

SAFETY DATA SHEET

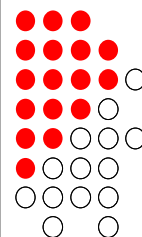
according to Regulations (EC) 1907/2006 and (EU) 2015/830

R-407c

Issue date: 28. 02. 2013

Revision: 08. 08. 2019

Version: 4.00



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

1.1. Product identifier

Product name: R-407c
Substance/Mixture: Mixture

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

Identified use: Refrigerant gas.

1.3. Details of the supplier of the safety data sheet

Producer/supplier: Vrec-Co Kft.
Address: H-6763 Szatymaz Kossuth u. 12.
Phone: +36-62-283-481
Fax: +36-62-583-550
E-mail: info@vrec-co.hu

Safety data sheet prepared by: TOXICHEM KFT.
Address: 6721 Szeged Osztróvszky u. 27.
Phone: +36 30 999 77 82
Fax: +36 62 64 12 13
E-mail: info@toxichem.hu

1.4. Emergency telephone number:

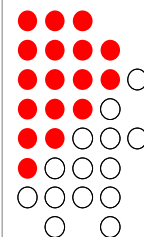
Austria tel.: +431 406 43 43, Belgium tel.: 070/245.245, Bulgaria tel.: +359 2 9154 409, Czech Republic tel.: +420 224 919 293, +420 224 915 402, Denmark tel.: 82 12 12 12, Estonia tel.: 112, Finland tel.: (09) 471 977 (direct) or (09) 4711, France tel.: ORFILA (INRS) : + 33 (0)1 45 42 59 59, Ireland tel.: 01 809 2166, Lithuania tel.: +370 5 236 20 52, +370 687 53378, Malta tel.: 2545 0000, Medicines & Poisons Info Office tel.: 2545 6504, Norway tel.: 22 59 13 00, Portugal tel.: 808 250 143, Romania tel.: 021.318.36.06 (8:00 – 15:00), Slovakia tel.: +421 2 5477 4166, Spain tel.: + 34 91 562 04 20, Sweden tel.: 112; 08-331231 (9:00-17:00).

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SECTION 2: Hazards identification

2.1. Classification of the substance or mixture:

Regulation EC 1272/2008 (CLP):

Gases under pressure - Liquefied gas – (Press. Gas, H280)

See H-statements in Section 2.2. and 16.

2.2. Label elements

Regulation (EC) 1272/2008:

Pictogram:



Signal word:

Warning

Hazard statement:

H280

Contains gas under pressure; may explode if heated.

Precautionary statement:

P410+P403

Protect from sunlight. Store in a well-ventilated place.

2.3. Other hazards

Physical hazards:

Liquefied gas.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Components	EC number	REACH-registration number	CAS number	Index number	Weight %	Classification (Regulation (EC) No 1272/2008)
1,1,1,2-tetrafluoroethane	212-377-0	01-2119459374-33	811-97-2	-	52	Press. Gas H280

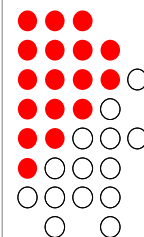
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Components	EC number	REACH-registration number	CAS number	Index number	Weight %	Classification (Regulation (EC) No 1272/2008)
1,1,1,2,2-pentafluoroethane	206-557-8	01-2119485636-25	354-33-6	-	25	Press. Gas H280
Difluoromethane	200-839-4	01-2119471312-47	75-10-5	-	23	Flam. Gas 1 H220 Press. Gas H280



H-statements in Section 16 below.

SECTION 4: First aid measures

4.1. Description of first aid measures

Medical intervention: Call physician in case of asphyxiation, frostbite.

Inhalation: If inhaled, immediately remove to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion: Ingestion is not considered a potential route of exposure.

Skin contact:
– frostbite In case of frostbite spray with water for at least 15 minutes. Do not scrub the frozen surface. Apply a sterile bandage. Obtain medical assistance.

Eye contact: Immediately flush eyes thoroughly with water for at least 15 minutes (remove contact lenses if easily possible). Obtain medical assistance.

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

Inhalation: Overexposure to the vapors by inhalation may include temporary nervous system depression with anesthetic effects such as dizziness, headache, confusion, in-coordination, and loss of consciousness. Higher exposures to the vapors may cause temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation. Gross overexposure may be fatal.

Ingestion: Ingestion is not considered a potential route of exposure.

Skin contact: Skin contact with the liquid may cause frostbite.

Eye contact: Contact with the liquid may cause frostbite.

Delayed effects: Not expected.

General: Not expected.

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

Advice for physician: Symptomatic treatment is recommended .

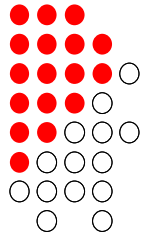
Special equipment at the workplace: Not necessary.

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SECTION 5: Firefighting measures

5.1. Extinguishing media

Applicable extinguishing media All known extinguisher can be used.

Not applicable extinguishing media No information.

5.2. Special hazards arising from the substance or mixture

Specific risk: However, this material will become combustible when mixed with air under pressure and exposed to strong ignition sources. Cylinders may rupture under fire conditions. Decomposition may occur.

5.3. Advice for firefighters

Special protective equipment: Respiratory protective devices. (EN 14593-1), protective clothing against liquid chemicals. (EN 14605).

Advice: If possible, stop flow of product.
Move away from the container and cool with water from a protected position.
Use self-contained breathing apparatus and chemically protective clothing.

Fire classification: Non-flammable.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal emergency procedures: Evacuate the area.
Try to stop release. Wear a self-contained breathing apparatus when entering the area unless atmosphere is proved to be safe. The affected area in the direction of the wind and other personnel carrying out damage control does not stay! The evacuation of persons facing the wind to be performed.
Ensure adequate air ventilation.

6.2. Environmental precautions

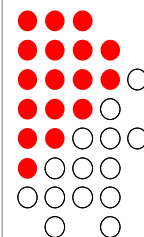
Environmental precautions: Try to stop release. Land of the danger area should be closed. High safety zone must be established.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Have to notify the

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authorities.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up: Ventilate area.

6.4. Reference to other sections

Personal protective equipment: See the Section 8.

Waste management: See the Section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Recommendations for safe handling: This product should be used by properly trained person!
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. (See more in Section 8.).

Fire and explosion protection: Non-flammable.

Hygiene standards: The people in contact with product should be maintained the workplace hygiene standards. After the treatment of the product at breaks, before eating, after work the hot hand and face washing is necessary.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures / Storage conditions: Can only be stored in a closed system, should be checked regularly for tightness. Store only in the original packaging. Tightly closed. Protect from sunlight and sources of heat. The bottles, containers are stored in an upright position, so as to prevent any contact with the liquid phase from the gas phase designed parts. Do not allow the temperature to rise above 52 ° C. After use, close the air outlet of the valve. Propane is only suitable for use with a pressure hose grade.

Incompatible materials: Chlorine or other strong oxidizing agents. Avoid open flames and high temperatures. Incompatible with active metals, alkali or alkaline earth metals-powdered Al, Zn, Be, etc.

7.3. Specific end use(s)

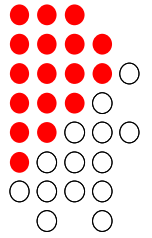
Special uses: None.

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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

	CAS-NUMBER	Limit value, Eight hours (mg/m ³)	Limit value, Short term (mg/m ³)	Country
1,1,1,2,2-pentafluoroethane	354-33-6	2500	3750	Sweden
1,1,1,2-tetrafluoroethane (R134a)	811-97-2	4240	-	Australia
		4240	16800	Austria
		4200	33600	Germany (AGS)
		4200	33600	Germany (DFG)
		2000	3000	Sweden
		4200	-	Switzerland
		4240	-	United Kingdom

8.2. Exposure controls

Engineering measures:

Do not inhale the gas! Avoid contact with liquefied gas with eyes or skin! Provide adequate ventilation! Only in closed, leak-proof network. No smoking, open flames and ignition sources related activities are prohibited!

Hygiene standards:

The people in contact with product should be maintained the workplace hygiene standards. After the treatment of the product at breaks, before eating, after work the hot hand and face washing is necessary.

Personal protective equipment

Eye and face protection:

Safety glasses with side-shields (EN 166) or face shield recommended to wear.

Skin protection

Hand protection:

Avoid hand contact. Proper contact is recommended to wear gloves to protect against cold (EN 511).

Other:

Long-sleeved clothing and anti-static anti-static footwear must be worn.

Inhalation protection:

In gas leak case, compressed air breathing apparatus (EN 14593) is recommended.

Environmental exposure controls

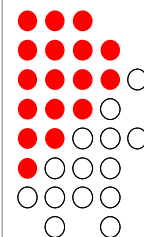
Environmental exposure control : Not needed.

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SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical condition (20°C):	Gas
Colour:	Colourless gas
Odour:	Slight ethereal.

Properties

Value

pH (20°C):	No information.
Melting point / Freezing point:	No information.
Initial boiling point and boiling range:	-43.9°C
Fire point:	No fire point.
Evaporating rate:	>1 (CCL ₄ =1)
Flammability:	None flammable.
Upper / lower flammability or explosive limits	
– lower explosive limit:	No information.
– upper explosive limit:	No information.
Vapor Pressure:	11,85 bar (25°C)
Vapor density:	
Relative density, gas:	No information.
Relative density, liquified gas:	No information.
Solubility	
– In water:	Not determined.
– Organic solvents:	No information.
Partition coefficient: n-octanol/water:	No information.
Auto-ignition temperature:	Not determined.
Decomposition temperature:	No information.
Kinematic viscosity:	No information.
Explosive properties:	No information.
Oxidizing properties:	No information.

9.2. Other information

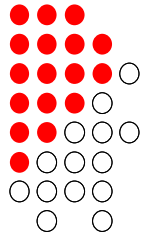
No other information.

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**SECTION 10: Stability and reactivity****10.1. Reactivity**

Reactivity: Decomposition products are hazardous. No specific reactivity other than those specified under section 10.5.

10.2. Chemical stability

Stability: Stable in the recommended storage conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions: There are no under normal conditions of use.

10.4. Conditions to avoid

Situations to avoid: Avoid open flames and high temperatures.

10.5. Incompatible materials

Materials to avoid: Incompatible with active metals, alkali or alkaline earth metals-powdered Al, Zn, Be, etc.

10.6. Hazardous decomposition products

Hazardous decomposition products: Decomposition products are hazardous.

SECTION 11: Toxicological information**11.1. Information on toxicological effects****Acute toxicity:**

- Skin: Not classified as hazardous.
Frostbite may possible.
- Eyes: Frostbite may possible.
- Inhalation: Not classified as hazardous.

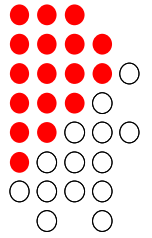
Anesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness. Higher exposures to the vapors may cause temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation. Gross overexposure may be fatal.

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HFC-125: Inhalation 4 hour ALC: > 709,000 ppm in rats
HFC-134a: Inhalation 4-hour LC₅₀: 567,000 ppm in rats
HFC-32: Inhalation: 4 hour-ALC: > 520,000 ppm in rats

– Ingestion:

Not classified as hazardous.

Ingestion is not considered a potential route of exposure.

Irritation:

Not classified as hazardous.

Corrosion:

Not classified as hazardous.

Sensitisation:

Not classified as hazardous.

HFC-125:

Single, high inhalation exposures caused lethargy, decreased activity, labored breathing and weight loss. Weak cardiac sensitization effect, a potentially fatal disturbance of heart rhythm caused by a heightened sensitivity to the action of epinephrine.

Lowest-Observed-Adverse-Effect-Level for cardiac sensitization: 100,000 ppm. Repeated exposure caused: No significant toxicological effects. No-Observed-Adverse-Effect-Level(NOAEL): 50,000 ppm

HFC-134a:

Single exposure caused: Cardiac sensitization, a potentially fatal disturbance of heart rhythm associated with a heightened sensitivity to the action of epinephrine.

Lowest-Observed-Adverse-Effect-Level for cardiac sensitization: 75,000 ppm. Single exposure caused: Lethargy. Narcosis. Increased respiratory rates. These effects were temporary. Single exposure to near lethal doses caused: Pulmonary edema. Repeated exposure caused: Increased adrenals, liver, spleen weight. Decreased uterine, prostate weight. Repeated dosing of higher concentrations caused: the following temporary effects - Tremors. Incoordination.

HFC-32:

Single exposure caused: Lethargy. Spasms. Loss of mobility in the hind limbs. Other effects include weak cardiac sensitization, a potentially fatal disturbance of heart rhythm caused by a heightened sensitivity to the action of epinephrine. 250,000 ppm.

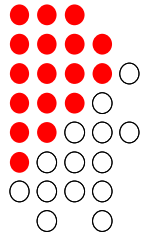
Repeated exposure caused pathological changes of the lungs, liver, spleen, kidneys. In more recent studies repeated exposure caused: No significant toxicological effects. No-Observed-Effect-Level

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(NOEL): 49,100 ppm.

Repeated dose toxicity: No information.

Carcinogenicity: Not classified as hazardous.

HFC-125:
No animal data are available to define carcinogenic.

HFC-134a:
In a two-year inhalation study, HFC-134a, at a concentration of 50,000 ppm, produced an increase in late-occurring benign testicular tumors, testicular hyperplasia and testicular weight. The no-effect-level for this study was 10,000 ppm. Animal data show slight fetotoxicity but only at exposure levels producing other toxic effects in the adult animal.

HFC-32:
No animal data are available to define the following effects of this material.

Mutagenicity: Not classified as hazardous.

Reproductive toxicity: Not classified as hazardous.

HFC-125:
HFC-125 does not produce genetic damage in bacterial or mammalian cell cultures or when tested in animals (not tested for heritable genetic damage).

HFC-134a:
Does not produce genetic damage in bacterial or mammalian cell cultures or when tested in animals (not tested for heritable genetic damage).

HFC-32:
Does not produce genetic damage in bacterial or mammalian cell cultures or when tested in animals (not tested for heritable genetic damage).

Repeated dose toxicity:

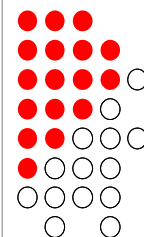
Sub-chronic toxicity: No information.

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Target organ toxicity (STOT):

Single exposure Not classified as hazardous.
Repeated exposure Not classified as hazardous.

Aspiration toxicity

Not classified as hazardous.

SECTION 12: Ecological information

12.1. Toxicity

General informations: HFC-134a:
48-hour EC₅₀, Daphnia magna: 980 mg/L
96-hour LC₅₀, Rainbow trout: 450 mg/L

12.2. Persistence and degradability

General informations: No information.

12.3. Bioaccumulative potential

General informations: No information.
log P_{ow} No information.

12.4. Mobility in soil

- Air: No information.
- Water: Slightly soluble.
- Soil: No information.

12.5. Results of PBT and vPvB assessment

No information.

12.6. Other adverse effects

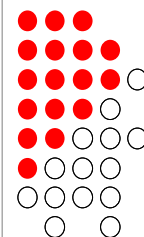
No information.

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SECTION 13: Disposal considerations

13.1. Waste treatment methods

Must not release into the environment. Should not be released into the environment. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

Mixture:

Avoid discharge to atmosphere.

According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user based on the application for which the product was used. Render harmless by incineration.

Contaminated packaging:

Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14: Transport information

14.1. UN-number

UN-number: UN3340

14.2. UN proper shipping name

International transport: REFRIGERANT GAS R 407C

14.3. Transport hazard class(es)

Classification code 2A

Labels: 2.2

14.4. Packing group

None.

14.5. Environmental hazards

ADR/RID None.

IMDG None.

ADN None.

14.6. Special precautions for user

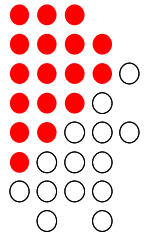
ADR/RID Transport category: 3

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Tunnel restriction code (C/E)
Hazard number: 20
Limited quantity: 120 ml
Special specification (s): CV9 CV10 CV36

Avoid transport on vehicles where the load space is not separated from the driver's compartment.

Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.

Before transporting product containers ensure that they are firmly secured and:

- cylinder valve is closed and not leaking
- valve outlet cap nut or plug (where provided) is correctly fitted
- valve protection device (where provided) is correctly fitted
- there is adequate ventilation.
- compliance with applicable regulations.

IMDG

EMS Code: F-C, S-V
Stowage category: Category A
Liquefied, non-flammable, colourless gas with a faint ether-like odour.
Heavier than air (1.16). Very high exposures may cause anaesthetic effects and asphyxiation.

ICAO

Limited quantity: forbidden
Passenger and Cargo Aircraft: 75 kg (200)
Cargo Aircraft only: 150 kg (200)

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

SECTION 15: Regulatory information

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

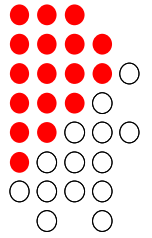
- REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC
- COMMISSION REGULATION (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
- REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

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- Regulation (EC) No 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer
- European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) applicable from 1st of January 2019

15.2. Chemical safety assessment

No information.

SECTION 16: Other information

The risk of choking is often overlooked, so it should be emphasized during the operational training. Users should be trained in the method of artificial respiration.

The full H-statements from the Section 2. and 3:

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

The full abbreviation from the Section 2. and 3:

Flam. Gas	Flammable gas
Press. Gas	Gas under pressure

Used evaluation of hazard information:

According to Regulation (EC) 1272/2008 Article 9 for the classification used paragraph 1. and 5.

The safety data sheet comply with Regulation (EU) No. 2015/830. All points in the previous SDS have been changed.

This safety data sheet serves to complete but not to replace the technical product sheets. The information contained herein is given in good faith and is accurate to the best of knowledge at the date indicated above. It is understood by the user that any use of the product for purposes other than those for which it was designed entails potential risk. The information given herein in no way dispenses the user from knowing and applying all provisions regulating his activity. The user bears sole liability for the precautions required when using the product. The regulatory texts indicated herein are intended to aid the user to fulfill his obligations. This list is not to be considered complete and exhaustive. It is the user's responsibility to ensure that he is subject to no other obligations than those mentioned.

End of safety data sheet.