Adverse Effect Level) parents: 7.131 mg/l
NOAEL F1: 21.394 mg/l
Method: OECD TG 422

Developmental toxicity/teratogenesis:
Most studies did not show any consistent evidence of developmental toxicity/teratogenesis: the main impurities contained in the substance do not classify as toxic for reproduction pursuant to the regulations on hazardous substances.

Rat inhalation (males/females)
Number of exposures: daily
NOAEL (No Observed Adverse Effect Level) parents: 21.394 mg/l
Maternal NOAEL: 21.394 mg/l
In animal testing (OCSE 422, screening test) there is no evidence of developmental effects.

11.1.6 Specific target organ toxicity (STOT)

Single exposure
Data not available.

Repeated exposure
Oral
In accordance with section 2 of the Annex XI of Regulation (EC) no. 1907/2006 (REACH), such study shall not be conducted, since this substance is a gas at atmospheric temperature and pressure.
Extremely volatile and flammable at ambient temperature, it tends to form explosive mixtures with air. A high risk of fire and explosion would be associated with any test at significant concentrations.

Skin:
In accordance with section 2 of the Annex XI of Regulation (EC) no. 1907/2006 (REACH), such study shall not be conducted, since this substance is a gas at atmospheric temperature and pressure.
Extremely volatile and flammable at ambient temperature, it tends to form explosive mixtures with air. A high risk of fire and explosion would be associated with any test at significant concentrations.

Inhalation:
In a study conducted for 6 weeks on male and female rats, no neurological, hematological or clinical effects have been observed.
The lowest concentration at which adverse effects were observed (LOAEC) in this study equals 21.394 mg/l [OECD TG 422 method].

11.1.7 Aspiration hazard
Not Applicable. The substance at room temperatiure and atmospheric pressure is a colourless and odourless gas.

11.1.8 Further information

Other standard effects (e.g. state of unconsciousness, especially toxic metabolites, etc…)

A high concentration causes drowsiness, headache and dizziness. Should the oxygen amount go down below 17%, it may cause unconsciousness, asphyxiation and/or CNS depression. Contact with compressed gas causes cold burns/frostbite.
High concentrations may cause hypoxia and be toxic to heart; should the airborne oxygen concentration go down below 14%, it may also prove fatal.

Permanent effects of acute or chronic toxicity:

It damages the CNS.
It is asphyxiating and causes headache and drowsiness. A high concentration or excessive exposure may cause unconsciousness and asphyxiation.

| 12 - Ecological information

This substance is classified as Volatile Organic Compound in accordance with Directive 2004/42/EC.

12.1 - Toxicity

At the time being, data relating to toxicity to water evidenced no ecological toxicity and no PNEC(S) was derived for sweet water, marine water, sediments and soil.
Under atmospheric temperature and pressure the product is gaseous, colorless and odorless, highly volatile and almost insolubla in water: in compliance with column 2 of annexes VII and VIII of REACH regulation, acute toxicity tests (acute toxicity for water, chornic toxicity for water, toxicity on soil) may be avoided in case of conditions evidencing scarse possibility of water toxicity.
As to waste water pollution no specific actions have to be taken since the product – under atmospheric temperature and pressure – is gaseous, extremely volatile and almost insoluble in water.

CL50 fish 1	24,11 - 147,54 mg/l (96h)
CE50 Daphnia 1	14,22 - 69,43 mg/l (48h)
ErC50 (algae)	7,71 - 19,37 mg/l

Toxicity for bacteria
Considering the above chemical and physical properties of the product, literature data pointed out no toxicity, extremely scarce due to volatility.
Test di ames Salmonella typhimurium
No sign of mutagenic action
Metabolic activation: with or without
Method: Mutagenicity (Salmonella typhimurium – reversion assay)

Toxicity for living organism in the soil
Considering the above chemical and physical properties of the product, literature data pointed out no toxicity, extremely scarce due to volatility.

Toxicity for plants
Considering the above chemical and physical properties of the product, literature data pointed out no toxicity, extremely scarce due to volatility.

12.2 - Persistence and degradability

Photodecomposition
The product breaks down rapidly in the air by exposure to light.
Life in the atmosphere is of few days, with an ozone depletion potential equal to zero.
Global Warming Potential is 3.
Exclusively under specific circumstances, through complex interaction with air pollutants and climatic and weather conditions photochemical degradation nearby the surface might contribute to the formation of tropospheric ozone.

Biodegradability
Literature data evidenced that the product (gaseous in case of atmospheric temperature and pressure) is rapidly biodegradable (QSAR Method).

12.3 - Bioaccumulative potential

Iso-butane (N CAS 75-28-5)

Log Pow	≤2,8 literature data

Considering its chemical and physical properties the product is assumed to have no bioaccumulation potential following decomposition, reduction and degradation.

12.4 - Mobility in soil
Controls of emissions to the soil cannot be applied, since no direct release to the soil occurs.
Known or predictable distribution in environmental compartments: evaporates quickly.
Due to its quick evaporation, it is unlikely to be a source of water and soil pollution is unlikely.
Due to its lower density, it floats on water surface where it evaporates quickly.

12.5 - Results of PBT and vPvB assessment
In accordance with the criteria set forth in the Annex XIII of REACH Regulation, the substance is not defined as persistent, bioaccumulative and toxic to the environment.

12.6 - Other adverse effects
Global warning potential (GWP): 3
Ozone depletion potential (ODP): 0
Use the product in compliance with best practices and avoid dispersion into the environment.
High concentrations of ozone are associated with adverse effects on humans and during the season of crops with different damage on crops, forests and vegetation.

13 - Disposal considerations

13.1 - Waste treatment methods
This product shall be classified as: **hazardous special waste**. Recover, if possible.
This product CANNOT be disposed of in dumps and/or through public sewers, channels, waterways, watercourses or rivers. This product can be incinerated in suitable thermal disposal plants in accordance with the regulations in force. The waste originated from or contaminated by the preparation shall have to be classified, stored and sent to a suitable disposal plant complying with the national and regional regulations in force. For handling and storing the waste originating from or contamined by the preparation, apply the procedures and precautions described in paragraphs 6, 7 and 8 of this Sheet.

13.1.1 Containers disposal
The containers, although completely emptied out, shall not be dispersed into the environment. The product containers shall be duly decontaminated before starting their disposal. The containers containing the product residues must be classified, stored and sent to a suitable disposal plant complying with the national ad regional regulations in force.
Empty pressure vessels should be returned to the supplier.

13.1.2 European Waste Catalogue Code
According to its use, the product may be catalogued according to different codes. General indications cannot be given. The product as supplied does not contain halogenated compounds.
The user must be aware that the use conditions may change the waste code after the use. Refer to Directive 2001/118/EC for waste definition.

| 14 - Transport information

Precautions: The product is hazardous and subject to restrictions for transport.

Transport label: 2.1
Alternatively, symbol (flame and number) black or white; background: red.

14.1 – UN Number
ADR-RID (Road/rail transport) UN Number: 1969
ADNR/ADN (Inland waterway transport) UN number: 1969

IMDG	(Sea transport)	UN Number: 1969
ICAO-IATA	(Air transport)	UN Number: 1969

14.2 - UN proper shipping name

ADR-RID	(Road/rail transport)	UN proper shipping name: Isobutane
ADNR/ADN	(Inland waterway transport)	UN proper shipping name: Isobutane
IMDG	(Sea transport)	UN proper shipping name: Isobutane
ICAO-IATA	(Air transport)	UN proper shipping name: Isobutane

14.3 - Transport hazard classes

ADR-RID	(Road/rail transport)	Hazard class: 2
ADR-RID	(Road/rail transport)	Hazard identification no.: 23
ADR-RID	(Road/rail transport)	Hazard label: 2.1
ADR-RID	(Road/rail transport)	Classification code: 2F
ADNR/ADN	(Inland waterway transport)	Hazard class: 2
ADNR/ADN	(Inland waterway transport)	Hazard label: 2.1
ADNR/ADN	(Inland waterway transport)	Classification code: 2F
IMDG	(Sea transport)	Hazard class: 2
IMDG	(Sea transport)	Hazard label: 2.1
ICAO-IATA	(Air transport)	Hazard class: 2
ICAO-IATA	(Air transport)	Hazard label: 2.1

14.4 - Packing group

ADR-RID	(Road/rail transport)	Packing group:--
ADR-RID	(Road/rail transport)	Special dispositions: 657, 660
ADR-RID	(Road/rail transport)	Limited quantities: 0
ADR-RID	(Road/rail transport)	Exempt quantities: E0
ADR-RID	(Road/rail transport)	Packing instructions: P200 Testing time, years: 10 Testing pressure, bar: 10 Filling level: 0.49 Special packing dispositions: ra, v
ADR-RID	(Road/rail transport)	Common packing: MP9
ADR-RID	(Road/rail transport)	Tank code: PxBN (M) Portable tanks: T50 (M) Maximum allowable working pressure (bar): small; naked; sunroof; blocks; respectively: 8.5, 7.5, 7.0, 7.0 Opening below fluid level: allowed Pressure measurement requirements: Normal Maximum filling ratio: 0.49
ADR-RID	(Road/rail transport)	Tunnel restriction code: 2 (B/D): Passage forbidden through tunnels of category B and C for transport via tank. Passage forbidden through tunnels of category D and E.
IMDG	(Sea transport)	Packing group:--
ICAO-IATA	(Air transport)	Packing group:--

14.5 - Environmental hazards

This substance is not classified as environmentally hazardous.

IMDG	(Transport by sea)	Marine pollutant: No

14.6 - Special precautions for users

IMDG (Sea transport) Emergency procedures (Ems): F-D, S-U

Packages shall not be stowed in the vehicle. The cylinders must be kept upright and carried only in a safe position, preferably well-ventilated vehicles or open carriages.

Avoid transport on vehicles where the load space is not separated from.

Make sure that the driver is aware of the potential hazards of the load and knows what to do in case of an accident or emergency.

Before starting cylinder transport:

- Make sure the load is correctly anchored
- Make sure the cock is tightly closed and does not leak
- Make sure the blind cap of valve – when provided – is correctly mounted
- Make sure the cap (when provided) is correctly applied on the cock outfeed
- Make sure there is a good ventilation.

Transport shall be carried out on vehicles authorized to the carriage of dangerous goods, following the provisions of A.D.R. agreement in force as well as applicable national.
Goods shall be carried in their original packaging and, in any case, in content-resistant packages which might not cause any dangerous reaction with the content and not subject to generate dangerous reactions with it.
Operators in charge of the dangerous goods loading and unloading shall be duly trained on the risks deriving from the goods and on any procedure to be adopted in case of emergency.
Other information:
Cylinder minimum testing pressure: with thermal insulation: 1 Mbar 10 bar
without thermal insulation: 1 Mbar 10 bar
Permissible maximum mass of the content per capacity liter: 0.49 kg

14.7 - Transport in bulk according to Annex II of MARPOL and the IBC Code
For the transport in bulk, stick to Annex II MARPOL and to the IBC code whereas applicable.

| 15 - Regulatory information

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

Authorization pursuant to REACH Regulation (EC Regulation no. 1907/2006 as amended):
substance not included in the list of Substances of Very High Concern (SVHC) nominated for the authorization.

Use restrictions pursuant to REACH Regulation (EC Regulation no. 1907/2006 as amended):
no component subject to restrictions pursuant to Title VIII (Annex XVII), Appendix 2.

Other EU regulations and national implementations

Seveso category (Dir. 96/82/EC and Dir. 105/2003/EC and Law Decree 334/99 as amended): annex I part 1.
Hazardous chemical pursuant to Title IX (implementation Dir. 98/24/EC) of Law Decree 81/08 as amended.
For waste disposal refer to Law Decree 152/06 as amended.

Other regulatory references that can be applied

Legislative Decree no. 81 of 9 April 2008 as amended: Implementation of Article 1 of Law no.123 of 3 August 2007 on occupational health and safety in the workplace.
Presidential Decree no.336/94 of 13 April 1994: new table on the occupational diseases in the industry.
Ministerial Decree of 5 September 1994 of the Ministry of Health: List of unhealthy industries in article 216 of the consolidated texts of health laws (N.B.: LPG productions and storages at manufacturers' and wholesalers' are included among the first-class unhealthy industries).
Circular no.74 of 29 September 1956 of the Ministry of the Interior: Storage and resale of liquefied petroleum gases in cylinders.
Decree of 31 March 1974 of the Ministry of the Interior: Safety regulations for the design, construction, installation and operation of LPG facilities with an overall capacity not exceeding 5m³.
Legislative Decree no.475 of 4 December 1992: Implementation of the Directive no. 89/686/EEC on personal protective equipment.
Decree of 13 October 1994 of the Ministry of the Interior: Technical Rule of fire prevention for the design, construction, installation and operation of LPG deposits in fixed tanks with a capacity exceeding 5m³ and/or in movable vessels with an overall capacity exceeding 5000 kg.
Decree of 15 May 1996 of the Ministry of the Environment: Safety technical procedures and regulations in pouring from tankers and rail tankers.

Germany

Reference attached VwVwS:	Water hazard class (WGK) nwg, not hazardous to water
German Storage class (LGK):	LGK 2A - Gases
12th Law for the Enforcement of the Federal emission control Act– 12.BlmSchV:	Not falling within the scope of the 12th BlmSchV (Emission protection decree) (Regulation on relevant incidents)

Holland

Waterbezwaarlijkheid:	11 - Weining schadelijk voor in het water levende organismen
SZW-lijst van kankerverwekkende stoffen:	The substace is not listing
SZW-lijst van mutagen stoffen:	The substace is not listing
NIET-limitatieve lijst van voor de voortplanting giftige stoffen -	

Borstvoeding:	The substace is not listing
NIET-limitatieve lijst van voor de voortplanting giftige stoffen - Vruchtbaarheid:	The substace is not listing
NIET-limitatieve lijst van voor de voortplanting giftige stoffen - Ontwikkeling:	The substace is not listing

Denmark

Class for fire hazard:	Classe l-1
Store unit:	1 litre
Observation on classification:	F+ < Flam. Gas 1; Gas liquefatto>; Emergency management guidelines for the storage of flammable liquids must be followed
Recommendations Danish Regulation:	Unauthorized product to anyone under 18 years

National Legislation : Whereas applicable, refer to the following regulations:
Presidential Decree (D.P.R.) 175/88 as amended
Presidential Decree 303/56 of 19/05/1956
Ministerial Circulars 45 and 61
Law Decree 81/2008 as amended

National Legislation : Other regulations in force:

- threshold limit values (TLV) and exposure biological indicators (EBI) ACGIH 1998 as amended.
- Protection of workers against risks relating to exposure to the chemical, physical and biological agents at work (LAW DECREE 212 of 30/07/1990) (published in: **Official Journal of the Italian Republic** no. **181** of **04/08/1990)**
- General regulations for the working hygiene (Presidential Decree 303/56 of 19/03/1956) (published in: **Ordinary Supplement of the Official Journal** no. **105** of **30/04/1956)** as amended.
- Occupational disease regulations and prospects (Presidential Decree no. 336 of 13/04/1994) (published on: Gazzetta Ufficiale Italiana no. 131 of 07/06/1994) and amendments.
- Working safety (Law Decree 626 of 19/09/94) (Implementation of Directives 89/391EEC, 89/654/EEC, 89/655/EEC, 89/656/EEC, 90/269/EEC, 90/270/EEC, 90/394/EEC and 90/679/EEC, *93/88/EEC, 97/42/CEC and 1999/38/EC* concerning the improvement of safety and health of workers *at* work) (published in: **Ordinary Supplement of the Official Journal** no. **265** of **12/11/1994**).
- Relevant incident risks (Seveso bis) (Law Decree 334 of 17/08/1999) (Implementation of Directive 96/82/EC concerning the prevention of major-accident hazards involving dangerous substances) (published in: **Ordinary Supplement of the Official Journal** no. **228** of **28/09/1999**) as amended.
- Regulations on the emissions (M.D. of 12/7/90) (Guidelines for the limitation of the emissions from the industrial facilities and the setting of the minimal values of emission) (published in: **Ordinary Supplement of the Official Journal** no. **176** of **30/07/1990**).
- Regulations on the atmospheric pollution (M.D. of 12/7/90- Guidelines for the limitation of the emissions from the industrial facilities and the setting of the minimal values of emission and of Presidential Decree of 25/07/1991- published in: **Official Journal of the Italian Republic** no. **175** of **27/07/1991**) as amended.
- Regulations on the water protection (LAW DECREE 152 of 11/5/99) (Rules on the water protection from the pollution and implementation of Directive 91/271/EEC concerning the treatment of urban waste water and of Directive 91/676/EEC concerning the protection of waters against pollution caused by the nitrates from agricultural sources) (published in: **Ordinary Supplement of the Official Journal** no. **124** of **29/05/1999**) as amended.
- Regulations on the disposal and transport of hazardous waste (Law Decree 22/97- Implementation of Directives 91/156/EEC on waste, 91/689/EEC on hazardous waste and 94/62/EC on packaging and packaging waste – published in : **Ordinary Supplement of the Official Journal** no. **38** of **15/02/1997** and Law Decree 389/97-Amendments and integrations to the Law Decree 5 February 1997, no. 22, regarding waste, hazardous waste, packaging and packaging waste – published in: **Official Journal of the Italian Republic** no. **261** of **08/11/1997**) as amended.
- Land transport regulations ADR/RID – M.D. of 4/9/1996- Implementation of Directive 94/55/EC of the Council concerning the approximation of the laws of the Member States with regard to the transport of dangerous goods by road (published in: **Ordinary Supplement of the Official Journal** no. **282** of **02/12/1996**) as amended.
- Ministerial Circulars 45 and 61 as amended.
- Consolidation act on classification, packaging and labelling of hazardous substances (with implementation of Directive EC until 22° Adaptation): M.D. of 28/4/1997 – Implementation of Article 37, paragraphs 1 and 2, of the Law Decree 3 February 1997, no. 52, concerning the classification, packaging and labelling of the hazardous substances (published in: **Ordinary Supplement of the Official Journal** no. **192** of **19/08/1997**) as amended.
- Regulations on classification, packaging and labelling of dangerous preparations (L.D. 285 of 16/07/1998- Implementation of Community Directives regarding the classification, packaging and labelling of dangerous preparations, complying with Article 38 of the Law 24 April 1998, no. 128) (published in: **Official Journal of the Italian Republic** no. **191** of **18/08/1998**) as amended.

- Implementation of 24th Adaptation EC (M.D. 175 of 07/07/1999 – Rules relating to classification, packaging and labelling of dangerous substances as implementation of Directive 98/73/EC) (published in: **Ordinary Supplement of the Official Journal** no. **226** of **25/09/1999**) as amended.
- Regulations for the compilation of the Safety Sheets (with implementation until Directive 93/112 EC) (M.D. of 4/4/97 – Implementation of Article 25, paragraphs 1 and 2 of the Law Decree 3 February 1997, no. 52, regarding the classification, packaging and labelling of dangerous substances, with regard to the safety sheet on safety) (published in : **Official Journal of the Italian Republic** n° **169** of **22/07/1997**) as amended.
- Implementation of 24th and 25th Adaptation EC (M.D. 10/04/2000 – Implementation of Directives 98/73/EC and 98/98/EC, respectively adapting to Directive 67/548/EEC for the 24th and 25th time) (published in: **Ordinary Supplement of the Official Journal** no. **205** of **02/09/2000**) as amended.
- **Directive EEC/EAEC/EC** no. **45** of **31/05/1999**
- 1999/45/EC: Directive of the European Parliament and Council, of 31 May 1999, concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to classification, packaging and labelling of dangerous preparations.
- **The preparation was recorded with the codes IB, IB1, IB2 and IB3, as provided for by the ex-Ministerial Decree of 19/04/2000 replaced by Decree no.65 of 14 March 2003.**
- **Ministerial Decree** of **26/01/2001**- Regulations relating to classification, packaging and labelling of dangerous substances as implementing Directive **2000/32/EC** (adapting to technical progress of Directive 67/548/EEC for the 26th time).
- **Ministerial Decree** of **11/04/2001**- Implementation of the Directive **2000/33/EC** adapting to technical progress of Directive 67/548/EEC for the 27th time, regarding the classification, packaging and labelling of dangerous substances.
- **Community Directive** 2001/59/EC of 06/08/2001, adapting to technical progress of Directive 67/548/EEC for the 28th time regarding the classification, packaging and labelling of dangerous substances.
- **Community Directive** 2001/58/EC of 27/07/01, amending for the second time Directive 91/155/EC defining and lying down the detailed arrangements for the system of specific information relating to dangerous preparations in implementation of Article 14 of Directive 1999/45/EC.
- **Law Decree** of **14 March 2003**, no. **65** – Implementation of Directives 1999/45/EC and 2001/60/EC relating to the classification, packaging and labelling of dangerous preparations.
- **Decree** of **16 January 2004**, no.**44** – Implementation of Directive 1999/13/EC on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities according to Article 3, paragraph 2 of the Presidential Decree of 24 May 1988, no. 203.
- **Decree 28/02/2006 –** Implementation of Directive 2004/74/EC, adapting to technical progress of Directive 67/548/EEC for the 29th time regarding the classification, packaging and labelling of dangerous substances.
- **Regulation (CE) n. 1907/2006** concerning registration, evaluation, authorization and restriction of chemicals (REACH) and establishing a European agency for chemicals.
- **Decree 04/02/2008 -** Implementation of Directive 2006/15/CE, which defines a second list of the occupational exposure limit values as implementation of Council Directives 98/24/CE and modifying Directives 91/322/CEE and 200/39/CE.
- **Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008** on classification, labelling and packaging of substances and misture, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No. 1907/2006.
- **Regulation (EC) No. 552/2009 of 22 June 2009** - amending Regulation (EC) No. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards Annex XVII.
- **Commission Regulation (EC) No. 790/2009 of 10 August 2009** amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures.
- **Commission Regulation (EU) N. 276/2010 of 31 March 2010** amending regulation (EC) n. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards annex XVII (dichloromethane, lamp oils, grill lighter fluids and organostannic compounds).
- **Commission Regulation (EU) no. 453/2010 of 20 May 2010**, amending Regulation (EC) no. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).
- **Commission Regulation (EU) No. 286/2011 of 10 March 2011** amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures.
- **Commission Regulation (EU) N. 109/2012 of 9 February 2012**, amending regulation (EC) n. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards annex XVII (CMR substances)
- **Commission Regulation (EU) N. 618/2012 of 10 July 2012,** amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) n. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures.
- **Commission Regulation (EU) N. 126/2013 of 13 February 2013,** amending Annex XVII of Regulation (EC) n. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).
- **Commission Regulation (EU) N. 348/2013 of 17 April 2013** amending Annex XIV of Regulation (EC) n. 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

- **Commission Regulation (EU) N. 487/2013 of 8 May 2013** amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) n. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures.
- **Commission Regulation (EU) N. 758/2013 of 7 August 2013** amending Annex VI of Regulation (EC) n. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures.
- **Commission Regulation (EU) No 944/2013** of **2 October 2013,** amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures
- **Directive 2014/27/EU of the European Parliament and of the Council** of **26 February 2014,** amending Council Directives 92/58/EEC, 92/85/EEC, 94/33/EC, 98/24/EC and Directive 2004/37/EC of the European Parliament and of the Council, in order to align them to Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures
- **Regulation (EU) No 517/2014 of the European Parliament and of the Council** of **16 April 2014** on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006
- **Commission Regulation (EU) No 605/2014 of 5 June 2014**, amending, for the purposes of introducing hazard and precautionary statements in the Croatian language and its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures.
- **Commission Regulation (EU) No 2015/830** of **28 May 2015** amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).
- **Commission Regulation (EU) 2015/1221** of **24 July 2015** amending Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures, for the purposes of its adaptation to technical and scientific progress

15.2 - Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.
All information contained in sections 11 and 12 are extracted from IUCLID.

15.3 - Restrictions on marketing and use

Authorization and/or restrictions on use (annex XVII):

3. Liquid substances or mixtures which are regarded as dangerous in accordance with Directive 1999/45/EC or are fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: (a) hazard classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 types A to F; (b) hazard classes 3.1 to 3.6, 3.7 adverse effects on sexual function and fertility or on development, 3.8 effects other than narcotic effects, 3.9 and 3.10; (c) hazard class 4.1; (d) hazard class 5.1 ◄	1. Shall not be used in: — ornamental articles intended to produce light or colour effects by means of different phases, for example in ornamental lamps and ashtrays, — tricks and jokes, — games for one or more participants, or any article intended to be used as such, even with ornamental aspects, 2. Articles not complying with paragraph 1 shall not be placed on the market. 3. Shall not be placed on the market if they contain a colouring agent, unless required for fiscal reasons, or perfume, or both, if they: — can be used as fuel in decorative oil lamps for supply to the general public, and, — present an aspiration hazard and are labelled with R65 or H304, 4. Decorative oil lamps for supply to the general public shall not be placed on the market unless they conform to the European Standard on Decorative oil lamps (EN 14059) adopted by the European Committee for Standardisation (CEN). 5. Without prejudice to the implementation of other Community provisions relating to the classification, packaging and labelling of dangerous substances and mixtures, suppliers shall ensure, before the placing on the market, that the following requirements are met: (a) lamp oils, labelled with R65 or H304, intended for supply to the general public are visibly, legibly and indelibly marked as follows: 'Keep lamps filled with this liquid out of the reach of children'; and, by 1 December 2010, 'Just a sip of lamp oil — or even sucking the wick of lamps — may lead to life-

	threatening lung damage'; (b) grill lighter fluids, labelled with R65 or H304, intended for supply to the general public are legibly and indelibly marked by 1 December 2010 as follows: 'Just a sip of grill lighter may lead to life threatening lung damage'; (c) lamp oils and grill lighters, labelled with R65 or H304, intended for supply to the general public are packaged in black opaque containers not exceeding 1 litre by 1 December 2010. 6. No later than 1 June 2014, the Commission shall request the European Chemicals Agency to prepare a dossier, in accordance with Article 69 of the present Regulation with a view to ban, if appropriate, grill lighter fluids and fuel for decorative lamps, labelled R65 or H304, intended for supply to the general public. 7. Natural or legal persons placing on the market for the first time lamp oils and grill lighter fluids, labelled with R65 or H304, shall by 1 December 2011, and annually thereafter, provide data on alternatives to lamp oils and grill lighter fluids labelled R65 or H304 to the competent authority in the Member State concerned. Member States shall make those data available to the Commission.
40. Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI ►M19 to Regulation (EC) No 1272/2008 ◄ or not	1. Shall not be used, as substance or as mixtures in aerosol dispensers where these aerosol dispensers are intended for supply to the general public for entertainment and decorative purposes such as the following: — metallic glitter intended mainly for decoration, — artificial snow and frost, — 'whoopee' cushions, — silly string aerosols, — imitation excrement, — horns for parties, — decorative flakes and foams, — artificial cobwebs, — stink bombs. 2. Without prejudice to the application of other Community provisions on the classification, packaging and labelling of substances, suppliers shall ensure before the placing on the market that the packaging of aerosol dispensers referred to above is marked visibly, legibly and indelibly with: 'For professional users only'. 3. By way of derogation, paragraphs 1 and 2 shall not apply to the aerosol dispensers referred to Article 8 (1a) of Council Directive 75/324/EEC (2). 4. The aerosol dispensers referred to in paragraphs 1 and 2 shall not be placed on the market unless they conform to the requirements indicated.

15.4 - Greater hazards
Such mixture must be entered in the storage classification summation.

| 16 - Other information

Uses and restrictions : The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

SDS distribution : The information contained herein must be available to those who handle the product.

Employees shall be informed and trained according to their specific tasks in compliance with the regulations in force.

The dangers that may arise for misuse are mainly those related to fire or explosion or to asphyxia in the case of unplanned releases on fire in confined areas.
It is essential that all operators and users of the GPL are informed and trained on precautions for handling and safe operation.
Workers must be trained according to their specific tasks, according to the relevant laws.
Vocational education and training of workers on chemical agents must be conducted according to Directive No. 98/24/EC.

D.M. 31/03/1984 Ministry of Interior: Education and training drivers supply ship tank capacity of up to 5 m^3.
Legislative Decree. 09/04/2008 n°81, as amended: Training and safety training for workers.
D.M. Interior Ministry 13/10/1994: Training of managers of stores in which you animate the GPL
ADR 2011: Obligation of professional training for drivers, consultants and operators.
UNI 10682: Small plants of LPG to distribution networks, design, construction, installation, testing and operation.
Legislative Decree. 02/01/1997 n. 10: Implementation of Directives 93/68/EEC - 96/58/EC relating to personal protective equipment.
Legislative Decree. 25/02/2000 n. 93 (PED): Implementation of Directive 97/23/EC concerning pressure equipment.
Legislative Decree. 02/02/2002 n. 23 (TPED): Implementation of Directive 1999/36/EC, 2001/2/EC and Decision 2001/107/EC on transportable pressure equipment.
Legislative Decree. 02/02/2002 n. 25: Implementation of Directives 98/24/EC on the protection of the health and safety of workers
D.M. 31/03/1984 Ministry of Interior: Education and training drivers supply ship of serbatoietti capacity of up to 5 m^3
D.M. 15/05/1996 Ministry of Environment: Safety Procedures for the transfer of LPG in storage
D.M. 10/03/1998 Ministry of Interior: Obligation to educate and train workers to fire crews and emergency management for all activities subject to prevention certificate.
D.M. 16/03/1998 Min. Environment: Arrangements for information and training of workers in situ.

GLOSSARY OF THE HAZARD STATEMENTS REPORTED IN THE DOCUMENT
H phrases description (1272/2008)
H220-Extremely flammable gas
H280-Contains gas under pressure; may explode if heated

The information contained herein is believed to be accurate and correct based on our present state of knowledge and working experience with this product, and shall not be deemed exhaustive. It is applied to the product complying with the specifications. In case of combinations or mixtures, make sure that no new hazard may occur. It does in no way exempt the user of the product from complying with the ensemble of laws, regulations and administrative provisions concerning the product, working hygiene and safety.
This Sheet was drawn by using the program ESWIN together with the database SINTALEX.

Key/Legend

ACGIH	American Conference of Governmental Industrial Hygienists (Documentation of the Threshold Limit Values)
ADR	Accord européen relative au transport international des marchandises dangereuses par route (The European Agreement concerning the International Carriage of Dangerous Goods by Road)
ASTM	ASTM International, originally known as American Society for Testing and Materials (ASTM)
bw	Body weight
CAS	Chemical Abstracts Service (division of the American Chemical Society)
CMR	Carcinogen, Mutagen and Reprotoxic
CONCAWE	CONservation of Clean Air and Water in Europa
CSA	Chemical Safety Assessment
CSR	Chemical Safety Report
DMEL	Derived Minimum Effect Level
DNEL	Derived No Effect Level
dw	Dry weight
EC number	European Chemical number
EC50	Effective Concentration 50 (Maximum effective concentration for 50% of Individuals)
EINECS	European Inventory of Existing Commercial Substances
EL50	Effective load, 50%
IATA	International Air Transport Association
ICAO	International Civil Aviation Oragnization
IC50	Inhibitor Concentration 50 (Inhibitor Concentration for 50% of Individuals)
IMDG code	International Maritime Dangerous Good code (Codice sul Regolamento del Trasporto Marittimo)
LC50	Lethal Concentration 50 (Lethal Concentration for 50% of Individuals)
LD50	Lethal Dose 50 (Lethal Dose for 50% of Individuals)
LL50	Lethal load, 50%

LL0	Lethal load, 0%
LOAEL	Low Observed Adverse Effects Level
NIOSH/OSHA	Occupational Healt Guidelines for Chemical Hazards (Registry of Toxic Effects of Chemical Substances)
NOEC	No Observed Effects Concentration
NOAEL	No Observed Adverse Effects Level
NOEL	No Observed Effects Level
OECD	Organisation for Economic Co-operation and Development
PNEC	Predicted No-Effect Concentration
PBT	Persistent, bioaccumulative and toxic
RID	Règlement concernent le trasport International ferroviaire des marchandises Dangereuses
RMM	Risk Management Measure
CNS	Central nervous system
STEL	Short term exposure limit
STOT	Specific Target Organ Toxicity
TLV	Threshold limit value (America Conference of Governmental Industrial Hygienists)
TWA	Time Weighted Average
STEL	Short trm exposure limit
UVCB	Chemical Substances of Unknown or Variable Composition, Complex Reaction Products and Biological Materials
vPvB	Very Persistent very bioaccumulative (Molto Persistente e molto Bioaccumulabile)
VOC	Volatile Organic Compounds
VwVwS	Text of Administrative Regulation on the Classification of Substances hazardous to waters into Water Hazard Classes (Verwaltungsvorschrift wassergefährdende Stoffe - VwVwS)
WAF	Water Accomodated Fraction

Abbreviations and acronyms used herein can be found in the following Webpage://www.wikipedia.org/

International poison control centers:

Country	Regional Centre (if any)	Official Poison Centre	Emergency Number	Operating Time	Available to	Website
Austria	No	Österreich Vergiftungsinformation szentrale (*Poison Information Centre*)	+431 406 43 43	24h/7 days	General public and Professionals	www.giftinfo.org
Belgium	No	Centre Antipoisons / Antigiftcentrum (*Antipoison Centre*)	+32 70 245 245	24h/7 days	General public and Professionals	http://www.poisoncentre.be
Bulgaria	No	Университетска многопрофилна болница за активно лечение и спешна медицина "Н.И.Пирогов" (*Institute for Emergency Medicine "N.I. Pirogov"*)	+359 887 435 325 +359 2 9154 378	24h/7 days	(not specified)	http://www.pirogov.bg
Cyprus	No	Το Κέντρο Δηλητηριάσεων - Παθολογικού Τομέα του Γενικού Νοσοκομείου Παίδων Αθηνών «Π. & Α. Κυριακού» (*Greek Poison Information Centre*)	+30 210 779 37 77	24h/7 days	General public and Professionals	http://www.aglaiakyriakou.gr/poison.html
Czech Republic	No	Toxikologického informačního střediska (*Toxicological Information Centre*)	+420 224 919 293 +420 224 915 402	24h/7 days	General public and Professionals	http://www.tis-cz.cz/

Denmark	No	Giftlinjen (*Poison Control Hotline*)	+45 82 12 12 12	24h/7 days	General public only	http://www.giftlinjen.dk
Estonia	No	Mürgistusteabekeskus (*Poison Information Centre*)	16662 (hotline) +372 626 93 9 (from abroad)	Esmaspäevast 09.00 kuni laupäeva hommikuni 09.00 - Nädalavahetustel keskus ei tööta. (*Monday through Saturday mornings 9:00am to 9:00pm - close on weekend*)	General public and Professionals	http://www.16662.ee/
Finland	No	Myrkytystietokeskuksen (*Poison Information Centre*)	+358 9 471 977	24h/7 days	General public and Professionals	http://www.hus.fi/default.asp?path=1,28,824,2049,2265,2260
France	Angers	Centre Antipoison et de Toxicovigilance	+33 (0)2 41 48 21 21 +33 (0)1 45 42 59 59	24h/7 days	General public and Professionals	http://www.centres-antipoison.net/
	Bordeaux	Centre Antipoison et de Toxicovigilance	+33 (0)5 56 96 40 80 +33 (0)1 45 42 59 59			
	Lille	Centre Antipoison et de Toxicovigilance	0800 59 59 59 (nation) +33 (0)1 45 42 59 59			
	Lyon	Centre Antipoison et de Toxicovigilance	+33 (0)4 72 11 69 11 +33 (0)1 45 42 59 59			
	Marseille et - Réunion	Centre Antipoison et de Toxicovigilance	+33 (0)4 91 75 25 25 +33 (0)1 45 42 59 59			
	Nancy	Centre Antipoison et de Toxicovigilance	+33 (0)3 83 32 36 36 +33 (0)1 45 42 59 59			http://www.ineris.fr/reach-info/jsp/index.jsp?content=orfila
	Paris et - Gudelupe - Martinique - Guyane	Centre Antipoison et de Toxicovigilance	+33 (0)1 40 05 48 48 +33 (0)1 45 42 59 59			
	Rennes	Centre Antipoison et de Toxicovigilance	+33 (0)2 99 59 22 22 +33 (0)1 45 42 59 59			
	Strasbourg	Centre Antipoison et de Toxicovigilance	+33 (0)3 88 37 37 37 +33 (0)1 45 42 59 59			
	Toulouse	Centre Antipoison et de Toxicovigilance	+33 (0)5 61 77 74 47 +33 (0)1 45 42 59 59			
Germany	Berlin	Deutschland Berlin - Klinische Toxikologie und Giftnotruf Berlin	030 19 240 (national number)	24h/7 days	General public and Professionals	http://www.bbges.de/content/index28aa.html
	Bonn	Informationszentrale Vergiftungen Bonn	0228 19 240 (national number)			http://www.gizbonn.de/
	Erfurt	Giftnotruf Erfurt	0361 73 0730 (national number)			http://www.ggiz-erfurt.de/

	Freiburg	Vergiftungs-Informations-Zentrale Freiburg	0761 19 240 (national number)			http://www.uniklinik-freiburg.de/giftberatung/live/index.html
	Goettingen	Giftinformationszentrum-Nord	0551 19 240 (national number)			http://www.giz-nord.de/cms/
	Homburg/Saar	Informations- und Behandlungszentrum für Vergiftungen des Saarlandes	06841 19 240 (national number)			http://www.uniklinikum-saarland.de/de/einrichtungen/kliniken-und-institute/kinder-und-jugendmedizin/informations-und-behandlungszentrum-fuer-vergiftungen-des-saarlandes
	Mainz	Giftinfo Mainz Klinische Toxikologie der Universitätsmedizin Mainz	+49 (0)6131 19240			http://www.giftinfo.uni-mainz.de/
	München	Toxikologische Abteilung der II. Medizinischen Klinik der Technischen Universität München	089 19 240 (national number)			http://www.toxinfo.org/frameset.php?class=21&hauptframe=showClass.php?class=21
Greece	No	Το Κέντρο Δηλητηριάσεων - Παθολογικού Τομέα του Γενικού Νοσοκομείου Παίδων Αθηνών «Π. & Α. Κυριακού» (*Poison Information Centre*)	+30 210 779 37 77	24h/7 days	General public and Professionals	http://www.aglaiakyriakou.gr/poison.html
Hungary	No	Országos Kémiai Biztonsági Intézet (*National Institute of Chemical Safety*)	+36 80 20 11 99	24h/7 days	General public and Professionals	http://www.okbi.hu
Ireland	No	National Poisons Information Centre Heath professionals	+353 1 8379964 +353 1 809 25 66	24h/7 days	Health professionals only	http://www.poisons.ie
	No	National Poisons Information Centre General public	+353 1 809 2166	Monday through Friday from 9am to 5 pm	General public	http://www.poisons.ie
Italy	Bergamo	Centro Antiveleni Ospedali Riuniti di Bergamo	118 or 800 88 3300 (national numbers)	24h/7 days	General public	http://www.ospedaliriuniti.bergamo.it/portale/sanagrafiche.nsf/%28all%29/AF37158220A2678EC12575630030FF90?OpenDocument
	Milano	Centro Antiveleni Ospedal Niguardia	+39 (0)2 661 010 29	24h/7 days	General public and Professionals	http://www.centroantiveleni.org/
	Firenze	Centro Antiveleni	+39 (0)55 427 72 38	24h/7 days	General public	http://www.tox.it/index.php?option=com_content&task=view&id=39&Itemid=64
	Napoli	Centro Antiveleni	+39 (0)8 174 72 870	24h/7 days	General public	http://www.tox.it/index.php?option=com_content&task=view&id=39&Itemid=64

	Lecce	Centro Antiveleni, Ospedale Vito Fazzi	+39 0832 66 1374 +39 0832 35 1105	24h/7 days	General public	
	Roma	Centro Antiveleni (Gemelli)	+39 (0)6 305 43 43	24h/7 days	General public and Professionals	www.tox.it
Ireland	No	National Poison Information Centre	01 809 21 66 (national number - public) 01 837 99 64 (national number -professionals)	8am-10pm/7 days	General public and Professionals	http://www.poisons.ie/
Latvia	No	Rīgas Austrumu klīniskā universitātes slimnīca *(Latvian Poisons Information Centre Clinical Hospital "Gailezers"*)	+371 704 26 73 +371 704 24 68	24h/7 days	General public and Professionals	http://www.aslimnica.lv/index.php?cat=46
Lithuania	No	Neatidėliotina informacija apsinuodijus (*Poisoning emergency information*)	+370 5 236 2052 +370 687 53 378	24h/7 days	(not specified)	http://www.tox.lt/
Luxembourg	No	Belgian Centre Antipoisons / Antigiftcentrum (*Antipoison Centre*)	+32 70 245 245	24h/7 days	General public and Professionals	http://www.poisoncentre.be
Netherlands	No	Nationaal Vergiftigingen Informatie centrum (voor gezondheidswerker) (*National Poisons Information Centre (for healthcare*)	+31 30 274 88 88	24h/7 days	Professionals only	https://www.vergiftigingen.info
Norway	No	Giftinformasjon (*Poisons information*)	+47 22 59 1300	24h/7 days	General public and Professionals	http://helsenorge.no/Helseogsunnhet/Giftinformasjon/Sider/default.aspx
Poland	Krakow	Ośrodek Informacji Toksykologicznej (*Poison Information Centre*)	+48 12 411 99 99	24h/7 days	(not specified)	http://www.oit.cm-uj.krakow.pl/index.php
	Gdansk	Regional Poison Information Centre	+48 58 682 04 04	24h/7 days	(not specified)	
	Warszawa	Warsaw Poison Information and Control Centre	+48 22 619 66 54	24h/7 days	(not specified)	
Portugal	No	Centro de Informação Antivenenos Instituto Nacional de Emergência Médica (INEM) (*Poison Information Centre*)	808 250 143 (national number) +351 21 330 3284	24h/7 days	General public and Professionals	http://www.inem.pt/

Romania	No	Biroul pentru Regulamentul Sanitar International si Informare Toxicologica (*Office of International Health Regulations and Toxicological Information*)	021 318 36 06 (national number)	8:00 am to 3:00 pm	General public	http://www.insp.gov.ro/index.php?option=com_content&view=article&id=9&Itemid=22
	No	Emergency Clinical Hospital for Children "Grigore Alexandrescu"	+402 1 210 6282 +402 1 210 6183	24h/7 days	General public	
Slovakia	No	Národné toxikologické informačné centrum (*National Poison Information Centre*)	+421 2 5477 4166 +421 2 5465 2307	24h/7 days	General public and Professionals	http://www.ntic.sk
Slovenia	No	UKC Ljubljana (*University Medical Centre Ljubljana*)	+386(1) 522 84 08 +386(1) 522 84 09 (01) 522 52 76 (national number) (01) 522 53 42 (national number)	24h/7 days	General public and Professionals	http://www4.kclj.si/index.php
	No	Zastrupitve nadzor centra Ljubljani (*Poison Control Centre*)	+386 41 635 500	24h/7 days	Professionals only	http://www.zastrupitve.net/
Spain	No	Instituto Nacional de Toxicología	+34 91 562 04 20	24h/7 days	General public and Professionals	http://institutodetoxicologia.justicia.es/wps/portal/intcf_internet/portada/utilidades_portal/telefono_emergencias/
Sweden	No	Giftinformationscentralen (*Swedish Poisons Information Centre*)	+46 8 33 12 31 (acute poisoning) 112 (emergency)	Emergency: 24h/7 days Acute poisoning: Monday/Friday 9am/5pm	General public and Professionals	http://www.giftinformation.se
Switzerland	No	Swiss Toxicological Informtion Centre Freiestrasse 16 Zurich, Switzerland	+41 44 251 66 66 Emergency No: +41 44 251 51 51 (in Switzerland (145)	24h/7 days	General public and Professionals	Email address : info@toxi.ch Website : www.toxi.ch
Turkey	No	Toxicology Department and Poisons Centre. Refik Saydam Central Institute of Hygiene Cemal Gürsel Cad No. 18 Sihhiye Ankara	+90 0312 433 70 07 Emergency No +90 0312 433 70 01 or 0 800 314 7900	24h/7 days	General public and Professionals	zehir@saglik.gov.tr www.rshm.gov.tr/en
United Kingdom	UK	UK National Poisons Information Service	+44 844 892 0111 +44 870 600 6266 0845 4647 (national number) 08454 24 24 24 (national number)	24h/7 days	Professionals only	http://www.npis.org/
	London	Guy's & St Thomas' Poisons Unit Medical Toxicology Unit	+44 20 7188 0600	24h/7 days	General public and Professionals	http://www.guysandstthomas.nhs.uk/our-services/toxicology/medical-toxicology.aspx

	Scotland	National Poisons Information Service (Edinburgh)	0844 892 0111 (national number)	24h/7 days	Professionals only	http://www.spib.scot.nhs.uk/

Updated on 25-Jul-2012
Additional information on European Poison Centres is available on:
- The European Association of Poisons Centres and Clinical Toxicologists (EAPCCT): http://www.eapcct.org/index.php?page=home
- World Health Organization Directory of Poison Centres: http://www.who.int/gho/phe/chemical_safety/poisons_centres/en/index.html

For technical information: telephone number +39 0384-56022

Revision summary:
This sheet was revised in section/s: 1,2,3,8,11,12,14,15,16.
In those sections, a vertical bar (|) on the left margin indicates the changes made since the previous version. If a section is marked, but it does not point out the bar, then it indicates that the text was cancelled.

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