

## SAFETY DATA SHEET

**C4H10 0,6 %;C5H12 0,6 %;C3HF7 5 %;C2HF5 20 %;CH2F2 20 %;CH2FCF3 53,8 %**

Issue date: 07.10.2014  
Revision date: 09.10.2014

Version: 1.0

SDS No.: 000010022565  
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### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1 Product identifier

**Product name:** C4H10 0,6 %;C5H12 0,6 %;C3HF7 5 %;C2HF5 20 %;CH2F2 20 %;CH2FCF3 53,8 %

**Trade name:** RS-70

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

**Identified uses:** Industrial and professional. Perform risk assessment prior to use.  
Refrigerant.

**Uses advised against:** Consumer use.

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

**Supplier**

BOC  
Priestley Road, Worsley  
M28 2UT Manchester

**Telephone:** 0800 111 333

**E-Mail:** ReachSDS@boc.com

#### 1.4 Emergency telephone number: 0800 111 333

### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

**Classification according to Directive 67/548/EEC or 1999/45/EC as amended**

Not classified

**Classification according to Regulation (EC) No 1272/2008 as amended**

**Physical hazards**

Gases under pressure

Liquefied gas

H280: Contains gas under pressure; may explode if heated.

#### 2.2 Label elements



**Signal words:** Warning

**Hazard Statement(s):** H280: Contains gas under pressure; may explode if heated.

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#### Precautionary statement

**Prevention:** None.  
**Response:** None.  
**Storage:** P403: Store in a well-ventilated place.  
**Disposal:** None.

#### Supplemental label information

EIGA-0783: Contains fluorinated greenhouse gases covered by the Kyoto protocol.  
EIGA-As: Asphyxiant in high concentrations.

**2.3 Other hazards:** Contact with evaporating liquid may cause frostbite or freezing of skin.

### SECTION 3: Composition/information on ingredients

#### 3.2 Mixtures

Chemical name	Chemical formula	Concentration	CAS-No.	EC No.	REACH Registration No.	Notes
Butane	C4H10	0,6000 (% w/w)	106-97-8	203-448-7	01-2119474691-32	#
Pentafluoroethane	C2HF5	20 (% w/w)	354-33-6	206-557-8	01-2119485636-25	
1,1,1,2,3,3,3-Heptafluoropropane	C3HF7	5 (% w/w)	431-89-0	207-079-2	01-2119485489-18	
Difluoromethane	CH2F2	20 (% w/w)	75-10-5	200-839-4	01-2119471312-47	
isopentane; 2-methylbutane	C5H12	0,6000 (% w/w)	78-78-4	201-142-8	01-2119475602-38	#
Norflurane	C2H2F4	53,8000 (% w/w)	811-97-2	212-377-0	01-2119459374-33	#

All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in mol percent. All concentrations are nominal.

# This substance has workplace exposure limit(s).

PBT: persistent, bioaccumulative and toxic substance.

vPvB: very persistent and very bioaccumulative substance.

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#### Classification

Chemical name	Classification		Notes
Butane	DSD:	F+; R12	
	CLP:	Flam. Gas 1; H220, Press. Gas Liquef. Gas; H280	
Pentafluoroethane	DSD:	None	
	CLP:	Press. Gas Liquef. Gas; H280, Press. Gas Liquef. Gas; H280	
1,1,1,2,3,3,3-Heptafluoropropane	DSD:	None	
	CLP:	Press. Gas Liquef. Gas; H280	
Difluoromethane	DSD:	F+; R12	
	CLP:	Flam. Gas 1; H220, Press. Gas Liquef. Gas; H280	
isopentane; 2-methylbutane	DSD:	F+; R12 Xn; R65 R66 R67 N; R51/53	
	CLP:	Flam. Liq. 1; H224, Asp. Tox. 1; H304, STOT SE 3; H336, Aquatic Chronic 2; H411	
Norflurane	DSD:	None	
	CLP:	Press. Gas Liquef. Gas; H280	

DSD: Directive 67/548/EEC.

CLP: Regulation No. 1272/2008.

The full text for all R- and H-phrases is displayed in section 16.

#### SECTION 4: First Aid Measures

**General:** In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

#### 4.1 Description of first aid measures

**Inhalation:** In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

**Eye contact:** Rinse the eye with water immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.

**Skin contact:** Contact with evaporating liquid may cause frostbite or freezing of skin.

**Ingestion:** Ingestion is not considered a potential route of exposure.

**4.2 Most important symptoms and effects, both acute and delayed:** Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. Symptoms may include: Anaesthetic effects. Dizziness. Irregular cardiac activity. Unconsciousness. Loss of co-ordination

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

- Hazards:** Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.
- Treatment:** Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention. Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.

## SECTION 5: Firefighting Measures

**General fire hazards:** Heat may cause the containers to explode.

### 5.1 Extinguishing media

**Suitable extinguishing media:** Material will not burn. In case of fire in the surroundings: use appropriate extinguishing agent.

**Unsuitable extinguishing media:** None.

### 5.2 Special hazards arising from the substance or mixture:

Fire or excessive heat may produce hazardous decomposition products. The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions.

**Hazardous Combustion Products:** If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Carbon oxides fluorocarbons Hydrogen fluoride

### 5.3 Advice for firefighters

**Special fire fighting procedures:** In case of fire: Stop leak if safe to do so. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out.

**Special protective equipment for firefighters:** Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Guideline: EN 469 Protective clothing for firefighters. Performance requirements for protective clothing for firefighting. EN 15090 Footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in buildings and other structures. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

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### SECTION 6: Accidental Release Measures

- 6.1 Personal precautions, protective equipment and emergency procedures:** Evacuate area. Provide adequate ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.
- 6.2 Environmental precautions:** Prevent further leakage or spillage if safe to do so.
- 6.3 Methods and material for containment and cleaning up:** Provide adequate ventilation.
- 6.4 Reference to other sections:** Refer to sections 8 and 13.

### SECTION 7: Handling and Storage:

- 7.1 Precautions for safe handling:** Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/regional/national/international regulations. Never use direct flame or electrical heating devices to raise the pressure of a container. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Damaged valves should be reported immediately to the supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminants particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place.

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**7.2 Conditions for safe storage, including any incompatibilities:** Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material.

**7.3 Specific end use(s):** None.

## SECTION 8: Exposure Controls/Personal Protection

### 8.1 Control parameters

#### Occupational Exposure Limits

Chemical name	Type	Exposure Limit Values	Source
Norflurane	TWA	1.000 ppm 4.240 mg/m <sup>3</sup>	UK. EH40 Workplace Exposure Limits (WELs) ( 12 2011)
Butane	TWA	600 ppm 1.450 mg/m <sup>3</sup>	UK. EH40 Workplace Exposure Limits (WELs) ( 12 2011)
	STEL	750 ppm 1.810 mg/m <sup>3</sup>	UK. EH40 Workplace Exposure Limits (WELs) ( 12 2011)
isopentane; 2-methylbutane	TWA	600 ppm 1.800 mg/m <sup>3</sup>	UK. EH40 Workplace Exposure Limits (WELs) ( 12 2011)
	TWA	1.000 ppm 3.000 mg/m <sup>3</sup>	EU. Indicative Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU ( 12 2009)

#### DNEL-Values

Critical component	Type	Value	Remarks
Pentafluoroethane	Worker - inhalative, long-term - systemic	16444 mg/m <sup>3</sup>	-
1,1,1,2,3,3,3-Heptafluoropropane	Worker - inhalative, long-term - systemic	61279 mg/m <sup>3</sup>	-
Difluoromethane	Worker - inhalative, long-term - systemic	7035 mg/m <sup>3</sup>	-
isopentane; 2-methylbutane	Worker - inhalative, long-term - systemic	3000 mg/m <sup>3</sup>	-
	Worker - dermal, long-term - systemic	432 mg/kg bw/day	-
Norflurane	Worker - inhalative, long-term - systemic	13936 mg/m <sup>3</sup>	-

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#### PNEC-Values

Critical component	Type	Value	Remarks
Pentafluoroethane	Aquatic (intermit. releases)	1 mg/l	-
	Aquatic (freshwater)	0,1 mg/l	-
	Sediment (freshwater)	0,6 mg/kg	-
1,1,1,2,3,3,3-Heptafluoropropane	freshwater	0,1 mg/l	-
	freshwater - intermittent	1 mg/l	-
	freshwater sediment	1,3 mg/kg dry weight	-
	Microbiological Activity in Sewage Treatment Systems	1,73 mg/l	-
Difluoromethane	Aquatic (freshwater)	0,142 mg/l	-
	Aquatic (intermit. releases)	1,42 mg/l	-
	Sediment (freshwater)	0,534 mg/kg	-
Norflurane	freshwater	0,1 mg/l	-
	marine water	0,01 mg/l	-
	freshwater - intermittent	1 mg/l	-
	STP	73 mg/l	-
	freshwater sediment	0,75 mg/kg dry weight	-

#### 8.2 Exposure controls

##### Appropriate engineering controls:

Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Oxygen detectors should be used when asphyxiating gases may be released. Systems under pressure should be regularly checked for leakages. Preferably use permanent leak tight connections (eg. welded pipes). Do not eat, drink or smoke when using the product.

##### Individual protection measures, such as personal protective equipment

##### General information:

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved.

##### Eye/face protection:

Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Guideline: EN 166 Personal Eye Protection.

##### Skin protection

##### Hand protection:

Wear working gloves while handling containers  
Guideline: EN 388 Protective gloves against mechanical risks.

##### Body protection:

No special precautions.

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<b>Other:</b>	Wear safety shoes while handling containers Guideline: ISO 20345 Personal protective equipment - Safety footwear.
<b>Respiratory Protection:</b>	Not required.
<b>Thermal hazards:</b>	No precautionary measures are necessary.
<b>Hygiene measures:</b>	Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.
<b>Environmental exposure controls:</b>	For waste disposal, see section 13.

## SECTION 9: Physical And Chemical Properties

### 9.1 Information on basic physical and chemical properties

#### Appearance

<b>Physical state:</b>	Gas
<b>Form:</b>	Liquefied gas
<b>Colour:</b>	Colourless
<b>Odour:</b>	Odourless
<b>Odour Threshold:</b>	Odour threshold is subjective and is inadequate to warn of over exposure.
<b>pH:</b>	Not applicable.
<b>Melting Point:</b>	No data available.
<b>Boiling Point:</b>	-42,2 °C.
<b>Sublimation Point:</b>	Not applicable.
<b>Critical Temp. (°C):</b>	87,9 °C
<b>Flash Point:</b>	Not applicable to gases and gas mixtures.
<b>Evaporation Rate:</b>	Not applicable to gases and gas mixtures.
<b>Flammability (solid, gas):</b>	Non-Flammable Gas
<b>Flammability limit - upper (%)-:</b>	Not applicable.
<b>Flammability limit - lower (%)-:</b>	Not applicable.
<b>Vapour pressure:</b>	11,22 bar ( 25 °C)
<b>Vapour density (air=1):</b>	3,47 ( Calculated)
<b>Relative density:</b>	No data available.
<b>Solubility(ies)</b>	
<b>Solubility in Water:</b>	Insoluble in water
<b>Partition coefficient (n-octanol/water):</b>	Not known.
<b>Autoignition Temperature:</b>	Not applicable.
<b>Decomposition Temperature:</b>	Not known.
<b>Viscosity</b>	
<b>Kinematic viscosity:</b>	No data available.
<b>Dynamic Viscosity:</b>	No data available.

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**Explosive properties:** Not applicable.  
**Oxidising Properties:** Not applicable.

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

### SECTION 10: Stability and Reactivity

- 10.1 Reactivity:** No reactivity hazard other than the effects described in sub-section below.
- 10.2 Chemical stability:** Stable under normal conditions.
- 10.3 Possibility of hazardous reactions:** None.
- 10.4 Conditions to avoid:** Avoid heat, sparks, flame and high pressure. The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions.
- 10.5 Incompatible materials:** Strong bases Alkalis, alkaline earth metals (e.g., powdered aluminium, sodium, potassium, zinc)
- 10.6 Hazardous decomposition products:** Under normal conditions of storage and use, hazardous decomposition products should not be produced. If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Carbon oxides fluorocarbons Hydrogen fluoride ; Carbonyl difluoride

### SECTION 11: Toxicological Information

**General information:** None.

#### 11.1 Information on toxicological effects

**Acute Toxicity - Oral Product** Based on available data, the classification criteria are not met.

**Component information**  
isopentane; 2-methylbutane LD 50 ( Rat): > 2.000 mg/kg

**Acute Toxicity - Dermal Product** Based on available data, the classification criteria are not met.

**Acute Toxicity - Inhalation Product** Not classified for acute toxicity based on available data.

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**Component information**

Butane	LC 50 ( Rat, 4 h): 658 mg/l
Pentafluoroethane	LC Lo ( Rat, 4 h): > 800000 ppm
Difluoromethane	LC 0 ( Rat, 4 h): > 520000 ppm
isopentane; 2-methylbutane	LC 50 ( Rat, 4 h): > 25,3 mg/l

**Repeated dose toxicity**

**Component information**

Pentafluoroethane	NOEC ( Rabbit(Male)): 500 ppm NOEC ( Rabbit(Female)): 1000 ppm
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**Skin corrosion/irritation**

**Product**

Based on available data, the classification criteria are not met.

**Serious eye damage/eye irritation**

**Product**

Based on available data, the classification criteria are not met.

**Component information**

Butane	Not irritating
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**Respiratory or skin sensitisation**

**Product**

Based on available data, the classification criteria are not met.

**Germ cell mutagenicity**

**Product**

Based on available data, the classification criteria are not met.

**Carcinogenicity**

**Product**

Based on available data, the classification criteria are not met.

**Reproductive toxicity**

**Product**

Based on available data, the classification criteria are not met.

**Specific target organ toxicity - single exposure**

**Product**

Based on available data, the classification criteria are not met.

**Specific target organ toxicity - repeated exposure**

**Product**

Based on available data, the classification criteria are not met.

**Aspiration hazard**

**Product**

Not applicable to gases and gas mixtures..

**Other Relevant Toxicity Information**

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#### Component information

Pentafluoroethane	No Observed Adverse Effect Concentration / Dog : 100000 ppm Cardiac sensitization Low Observed Adverse Effect Concentration (LOAEC) / Dog : 75000 ppm Cardiac sensitization
Difluoromethane	Low Observed Adverse Effect Concentration (LOAEC) / Dog :> 350000 ppm Cardiac sensitization No Observed Adverse Effect Concentration / Dog : 350000 ppm Cardiac sensitization

## SECTION 12: Ecological Information

### 12.1 Toxicity

#### Acute toxicity

**Product** No ecological damage caused by this product.

#### Acute toxicity - Fish

##### Component information

Pentafluoroethane	LC 50 ( Rainbow trout (Oncorhynchus mykiss), 96 h): 450 mg/l
Difluoromethane	LC 50 ( Fish, 96 h): 1.507 mg/l
isopentane; 2-methylbutane	LC 50 ( Rainbow trout (Oncorhynchus mykiss), 96 h): 4,26 mg/l
Norflurane	LC 50 ( Fish, 96 h): 450 mg/l

#### Acute toxicity - Aquatic invertebrates

##### Component information

Pentafluoroethane	EC50 ( 48 h): > 200 mg/l
Difluoromethane	EC50 ( Water flea (Daphnia), 48 h): 652 mg/l
isopentane; 2-methylbutane	EC50 ( Water flea (Daphnia magna)): 2,3 mg/l
Norflurane	EC50 ( Water flea (Daphnia magna), 48 h): 930 mg/l

#### Toxicity to aquatic plants

##### Component information

Pentafluoroethane	EC50 ( Green algae, 96 h): 142 mg/l
Difluoromethane	EC50 ( Alga, 96 h): 142 mg/l
isopentane; 2-methylbutane	NOEC ( Algae (Pseudokirchneriella subcapitata), 72 h): 7,51 mg/l EC50 ( Algae (Pseudokirchneriella subcapitata), 72 h): 10,7 mg/l

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### 12.2 Persistence and degradability

#### Product

Not applicable to gases and gas mixtures..

### 12.3 Bioaccumulative potential

#### Product

The product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

### 12.4 Mobility in soil

#### Product

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

#### Component information

isopentane; 2-methylbutane

Henry's Law Constant: Estimated 7.851 MPa

Norflurane

Henry's Law Constant: Estimated 8.580 MPa ( 25 °C)

### 12.5 Results of PBT and vPvB assessment

#### Product

Not classified as PBT or vPvB.

### 12.6 Other adverse effects:

#### Global Warming Potential

Global warming potential: 1765

Contains fluorinated greenhouse gases covered by the Kyoto protocol. When discharged in large quantities may contribute to the greenhouse effect. For GWP value of mixture and quantities, refer to container label.

## SECTION 13: Disposal Considerations

### 13.1 Waste treatment methods

#### General information:

Do not discharge into any place where its accumulation could be dangerous. Vent to atmosphere in a well ventilated place.

#### Disposal methods:

Refer to the EIGA code of practice (Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

#### European Waste Codes

##### Container:

14 06 01: chlorofluorocarbons, HCFC, HFC

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**SECTION 14: Transport Information**

**ADR**

14.1 UN number: UN 3163  
14.2 UN proper shipping name: LIQUEFIED GAS, N.O.S.( 1,1,1,2-Tetrafluoroethane, Difluoromethane)  
14.3 Transport hazard class(es)  
Class: 2  
Label(s): 2.2  
Hazard No. (ADR): 20  
Tunnel restriction code: (C/E)  
Emergency Action Code: 2TE  
14.4 Packing group: -  
14.5 Environmental hazards: Not applicable  
14.6 Special precautions for user: -

**RID**

14.1 UN number: UN 3163  
14.2 UN proper shipping name: LIQUEFIED GAS, N.O.S.( 1,1,1,2-Tetrafluoroethane, Difluoromethane)  
14.3 Transport hazard class(es)  
Class: 2  
Label(s): 2.2  
14.4 Packing group: -  
14.5 Environmental hazards: Not applicable  
14.6 Special precautions for user: -

**IMDG**

14.1 UN number: UN 3163  
14.2 UN proper shipping name: LIQUEFIED GAS, N.O.S.( 1,1,1,2-Tetrafluoroethane, Difluoromethane)  
14.3 Transport hazard class(es)  
Class: 2.2  
Label(s): 2.2  
EmS No.: F-C, S-V  
14.3 Packing group: -  
14.5 Environmental hazards: Not applicable  
14.6 Special precautions for user: -

**IATA**

14.1 UN number: UN 3163  
14.2 Proper Shipping Name: Liquefied gas, n.o.s.( 1,1,1,2-Tetrafluoroethane, Difluoromethane)  
14.3 Transport hazard class(es)  
Class: 2.2  
Label(s): 2.2  
14.4 Packing group: -  
14.5 Environmental hazards: Not applicable  
14.6 Special precautions for user: -  
Other information  
Passenger and cargo aircraft: Allowed.  
Cargo aircraft only: Allowed.

**14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:** Not applicable

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**C4H10 0,6 %;C5H12 0,6 %;C3HF7 5 %;C2HF5 20 %;CH2F2 20 %;CH2FCF3 53,8 %**

Issue date: 07.10.2014  
Revision date: 09.10.2014

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#### Additional identification:

Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation.

### SECTION 15: Regulatory information

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

##### EU Regulations

Regulation (EC) No. 1907/2006 Annex XVII Substances subject to restriction on marketing and use:

Chemical name	CAS-No.	Concentration
Butane	106-97-8	0,1 - 1,0 %
isopentane; 2-methylbutane	78-78-4	0,1 - 1,0 %

Directive 2004/37/EC on the protection of workers from the risks related to exposure to carcinogens and mutagens at work:

Chemical name	CAS-No.	Concentration
Butane	106-97-8	0,1 - 1,0 %
isopentane; 2-methylbutane	78-78-4	0,1 - 1,0 %

Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breast feeding.:

Chemical name	CAS-No.	Concentration
Butane	106-97-8	0,1 - 1,0 %
isopentane; 2-methylbutane	78-78-4	0,1 - 1,0 %

Directive 96/82/EC (Seveso II): on the control of major accident hazards involving dangerous substances:

Chemical name	CAS-No.	Concentration
Butane	106-97-8	0,1 - 1,0 %
isopentane; 2-methylbutane	78-78-4	0,1 - 1,0 %

Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work.:

### SAFETY DATA SHEET

**C4H10 0,6 %;C5H12 0,6 %;C3HF7 5 %;C2HF5 20 %;CH2F2 20 %;CH2FCF3 53,8 %**

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Chemical name	CAS-No.	Concentration
Butane	106-97-8	0,1 - 1,0 %
isopentane; 2-methylbutane	78-78-4	0,1 - 1,0 %

#### National Regulations

Management of Health and Safety at Work Regulations (1999 No. 3242) The Regulatory Reform (Fire Safety) Order 2005 (2005 No. 1541) Control of Substances Hazardous to Health Regulations (COSHH, 2002 No. 2677) Provision and Use of Work Equipment Regulations (PUWER, 1998 No. 2306) Personal Protective Equipment Regulations (1992 No. 2966) Control of Major Accident Hazards Regulations (COMAH, 1999 No. 743) Chemical Hazards Information and Packaging for Supply (CHIP, 1994 No. 3247) Pressure Systems Safety Regulations (PSSR, 2000 No. 128) Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.

This Safety Data Sheet has been produced to comply with Regulation (EU) 453/2010.

#### 15.2 Chemical safety assessment:

No Chemical Safety Assessment has been carried out.

#### SECTION 16: Other Information

##### Revision Information:

Not relevant.

##### Key literature references and sources for data:

Various sources of data have been used in the compilation of this SDS, they include but are not exclusive to:

Agency for Toxic Substances and Diseases Registry (ATSDR)  
(<http://www.atsdr.cdc.gov/>).

European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.  
European Chemical Agency: Information on Registered Substances

<http://apps.echa.europa.eu/registered/registered-sub.aspx#search>

European Industrial Gases Association (EIGA) Doc. 169 Classification and Labelling guide.

International Programme on Chemical Safety (<http://www.inchem.org/>)

ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.

Matheson Gas Data Book, 7th Edition.

National Institute for Standards and Technology (NIST) Standard Reference Database Number 69.

The ESIS (European chemical Substances Information System) platform of the former European Chemicals Bureau (ECB) ESIS (<http://ecb.jrc.ec.europa.eu/esis/>).

The European Chemical Industry Council (CEFIC) ERICards.

United States of America's National Library of Medicine's toxicology data network TOXNET (<http://toxnet.nlm.nih.gov/index.html>)

Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).

Substance specific information from suppliers.

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

EH40 (as amended) Workplace exposure limits.

**SAFETY DATA SHEET****C4H10 0,6 %;C5H12 0,6 %;C3HF7 5 %;C2HF5 20 %;CH2F2 20 %;CH2FCF3 53,8 %**Issue date: 07.10.2014  
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SDS No.: 000010022565  
16/16**Wording of the R-phrases and H-statements in sections 2 and 3**

H224	Extremely flammable liquid and vapour.
H280	Contains gas under pressure; may explode if heated.
H304	May be fatal if swallowed and enters airways.
H336	May cause drowsiness or dizziness.
H411	Toxic to aquatic life with long lasting effects.
R12	Extremely flammable.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R65	Harmful: may cause lung damage if swallowed.
R66	Repeated exposure may cause skin dryness or cracking.
R67	Vapours may cause drowsiness and dizziness

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

**Classification according to Regulation (EC) No 1272/2008 as amended**

Press. Gas Liq. Gas, H280

**Other information:** Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted. Note: When using this document care should be taken, as the decimal sign and its position complies with rules for the structure and drafting of international standards, and is a comma on the line. As an example 2,000 is two (to three decimal places) and not two thousand, whilst 1.000 is one thousand and not one (to three decimal places).

**Revision date:** 09.10.2014

**Disclaimer:** This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.