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

### 1.1. Product identifier

Trade name	R454B (DuPont™ Opteon® XL41)
Chemical description	Refrigerant mixture HFC-HFO (Difluoromethane, 2,3,3,3-Tetrafluoropropene)
CAS N°	--
CE N°	--
Index N°	--
Registration n°	--
Chemical formula	(CH <sub>2</sub> F <sub>2</sub> , C <sub>3</sub> H <sub>2</sub> F <sub>4</sub> )

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

Relevant identified uses	Industrial and professional Test gas/Calibration gas Use for manufacture of electronic/photovoltaic components Use as refrigerant Laboratory use Contact supplier for more information on uses
Uses advised against	Consumer use not recommended

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

Company identification	MULTIGAS Route de l'Industrie 102 CH-1564 Domdidier
Phone number	+41 (0) 26 676 94 94
E-mail address	<a href="mailto:info@multigas.ch">info@multigas.ch</a>

### 1.4. Emergency telephone numbers

145 (Toxicology Centre Zurich) or +41 (0) 44 251 51 51  
+41 (0) 26 676 94 94 (Multigas)


## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

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

**Hazards** Flammable gases, Category 1B

H221

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Gases under pressure : Liquefied gas

H280

For the complete H-sentences texts mentioned in that chapter, refer to Section 16

## 2.2. Label elements

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

Hazard pictograms



GHS02

GHS04

Signal word

Danger

Hazard statements

H221	Flammable gas
H280	Contains gas under pressure; may explode if heated

Precautionary statements

P210	Keep away from heat/sparks/open flames/hot surfaces. — No smoking
P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381	Eliminate all ignition sources if safe to do so
P410+P403	Protect from sunlight. Store in a well-ventilated place

## 2.3. Other hazards

None


## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Name	Product identifier	Concentration	Classification
Difluoromethane (R32)	(CAS-No.) 75-10-5 (EC-No.) 200-839-4 (EC Index-No.) --- (Registration-No.) 01-2119471312-47	67.9 – 69.9 %	Flam. Gas 1B, H221 Press. Gas (Liq.), H280
2,3,3,3-Tetrafluoropropene (R1234yf)	(CAS-No.) 754-12-1 (EC-No.) 468-710-7 (EC Index-No.) --- (Registration-No.) 01-0000019665-61	30.1 – 32.1 %	Flam. Gas 1B, H221 Press. Gas (Liq.), H280

For the complete H-sentences texts mentioned in that chapter, refer to Section 16

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

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### 3.2. Mixtures

Not established

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

<b>General advice</b>	See a doctor. Show this safety data sheet to the attending physician
<b>In case of inhalation</b>	In case of inhalation, remove the person from the contaminated area. In case of respiratory arrest, give artificial respiration. See a doctor
<b>In case of skin contact</b>	Frostbite should be treated like thermal burns: Immediate, abundant and prolonged washing with water. Consult a doctor
<b>In case of eyes contact</b>	Immediate washing, abundant and prolonged with water. If irritation persists, consult a doctor
<b>In case of ingestion</b>	Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. See a doctor

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

May cause asphyxiation at high concentrations. Symptoms may include loss of consciousness or motor skills. The victim may not be aware of the asphyxia  
Refer to section 11

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

Do not give adrenaline or similar drugs

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media


<b>Suitable extinguishing media</b>	Water spray or water mist. Dry powder. Carbon dioxide. Foam
<b>Unsuitable extinguishing media</b>	Do not use water jet

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

<b>Specific hazards</b>	In case of fire or excessive heat, hazardous combustion products may be produced Exposure to fire may cause containers to rupture/explode
<b>Hazardous combustion products</b>	In case of fire or excessive heat, hazardous combustion products may be produced such as : carbonyl fluoride, carbon monoxide, hydrogen fluoride

### 5.3. Additional information

Cool endangered receptacles with water spray jet from a protected position

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**SECTION 6: Accidental release measures**

**6.1. Personal precautions, protective equipment and emergency procedures**

Avoid breathing vapours, spray mists or gases  
 Provide adequate ventilation  
 Evacuate personnel to a safe place  
 Personal protective equipment, see section 8

**6.2. Environmental precautions**

-

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

Ventilate the area

**6.4. Reference to other sections**

See also sections 8 and 13

**SECTION 7: Handling and storage**

**7.1. Precautions for safe handling**

Avoid contact with skin and eyes  
 Avoid breathing vapours or mist  
 Keep away from sources of ignition - No smoking  
 Take measures to avoid the accumulation of electrostatic charges  
 For precautions, see section 2.2


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

Store in a cool place. Keep container tightly closed in a dry and well-ventilated place  
 Storage life: > 10 years  
 Recommended storage temperature: < 52 °C  
 Content under pressure

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

None



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### 8.2.3. Environmental exposure controls

-

## SECTION 9: Physical and chemical properties

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

#### Appearance

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

Odour    No data available

Odour threshold                              No data available

pH    No data available

Melting point / Freezing point            No data available

Boiling point                                    -50.9°C

Flash point                                      No data available

Evaporation rate                              No data available

Flammability (solid, gas)                  No data available

Explosive limits                                11.25 - 22 %

Vapour pressure [20°C]                      13.9 bar

Vapour pressure [50°C]                      29.3 bar

Vapour density                                 No data available

Relative density, liquid (water=1)        1

Relative density, gas (air=1)                2.2

Water solubility                                No data available

Partition coefficient                          No data available

n-octanol/water (Log Kow)

Auto-ignition temperature                  No data available

Decomposition temperature                No data available

Viscosity                                         No data available

Explosive properties                         No data available


Oxidising properties                         No data available

### 9.2. Other information

Molar mass                                      62.6 g/mol

Critical temperature [°C]                    77°C

Relative vapour density                      Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level

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## SECTION 10: Stability and reactivity

### **10.1. Reactivity**

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

### **10.2. Chemical stability**

Stable under recommended storage conditions

### **10.3. Possibility of hazardous reactions**

May react violently with oxidants  
May form an explosive mixture with air

### **10.4. Conditions to avoid**

Keep away from heat and sources of ignition. Avoid contact with flames and red metal surfaces. Do not smoke

### **10.5. Incompatible materials**

Air, oxidizers, finely divided metal powders, strong oxidizers  
For more information on compatibility, refer to ISO 11114

### **10.6. Hazardous decomposition products**

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


## SECTION 11: Toxicological information

### **11.1. Chemical safety assessment**

<b>Acute toxicity</b>	No toxicological effects expected with this product if exposure limit values are not exceeded
<b>Skin corrosion/irritation</b>	No data available
<b>Serious eye damage/irritation</b>	No data available
<b>Respiratory or skin sensitisation</b>	No data available
<b>Germ cell mutagenicity</b>	No data available
<b>Carcinogenicity</b>	No data available
<b>Reproductive toxicity</b>	No data available
<b>STOT-single exposure – Target organ(s)</b>	No data available
<b>STOT-repeated exposure</b>	No data available
<b>Ingestion hazard</b>	No data available





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#### 14.2. UN proper shipping name

Transport par road/rail ADR / RID	Transport by sea IMDG	Transport by air IATA
LIQUEFIED GAS, FLAMMABLE, N.O.S. (Difluoromethane, 2,3,3,3-Tetrafluoropropene) R454B	LIQUEFIED GAS, FLAMMABLE, N.O.S. (Difluoromethane, 2,3,3,3-Tetrafluoropropene) R454B	LIQUEFIED GAS, FLAMMABLE, N.O.S. (Difluoromethane, 2,3,3,3-Tetrafluoropropene) R454B

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

##### Labelling



ADR/RID  
IMDG  
IATA

2.1 Flammable gases

##### 14.4. Packing group

ADR/RID  
IMDG  
IATA

Not established

#### 14.5. Environmental hazards

ADR/RID                      None  
IMDG                            None  
ICAO-TI / IATA-DGR        None

#### 14.6. Special precautions for user

No data available

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

Not applicable


### **SECTION 15: Regulatory information**

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

This safety data sheet complies with the requirements of Regulation (CE) No. 1907/2006

#### 15.2. Chemical safety assessment

A CSA has not been made yet

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## SECTION 16: Other information

<b>Indication of changes</b>	Revised safety data sheet in accordance with commission regulation (EU) No 2015/830
<b>Abbreviations and acronyms</b>	<p>ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road</p> <p>CAS : Chemical Abstract Service number (USA)</p> <p>CLP : Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008</p> <p>CSA : Chemical Safety Assessment</p> <p>EIGA : European Industrial Gases Association</p> <p>EINECS : European Inventory of Existing Commercial Chemical Substances</p> <p>EN : European Standard</p> <p>ATE : Acute Toxicity Estimate</p> <p>IATA : International Air Transport Association</p> <p>IMDG Code : International Maritime Dangerous Goods Code</p> <p>LC50 : Lethal Concentration to 50 % of a test population</p> <p>OMoD : Swiss Ordinance on the movement of waste</p> <p>PBT : Persistent, Bioaccumulative and Toxic</p> <p>PPE: Personal Protection Equipment</p> <p>REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006</p> <p>RID : Regulations concerning the international carriage of dangerous goods by rail</p> <p>RMM : Risk Management Measures</p> <p>STOT-SE : Specific Target Organ Toxicity - Single Exposure</p> <p>UN : United Nations</p> <p>vPvB : Very Persistent and Very Bioaccumulative</p> <p>WGK: Water Hazards Class</p>


### Full text of H, EUH and P statements used in sections 2 and 3

#### Hazard statements

H221	Flammable gas
H280	Contains gas under pressure; may explode if heated

#### Precautionary statements

P210	Keep away from heat/sparks/open flames/hot surfaces. — No smoking
P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381	Eliminate all ignition sources if safe to do so
P410+P403	Protect from sunlight. Store in a well-ventilated place

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They do not claim to be exhaustive and should be considered as a guide