	SAFETY DATASHEET	Page : 1/11
		Revised edition n° : 10.2
		Revision date : 03/2024
HFO - 1234yf		MTGxxx

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

1.1. Product identifier

Trade name	HFO - 1234yf (DuPont™ Opteon® YF AFTERMARKET)
Chemical description	2,3,3,3-Tetrafluoropropene
CAS N°	754-12-1
CE N°	468-710-7
Index N°	-
Registration n°	01-0000019665-61
Chemical formula	C ₃ H ₂ F ₄

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

Relevant identified uses	Industrial and professional Test or calibration gas Manufacture of electronic or photovoltaic components 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]

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

	SAFETY DATASHEET	Page : 2/11
		Revised edition n° : 10.2
		Revision date : 03/2024
HFO - 1234yf		MTGxxx

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, hot surfaces, sparks, open flames and other ignition sources. No smoking
P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381	In case of leakage, eliminate all ignition sources
P403+P410	Protect from sunlight. Store in a well-ventilated place

2.3. Other hazards

Misuse or intentional inhalation can cause death without warning symptoms, due to cardiac effects

SECTION 3: Composition/information on ingredients

3.1. Substances


Name	Product identifier	Concentration	Classification
2,3,3,3-Tétrafluoropropène (HFO-1234yf)	(CAS-No.) 754-12-1 (EC-No.) 468-710-7 (EC Index-No.) -- (Registration-No.) 01-0000019665-61	≥99,5 %	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

3.2. Mixtures

Not established

	SAFETY DATASHEET	Page : 3/11
		Revised edition n° : 10.2
		Revision date : 03/2024
HFO - 1234yf		MTGxxx

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	Frostbites are to be treated like thermal burns: immediate, abundant and prolonged wash with water
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

Misuse or intentional intentional inhalation can cause death without warning symptoms due to cardiac effects. Other symptoms that may be related to misuse or abusive inhalation are: anesthetic effects, dizziness, vertigo, confusion, lack of coordination, drowsiness or unconsciousness
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	This product is flammable Water spray or water mist. Dry powder. Carbon dioxide. Foam
Unsuitable extinguishing media	Do not use water jet to extinguish

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 : carbon monoxide

5.3. Additional information

Cool endangered receptacles with water spray jet from a protected position

	SAFETY DATASHEET	Page : 4/11
		Revised edition n° : 10.2
		Revision date : 03/2024
HFO - 1234yf		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

Avoid release into the environment
 Avoid any spills or leaks
 Contain and dispose of contaminated wash water

6.3. Methods and material for containment and cleaning up

Keep area evacuated and free from ignition sources until any spilled liquid has evaporated (ground free from frost)

6.4. Reference to other sections

See also sections 8 and 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling


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

	SAFETY DATASHEET	Page : 5/11
		Revised edition n° : 10.2
		Revision date : 03/2024
HFO - 1234yf		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
2,3,3,3-Tetrafluoropropene (HFO-1234yf)	754-12-1	TWA	-	No occupational exposure limit value
			-	
		OEL	-	No occupational exposure limit value
			-	

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Provide adequate general and local exhaust ventilation
 Gas detectors should be used when flammable gases may 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
 Glove thickness: 0.7 mm
 Penetration time: 480 min

For long-term use

Material: Fluoroelastomer.
 Glove thickness: 0.7 mm
 Penetration time: 480 min

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


-

HFO - 1234yf
MTGxxx
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	Slightly ethereal
Odour threshold	No data available
pH	No data available
Melting point / Freezing point	-152.2°C
Boiling point	-29°C
Flash point	No data available
Evaporation rate	No data available
Flammability (solid, gas)	Flammable gas
Explosive limits	6.2 – 12.3 %
Vapour pressure [20°C]	5.8 bar
Vapour pressure [50°C]	13.0 bar
Vapour density	No data available
Relative density, liquid (water=1)	1.11 g/cm ³
Relative density, gas (air=1)	3.9
Water solubility	0.2 g/l
Partition coefficient n-octanol/water (Log Kow)	No data available
Auto-ignition temperature	405°C
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	114.04 g/mol
Critical temperature [°C]	94.7°C
Critical pressure	33.8 bar
Relative vapour density	Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level

	SAFETY DATASHEET	Page : 7/11
		Revised edition n° : 10.2
		Revision date : 03/2024
HFO - 1234yf		MTGxxx

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

Vapours may form a flammable mixture with air

10.4. Conditions to avoid

Keep away from heat and sources of ignition. Avoid contact with flames and red-hot metal surfaces. No smoking

10.5. Incompatible materials

Air, oxidizers, strong oxidants, strong bases
 Alkaline earth metals
 Finely divided metal powders, such as aluminum, zinc
 For additional 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
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
STOT-single exposure – Target organ(s)	No data available
STOT-repeated exposure	No data available
Ingestion hazard	No data available

	SAFETY DATASHEET	Page : 8/11
		Revised edition n° : 10.2
		Revision date : 03/2024
HFO - 1234yf		MTGxxx

11.2 Information on other hazards

The substance/mixture has no endocrine disrupting properties

SECTION 12: Ecological information

12.1. Toxicity

Assessment Classification criteria are not met

12.2. Persistence and degradability

Hardly biodegradable

12.3. Bioaccumulative potential

Virtually non-bioaccumulative

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. Endocrine-disrupting properties

The substance/mixture does not have endocrine disrupting properties

12.7. Other adverse effects

Effect on the ozone layer May contribute to the greenhouse effect when discharged in large quantities For quantities, see bottle label

Ozone depletion potential 0

Effect on global warming

Global warming potential 4


SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product Must not be discharged to atmosphere
Burn in a chemical incinerator equipped with an afterburner and scrubber

Contaminated container Return unused product in original cylinder to supplier
Contact the supplier if instructions are needed

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° : 10.2
		Revision date : 03/2024
HFO - 1234yf		MTGxxx

SECTION 14: Transport information

14.1. UN number

Transport par road/rail ADR / RID	Transport by sea IMDG	Transport by air IATA
3161	3161	3161

14.2. UN proper shipping name

Transport par road/rail ADR / RID	Transport by sea IMDG	Transport by air IATA
LIQUIFIED GAS, FLAMMABLE N.S.A (2,3,3,3- TETRAFLUOROPROPENE)	LIQUIFIED GAS, FLAMMABLE N.S.A (2,3,3,3- TETRAFLUOROPROPENE)	LIQUIFIED GAS, FLAMMABLE N.S.A (2,3,3,3- TETRAFLUOROPROPENE)

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

	SAFETY DATASHEET	Page : 10/11
		Revised edition n° : 10.2
		Revision date : 03/2024
HFO - 1234yf		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 been carried out

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

H221

Flammable gas

	SAFETY DATASHEET	Page : 11/11
		Revised edition n° : 10.2
		Revision date : 03/2024
HFO - 1234yf		MTGxxx

H280 Contains gas under pressure; may explode if heated

Precautionary statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely

P381 In case of leakage, eliminate all ignition sources

P403+P410 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