

**SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING**

1.1. Product Identifier

Mixture identification:

Name: R410A
UFI code: N68M-STQ3-V00E-VS8S

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

Recommended use:

Industrial and professional

Refrigerant gas

1.3. Details of the supplier of the safety data sheet

Company:

TAZZETTI S.P.A

CORSO EUROPA 600/A

10088 VOLPIANO (TO) - ITALY-

Tel. +39 011 97021

Fax +39 011 9702460

rsg.inquiry@tazzetti.com**1.4. Italian Emergency telephone number**

Ph +39 02 66101029 (24h / 24h) – Poison centre Niguarda Hospital of Milan (Italy)

SECTION 2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

EC regulation criteria 1272/2008 (CLP):

Warning, Liquef. Gas, Contains gas under pressure

2.2. Label elements

Symbols:



Signal word: Warning

Hazard statements:

H280 Contains gas under pressure; may explode if heated.

Precautionary statements:

P403 Store in a well ventilated place

P410 Protect from sunlight

P273 Avoid release to the environment.

P314 Get medical advice/attention if you feel unwell

Special Provisions:

Contains fluorinated greenhouse gases covered by the Kyoto protocol.



2.3. Other hazards

Adverse health effects:

Inhalation: In high concentrations may cause asphyxiation. Vapour heavier than air, may accumulate below ground level and cause choking.

Skin contact: Contact with liquid may cause cold burns/frostbite

Evaluation results PBT e vPvB : in accordance with Annex III of REACH, this mixture does not contain any substance in compliance with PBT and vPvB criteria.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substances

Not applicable

3.2. Mixtures

Component	No. Reg. REACH	CAS No.	EC No.	% (w/w)	Classific. CLP
Difluoromethane	01-2119471312-47-0022	75-10-5	200-839-4	50.0	H221 Flam. Gas 1B H280 Press. Gas
Pentafluoroethane	01-2119485636-25-0011	354-33-6	206-557-8	50.0	H280 Press. Gas

SECTION 4. FIRST AID MEASURES

4.1. Description of first aid measures

Skin contact:

In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.

Eye contact:

In case of contact with eyes, rinse immediately (for at least 15 minutes) with plenty of water and seek medical advice.

Ingestion:

Do not induce vomiting. Obtain medical assistance.

Inhalation:

Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

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

Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects., Other symptoms potentially related to misuse or inhalation abuse are:, Anaesthetic effects, Light-headedness, dizziness, confusion, incoordination, drowsiness, or unconsciousness, irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness. In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation.

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

Treatment:

Do not administer catecholamines (due cardiac effects).

SECTION 5. FIRE-FIGHTING MEASURES

5.1. Extinguishing media

All known extinguishants can be used.

Extinguishing media which must not be used for safety reasons:

None in particular.



5.2. Special hazards arising from the substance or mixture

The product is not flammable in air, in a normal temperature and pressure conditions. Certain mixtures of the product with air, in certain conditions of pressure may be flammable. Avoid mixtures of the product with air, under pressure.

Certain mixtures of the product and chlorine may be flammable or reactive under certain conditions. Thermal decomposition causes the emission of fumes very toxic and corrosive gases (hydrogen fluoride).

Containers may explode if heated.

Do not inhale explosion and combustion gases.

5.3. Advice for fire-fighters

Keep containers/tank cool with water spray. Move undamaged containers from immediate hazard area if it can be done safely

Use special protective equipment for firefighters, such as boots, overalls, gloves, eye and face protection and breathing apparatus: suitable breathing apparatus

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.

Evacuate area.

Ensure adequate air ventilation.

Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

See protective measures under point 7 and 8.

6.2. Environmental precautions

Avoid discharge to atmosphere.

6.3. Methods and material for containment and cleaning up

Ventilate area.

6.4. Reference to other sections

See also section 8 and 13.

SECTION 7. HANDLING AND STORAGE

7.1. Precautions for safe handling

Do not allow backfeed into the container.

Use only equipment suitable for the product and the operating pressure.

Avoid contact with skin and eyes, inhalation of vapours and mists.

Only experienced and properly instructed persons should handle compressed gases.

The substance must be handled in accordance with good industrial hygiene and safety procedures.

Close container valve after each use and when empty, even if still connected to equipment.

Never attempt to repair or modify container valves or safety relief devices.

Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.

Never use direct flame to raise the pressure of a container.

Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.

Do not cut, drill, grind, weld or do similar operations on containers.

7.2. Conditions for safe storage, including any incompatibilities

Observe all regulations and local requirements regarding storage of containers.

Keep container in a well ventilated place.



Protect cylinders from physical damage; do not drag, roll, slide or drop.
Keep away from open flames, sparks and heat sources.
Keep container below 50 °C.
Containers should not be stored in conditions likely to encourage corrosion.
Incompatible materials:
See paragraph 10 below.
Instructions as regards storage permises:
Adequately ventilated.

7.3. Specific end use(s)

If annexed, please make reference to the scenario

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Pentafluoroethane: WEEL Data 2010 LEEL - 8h TWA 1.000 (ppm) 4.900 (mg/m³)

Difluoromethane: ARKEMA data LEEL - 8h TWA 1.000 (ppm) 2.130(mg/m³)

DNEL:

Difluoromethane: Workers: 7035 mg/m³ - Consumers: 750 mg/m³ - Exposure routes: Inhalation; Health effect: Chronic effects, Systemic toxicity.

Pentafluoroethane: Workers: 16444 mg/m³ - Consumers: 1753 mg/m³ - Exposure routes: Inhalation; Health effect: Chronic effects, Systemic toxicity.

PNEC:

Difluoromethane: fresh water: 0,313 mg/l; water (Intermittent use/release): 3.13 mg/l; fresh water sediment: 1,8069 mg/kg dw

Pentafluoroethane: fresh water: 0.1 mg/l; water (Intermittent use/release): 1 mg/l; fresh water sediment: 0.6 mg/kg

8.2. Exposure controls

The product should be handled in a closed circuit.

Provide adequate general and local ventilation.

Make sure the exposure is well below the occupational exposure limits.

If the risk assessment indicates this is necessary, use the following protection

Eye protection:

If foreseeable a risk of spurts or squirts, please wear safety glasses with lateral protection in compliance with rule of law EN 166.

Protection for skin:

Protective clothing

Protection for hands:

If foreseeable a direct contact with liquid or with cold machineries/equipments for which exist a risk of cold burn, please use cold protection gloves in compliance with rule of law EN511 – 020.

Respiratory protection:

Wear self-contained breathing apparatus in compliance with EN 137 when entering area unless atmosphere is proved to be safe.

Thermal Hazards:

Contact with liquid may cause cold burns/frostbite.

Environmental exposure controls:

Refer to environment legislation. Please observe section 13 (Waste treatment methods).

Contact with liquid may cause cold burns/frostbite.

In high concentrations may cause asphyxiation.

Vapour heavier than air, may accumulate below ground level and cause choking.



SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Appearance:	Gas at 20°C
Colour:	Incolour
Odour:	Ethereal
Odour threshold:	Information not available
pH:	Not applicable to substance
Melting point / freezing point:	Information not available
Initial boiling point and boiling range:	from -51.8 to -51.9 °C
Solid/gas flammability:	Not applicable to substance
Upper/lower flammability or explosive limits:	Not applicable to substance
Density: (water=1):	1.06 g/cm ³ (at 25°C)
Vapour density:	3,0 Kg/m ³ , a 25 °C
Vapour density:	2.56 (at 25°C air=1)
Flash point:	Not applicable to substance
Evaporation rate:	Not tested
Vapour pressure:	14.5 bar (at 20°C)
Solubility in water:	0,48 g/l at 25 °C
Solubility in water:	
Difluoromethane:	1,68 g/l at 25 °C (misure)
Pentafluoroethane:	430 mg/l at 25 °C (calculated)
Solubility (in other substances):	Alcohols, chlorinated solvents, esthers
Partition coefficient n-octanol/water (POW):	Not tested
Pentafluoroethane: log Kow :	1,48 , a 25 °C (OCDE Linea direttiva 107)
Difluoromethane: log Kow :	0,21 , a 25 °C (OCDE Linea direttiva 107)
Auto-ignition temperature:	> 530 °C
Auto-ignition temperature: Difluoromethane	530 °C a 1.018 hPa (Norma A15 (D. 92/69/EEC)
Decomposition temperature:	Information not available
Viscosity:	Information not available

9.2. Other information

Critical Point:	
Critical Pressure:	4,9 MPa,
Critical Temperature:	71 °C
Explosive properties:	Not applicable
Oxidizing properties:	Not applicable

SECTION 10. STABILITY AND REACTIVITY

10.1. Reactivity

The product is not flammable in air, in a normal temperature and pressure conditions. Certain mixtures of the product with air, under certain pressure conditions which may be flammable. Avoiding product mixtures with air under pressure.

Certain product mixtures and chlorine may be flammable or reactive under certain conditions. Thermal decomposition gas emissions very toxic and corrosive fumes (hydrogen fluoride)

10.2. Chemical stability

Stable in normal conditions

10.3. Possibility of hazardous reactions

Can react violently if in contact with alkali metals, alkaline earth metals.

10.4. Conditions to avoid



Avoid all possible sources of ignition (spark or flame). Don't smoke.

10.5. Incompatible materials

Finely divided metals, magnesium and alloys containing more than 2% magnesium, powdered metal salts.

10.6. Hazardous decomposition products

Hydrogen fluoride by thermal decomposition and hydrolysis, carbon oxides, carbonyl fluoride, fluorocarbons.

SECTION 11. TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Toxicological information of the mixture:

Acute inhalation toxicity: in high concentrations may cause asphyxiation. Vapour heavier than air, may accumulate below ground level and cause choking.

Difluoromethane: LC50/4h - rat > 520000 ppm (Method: Guidelines 403 OECD Test)

Pentafluoroethane: LC50/4h - rat > 800000 ppm (Method: Guidelines 403 OECD Test)

Skin corrosion/irritation: Contact with liquid may cause cold burns/frostbite

Serious eye damage/irritation: Contact with liquid may cause cold burns/frostbite

Respiratory or skin sensitisation:

Inhalation:

Pentafluoroethane: Level within which no effects are manifested: 7 % (Dog cardiac sensitisation)

Difluoromethane: Level within which no effects are manifested: 35 % (Dog cardiac sensitisation)

CMR effects:

Mutagenicity: no germ cell mutagenicity by composition

Difluoromethane: in vitro Ames Test: Idle (Method: OCDE Guidelines 471) in vitro genetic aberration Test on Human lymphocytes: Idle (Method: OCDE Guidelines 473). Can be considered comparable to a similar product, whose sperimental results are: in vitro gene mutation test on mammalian cells: Idle (Method: OCDE Guidelines 476)

Pentafluoroethane: Ames Test: Idle (Method: OCDE Guidelines 471). In vitro chromosomal aberration Test on CHO cells: Idle (Method: OCDE Guidelines 473) In vitro chromosomal aberration Test on human lymphocytes: Idle (Metodo: OCDE Guidelines 476)

In vivo

Difluoromethane: in vivo mouse micronucleus Test: Idle (Metodo: OCDE Guidelines 474)

Pentafluoroethane: in vivo mouse micronucleus Test: Idle (Metodo: OCDE Guidelines 474)

Toxicity to reproduction assessment: none by composition

Difluoromethane: Can be considered comparable to a similar product, whose sperimental results are: NOAEL (parental toxicity): > 50.000 ppm NOAEL (Fertility): > 50.000 ppm NOAEL (developmental toxicity): > 50000 ppm (rat, mouse, Inhalation)

Fetal development: based on available data, the product cannot be assumed to have developmental potential.

Difluoromethane: on the animal: Absence of toxic effects for the development of the phoetus. NOAEL (development toxicity): 50.000 ppm NOAEL (maternal toxicity): 50.000 ppm (Method: OCDE Guidelines 414, rat, rabbit, Inhalation)

Pentafluoroethane: on the animal: Absence of toxic effects for the development of the phoetus. NOAEL (development toxicity): 245 mg/l NOAEL (maternal toxicity): 245 mg/l (Metodo: OCDE Guidelines 414, rat, rabbit, Inhalation)

STOT — single exposure: not available data



STOT — repeated exposure: not classified by composition

Difluoromethane: on the animal: Inhalation: No specific toxic effects NOAEL= 50000ppm (Method: OCDE Guidelines 413, Rat, 3 months)

Pentafluoroethane: on the animal: No specific subchronic toxic effects Inhalation: NOAEL= 50000ppm (Method: OCDE Guidelines 413, Rat, 3 months)

Aspiration hazard: not relevant

11.2 Information on other hazards

Endocrine disrupting properties: not available data

SECTION 12. ECOLOGICAL INFORMATION

12.1. Toxicity

Toxicity to fish: by composition, must be regarded as: little harmful to fish.

Pentafluoroethane: Can be considered comparable to a similar product, whose sperimental results are:
1,1,1,3,3-PENTAFLUOROPROPANE : LC50, 96 h (Danio rerio) : > 200 mg/l (Method: OECD Guidelines 203)

Difluoromethane: LC50, 96 h (Frech water fish) : 1.731 mg/l (Method: calculated)

Toxicity to aquatic invertebrates: by composition, must be regarded as: little harmful to dafnia

Pentafluoroethane: Can be considered comparable to a similar product, whose sperimental results are:
1,1,1,3,3-PENTAFLUROBUTANE : EC50, 48 h (Daphnia magna) : > 200 mg/l (Method: OECD TG 202)

Difluoromethane: EC50, 48 h (Daphnia) : 833 mg/l (Method: calculated)

Toxicity to aquatic plants: by composition, must be regarded as: little harmful to algae Pentafluoroethane:

Can be considered comparable to a similar product, whose sperimental results are: 1,1,1,3,3-PENTAFLUOROPROPANE : EC50r, 72 h (Pseudokirchneriella subcapitata) : > 118 mg/l (Method: OECD TG 201)

Difluoromethane: EC50r, 96 h (algae) : 313 mg/l (Metodo: calculated)

12.2. Persistence and degradability

Biodegradability (water): not easy to biodegradation.

Pentafluoroethane: Not immediately to biodegradation: 5% after 28 d (Method: OCDE Guidelines 301 D)

Difluoromethane: Non immediatamente biodegradabile.: 5 % dopo 28 d (Metodo: OCDE Guidelines 301 D)

Photodegradation (in air):

Difluoromethane: Degradation OH: direct photolysis (half-lives time) : 3,39 y

12.3. Bioaccumulative potential

Bioaccumulation: not forseen

Pentafluoroethane: Partition coefficient n-octanol/water log Kow: 1,48 , a 25 °C (Method: OCDE Guidelines 107)

Difluoromethane: Partition coefficient n-octanol/water log Kow : 0,21 , a 25 °C (Method: OCDE Guidelines 107)

12.4. Mobility in soil

Substance:

Difluoromethane: water: 0,01 % Air: 99,99 % Soil: 0 % sediment: 0 % (Method: Calculated by Mackay method, level I)

Vapour Pressure :
1,49 hPa, 21,1 °C
3,11 MPa, 50 °C
1,68 MPa, 25 °C
4,31 MPa, 65 °C

Adsorbiont / desorbiont:

Difluoromethane: log Koc: 0,17 - 1,34 (Method: calculated)



Pentafluoroethane: log Koc: 1,3 - 1,7 (Method: calculated)

12.5. Results of PBT and vPvB assessment

In accordance with Annex III of REACH, this mixture does not contain any substance in compliance with PBT and vPvB criteria.

12.6. Endocrine disrupting properties

Not known

12.7. Other adverse effects

Global warming potential (GWP):

Pentafluoroethane GWP: 3.500 (calcul horizon: 100 y)

Difluoromethane GWP: 675 (calcul horizon: 100 y)

Ozone depletion potencial (ODP):

Difluoromethane ODP; (R-11 = 1) , Value: 0

Pentafluoroethane ODP; (R-11 = 1) , Value: 0

SECTION 13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Recover if possible. In so doing, comply with the local and national regulations currently in force. Destruction should be on licensed premises equipped to absorb and neutralize acid gases and other toxic processing products.

Avoid release to the environment

Avoid discharge to atmosphere.

Recovering according to the supplier's instructions.

SECTION 14. TRANSPORT INFORMATION

14.1. UN number

ADR/RID/IMDG/IATA - UN number: 1078

In case a substance is inside a refrigerating machine is applied the following n° ONU: 2857

14.2. UN proper shipping name:

ADR/RID/IMDG - Shipping name: REFRIGERANT GAS N.O.S.

IATA-Technical name: REFRIGERANT GAS N.O.S.

In case a substance is inside a refrigerating machine the shipping name will be: REFRIGERATING MACHINES containing non-flammable, no-toxic, gases or ammonia solutions (N° ONU 2672).

14.3. Transport hazard class(es)

ADR/RID-Class: 2

ADR-Label: 2.2

RID-Label: 2.2 (+13)

ADR/RID - Hazard identification number: 20

Classification code: 2A

IATA/IMDG - Class: 2.2

14.4. Packing Group

ADR- Packing Group: -

14.5. Environmental hazards: No

14.6. Special Precautions for User



ADR-Tunnel restriction code: C/E

IMDG Stowage and segregation: Cat. A

IMDG Emergency Schedules: F-C, S-V

Ensure there is adequate ventilation

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.

Compliance with applicable regulations.

Before transporting product containers :

- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.

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

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

Not applicable

SECTION 15. REGULATORY INFORMATION

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

Dir. 99/45/EEC (Classification, packaging and labelling of dangerous preparations). Dir. 98/24/EC (Risks related to chemical agents at work). Dir. 2000/39/EC (Occupational exposure limit values); Dir. 2006/8/CE. Regulation (CE) n. 1907/2006 (REACH), Regulation (CE) n. 1272/2008 (CLP), Regulation (CE) n. 790/2009 (1° ATP CLP), Regulation (EU) n. 830/2015, Regulation (EU) n. 878/2020.

Where applicable, refer to the following regulatory provisions :

Directive 2003/105/CE ('Activities linked to risks of serious accidents') and subsequent amendments.
1999/13/EC (VOC directive)

15.2. Chemical Safety Assessment: yes

SECTION 16. OTHER INFORMATION

Revised safety data sheet in accordance with commission regulation (EU) No 878/2020

A vertical line indicates where changes have been made to the previous version of the safety data sheet.

Ensure operators understand the flammability hazard.

Users of breathing apparatus must be trained.

Ensure operators understand the toxicity hazard.

This document was prepared by a competent person who has received appropriate training.

Main bibliographic sources:

ECHA: European chemical agency

ECDIN - Environmental Chemicals Data and Information Network - Joint Research Centre, Commission of the European Communities

SAX's DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS - Eight Edition - Van Nostrand Reinold

CCNL - Appendix 1

EIGA

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.

Classification in accordance with calculation methods of regulation (EC) 1272/2008 CLP / (EC) 1999/45 DPD. The MSDS cancels and replaces any preceding release.



ADR:	European Agreement concerning the International Carriage of Dangerous Goods by Road.
CAS:	Chemical Abstracts Service (division of the American Chemical Society).
CLP:	Classification, Labeling, Packaging..
DNEL:	Derived No Effect Level.
EINECS:	European Inventory of Existing Commercial Chemical Substances.
GHS:	Globally Harmonized System of Classification and Labeling of Chemicals.
IATA:	International Air Transport Association.
IATA-DGR:	Dangerous Goods Regulation by the "International Air Transport Association" (IATA).
ICAO:	International Civil Aviation Organization.
ICAO-TI:	Technical Instructions by the "International Civil Aviation Organization" (ICAO).
IMDG:	International Maritime Code for Dangerous Goods.
LC50:	Lethal concentration, for 50 percent of test population.
LD50:	Lethal dose, for 50 percent of test population.
LTE:	Long-term exposure.
PNEC:	Predicted No Effect Concentration.
RID:	Regulation Concerning the International Transport of Dangerous Goods by Rail.
STE:	Short-term exposure.
STEL:	Short Term Exposure limit.
STOT:	Specific Target Organ Toxicity.
TLV:	Threshold Limiting Value.
TWATLV:	Threshold Limit Value for the Time Weighted Average 8 hour day. (ACGIH Standard).