


|                                                                                   |                         |                           |
|-----------------------------------------------------------------------------------|-------------------------|---------------------------|
|  | <b>SAFETY DATASHEET</b> | Page : 1/11               |
|                                                                                   |                         | Revised edition n° : 10.1 |
|                                                                                   |                         | Revision date : 03/2022   |
| <b>R452B</b>                                                                      |                         | <b>MTGxxx</b>             |

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

### 1.1. Product identifier

|                      |                                                                                                                   |                   |          |
|----------------------|-------------------------------------------------------------------------------------------------------------------|-------------------|----------|
| Trade name           | R452B (DuPont™ Opteon® XL55)                                                                                      |                   |          |
| Chemical description | Refrigerant mixture HFC-HFO<br>Tetrafluoropropene, Pentafluoroethane)                                             | (Difluoromethane, | 2,3,3,3- |
| 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> , C <sub>2</sub> HF <sub>5</sub> ) |                   |          |

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

|                          |                                                                                                                                                                                                               |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Relevant identified uses | Industrial and professional<br>Test gas/Calibration gas<br>Use for manufacture of electronic/photovoltaic components<br>Use as refrigerant<br>Laboratory use<br>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<br>Route de l'Industrie 102<br>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]



|                                                                                   |                         |                           |
|-----------------------------------------------------------------------------------|-------------------------|---------------------------|
|  | <b>SAFETY DATASHEET</b> | Page : 2/11               |
|                                                                                   |                         | Revised edition n° : 10.1 |
|                                                                                   |                         | Revision date : 03/2022   |
| <b>R452B</b>                                                                      |                         | <b>MTGxxx</b>             |

**Hazards** Flammable gases, Category 1B H221  
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]

|                                 |                                                                                   |                                                                                   |
|---------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>Hazard pictograms</b>        |  |  |
|                                 | GHS02                                                                             | GHS04                                                                             |
| <b>Signal word</b>              | Danger                                                                            |                                                                                   |
| <b>Hazard statements</b>        |                                                                                   |                                                                                   |
|                                 | H221                                                                              | Flammable gas                                                                     |
|                                 | H280                                                                              | Contains gas under pressure; may explode if heated                                |
| <b>Precautionary statements</b> |                                                                                   |                                                                                   |
|                                 | 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+403                                                                          | 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<br>(R32)                | (CAS-No.) 75-10-5<br>(EC-No.) 200-839-4<br>(EC Index-No.) ---<br>(Registration-No.)<br>01-2119471312-47  | 65 – 69%      | Flam. Gas 1B, H221<br>Press. Gas (Liq.),<br>H280 |
| 2,3,3,3-Tetrafluoropropene<br>(R1234yf) | (CAS-No.) 754-12-1<br>(EC-No.) 468-710-7<br>(EC Index-No.) ---<br>(Registration-No.)<br>01-0000019665-61 | 24 – 28%      | Flam. Gas 1B, H221<br>Press. Gas (Liq.),<br>H280 |

|                                                                                   |                         |                           |
|-----------------------------------------------------------------------------------|-------------------------|---------------------------|
|  | <b>SAFETY DATASHEET</b> | Page : 3/11               |
|                                                                                   |                         | Revised edition n° : 10.1 |
|                                                                                   |                         | Revision date : 03/2022   |
| <b>R452B</b>                                                                      |                         | <b>MTGxxx</b>             |

|                             |                                                                                                          |            |                            |
|-----------------------------|----------------------------------------------------------------------------------------------------------|------------|----------------------------|
| Pentafluoroethane<br>(R125) | (CAS-No.) 354-33-6<br>(EC-No.) 206-557-8<br>(EC Index-No.) ---<br>(Registration-No.)<br>01-2119485636-25 | 5.5 – 8.5% | Press. Gas (Liq.),<br>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

### **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<br>Exposure to fire may cause containers to rupture/explode |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                   |                         |                           |
|-----------------------------------------------------------------------------------|-------------------------|---------------------------|
|  | <b>SAFETY DATASHEET</b> | Page : 4/11               |
|                                                                                   |                         | Revised edition n° : 10.1 |
|                                                                                   |                         | Revision date : 03/2022   |
| <b>R452B</b>                                                                      |                         | <b>MTGxxx</b>             |

**Hazardous combustion products**

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

**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  
Content under pressure

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

None

|                                                                                   |                         |                           |
|-----------------------------------------------------------------------------------|-------------------------|---------------------------|
|  | <b>SAFETY DATASHEET</b> | Page : 5/11               |
|                                                                                   |                         | Revised edition n° : 10.1 |
| <b>R452B</b>                                                                      |                         | Revision date : 03/2022   |
|                                                                                   |                         | <b>MTGxxx</b>             |

**SECTION 8: Exposure controls/personal protection**

**8.1. Control parameters**

**Components with occupational exposure limits**

| Component                            | CAS N°   | Exposure value type | Control parameter | Source                                     |
|--------------------------------------|----------|---------------------|-------------------|--------------------------------------------|
| Difluoromethane (R32)                | 75-10-5  | TWA                 | -                 | No limit value of exposure to workstations |
|                                      |          |                     | -                 |                                            |
|                                      |          | OEL                 | -                 |                                            |
|                                      |          |                     | -                 |                                            |
| 2,3,3,3-Tetrafluoropropene (R1234yf) | 754-12-1 | TWA                 | -                 | No limit value of exposure to workstations |
|                                      |          |                     | -                 |                                            |
|                                      |          | OEL                 | -                 |                                            |
|                                      |          |                     | -                 |                                            |
| Pentafluoroethane (R125)             | 354-33-6 | TWA                 | -                 | No limit value of exposure to workstations |
|                                      |          |                     | -                 |                                            |
|                                      |          | OEL                 | -                 |                                            |
|                                      |          |                     | -                 |                                            |

**8.2. Exposure controls**

**8.2.1. Appropriate engineering controls**

Provide adequate general and local exhaust ventilation

Gas detectors should be used when flammable / toxic gases / vapours are likely to be released

**8.2.2. Individual protection measures, e.g. personal protective equipment**

**Eye/face protection**

Wear goggles and a face shield when transfilling or breaking transfer connections. Standard EN 166

**Skin / hand protection**

Wear protective gloves when handling gas cylinders Standard EN 388- Protective gloves against mechanical hazards

The selected protective gloves have to satisfy the specifications of EU Directive 89/686 / EEC and the standard EN 374 derived from it

**For short-term use**

Material: Fluoroelastomer


Penetration time:> 480 min

Glove thickness: 0.7 mm

**For long-term use**

Material: Fluoroelastomer

Penetration time:> 480 min

|                                                                                   |                         |                           |
|-----------------------------------------------------------------------------------|-------------------------|---------------------------|
|  | <b>SAFETY DATASHEET</b> | Page : 6/11               |
|                                                                                   |                         | Revised edition n° : 10.1 |
|                                                                                   |                         | Revision date : 03/2022   |
| <b>R452B</b>                                                                      |                         | <b>MTGxxx</b>             |

Glove thickness: 0.7 mm

Have appropriate, chemical-resistant protective clothing ready for use in emergencies

**Respiratory protection**

Self-contained breathing apparatus (SCBA) or positive pressure air mask must be used in oxygenated atmospheres. Standard EN 137 - Self-contained compressed air device with a full face mask

**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** -51°C

**Flash point** No data available

**Evaporation rate** No data available

**Flammability (solid, gas)** Flammable

**Explosive limits** 12 – 23.3%

**Vapour pressure [20°C]** 14 bar

**Vapour pressure [50°C]** 29.5 bar

**Vapour density** No data available

**Relative density, liquid (water=1)** 1.01

**Relative density, gas (air=1)** 2.51

**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

|                                                                                   |                         |                           |
|-----------------------------------------------------------------------------------|-------------------------|---------------------------|
|  | <b>SAFETY DATASHEET</b> | Page : 7/11               |
|                                                                                   |                         | Revised edition n° : 10.1 |
|                                                                                   |                         | Revision date : 03/2022   |
| <b>R452B</b>                                                                      |                         | <b>MTGxxx</b>             |

## **9.2. Other information**

|                                  |                                                                                                       |
|----------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Molar mass</b>                | 72.9 g/mol                                                                                            |
| <b>Critical temperature [°C]</b> | 75.7°C                                                                                                |
| <b>Relative vapour density</b>   | Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level |

## **SECTION 10: Stability and reactivity**

### **10.1. Reactivity**

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

### **10.2. Chemical stability**

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**

Alkaline and alkaline earth metals, Strong oxidizers, Finely divided metals  
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>SAFETY DATASHEET</b> | Page : 8/11               |
|                                                                                   |                         | Revised edition n° : 10.1 |
|                                                                                   |                         | Revision date : 03/2022   |
| <b>R452B</b>                                                                      |                         | <b>MTGxxx</b>             |

|                                               |                   |
|-----------------------------------------------|-------------------|
| <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 |

## SECTION 12: Ecological information

### 12.1. Toxicity

|                   |                                         |
|-------------------|-----------------------------------------|
| <b>Assessment</b> | The classification criteria are not met |
|-------------------|-----------------------------------------|

### 12.2. Persistence and degradability

No data available

### 12.3. Bioaccumulative potential

No data available

### 12.4. Mobility in soil

No data available

### 12.5. Results of PBT and vPvB assessment

PBT / vPvB assessment is not available because the chemical safety assessment is not required / is not conducted

### 12.6. Other adverse effects


Contains fluorinated greenhouse gases  
When discharged in large quantities may contribute to the greenhouse effect

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

|                               |                                                                                                                                                                                                   |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Product</b>                | Must not be released into the atmosphere<br>Burn in a chemical incinerator equipped with an afterburner and scrubber<br>Return to the supplier the product not consumed in its original container |
| <b>Contaminated container</b> | Eliminate as unused product<br>Contact the supplier if instructions are needed                                                                                                                    |
| <b>OMoD Code</b>              | 14 06 01<br>Solvent, refrigerant and aerosol propellant or organic foam wastes:<br>Chlorofluorocarbons, HCFCs, HFCs                                                                               |



|                                                                                   |                         |                           |
|-----------------------------------------------------------------------------------|-------------------------|---------------------------|
|  | <b>SAFETY DATASHEET</b> | Page : 9/11               |
|                                                                                   |                         | Revised edition n° : 10.1 |
|                                                                                   |                         | Revision date : 03/2022   |
| <b>R452B</b>                                                                      |                         | <b>MTGxxx</b>             |

**SECTION 14: Transport information**

**14.1. UN number**

| Transport par road/rail<br>ADR / RID | Transport by sea<br>IMDG | Transport by air<br>IATA |
|--------------------------------------|--------------------------|--------------------------|
| 3161                                 | 3161                     | 3161                     |

**14.2. UN proper shipping name**

| Transport par road/rail<br>ADR / RID                                                                           | Transport by sea<br>IMDG                                                                                       | Transport by air<br>IATA                                                                                       |
|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| LIQUEFIED GAS, FLAMMABLE ; N.O.S.<br>(Difluoromethane, 2,3,3,3-Tetrafluoropropene, Pentafluoroethane)<br>R452B | LIQUEFIED GAS, FLAMMABLE ; N.O.S.<br>(Difluoromethane, 2,3,3,3-Tetrafluoropropene, Pentafluoroethane)<br>R452B | LIQUEFIED GAS, FLAMMABLE ; N.O.S.<br>(Difluoromethane, 2,3,3,3-Tetrafluoropropene, Pentafluoroethane)<br>R452B |

**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

|                                                                                   |                         |                           |
|-----------------------------------------------------------------------------------|-------------------------|---------------------------|
|  | <b>SAFETY DATASHEET</b> | Page : 10/11              |
|                                                                                   |                         | Revised edition n° : 10.1 |
|                                                                                   |                         | Revision date : 03/2022   |
| <b>R452B</b>                                                                      |                         | <b>MTGxxx</b>             |

#### **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

### **SECTION 16: Other information**

#### **Indication of changes**

Revised safety data sheet in accordance with commission regulation (EU) No 2015/830

#### **Abbreviations and acronyms**

ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road

CAS : Chemical Abstract Service number (USA)

CLP : Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008

CSA : Chemical Safety Assessment

EIGA : European Industrial Gases Association

EINECS : European Inventory of Existing Commercial Chemical Substances

EN : European Standard

ATE : Acute Toxicity Estimate

IATA : International Air Transport Association

IMDG Code : International Maritime Dangerous Goods Code

LC50 : Lethal Concentration to 50 % of a test population

OMoD : Swiss Ordinance on the movement of waste

PBT : Persistent, Bioaccumulative and Toxic

PPE: Personal Protection Equipment

REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006

RID : Regulations concerning the international carriage of dangerous goods by rail


RMM : Risk Management Measures

STOT-SE : Specific Target Organ Toxicity - Single Exposure

UN : United Nations

vPvB : Very Persistent and Very Bioaccumulative

WGK: Water Hazards Class

|                                                                                   |                         |                           |
|-----------------------------------------------------------------------------------|-------------------------|---------------------------|
|  | <b>SAFETY DATASHEET</b> | Page : 11/11              |
|                                                                                   |                         | Revised edition n° : 10.1 |
|                                                                                   |                         | Revision date : 03/2022   |
| <b>R452B</b>                                                                      |                         | <b>MTGxxx</b>             |

**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+403 | Protect from sunlight. Store in a well-ventilated place                |

**Disclaimer of liability**

Details given in this document have been prepared based on the most available reliable documents and are believed to be correct at the time of going to press  
They do not claim to be exhaustive and should be considered as a guide