KRYON® 134A

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

1.1. Product Identifier :

Product Name	: HFC-134a , Kryon®134a
Type of Product	: Substance
Remarks	: SDS according to Art.31 of Regulation (EC) 1907/2006
SDS Nr	: GG_024
Chemical Name	: Norflurane
CAS-No.	: 811-97-2
Registration Number	: 01-211-9459374-33

1.2. Revelant Identified Uses of the substance or mixture and uses advised against

Use of the Substance/Mixture :
: Refrigerant
Propellant
Heat Transfer Fluid

Uses advised against : None

1.3. Details of the supplier of the safety data sheet

Company : General Gas S.r.l. – Via Aosta 5 – 20063 Cernusco S/N (MI) – Italy
Telephone : 0039-02-92141835
Telefax : 0039-02-92141841
For further information please contact :
: Marco Migliaccio – m.migliaccio@gas-tec.it

1.4. Details of the supplier of the safety data sheet

Emergency telephone number :
: 0039-335-5644288

SECTION 2: Hazards Identification

2.1. Classification of the substance or mixture

REGULATION (EC) No 1272/2008

Gases under pressure Liquefied gas
H280 Contains gas under pressure; may explode if heated.

2.2. Label Elements

REGULATION (EC) No 1272/2008

Hazard pictograms : 

Signal word : Warning

Hazard Statements : H280 Contains gas under pressure; may explode if heated.

Precautionary statements : P280 Wear protective gloves/ eye protection/ face protection.

P284 In case of Inadequate ventilation wear respiratory protection.

P410 + P403 Protect form sun light. Store in a well- ventilated place.

2.3. Other hazards : Warning! Container Under Pressure.

SECTION 3: Composition/Information on ingredients

3.1. Substance

Chemical Name	CAS-No. Index-No. Registration Number EC-No	Classification 1272/2008	Concentration	Remarks
Norflurane (Active ingredient)	811-97-2 01-2119459374-33 212-377-0	Press. Gas ; H280	99,8	1*

1* For specific concentration limits see Annexes of 1272/2008

3.2. Mixture

Not applicable

Occupational Exposure Limit(s), if available, are listed in Section 8.
For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:

Remove to fresh air. Artificial respiration and/or oxygen may be necessary. Call a physician immediately.

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 Consult a physician. Take off contaminated clothing and shoes immediately. Wash contaminated clothing before re-use.

Eye contact:
Remove contact lenses. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Ingestion:
As this product is a gas, refer to the inhalation section. Ingestion is unlikely because of the physical properties and is not expected to be hazardous.

4.2. Most Important symptoms and effects, both acute and delayed

No data available

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

Do not give adrenaline or similar drugs
See Section 11 for more detailed information on health effects and symptoms.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media:
The product is not flammable.
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Extinguishing media which shall not be used for safety reasons:
High volume water jet

5.2. Special hazards arising from the substance or mixture

Possibility of generating hazardous reactions during a fire due to the presence of F and Cl groups. Heating will cause pressure rise with risk of bursting
Cool closed containers exposed to fire with water spray.
This product is not flammable at ambient temperatures and atmospheric pressure.
However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources.

5.3. Advice for firefighters

Wear full protective clothing and self-contained breathing apparatus.

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6: Accidental release measures

6.1. Personal Precautions, protective equipment and emergency procedures

Immediately contact emergency personnel. Wear personal protective equipment. Unprotected persons must be kept away. Ensure adequate ventilation. In case of insufficient ventilation wear suitable respiratory equipment.

6.2. Environmental precautions

Prevent further leakage or spillage if safe to do so. The product evapourates readily.

6.3. Methods and materials for containment and cleaning up

Ventilate the area.

6.4. Reference to other sections

For personal protection see section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling:
Open drum carefully as content may be under pressure. The product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Pressurized container. Protect from sunlight and do not expose to
temperatures exceeding 50 °C. Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material. Do not use in areas without adequate ventilation. Contaminated equipment (brushes, rags) must be cleaned immediately with water.

Hygiene measures:
Provide adequate ventilation. When using do not eat or drink.

7.2. Conditions for safe storage, including any incompatibilities

Further information on storage conditions:
Store in original container. Keep away from direct sunlight. Keep containers tightly closed in a cool, well-ventilated place.

7.3. Specific end use(s)

no additional data available

SECTION 8 : Exposure controls / personal protection

8.1. Control parameters

Occupational exposure limits :

Components	Basis / Value Type	Value / Form of exposure	Exceeding Factor	Remarks
Norflurane	Twa	1'000 ppm		
Norflurane	EH40 WEL TWA	4'240 mg/m3 1000 ppm		

TWA – Time weighted average

DNEL / PNEC-VALUES

Component	**End-use / Impact**	**Exposure Duration**	**Value**	**Exposure routes**	**Remarks**
Norflurane	Workers / Long-term systemic effects		13936 mg/m3	Inhalation	
Norflurane	Consumers / Long-term systemic effects		2476 mg/m3	Inhalation	

Component	**Environmental compartment / Value**	**remarks**
Norflurane	Fresh water : 0,1 mg/l	Assessment factor : 1'000
Norflurane	Marine water : 0,01 mg/l	Assessment factor : 10'000
Norflurane	Fresh water sediment : 0,75 mg/kg	Assessment factor : 100
Norflurane	Sew age treatment plant : 73 mg/l	Assessment factor : 10

8.2. Exposure controls

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.

Personal protective equipment
Respiratory protection:
In case of insufficient ventilation wear suitable respiratory equipment.

Self-contained breathing apparatus (EN 133)

Hand protection:
Glove material: Viton (R) Break
through time: > 480 min Glove
thickness: 0,7 mm Vitoject®
890
Protective gloves against cold
(EN 511)
Gloves must be inspected prior to use.
Replace when worn.
Remarks:Supplementary note: The specifications are based on information and tests from similar substances by analogy.
Due to varying conditions (e.g.temperature or other strains) it must be considered that the usage of a chemical protective glove in practice may be much shorter than the permeation time determined in accordance with EN 374.
Since actual conditions of practical use often deviate from standardised conditions according EN 374 the glove manufacturer reccomends to use the chemical protective glove in practice not longer than 50% of the recomended permeation time.

Manufacturer´s directions for use should be observed because of great diversity of types .
Suitable gloves tested according EN 374 are supplied e.g. from KCL GmbH, D-36124 Eichenzell, Vertrieb@kcl.de

Eye protection:
Safety glasses with side-shields conforming to EN166
Face-shield

Skin and body protection:
Protective footwear

Environmental exposure controls

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

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form	:	Liquefied gas

Colour	:	colourless
Odour	:	weak
Molecular weight	:	102,02 g/mol
Melting point/range	:	-101 °C
Boiling point/boiling range	:	-26,2 °C
Flash point	:	Not applicable
Flammability (solid,gas):		no data available
Ignition temperature	:	> 750 °C
Lower explosion limit	:	no data available
Upper explosion limit	:	no data available
Vapour pressure	:	5.915 hPa at 21,1°C
Vapour pressure	:	14.713 hPa at 54,4 °C
Density	:	1,2 g/cm3
pH	:	neutral
Water solubility	:	1,5 g/l
Partition coefficient:		
n- octanol/water	:	log Pow 1,06 The product is more soluble in octanol.
Relative vapour density	:	3,5
Evaporation rate	:	> 1 Method: Compared to CCl4.

9.2. Other Information

no additional data available

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal conditions.Hazardous polymerisation does not occur.

10.2. Chemical stability

no data available

10.3. Possibility of hazardous reactions

no data available

10.4. Conditions to avoid

Heating will cause pressure rise with risk of bursting
Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material.

10.5. Incompatible materials

oxidizing substance
Possible incompatibility with alkali sensitive materials.
Powdered metals

10.6. Hazardous decomposition products

Halogenated compounds Hydrogen fluoride Carbonyl halides Carbon oxides

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute oral toxicity:
Not applicable

Acute dermal toxicity:
no data available

Acute inhalation toxicity:
LC50
Species: Rat
Value: > 500000 ppm
Exposure time: 4 h

Skin irritation:
no data available

Eye irritation:
no data available

Respiratory or skin sensitisation:
no data available

Carcinogenicity:
Note: Not classified as a human carcinogen. Substance not expected to be a carcinogen based on available data.

Germ cell mutagenicity:
Test Method: Ames test Result: negative
Method: OECD Test Guideline 471

Species: Mouse
Result: negative

Reproductive toxicity:
Species: MouseRoute of Application: Inhalation

General Toxicity - Parent: NOEL: 50.000 ppm

Method: OECD Test Guideline 414
Species: Rabbit
Route of Application: Inhalation

General Toxicity Maternal: NOEL: 2.500 ppm Embryo-fetal toxicity: NOEL: 40.000 ppm

Aspiration hazard:
no data available

Other information:
no data available

SECTION 12: Ecological Information

12.1. Toxicity

Toxicity to fish:
LC50
semi-static test
Species: Oncorhynchus mykiss (rainbow trout) Value: 450 mg/l

Exposure time: 96 h
Method:
92/69/EEC,C.1

Toxicity to aquatic plants:
Growth rate
Species: Selenastrum capricornutum (green algae) Value: > 118 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to Microorganisms:
EC10
Growth inhibition
Species: Pseudomonas putida Value: > 730 mg/l
Exposure time: 6 h

Toxicity to aquatic invertebrates:
EC50
static test
Species: Daphnia magna (Water flea) Value: 980 mg/l
Exposure time: 48 h
Method: EEC 92/69/V, C2

12.2. Persistence and degradability

Biodegradability : Biodegradation 3%

Exposure time: 28 d
Result: Not rapidly biodegradable
Method: OECD 301 D

12.3. Bioaccumulative potential

No data available

12.4. Mobility in soil

No data available

12.5. Results of PBT and vPvB assessment

Results PBT Assessment : This substance is not considered to be present, bioaccumulating and toxic (PBT).

This substance is not considered to be very persistent and very bioaccumulating (vPvB)

12.6. Other adverse effects

Accumulation in aquatic organisms is unlikely.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product:
Offer surplus and non-recyclable solutions to a licensed disposal company. Refer to manufacturer/supplier for information on recovery/recycling. Classification: 14.06.01

Further information:
Provisions relating to waste:
EC Directive 2006/12/EC;
2008/98/EEC
Regulation No. 1013/2006

For personal protection see section 8.

SECTION 14: Transport Information

ADR/RID

UN Number	:	3159
Description of the goods	:	1,1,1,2-TETRAFLUOROETHANE
Class	:	2
Classification Code	:	2A
Hazard Identification Number	:	20
ADR/RID-Labels	:	2.2
Environmentally hazardous	:	no

IATA

UN Number	:	3159
Description of the goods	:	1,1,1,2-TETRAFLUOROETHANE

Class	:	2.2
Hazard Labels	:	2.2

IMDG

UN Number	:	3159
Description of the goods	:	1,1,1,2-TETRAFLUOROETHANE
Class	:	2.2
Hazard Labels	:	2.2
EmS Number	:	F-C, S-V
Marine pollulant	:	no

SECTION 15: Regulatory information

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

Other inventory information

US. Toxic Substances Control Act On TSCA Inventory

Australia. Industrial Chemical (Notification and Assessment) Act On the inventory, or in compliance with the inventory

Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL) All components of this product are on the Canadian DSL

Japan. Kashin-Hou Law List
On the inventory, or in compliance with the inventory

Korea. Toxic Chemical Control Law (TCCL) List
On the inventory, or in compliance with the inventory

Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act On the inventory, or in compliance with the inventory

China. Inventory of Existing Chemical Substances On the inventory, or in compliance with the inventory

NZIOC - New Zealand
On the inventory, or in compliance with the inventory

15.2. Chemical safety assessment

A Chemical Safety Assessment has been carried out.

SECTION 16: Other information

Text of H-statements referred to under heading 3

Norflurane	:H280 Contains gas under pressure; may explode if heated.

Further information

All directives and regulations refer to amended versions.
Vertical lines in the left hand margin indicate a relevant amendment from the previous version.

Abreviations:
EC European Community
CAS Chemical Abstracts
Service DNEL Derived no
effect level PNEC Predicted
no effect level
vPvB Very persistent and very biaccumulative
substance PBT Persistent, bioaccmulative und toxic
substance

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