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

1.1 Product identifier

Commercial name R410A

Chemical description Mixture of R32 (Difluoromethane HFC R32) and R125 (Pentafluoroethane HFC R125)
Chemical formula: CH2F2+C2HF5

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

Industrial sector Refrigeration and air-conditioning
Relevant identified uses Refrigerant gas for refrigeration and air-conditioners systems
Application Industrial and professional

1.3 Details of the supplier of the safety data sheet

REFRIGERANT BOYS S.R.L.
Corso XX Settembre
21052 - Busto Arsizio VA
tel: +39 329 1858456
mail: service@refrigerantboys.it

1.4 Emergency telephone number

CAV-CNIT Anti-Poison (toxicological) National Information Centre +39 0382 24444 Hours: 24 h / 24 h

2. Hazards identification

2.1 Classification of the substance or mixture

Classification under Regulation (EC) 1272/2008 (CLP)

H280: Contains gas under pressure; may explode if heated

2.2 Label elements

Dangerous pictogram

GHS04

Signal word	Warning	
Hazard statements (H)	H280	Contains gas under pressure; may explode if heated.
Precautionary statements (P)	P260	Do not breathe dust/fumes/gas/mist/vapours/spray.
	P281	Use personal protective equipment as required.
	P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
	P308 + P313	IF EXPOSED: Call a POISON CENTER or doctor/physician.
	P410 + P403	Protect from sunlight. Store in a well-ventilated place.
Safety advise (S)	S47/49	Keep only in the original container at temperature not exceeding 50° C (122° F)
Other information	Contains greenhouse gases disciplined by Kyoto Protocol	

2.3 Other hazards

Contact with liquid can cause frostbite and damage to the eyes.

3. Composition/information on ingredients

3.2 Mixtures

Substance name	%	CAS No.	EC No.	REACH No.	Classification Reg. (CE) 1272/2008 (CLP) and Directive 67/548/EEC
Difluoromethane	50	75-105	200-839-4	01-2119471312-47-0024	Flam. Gas 1 (H220) Press. Gas (H280) F+ ; R12
Pentafluoroehane	50	354-33-6	206-557-8	01-2119485636-25-0025	Press. Gas (H280)

For more information on hazardous components, see section 8, 11, 12 and 16.

4. First aid measures

General information: If the person is unconscious, place it in the recovery position and get immediately medical attention. Do not give anything to an unconscious person. If breathing is irregular, give oxygen. If breathing stopped, administer artificial respiration. If symptoms persist, call a physician.

Notes to physician: Do not give adrenaline-ephedrine or similar drugs group.

4.1 Description of first aid measures

Inhalation	Remove patience from exposure to fresh air. Administer oxygen if necessary. Obtain immediate medical attention.
Skin contact	In case of contact with skin, wash immediately with plenty of water. Remove contaminated clothing. If irritation or blistering occurs, call a physician
Eye contact	Remove contact lenses, if present. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms persist, call a physician.
Ingestion	Unlikely route of exposure. As this product is a gas, refer to the section “Inhalation”. Do not induce vomiting without medical advice. Obtain immediate medical attention

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

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination

5. Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	Use water spray, alcohol-resistant foam, dry chemical and Carbon dioxide (CO2)
No suitable extinguishing media	None to our knowledge.

5.2 Special hazards arising from the substance or mixture

Specific hazards Contents under pressure.
On heating: heating will cause a rise in pressure with a risk of bursting.
Toxic and corrosive vapours are released.
Cool down the containers exposed to heat with a water spray.
Vapours are heavier than air and can cause rapid suffocation by reducing oxygen available for breathing.

5.3 Advice for firefighters

Wear self-contained positive pressure breathing apparatus (SCBA) and protective suit.
Avoid contact with skin and eyes. Do not breathe gas/fumes/vapour.

Other information

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
For further information to stability and reactivity, refer to section 10.

6. Accidental release measure

6.1 Personal precautions, protective equipment and emergency procedures

Immediately contact emergency personnel.
Immediately evacuate personnel to safe areas. Unprotected persons must be kept away.
Wear personal protective equipment refer to section 8 "Exposure controls/personal protection".
Remove all sources of ignition.
Avoid contact with skin (possible frostbite).
Ventilate the area/local. In case of insufficient ventilation, wear self-contained breathing apparatus.

6.2 Environmental precautions

Do not allow product to spread into the environment. Avoid spillage and prevent possible losses.

6.3 Methods and material for containment and cleaning up

Ventilate / aerate the area/local.

6.4 Reference to other sections

For further on personal protection, refer to section 8.

7. Handling and storage

7.1 Precautions for safe handling

Technical measures
Handle with care. Caution when opening, pressurized container.
Protect from sunlight and do not expose to temperatures exceeding 50° C (122 °F).
Do not spray on a naked flame or any incandescent material.
Do not use in area without adequate ventilation.
Do not pierce or burn, even after use.
Do not remove seal unless immediately before use.
Follow the general precautions for handling, storing, and using compressed gases.

Industrial hygiene
Ensure adequate ventilation of the working area.
Do not drink, eat or smoke in the working area.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers
Keep containers tightly closed in a dry, cool and well-ventilated place, away from any ignition or heat sources.
Store in original container. Protect from sunlight and do not expose to temperatures exceeding 50° C (122 °F).

7.3 Specific end use(s)

For professional and industrial use only.

8. Exposure controls/personal protection

8.1 Control parameters

OEL (Occupational Exposure Limit): No exposure limit was defined for any components of the mixture.

Components	CAS No.	TLV-TWA	Parameters	Font	Year
Difluoromethane	75-10-5	8 h	2.200 mg/m³ 1.000 ppm	ACGIH (WEEL)	//
Pentafluoroethane	354-33-6	8 h	4.900 mg/m³ 1,000 ppm	ACGIH (WEEL)	//

DNEL			
Component	**CAS No.**	**Inhalation**	
Pentafluoroethane	354-33-6	DNEL- Workers DNEL – Consumers	16444 mg/m³(long-term exposure – systemic effects) 1753 mg/m³ (long-term exposure – systemic effects)
Difluoromethane	75-10-5	DNEL – Workers DNEL - Consumers	7035 mg/m³ (long-term exposure – systemic effects) 750 mg/m³ (long-term exposure – systemic effects)

PNEC			
Component	**N. CAS**	**PNEC values**	
Pentafluoroethane	354-33-6	0,1 mg/l 0,6 mg/kg dw*	Fresh water Fresh water sediment
Difluoromethane	75-10-5	0,142 mg/l 0,534 mg/kg dw*	Fresh water Fresh water sediment

*dry weight

8.2 Exposure controls

Ensure adequate ventilation. In case of insufficient ventilation, wear self-contained breathing apparatus.
Personal protective equipment must comply with EU directives: respiratory protective equipment EN 136, 140, 149; eye protection (protective goggles or safety glasses) EN 166; skin protection EN 340, 463, 468, 943-1, 943-2; hands protection (protective gloves) EN374, safety boots EN ISO 20345.

8.2.2 Individual protection measures, such as personal protective equipment

a) Eye/face protection Safety glasses with side-shields (according to directive EN 166).

b) Skin protection

i) Hand protection: Protective gloves resistant to chemical products (EN374).
The penetration time of the gloves must be greater than the period of expected use.
Gloves should be replaced immediately if they show signs of wear or deterioration.

ii) Other: Apron or protective clothing are not necessary.

c) Respiratory protection In case of insufficient ventilation, wear self-contained breathing apparatus. (EN133).
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

8.2.3. Environmental exposure controls

Handling in accordance with good industrial hygiene and safety practice.
Avoid leakage or spillage in the environmental.
Avoid dispersion in the air.
For more information, see section 7.

9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	**Appearance**	Liquefied gas
	Colour	Colourless
b)	**Odour**	Ethereal
c)	**Odour threshold**	Odour threshold is subjective and inadequate to warn for overexposure.
d)	**pH**	n.a.
e)	**Melting point / Freezing point**	- 136 °C (- 212.8 °F) Difluoromethane - 103 °C (- 154.4 °F) Pentafluoroethane
f)	**Initial boiling point**	- 48,5° C (- 55.3° C)
g)	**Flash point**	n.a.
h)	**Evaporation rate**	Not applicable to gas and mixtures of gas
i)	**Flammability (solid, gas)**	n.a.
j)	**Upper/lower flammability**	n.a.
k)	**Vapour pressure**	14.844 @ 21,1° C (70° F) 33.798 hPa @ 54,4° C (129.9° F)
l)	**Vapour density**	1,08 g/cm³ @ 21,1° C (70° F)
m)	**Relative density**	3 (air = 1)

n)	**Solubility** (in the water)	280000 Pentafluoroethane 900 Difluoromethane
o)	**Partition coefficient: n-Octanol/water**	0.21 (log Pow) Difluoromethane 1.48 (log Pow) Pentafluoroethane
p)	**Auto-ignition temperature**	Noto applicable to gas and mixtures of gas
q)	**Decomposition temperature**	Not applicable to gas and mixtures of gas
r)	**Viscosity**	n.a.
s)	**Explosive properties**	Not explosive according with EU criteria
t)	**Oxidising properties**	Not oxidising according with EU criteria

10.1 Reactivity

Stable under recommended storage conditions.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

The product is non-reactive under normal conditions.

10.4 Conditions to avoid

Contains gas under pressure, may explode if heated.
Protect from sunlight and do not expose to temperatures exceeding 50 °C.
Keep away from heat, sparks, open flame or other sources of ignition. Do not smoke.
Do not pierce or burn, even after use.
Do not spray on a naked flame or any incandescent material.

10.5 Incompatible materials

No reaction with common materials in dry or wet conditions.
Avoid contact with alkaline and caustic products, alkaline-earth metals (e.g. calcium, aluminum powder, zinc and magnesium).

10.6 Hazardous decomposition products

No hazardous decomposition under normal conditions.
In case of fire, for thermal decomposition, the following substances can be released: carbon oxides (CO, CO2) and fluorocarbons.

11. Toxicological information

11.1 Information on toxicological effects

a) Acute toxicity

Inhalation

Difluoromethane	LC50: > 520 000 ppm Exposition time: 4 h Animal Species: Rat
Pentafluoroethane	LC50: 800 000 ppm Exposition time: 4 h Animal Species: Rat

b) Skin corrosion/Skin irritation Not applicable

c) Serious eye damage/irritation Not applicable

d) Respiratory sensitisation

Difluoromethane	LC50: > 520 000 ppm Exposition time: 4 h Animal Species: Rat
Pentafluoroethane	LC50: 800 000 ppm Exposition time: 4 h Animal Species: Rat

e) Germ cell mutagenicity

in vitro genotoxicity

Difluoromethane	In vitro test: Ames Result: Negative
Pentafluoroethane	In vitro test: Ames Result: Negative

In vivo genotoxicity

Difluoromethane	Animal Species: Mouse Exposed tissue: Bone marrow Method: Mutagenicity (micronucleus test) Result: Negative
Pentafluoroethane	No data available

f) Carcinogenicity Based on available data the classification criteria are not met.

g) Reproductive toxicity

Difluoromethane	NOAEL: Not classified Exposition time: 90 days (inhalation) Animal Species: Rat (50000 ppm/6h at day)
Pentafluoroethane	Based on the available data the classification criteria are not met

Other information

Difluoromethane	Cardiac sensitization NOAEC: > 350 000 ppm Animal Species: Dog
Pentafluoroethane	Cardiac sensitization NOAEC: 75 000 ppm LOAEC: 100 000 ppm Animal Species: Dog

12. Ecological information

12.1 Toxicity

Fish

Difluorometchane	No data available
Pentafluoroethane	LC50: > 100 mg/l Exposition time: 96 h Species: Oncorhynchus mykiss (Rainbow trout)

Aquatic invertebrates

Difluoromethane	No data available
Pentafluoroethane	EC50: > 100 mg/l Exposition time: 48 h Species: Daphnia magna (Water flea)

Algae

Difluoromethane	No data available
Pentafluoroethane	EC50: > 114 mg/l Exposition time: 72 h Species: Selenastrum capricornutum (Freshwater seaweed)

12.2 Persistence and degradability

The mixture is not easily biodegradable.

Difluoromethane	Water: 5% of biodegradation after 28 days - Air: Average life of 4 years
Pentafluoroethane	Water: 5% of biodegradation after 28 days - Air: Average life of 28.3 years (estimated value)

12.3 Bioaccumulative potential

Difluoromethane	0,21 log Pow
Pentafluoroethane	1,48 log Pow

12.4 Mobility in soil

Difluoromethane	No data available
Pentafluoroethane	1,30 – 1,70 log Koc

12.5 Results of PBT and vPvB assessment

This mixture does not meet the PBT and vPvB criteria.

12.6 Other adverse effects

Ozone Depletion Potential	ODP (R-11=1) = 0
Global Warming Potential	GWP (CO2=1) = 1.975

13.1 Waste treatment methods

Product	Take all necessary measures to prevent the production of residuals, value the possible methods of regeneration or recycling. Dispose in accordance with local, state, and federal regulations. Do not discharge into drains or environment.
Packaging	Reuse and recycle the packaging after its reclaim. Dispose of non-reusable packaging in accordance with local, state, and federal regulations.

European Waste Code (EWC)

Product 14 06 01: organic solvents, refrigerants and foam / aerosol propellants of waste-chlorofluorocarbons, HCFC, HFC.
Packaging 15 01 11: metallic packaging containing a hazardous solid porous matrix (for example asbestos), including empty pressure containers.

Additional information

Waste directives and regulations: Directive 2006/12/CE, Directive 91/689/CE, Regulation (EC) no. 1013/2006.
Dispose of waste product in compliance with EC, state and/or local regulations.
For more information, see section 8.

14. Transport information

14.1 UN Number	UN 3163
14.2 UN proper shipping name	Liquefied gas, N.O.S. (R410A)
Hazard labels ADR/RID, IMDG, IATA/ICAO	 2.2 Non-flammable, Non-toxic Gas

Transport by road (ADR) / Transport by rail (RID)

14.3 Transport hazard class(es)	2
Classification code	2A
Kemler code	20
14.4 Packing group	n.a.
Packing instruction	P200
14.5 Environmental hazards	No
Additional information	
Tunnel restriction code of total load	Code C/E - Tank carriage: Passage forbidden through tunnels of category C, D & E Code E (Other carriage): Passage forbidden through tunnels of category E

Transport by air (IATA/ICAO)

14.3 Transport hazard class(es)	2
Class/Division	2.2
14.4 Packing group	n.a.
Passengers and Cargo flights	200
Only Cargo flights	200
14.5 Environmental hazards	No

Additional information	
Passenger aircraft maximum net quantity (IATA)	75 Kg
Cargo aircraft maximum net quantity (IATA)	150 Kg

Transport by sea (IMDG)

14.3 Transport hazard class(es)	2
Class/Division	2.2
Emergency Schedule (EmS)	F-C, S-V
14.4 Packing group	n.a.
Packing instruction	P200
14.5 Environmental hazards	No

14.6 Special precautions for user

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.
Ensure that containers are firmly secured.
Before transporting product containers: - Ensure there is adequate ventilation. -

14.7 Transport in bulk according to Annex II of MARPOL the IBC Code

Not applicable.

15. Regulatory information

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

Ozone Depletion Potential ODP (R-11=1) = 0
Global Warming Potential GWP (CO2=1) = 1.975

Additional regulations/legislations

Regulation (EC) No 1906/2007; Regulation REACH No. 1907/2006; Regulation (EC) No. 1272/2008; Directive 67/548/CEE

15.2 Chemical safety assessment

A Chemical Safety Assessment (CSA) has been made for this product.

16. Other information

This Material Safety Data Sheet has been made according EU regulation in force.

Text of H and P statements in section 2 and 3

H220 Extremely flammable gas
H280 Contains gas under pressure; may explode if heated
P410 + P403 Protect from sunlight. Store in a well-ventilated place.

Text of "Security Code" under Regulation (EC) 1272/2008 (CLP) and Classification 67/548/EEC, in section 2 and 3

Flam. Gas 1 Flammable gas – Classification: Category 1
Press. Gas Liq. Gases under pressure - Compressed gas – Classification: Liquefied gas
F+ Extremely flammable gas
R12 Extremely flammable: liquids having a boiling point lower or equal to 35 °C

Hystory	Version 4	Version 3	Version 2	Version 1
	Revision: 01/2019	Date: 11/2015	Date: 05/2015	Date: 09/2010

b) Abbreviations and acronyms

ADR Accord Dangerous Route
CAS Chemical Abstracts Service
CE / EC European Community
CLP Classification, Labelling and Packaging

CSA	Chemical Safety Assessment
DNEL	Derived No-Effect Level
EC50	Effective Concentration 50%
EmS	Emergency Schedule
EWC	European Waste Code
GHS	Globally Harmonised System
GWP	Global Warming Potential
HCFC	Hydro-Chloro-Fluoro-Carbons
HFC	Hydro-Fluoro-Carbons
IATA	International Air Transport Association
IBC code	International Bulk Chemical code
ICAO	International Civil Aviation Organization
IMDG code	International Maritime Dangerous Goods code
IPCC	Intergovernmental Panel on Climate Change
LC50	Lethal Concentration 50%
LOAEC	Lowest Observed Adverse Effect Concentration
MARPOL	MARitime POLlution
Log Koc	Logarithm Partition coefficient Soil/Water
Log Kow (Pow)	Logarithm Partition coefficient n-Octanol/Water
n.a.	not applicable
n.d.a.	no data available
NOAEC	No Observed Adverse Concentration Level
NOAEL	No Observed Adverse Effect Level
ODP	Ozone Depleting Potential
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational Exposure Limit
PBT	Persistent Bio-accumulative Toxic
PNEC	Predicted No Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Rail International Dangerous Goods
STOT-RE	Specific Target Effect Concentration - repeated exposure
STOT-SE	Specific Target Effect Concentration - single exposure
TLV	Threshold Limit Value
TWA	Time Weighted Average
UE / EU	European Union
vPvB	very Persistent very Bioaccumulative
WEEL	Workplace Environmental Exposure Level

Notice of liability

This information should not constitute a guarantee for any specific product properties. This information are only a guidance for safe handling, use, processing, storage, transportation, disposal and release and are not to be considered a warranty or a quality specification.