

SAFETY DATA SHEET

According to Regulation (EC) No.1907/2006


HARP
INTERNATIONAL

HARP® HFO-1234yf

Version: CLP01

Date: Feb 2012

Page 1 of 6

1. Identification of the substance / preparation and company / undertaking

Product name	HFO-1234yf, 2,3,3,3-Tetrafluoroprop-1-ene
REACH registration number	01-0000019665-61-0000
Company	Harp International Ltd Gellihirion Industrial Estate Pontypridd Rhondda Cynon Taff CF37 5SX Tel: +44 (0) 1443 842255 Fax: +44 (0) 1443 841805 Email: harp@harpintl.com
Emergency phone number	+44 (0) 1270 502891 (24 hour)
Use	Refrigerant

2. Hazards identification

Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008/EC (CLP/GHS)

Flammable gases 1
H220 Extremely flammable gas
Gases under pressure, Liquefied gas
H280 Contains gas under pressure; may explode if heated

Classification according to Directive 67/548/EEC & 1999/45/EC

F+ Extremely flammable
R12 Extremely flammable

Label elements

Labelling Pictograms



Signal word

Danger

Hazard statements

H220 Extremely flammable gas
H280 Contains gas under pressure; may explode if heated

Precautionary statements

Precautionary statements

P281 Use personal protective equipment as required
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P260 Do not breathe dust/fumes/gas/mist/vapours/spray
P308 + P313 If exposed or concerned: Get medical advice/attention
P410 + P403 Protect from sunlight. Store in a well-ventilated place

SAFETY DATA SHEET

According to Regulation (EC) No.1907/2006


INTERNATIONAL

HARP® HFO-1234yf

Version: CLP01

Date: Feb 2012

Page 2 of 6

Potential health effects

Skin	Rapid evaporation of the liquid may cause frostbite
Eyes	May irritate eyes
Ingestion	Unlikely route of exposure
Inhalation	High vapour concentrations can cause headaches, dizziness, drowsiness and nausea and may lead to unconsciousness
Chronic exposure	None known
General advice	Warning. Container under pressure

Potential environmental effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal

3. Composition / information on ingredients

Substance / mixture: Substance

CAS number 754-12-1

EC No (from EINECS) 468-710-7

4. First aid measures

Description of first aid measures

General advice	First aider needs to protect himself. Take off all contaminated clothing immediately.
Inhalation	Remove to fresh air and seek medical aid. If breathing is irregular or stopped, administer artificial respiration. If unconscious place in recovery position and seek medical advice.
Skin contact	Rapid evaporation of the liquid may cause frostbite. In case of contact with liquid, thaw frosted parts with water, then remove clothing carefully. Wash with plenty of water. Wash contaminated clothing before reuse. Consult a physician.
Eye contact	Protect unharmed eye. Immediately flush eyes thoroughly with water for at least 15 minutes. Call a physician immediately.
Ingestion	Rinse mouth. Call a physician immediately.

Notes to physician

Treatment Adrenaline derivatives are contra-indicated. Treat symptomatically.

5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special hazards arising from the substance or mixture

Specific hazards Extremely flammable. Some risk may be expected of corrosive and toxic decomposition products. In case of fire, hazardous decomposition products may be produced such as carbon monoxide, hydrogen halides, carbonyl halides, pyrolysis products containing fluoride. Cool closed containers exposed to fire with water spray. Heating will cause pressure rise with risk of bursting and subsequent explosion.

SAFETY DATA SHEET

According to Regulation (EC) No.1907/2006


HARP
INTERNATIONAL

HARP® HFO-1234yf

Version: CLP01

Date: Feb 2012

Page 3 of 6

Advice for fire fighters

Special protective equipment

Wear full protective clothing and self-contained breathing apparatus

Further information

In case of fire, evacuate area. Fight remotely due to the risk of explosion.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear full protective clothing and self-contained breathing apparatus. Keep people away from and upwind of spill/leak. Ventilate the area.

Environmental precautions

The product evaporates readily. Prevent product from entering drains.

Methods and materials for containment and cleaning up

Use low-sparking hand tools and explosion proof electrical equipment. Allow to evaporate.

Additional advice

Inform the responsible authorities in case of gas leakage or of entry into waterways, soil or drains. Pay attention to the spread of gases especially at ground level (heavier than air) and to the direction of the wind.

Reference to other sections

See also sections 8 and 13.

7. Handling and storage

Precautions for safe handling

Exhaust ventilation at the object is necessary. Pressurised container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use. Use suitably rated equipment.

Advice on protection against fire and explosion

Keep product and empty container away from heat and sources of ignition. Fire or intense heat may cause violent rupture of packages. Use suitably rated equipment.

Hygiene measures

Provide adequate ventilation. Do not smoke. When using, do not eat or drink.

Conditions for safe storage, including any incompatibilities

Keep containers tightly closed in a cool, well-ventilated place. Containers should be protected against falling down. Protect from warmth. Do not store at temperatures exceeding 50°C. Keep away from direct sunlight.

8. Exposure controls / personal protection

Occupational exposure limits

Components	Basis	Value type	Control parameters	Exceeding factor	Form of exposure	Remarks
2,3,3,3-Tetrafluoroprop-1-ene	WEL	Time weighted average	500 ppm			We are not aware of any national exposure limit

Occupational exposure controls

The Personal Protective Equipment must be in accordance with EN standards: respirator EN 136, 140, 149; safety glasses EN 166; protective suit EN 340,463, 468, 943-1, 943-2; gloves EN 374; safety shoes EN-ISO 20345.

Environmental exposure controls

Handle in accordance with local environmental regulations and good industrial practices.

SAFETY DATA SHEET

According to Regulation (EC) No.1907/2006

HARP® HFO-1234yf

Version: CLP01

Date: Feb 2012

Page 4 of 6

Engineering measures	Highly effective exhaust ventilation.
Personal protective equipment	
Respiratory protection	Remarks: In case of insufficient ventilation, wear suitable respiratory equipment.
Hand protection	Wear suitable gloves. Heat insulating gloves.
Eye protection	Goggles
Skin and body protection	Wear suitable protective equipment

9. Physical and chemical properties

Form	Compressed liquefied gas
Appearance/colour	Colourless
Odour	Slight, original odour
Molecular weight	114 g/mol
Melting point	No data available
Boiling point	-29,4°C
Flash point	Not applicable
Flammability (solid, gas)	Extremely flammable gas. Method: Flammability (gases)
Auto-ignition temperature	405°C
Lower explosion limit	6,2 % (V) lower flammability limit
Upper explosion limit	12,3 % (V) upper flammability limit
Vapour pressure	6.067 hPa at 21,1°C
Vapour pressure	14.203 hPa at 54,4°C
Density	1,1 g/cm ³ at 25°C
pH	No data available
Solubility in water	198,2 mg/l at 24°C Method: 92/69/EEC, A.6
Partition coefficient (n-octanol/water)	log Pow 2,15 Method: 92/69/EEC, A.8
Relative vapour density	4
Evaporation rate	Not determined

10. Stability and reactivity

Conditions to avoid	Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material. Avoid heat, flames and sparks.
Materials to avoid	Reactions with alkali metals. Reactions with light metals. Zinc. Magnesium.
Hazardous decomposition products	Risk of formation of toxic pyrolysis products containing fluorine. Carbon monoxide, carbon dioxide, carbonyl halides, hydrogen halides.

11. Toxicological information

Information on toxicological effects

Acute oral toxicity	Not applicable
Acute dermal toxicity	Not applicable
Acute inhalation toxicity	LC50/rat, value: >400000 ppm. Exposure time: 4 h
Skin irritation	Slight irritation
Eye irritation	Slight irritation
Sensitisation	No data available
Repeated dose toxicity	Rat, exposure route: inhalation, NOEL:233 mg/kg, NOEL:50000 ppm
Further information	Concentration above the admissible concentration at the workplace may cause dizziness, headache and inebriation. 2,3,3,3-tetrafluoropropene: Mouse Micronucleus (4-hour): No toxicological significant signs reported. No increase in the frequency of micronuclei. Cardiac sensitisation: no effects for exposures up to 12% (120, 189ppm).

SAFETY DATA SHEET

According to Regulation (EC) No.1907/2006


HARP
INTERNATIONAL

HARP® HFO-1234yf

Version: CLP01

Date: Feb 2012

Page 5 of 6

12. Ecological information

Persistence and degradability

Biodegradability

Result: Not readily biodegradable

Ecotoxicity effects

		Species	Value	Exposure time	Method	Comment
Toxicity to fish	LC50	Cyprinus carpio (Carp)	>197 mg/l	96 h	OECD test guideline 203	No demonstrable toxic effect in saturated solution
Toxicity to aquatic plants	EC50	Scenedesmus capricornutum (fresh water algae)	>100 mg/l			
Acute toxicity to aquatic invertebrates	EC50	Daphnia magna (water flea)	>83 mg/l	48 h	OECD test guideline 202	

Further information

Additional ecological information

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. Disposal considerations

Product

Dispose according to legal requirements

Packaging

Legal requirements are to be considered in regard of reuse or disposal of used packaging materials

Further information

Provisions relating to waste: EC Directive 2006/12/EC; 91/689/EEC Regulation No. 1013/2006

14. Transport information

ADR/RID

Class 2
Classification code 2F
UN number 3161
Labels 2.1
Proper shipping name LIQUIFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-TETRAFLUOROPROP-1-ENE)
Hazard number 23
Environmentally hazardous No

IATA

Class 2.1
UN number 3161
Hazard labels 2.1
Proper shipping name LIQUIFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-TETRAFLUOROPROP-1-ENE)

IMDG

Class 2.1
UN number 3161
Hazard labels 2.1
Proper shipping name LIQUIFIED GAS, FLAMMABLE, N.O.S. (2,3,3,3-TETRAFLUOROPROP-1-ENE)
EmS number F-D,S-U
Marine pollutant No

SAFETY DATA SHEET

According to Regulation (EC) No.1907/2006


HARP
INTERNATIONAL

HARP® HFO-1234yf

Version: CLP01

Date: Feb 2012

Page 6 of 6

15. Regulatory information

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

Other inventory information

Country	Legislation	Information
US	Toxic Substances Control Act	On TSCA inventory
Australia	Industrial Chemical (Notification & Assessment) Act	Not in compliance with inventory
Canada	Canadian Environmental Protection Act (CEPA)	This product contains the following components that are not on the Canadian DSL or NDSL lists
	Domestic Substances List (DSL) (Can. Gaz. Part II, Vol.144)	
Japan	Kashin-Hou Law List	On the inventory or in compliance with the inventory
Korea	Existing Chemicals Inventory (KECI)	On the inventory or in compliance with the inventory
Philippines	The Toxic Substances and Hazardous and Nuclear Waste Control Act	Not in compliance with inventory
China	Inventory of Existing Chemical Substances	Not in compliance with inventory
New Zealand	Inventory of Chemicals (NZIoC), as published by ERMA New Zealand	Not in compliance with inventory

16. Other information

Abbreviations

EC	European Community
CAS	Chemical Abstract Service
WEL	Workplace Exposure Limit
MAK	Maximale Arbeitsplatz-Konzentration
AGW	Arbeitsplatzgrenzwert
STEL	Short Term Exposure Limit

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).

This datasheet was prepared in accordance with Regulation (EC) No. 1907/2006.

Information in this publication is believed to be accurate and is given in good faith but it is for the user to satisfy itself of the suitability for its own particular purpose. Accordingly, Harp International Limited gives no warranty as to the fitness of the product for any particular purpose and any implied warranty or condition, statutory or otherwise, is excluded except to the extent that such exclusion is prevented by law. Freedom under Patent, Copyright and Designs cannot be assumed. HARP® is a trademark, the property of Harp International Ltd.

Harp International Limited is registered in England & Wales No. 02432294. Registered office: Gellihirion Industrial Estate, Pontypridd, Rhondda Cynon Taff, CF37 5SX.