



R-470B (RS-51)

Version 1: May 2019

Date 02.05.2019

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

1.1. Product Identifier

Mixture identification:
Trade name: **R-470B (RS-51)**
Product type and use: Refrigerant gas

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

Recommended use:
Refrigerant

1.3. Details of the supplier of the safety data sheet

Company:
GAS-SERVEI, SA.
C/ Motores, 151-155 nave nº 9
08038 Barcelona
ESPAÑA
Tel: +34 (93) 2231377
Fax: +34 (93) 2231479
www.gas-servei.com

Competent person responsible for the safety data sheet:
gas-servei@gas-servei.com

1.4. Emergency telephone number

Gas- servei: + 34 619373605
National Institute of Toxicology (Spain) : + 34 (91) 5620420

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

EC regulation No. 1272/2008 (CLP):

 Gas under pressure, liquefied gas H280: Contains gas under pressure; may explode if heated.

2.2. Label elements

Symbols:



Warning

Hazard statements:

H280 Contains gas under pressure; may explode if heated.

Precautionary statements:

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

Special Provisions:

None

2.3. Other hazards

vPvB Substances: None - PBT Substances: None

Other risks








The product or equipment contains fluorinated greenhouse gases covered by the Kyoto Protocol.

SECTION 3: Composition/information on ingredients

3.1. Substances

N.A.

3.2. Mixtures

Components	Concentration (% w/w)	CAS No.	EC No.	REACH No.	Classification
					Regulation CE N°1272/2008
1,1,1,2,2-Pentafluoroethane (HFC 125)	>= 6% - < 15%	354-33-6	206-557-8	01-2119485636-25-XXXX	 2.5 Press. Gas H280
1,1,1,2,3,3,3-Heptafluoropropane (HFC 227ea)	>= 5% - < 10%	431-89-0	207-079-2	01-2119485489-18-XXXX	 2.5 Press. Gas H280
1,1,1,2-Tetrafluoroethane (HFC 134a)	>= 2% - < 6%	811-97-2	212-377-0	01-2119459374-33-XXXX	 2.5 Press. Gas H280
Difluoromethane (HFC 32)	>= 6% - < 15%	75-10-5	200-839-4	01-2119471312-47-XXXX	 2.2/1 Flam. Gas 1 H220  2.5 Press. Gas H280
Carbon Dioxide	>= 5% - < 15%	124-38-9	204-696-9	Not Applicable	 2.5 Press. Gas H280
Trans-1,3,3,3-Tetrafluoroprop-1-ene (HFO 1234ze)	>= 50% - < 60%	29118-24-9	471-480-0	01-0000019758-54-XXXX	 2.5 Press. Gas H280

SECTION 4: First aid measures

4.1. Description of first aid measures

For exhibitions to the liquid, the recommendation of the first aids given for contact with the skin(leather), I contact the eyes and ingestion, it(he,she) is equally applicable. See also section 11.



In case of skin contact:

Thaw affected areas with water. Remove contaminated clothing. Caution: clothing may adhere to the skin in the case of freeze burns. After contact with skin, wash immediately with plenty of warm water. If irritation or blistering occur obtain medical attention.

In case of eyes contact:

Wash immediately and thoroughly with running water, keeping eyelids raised, for at least 10 minutes. Following this, protect the eyes with sterile gauze or a clean, dry, handkerchief. Obtain a medical examination.

In case of Ingestion:

Unlikely route of exposure. Do not induce vomiting. Provided the patient is conscious, wash out mouth with water and give 200-300 ml (half a pint) of water to drink. Obtain immediate medical attention. Further Medical Treatment

In case of Inhalation:

Move to fresh air. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be

indicated. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation immediately. In case of shortness of breath, give oxygen.

Remove casualty to fresh air and keep warm and at rest.

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

The direct contact with the liquid can provoke freezings. May cause cardiac arrhythmia.

Atmospheric very high concentrations can produce anaesthetic effects and it asphyxiates.

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

Treatment:

Symptomatic treatment and therapy of support, as turn out to be indicated.

After an exhibition there must be avoided the administration of adrenaline or other drugs simpatomiméticas similar, since one can produce a cardiac arrhythmia with a possible later heart failure.

SECTION 5: Firefighting measures

Generally

This Cooling Gas is not inflammable in the air in normal conditions of temperature and pressure. Certain mixtures of cooling this one and air under pressure can turn out to be inflammable. The mixtures must be avoided of cooling this one and air under pressure.

Certain mixtures HFC and chlorine can be inflammable or you reactivate in certain conditions. The thermal decomposition detaches very toxic and corrosive steams (fluoride of hydrogen) The packings can burst if they are overheated.

5.1. Extinguishing media

Suitable extinguishing media:

Water.

Carbon dioxide (CO₂).

Extinguishing media which must not be used for safety reasons:

None in particular.

5.2. Special hazards arising from the substance or mixture

Exposure to combustion products may be a hazard to health. If the temperature rises there is danger of the vessels bursting due to the high vapor pressure.

Hazardous combustion products: Hydrogen fluoride, carbonyl fluoride, carbon oxides, fluorine compounds.

5.3. Advice for fire-fighters

Use suitable breathing apparatus . Fight fire remotely due to the risk of explosion.

Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

Move undamaged containers from immediate hazard area if it can be done safely.

Evacuate area.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Ensure suitable personal protection (including respiratory protection) during removal of spillages.

Evacuate personnel to safe areas. Avoid skin contact with leaking liquid (danger of frostbite).

Ventilate the area.

See protective measures under point 7 and 8.

6.2. Environmental precautions

Do not allow to enter into soil/subsoil. Do not allow to enter into surface water or drains.

Retain contaminated washing water and dispose it.

In case of gas escape or of entry into waterways, soil or drains, inform the responsible authorities.

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Suitable material for taking up: absorbing material, organic, sand

6.3. Methods and material for containment and cleaning up

Wash with plenty of water. Ventilate the area.

6.4. Reference to other sections

See also section 8 and 13

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Only experienced and properly instructed persons should handle liquefied gases liquids. Protect packages from physical damage; do not drag, roll, slide or drop.

Avoid contact with skin and eyes, inhalation of vapours and mists. Wash contaminated clothing before re-use.

Do not eat or drink while working. See also section 8 for recommended protective equipment.

Avoid venting to atmosphere.

Liquid refrigerant transfers between refrigerant containers and to and from systems can result in static generation. Ensure adequate earthing. Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions.

Care must be taken to mitigate the risk of developing high pressures in systems caused by a temperature rise when liquid is trapped between closed valves or in cases where containers have been overfilled.

7.2. Conditions for safe storage, including any incompatibilities

Keep away from heat and sources of ignition. Take precautionary measures against static discharges.

Keep in a cool, well-ventilated place. Keep away from direct sunlight.

Do not store with the following product types:

Self-reactive substances and mixtures

Organic peroxides

Oxidizing agents

Flammable liquids

Flammable solids

Pyrophoric liquids

Pyrophoric solids

Self-heating substances and mixtures

Substances and mixtures, which in contact with water, emit flammable gases.

Explosives

Acutely toxic substances and mixtures

Substances and mixtures with chronic toxicity

Instructions as regards storage premises:

Adequately ventilated premises.

Additional information on storage conditions:

Do not allow the storage temperature to reach 50 °C (122 °F).

Store in accordance with the particular national regulations.

7.3. Specific end use(s)

Subject to Member State regulations, applicable uses are: Refrigerant

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational Exposure Limits	CAS	VLA-ED (8 h ppm)	VLA- ED (8 h mg/m ³)	VLA- EC (15m. ppm)	VLA-EC (15m. g/m ³)	Note
1,1,1,2-Tetrafluoroethane (HFC 134a)	811-97-2	1000	4240	-	-	WEL
1,1,1,2,2-Pentafluoroethane (HFC 125)	354-33-6	1000	4900			COM
Difluoromethane (HFC 32)	75-10-5	1000	2200			COM
1,1,1,2,3,3,3-Heptafluoropropane (HFC 227ea)	431-89-0	1000				COM
Trans-1,3,3,3-Tetrafluoroprop-1-ene (HFO 1234ze)	29118-24-9	800				COM
Carbon Dioxide	124-38-9	5000	9150	15000		COM

8.2. Exposure controls



Eye protection:

Safety glasses recommended when handling containers.



Protection for skin:

Safety shoes are recommended when handling containers.

Protection for hands:

Sturdy work gloves are recommended for handling containers.

Respiratory protection:

Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmosphere.

Air purifying respirators will not provide protection. Users of breathing apparatus must be trained.

Thermal Hazards:

Use gloves thermos insulating

Environmental exposure controls:

Ensure adequate ventilation, especially in confined areas.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance and colour:	Liquefied, colorless gas
Odour:	Ether like.
Odour threshold:	No data available
pH:	No data available
Melting point / freezing point:	No data available
Initial boiling point and boiling range:	-59,89 °C
Flammability (Solid/gas):	Will not burn
Upper/lower flammability or explosive limits:	None.
Vapor density:	52,80kg/m ³ (25°C)
Flash point:	Non Flammable

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Evaporation rate:	Not applicable
Vapour pressure:	15,86 bar (25°C)
Relative density:	1129kg/m ³ (25°C)
Solubility in water:	Insoluble
Partition coefficient (n-octanol/water):	Not applicable
Auto-ignition temperature:	No data available
Decomposition temperature:	Not applicable
Viscosity:	Not applicable
Explosive properties:	Not applicable
Oxidizing properties:	Not applicable

9.2. Other information

Miscibility:	Not applicable
Fat Solubility:	Not applicable
Conductivity:	Not applicable
Substance Groups relevant properties	Not applicable
Critical temperature:	96,19 °C
Critical Pressure:	53,04 bar

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal conditions

10.2. Chemical stability

Stable under normal conditions

10.3. Possibility of hazardous reactions

Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions.
Can react with strong oxidizing agents.

10.4. Conditions to avoid

Heat, flames and sparks.

10.5. Incompatible materials

Finely divided metals, magnesium and alloys containing more than 2% magnesium. Can react violently if in contact with alkali metals and alkaline earth metals - sodium, potassium, barium.
Oxidizing agents.

10.6. Hazardous decomposition products

Hydrogen fluoride by thermal decomposition and hydrolysis.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Inhalation

1,1,1,2-Tetrafluoroethane (HFC 134a) :	LC 50 / 4h / rat:> 350,000 ppm
Pentafluoroethane (HFC 125) :	LC 50 / 4h / rat:> 769,000 ppm
HFC 32 :	LC 50 / 4h / rat:> 520,000 ppm
HFC 227ea :	LC 50 / 4h / rat:> 800,000 ppm
HFO1234ze :	LC 50 / 4h / rat:> 207,000 ppm
CO ₂ :	No data available

High exposures may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations may cause anaesthetic effects and asphyxiation.

Skin contact

Liquid splashes or spray may cause freeze burns. Unlikely to be hazardous by skin absorption.

Eyes contact

Liquid splashes or spray may cause freeze burns.

Ingestion

Highly unlikely - but should this occur freeze burns will result.

Germ cell mutagenicity

Not classified based on available information.

Carcinogenicity

Not classified based on available information.

Reproductive toxicity

Not classified based on available information.

STOT - single exposure

Not classified based on available information.

STOT - repeated exposure

Not classified based on available information.

Long-term exhibition

HFC 125 : An inhalation study in animals has shown that repeated exposures produce no significant effects (50000ppm in rats).

HFC 32 : Une étude par inhalation sur des animaux a montré que des expositions répétées n'ont aucun effet significatif (49500ppm sur les rats).

HFO 1234 ze: A 90-day repeated inhalation study in animals has shown no adverse effects at levels upto 5000ppm.

HFC 134a : A lifetime inhalation study in rats has shown that exposure to 50000ppm resulted in benign tumours of the testis. The increased tumour incidence was observed only after prolonged exposure to high levels, and is considered not to be of relevance to humans occupationally exposed to HFC 134a at or below the occupational exposure limit.

SECTION 12: Ecological information

12.1. Toxicity

Adopt good working practices, so that the product is not released into the environment.

Acute toxicity:

HFC 134a :	LC 50 / 96h / Rainbow trout: 450 mg / l
HFC 134a :	EC 50 / 48h / Daphnia: 980 mg / l
HFC 125 :	LC 50 / 96h / Rainbow trout: 450 mg / l
HFC 125 :	EC 50 / 48h / Daphnia : 980 mg / l
HFC 32 :	LC 50 / 96h / Fish: 1507 mg / l
HFC 32 :	EC 50 / 48h / Daphnia: 652 mg / l
HFC 227ea :	LC 50 / 96h / Rainbow trout: >81,8 mg / l
HFC 227ea :	EC 50 / 48h / Daphnia: >200 mg / l
HFO1234ze :	LC 50 / 96h / Carp: >117 mg / l
HFO1234ze :	EC 50 / 48h / Daphnia magna: >160 mg / l
CO2:	No data available

12.2. Persistence and degradability

Ozone Destruction Potential (ODP): 0

Global Warming Potential (GWP): 746 (relative to the value 1 of the carbon dioxide in 100 years) according to IPPCC-AR4/CIE (Fourth Assessment Report of the Intergovernmental Panel on Climate Change) -2007.

Components:

HFC 125: 29 years
 HFC 134a: 14 years
 HFC 32 : 4,9 years
 HFC 227ea : 34,2 years
 HFO 1234ze : approx. 0,05 years
 CO2 : Datos no disponibles

12.3. Bioaccumulative potential

No data available

12.4. Mobility in soil

No data available

12.5. Results of PBT and vPvB assessment

vPvB Substances: None - PBT Substances: None

12.6. Other adverse effects

None

Other information

The product contains fluorinated greenhouse gases covered by the Kyoto Protocol.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Recover and recycle if possible. Empty pressure vessels should be returned to the supplier. Operate in accordance with current local and national regulations.

SECTION 14: Transport information

14.1. UN number

ADR-UN number: 1078
 IATA-Un number: 1078
 IMDG-Un number: 1078



14.2. UN proper shipping name

ADR-Shipping Name: REFRIGERANT GAS, N.O.S R-470B (RS-51)
 (1,1,1,2-TETRAFLUOROETHANE / 1,1,1,2,2-PENTAFLUOROETHANE /
 DIFLUOROMETHANE/1,1,1,2,3,3,3-HEPTAFLUOROPROPANE/
 TRANS-1,3,3,3- TETRAFLUOROPROP-1-ENE/ CARBON DIOXIDE)

IATA-Technical name: REFRIGERANT GAS, N.O.S R-470B (RS-51)
 (1,1,1,2-TETRAFLUOROETHANE / 1,1,1,2,2-PENTAFLUOROETHANE /
 DIFLUOROMETHANE/1,1,1,2,3,3,3-HEPTAFLUOROPROPANE/
 TRANS-1,3,3,3- TETRAFLUOROPROP-1-ENE/ CARBON DIOXIDE)

IMDG-Technical name: REFRIGERANT GAS, N.O.S R-470B (RS-51)
 (1,1,1,2-TETRAFLUOROETHANE / 1,1,1,2,2-PENTAFLUOROETHANE /
 DIFLUOROMETHANE/1,1,1,2,3,3,3-HEPTAFLUOROPROPANE/
 TRANS-1,3,3,3- TETRAFLUOROPROP-1-ENE/ CARBON DIOXIDE)

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14.3. Transport hazard class(es)

ADR-Class:	2
ADR-Label:	2.2
ADR-Upper number:	20
IATA-Class:	2.2
IATA-Label:	2.2
IMDG-Class:	2.2
IMDG-Label:	2.2

14.4. Packing Group Not applicable

14.5. Environmental hazards

Marine pollutant: No

14.6. Special Precautions for User No aplicable

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

SECTION 15: Regulatory information

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

Regulation EC n.1272/2008 (CLP) and Regulation (EU) n. 2015/830 which replaces Annex II of the Regulation 1907/2006.

This Safety Data Sheet has been prepared in accordance with the current European Directives.

Special restrictions

The fluorinated greenhouse gas R-470B (RS-51) may be supplied in returnable containers (drums/cylinders). The Container contains fluorinated greenhouse gases covered by the Kyoto Protocol. The fluorinated greenhouse gases In containers may not be vented to the atmosphere.

Regulation (EC) No. 517/214 of the European Parliament and of the Council on certain fluorinated greenhouse gases that repeals Regulation 842/2006

15.2. Chemical Safety Assessment

A chemical safety assessment has not been conducted for this product.

SECTION 16: Other information

Text of phrases referred to under heading 3:

H220 Extremely flammable gas.

H280 Contains gas under pressure; may explode if heated.

Safety data sheet revised on version 1 in accordance with Regulation (EU) No. 2015/830

The information contained herein is based on our state of knowledge at the above-specified date. It refers solely to the product indicated and constitutes no guarantee of particular quality.

It is the duty of the user to ensure that this information is appropriate and complete with respect to the specific use intended.

This MSDS cancels and replaces any preceding release.

The enumeration of the risks, legal, regulation and administrative texts they are not exhaustive, since responsible only one will correspond(fit) to the addressee or user of the product to be sent to the official regulations of storage, manipulation and utilization of these products.

GLOSSARY

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

CAS: Chemical Abstracts Service

LC50: Lethal Concentration to 50 % of a test population

CLP: Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008

LD50: Lethal Dose to 50% of a test population (Median Lethal Dose)

COM: The company aims to control exposure in its workplace to this limit.

GHS: Globally Harmonized System.

IATA: International Air Transport Association

IMDG: International Maritime Dangerous Goods

VLA-ED: Value environmental limit daily exhibition.

WEL: The Manufacturer has for aim control the exhibition in the place of work at the level of the standard of the United Kingdom.