

## KRYON® 407C

**SECTION 1 : Identification of substance / mixture and of the company/undertaking****1.1. Product Identifier :**

Product Name : Kryon®407C  
Type of Product : Mixture  
SDS Nr : GG\_026

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

Use of the Substance/Mixture :  
: Refrigerant

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](mailto: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

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

Precautionary statements : P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

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

P284 In case of Inadequate ventilation wear respiratory protection.

P308 + P313: IF exposed or concerned: Get medical advice/ attention.

P410 + P403 Protect from sunlight. Store in a well- ventilated place.

### 2.3. Other hazards

Warning! Container under pressure.

## SECTION 3: Composition/Information on ingredients

### 3.1. Substance

Not applicable

### 3.2. Mixture

Chemical Name	CAS-No. Index-No. Registration Number EC-No	Classification 1272/2008	Concentration	Remarks
Norflurane (Active ingredient)	811-97-2  01-2119459374 -3 3 212-377-0	Press. Gas ; H280	>= 50 - <= 100	1*
Pentafluoroethane (Active ingredient)	354-33-6  01-2119485636 -25  206-557-8	Press. Gas ; H280	>= 25 - < 50	1*
Difluoromethane (Active ingredient)	75-10-5 01- 2119471312 -47 200-839-4	Flam. Gas 1; H220 Press. Gas ; H280	>= 25 - < 50	1*

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

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Remaining components of this product are non-hazardous and/or are present at concentrations below reportable limits.

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***General advice:*

First aider needs to protect himself. Move out of dangerous area. Take off all contaminated clothing immediately.

*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:*

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

**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.

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**SECTION 5: Firefighting measures****5.1. Extinguishing media**

*Suitable extinguishing media:*

The product is not flammable.

ASHRAE 34

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

**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 evaporates 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**

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### *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:*

Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation, especially in confined areas. Do not get in eyes, on skin, or on clothing. Remove and wash contaminated clothing before re-use. Keep working clothes separately.

## **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)**

### *Specific use information:*

Restricted to professional users.

For industrial use only.

## **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	4.240 mg/m3 1000 ppm		
Pentafluorethane	TWA	1000 ppm		We are not aware of any national exposure limit.

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Difluoromethane	TWA	2.200 mg/m <sup>3</sup> 1000 ppm		We are not aware of any national exposure limit.
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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/m <sup>3</sup>	Inhalation	
Norflurane	Consumers / Long-term systemic effects		2476 mg/m <sup>3</sup>	Inhalation	
Pentafluorethane	Workers / Long-term systemic effects		16444 mg/m <sup>3</sup>	Inhalation	
Pentafluorethane	Consumers / Long-term systemic effects		1753 mg/m <sup>3</sup>	Inhalation	
Difluoromethane	Workers / Long-term systemic effects		7035 mg/m <sup>3</sup>	Inhalation	
Difluoromethane	Consumers / Long-term systemic effects		750 mg/m <sup>3</sup>	Inhalation	

Component	Environmental compartment / Value	Remarks
Norflurane	Fresh water: 0,1 mg/l	Assessment factor: 1000
Norflurane	Marine water: 0,01 mg/l	Assessment factor: 10000
Norflurane	Fresh water sediment: 0,75 mg/kg	Assessment factor: 100
Norflurane	Sewage treatment plant: 73 mg/l	Assessment factor: 10
Pentafluorethane	Fresh water: 0,1 mg/l	Assessment factor: 1000

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Pentafluorethane	Fresh w ater sediment: 0,6 mg/kg dw	
Difluoromethane	Fresh w ater: 0,142 mg/l	Assessment factor: 1000
Difluoromethane	Fresh w ater sediment: 0,534 mg/kg dw	

### 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:*

Protective gloves against cold (EN 511)

##### *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	:	slight
Molecular weight	:	Not applicable
Boiling point/boiling range	:	-43,9 °C
Flash point	:	Not applicable

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Lower explosion limit	:	none
Upper explosion limit	:	none
Vapour pressure	:	10.769 hPa at 21,1 °C
Vapour pressure	:	24.593 hPa at 54,4 °C
Density	:	1,16 g/cm <sup>3</sup> at 21,1 °C
pH	:	neutral
Water solubility	:	1,5 g/l
Partition coefficient: n- octanol/water	:	log Pow 1,06 Medium: 1,1,1,2-tetrafluoroethane (HFC-134a)
Partition coefficient: n- octanol/water	:	log Pow 1,48 Medium: Ethane, pentafluoro- (HFC-125)
Relative vapour density	:	3 (Air = 1.0)
Evaporation rate	:	> 1 Method: Compared to CCl <sub>4</sub> .

## 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.



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**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  
Test substance: Ethane, pentafluoro- (HFC-125)

*LC50*

Species: Rat  
Value: 520000 ppm  
Exposure time: 4 h  
Test substance: Difluoromethane (HFC-32)

*Skin irritation:*

no data available

*Eye irritation:*

no data available

*Respiratory or skin sensitisation:*

no data available

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*Repeated dose toxicity:*

Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a)

Note: NOEL – 40,000 ppm

*Aspiration hazard:*

no data available

*Other information:*

1,1,1,2-tetrafluoroethane (HFC-134a): Cardiac sensitisation threshold (dog): 80000 ppm.  
Difluoromethane. (HFC-32): Cardiac sensitisation threshold (dog): 350000 ppm. Ethane,  
pentafluoro- (HFC-125): Cardiac sensitisation threshold (dog): 75000 ppm. Inhalation: May cause  
cardiac arrhythmia.

Rapid evaporation of the liquid may cause frostbite. Avoid skin contact with leaking liquid (danger  
of frostbite). Vapours are heavier than air and can cause suffocation by reducing oxygen available  
for breathing.

**SECTION 12: Ecological Information****12.1. Toxicity***Toxicity to fish:*

No data available

*Toxicity to aquatic plants:*

No data available

*Toxicity to aquatic invertebrates:*

No data available

**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**

No data available

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### 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	:	3340
Description of the goods	:	REFRIGERANT GAS R 407C
Class	:	2
Classification Code	:	2A
Hazard Identification Number	:	20
ADR/RID-Labels	:	2.2
Environmentally hazardous	:	no

### IATA

UN Number	:	3340
Description of the goods	:	REFRIGERANT GAS R 407C
Class	:	2.2
Hazard Labels	:	2.2

### IMDG

UN Number	:	3340
Description of the goods	:	REFRIGERANT GAS R 407C
Class	:	2.2
Hazard Labels	:	2.2
EmS Number	:	F-C, S-V
Marine pollutant	:	no

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**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.

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

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Difluoromethane : H220 Extremely flammable gas.  
: 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.

**Abbreviations:**

EC European Community

CAS Chemical Abstracts

Service

DNEL Derived no effect level

PNEC Predicted no effect  
level

vPvB Very persistent and very bioaccumulative

substance PBT Persistent, bioaccumulative und toxic  
substance

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user.

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