	SAFETY DATASHEET	Page : 1/11
		Revised edition n° : 10.0
		Revision date : 08/2019
R452A		MTGxxx

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

1.1. Product identifier

Trade name	R452A (DuPont™ Opteon® XP44)
Chemical description	Refrigerant mixture HFC-HFO (Pentafluoroethane, 2,3,3,3-Tetrafluoropropene, Difluoromethane)
CAS N°	--
CE N°	--
Index N°	--
Registration n°	--
Chemical formula	(CH ₂ F ₂ , C ₃ H ₂ F ₄ , C ₂ HF ₅)

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	info@multigas.ch

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]

Physical hazards Gases under pressure : Liquefied gas

H280

	SAFETY DATASHEET	Page : 2/11
		Revised edition n° : 10.0
		Revision date : 08/2019
R452A		MTGxxx

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



GHS04

Signal word

Warning

Hazard statements

H280 Contains gas under pressure; may explode if heated

Precautionary statements

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
Pentafluoroethane (R125)	(CAS-No.) 354-33-6 (EC-No.) 206-557-8 (EC Index-No.) --- (Registration-No.) 01-2119485636-25	59%	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 %	Flam. Gas 1, H220 Press. Gas (Liq.), H280
Difluoromethane (R32)	(CAS-No.) 75-10-5 (EC-No.) 200-839-4 (EC Index-No.) --- (Registration-No.) 01-2119471312-47	11%	Flam. Gas 1, H220 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

	SAFETY DATASHEET	Page : 3/11
		Revised edition n° : 10.0
		Revision date : 08/2019
R452A		MTGxxx

3.2. Mixtures

Not established

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice	See a doctor. Show this safety data sheet to the attending physician
In case of inhalation	In case of inhalation, remove the person from the contaminated area. In case of respiratory arrest, give artificial respiration. See a doctor
In case of skin contact	Frostbite should be treated like thermal burns: Immediate, abundant and prolonged washing with water. Consult a doctor
In case of eyes contact	Immediate washing, abundant and prolonged with water. If irritation persists, consult a doctor
In case of ingestion	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


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

5.2. Special hazards arising from the substance or mixture

Specific hazards	In case of fire or excessive heat, hazardous combustion products may be produced Exposure to fire may cause containers to rupture/explode
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

	SAFETY DATASHEET	Page : 4/11
		Revised edition n° : 10.0
		Revision date : 08/2019
R452A		MTGxxx

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

	SAFETY DATASHEET	Page : 5/11
		Revised edition n° : 10.0
		Revision date : 08/2019
R452A		MTGxxx

SECTION 8: Exposure controls/personal protection
8.1. Control parameters
Components with occupational exposure limits

Component	CAS N°	Exposure value type	Control parameter	Source
Pentafluoroethane (R125)	354-33-6	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	-	
			-	
Difluoromethane (R32)	75-10-5	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

	SAFETY DATASHEET	Page : 6/11
		Revised edition n° : 10.0
		Revision date : 08/2019
R452A		MTGxxx

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 -47°C

Flash point No data available

Evaporation rate No data available

Flammability (solid, gas) No data available

Explosive limits No data available

Vapour pressure [20°C] 11.5 bar

Vapour pressure [50°C] 24 bar

Vapour density No data available

Relative density, liquid (water=1) 1.15

Relative density, gas (air=1) 3.6

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

	SAFETY DATASHEET	Page : 7/11
		Revised edition n° : 10.0
		Revision date : 08/2019
R452A		MTGxxx

9.2. Other information

Molar mass	103.5 g/mol
Critical temperature [°C]	74.9°C
Relative vapour density	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

Acute toxicity	No toxicological effects expected with this product if exposure limit values are not exceeded
Skin corrosion/irritation	No data available
Serious eye damage/irritation	No data available
Respiratory or skin sensitisation	No data available
Germ cell mutagenicity	No data available
Carcinogenicity	No data available
Reproductive toxicity	No data available

	SAFETY DATASHEET	Page : 8/11
		Revised edition n° : 10.0
		Revision date : 08/2019
R452A		MTGxxx

STOT-single exposure – Target organ(s)	No data available
STOT-repeated exposure	No data available
Ingestion hazard	No data available

SECTION 12: Ecological information

12.1. Toxicity

Assessment	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

Product	Must not be released into the atmosphere Burn in a chemical incinerator equipped with an afterburner and scrubber Return to the supplier the product not consumed in its original container
Contaminated container	Return the unused product in its original container to the supplier
OMoD Code	14 06 01 Solvent, refrigerant and aerosol propellant or organic foam wastes: Chlorofluorocarbons, HCFCs, HFCs

	SAFETY DATASHEET	Page : 9/11
		Revised edition n° : 10.0
		Revision date : 08/2019
R452A		MTGxxx

SECTION 14: Transport information

14.1. UN number

Transport par road/rail ADR / RID	Transport by sea IMDG	Transport by air IATA
1078	1078	1078

14.2. UN proper shipping name

Transport par road/rail ADR / RID	Transport by sea IMDG	Transport by air IATA
REFRIGERANT GAS ; N.O.S. (REFRIGERANT GAS R 452A)	REFRIGERANT GAS ; N.O.S. (REFRIGERANT GAS R 452A)	REFRIGERANT GAS ; N.O.S. (REFRIGERANT GAS R 452A)

14.3. Transport hazard class(es)

Labelling



ADR/RID
IMDG
IATA

2.2 : Non-flammable, non-toxic 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

	SAFETY DATASHEET	Page : 10/11
		Revised edition n° : 10.0
		Revision date : 08/2019
R452A		MTGxxx

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	<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

H280

Contains gas under pressure; may explode if heated

	SAFETY DATASHEET	Page : 11/11
		Revised edition n° : 10.0
		Revision date : 08/2019
R452A		MTGxxx

Precautionary statements

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