



SAFETY DATA SHEET
According to Regulation (EC) N. 1907/2006

SDS Supplier 05032108

REFRIGERANTE GAS
R134a

Preparation date:
04.12.2018
Revision 1.4

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

1.1. Product identifier

Substance name: **REFRIGERANT GAS R134a**

Chemical name: NORFLURANE

Synonyms: R-134a

IUPAC Name: 1,1,1,2 – TETRAFLUOROETHANE

CE Number: 212-377-0

CAS Number: 811-97-2

REACH registration no.: 01-2119459374-33-XXXX

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

Identified uses: Refrigerant (professional use).

Uses advised against: any other use other than the identified one.

1.3. Details of the supplier of the safety data sheet

Supplied by: Magneti Marelli After Market Parts and Services S.p.A.

Viale Aldo Borletti, 61/63

20011 Corbetta (MI), Italy

Tel. 0039 02 97 227 111

technical.equipment@magnetimarelli.com

1.4. Emergency telephone number

Telephone 0039 02 97 227 111 (9.00 ÷ 12.00 - 14.00 ÷ 17.00)

SECTION 2: Hazards identification

2.1. Classification of the substance

Classification according to Regulation (EC) N. 1272/2008:

Press. Gas (Liq.)

H280 Contains gas under pressure; may explode if heated.

2.2. Label elements

Labelling according to Regulation (EC) N. 1272/2008:

Hazard 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



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The substance does not meet the criteria for PBT or vPvB according to Annex XIII.

SECTION 3: Composition/information on ingredients

3.1. Substance

Substances	Identifiers	%
1,1,1,2 – tetrafluoroethane	CAS Number: 811-97-2 CE Number: 212- 377-0 REACH registration no.: 01-2119459374-33-XXXX	100

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation: At high concentration could cause asphyxia. Symptoms could include loss of mobility and/or consciousness. Victims couldn't realize of becoming asphyxiated. While wearing a breathing apparatus, move the victims to fresh air and keep them lied down at warm temperature. Call a physician. If the victim is not breathing, give artificial respiration.

Skin contact: contact with the liquid product causes freezing of the skin and cold burnings. Remove contaminated clothing and shoes immediately. Heat the injured part with warm water for at least 15 minutes. Apply a sterile gauze. Call a physician.

Eye contact: Remove contact lenses, if present and easy to do. Flush immediately the eyes with abundant water for at least 10-15 minutes. Continue rinsing. Call a physician.

Ingestion: Ingestion is considered unlikely due to the form of the product (compressed gas). Consult a physician. Induce vomiting only after specific medical disposition. Never give anything by mouth to an unconscious person without medical consent.

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

Inhalation: could irritate mucosa and the respiratory tract, with coughing and burning sensation in the throat and nose. At high concentration could cause asphyxia. Symptoms could include loss of mobility and/or consciousness. Victims couldn't realize of becoming asphyxiated.

At low concentration may have a narcotic effect. Symptoms include dizziness, headache, nausea and loss of coordination.

Skin contact: Contact with the liquid product causes skin freezing and cold burnings.

Eye contact: may cause lacrimation, eye pain and conjunctival redness. Contact with the liquid product causes freezing and burnings.

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

In case of contact with the liquid product, heat immediately the interested area with warm water.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media:

Cool the containers exposed to flames and heat with water, extinguishing powder, carbon dioxide (CO₂) or foam.

Unsuitable extinguishing media:

None.

5.2. Special hazards arising from the substance



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Heat may cause the explosion of the containers.
In case of fire could be released: carbon monoxide (CO), hydrogen fluoride (HF), carbonyl fluoride (COF₂).

5.3. Advice for firefighters

Cool the containers exposed to flames with jet water.
Firefighters must use standard protection equipment, included antiframe suit, helmet with face shield, gloves, rubber boots and, in confined spaces, breathing apparatus SCBA.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel:
Evacuate and ventilate the area.
For emergency responders:
Stop the spill, if it can be performed in a safe manner. Prevent the leakage to sewage, basements and confined areas. Wear a breathing apparatus if not sure that the atmosphere is breathable.

6.2. Environmental precautions

Avoid to spread the substance in the environment.

6.3. Methods and material for containment and cleaning up

Grant an adequate ventilation.

6.4. Reference to other sections

Refer to Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Avoid contact of the liquid with skin and eyes.
Avoid inhalation of high concentrations. Provide an adequate ventilation in the place of use.
Keep away from heat sources.
Follow the specific operative instructions related to the use of the product.
Don't eat, drink or smoke while using the product.

7.2. Conditions for safe storage, including any incompatibilities

Follow standard prescription for the stocking of the container. Store away from heat and ignition sources.
Containers must be stocked vertically and anchored to prevent the fall. Keep away from strong oxidisers.

7.3. Specific end uses

No information available on specific end uses.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<i>National occupational exposure limit values:</i>	Substance name	Limit value – 8 hours
<i>United Kingdom</i>	1,1,1,2-tetrafluoroethan	1000 ppm 4240 mg/m ³



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DNEL (Derived no-effect level):

Industrial worker (exposure through inhalation, long-term, systemic effects): 13936 mg/m³

Consumer (exposure through inhalation, long-term, systemic effects): 2476 mg/m³

PNEC (Predicted no-effect concentration):

freshwater: 0,1 mg/l;

marine water: 0,01 mg/l;

water (intermittent releases): 1 mg/L;

sediments in freshwater: 0,75 mg/Kg dry weight;

water (sewage treatment plants): 73mg/L

8.2 Exposure controls

Ensure an adequate ventilation.

Don't eat, drink or smoke while using the product.

Individual protection measures

Protection of eyes and face

Wear safety goggles with lateral protection EN 166 – Personal protection for eyes.

Hands protection

It is advised to use gloves resistant to low temperatures with a material thermal insulating PAW (UNI EN 511).

Gloves must be replaced after first signs of wear, use them only after a thoroughly hand cleaning. The choice

of the gloves also depends on use conditions and limits posed by the producer must be taken into account.

Body protection

Wear protective clothes.

Respiratory tract protection

Not necessary in normal use conditions. If the adopted measures for worker exposition wouldn't result to be

adequate, wear personal protective equipment as: masks with cartridges for organic vapours and

for dust/fog in conformity with EN 14387.

Environmental exposure controls

Keep away from drains, surface waters and groundwater.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance:	Gas, compressed and liquefied
Colour:	Colourless
Odour:	Characteristic, ethereal
pH:	7,5-11
Melting point/freezing point:	-108°C
Boiling point:	-26,3 °C
Flash point:	No data available
Evaporation rate:	No data available
Flammability:	Not flammable
Vapour pressure:	5,74 bar (20°C), 6,65 bar (25°C), 13,18 bar (50°C)
Vapour density:	4,32 (20°C); 3,52 (25°C)
Relative density:	1,21 g/cm ³ at 20 °C
Solubility in water:	1 g/L (25°C)
Partition coefficient n-octanol/water:	Log Pow: 1,06
Decomposition temperature:	> 370 °C
Auto-ignition temperature:	> 743°C
Viscosity:	0,21 mPas at 25 °C
Explosive properties:	Not explosive
Oxidising properties:	Not oxidiser



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9.2. Other information
Not available.

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable in standard conditions.

10.2. Chemical stability

The material is stable in standard temperature and pressure conditions foreseen for stocking and manipulation.

10.3. Possibility of hazardous reactions

Could react violently with alkali metals and alkaline earth metals.

10.4. Conditions to avoid

Avoid heat sources.

10.5. Incompatible materials

Strong oxidisers, alkali metals and alkaline earth metals.

10.6. Hazardous decomposition products

Hazardous combustion products: see section 5.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity:

LD0 (rat, inhalation) > 2086 g / L

LD50 (skin): No data available

LD50 (oral): No data available

Skin corrosion/irritation:

Not skin irritating (in vivo test)

Serious eye damage/eye irritation:

Not eye irritating (in vivo test)

Respiratory or skin sensitisation:

Not skin sensitizing (in vivo test).

Mutagenicity:

Not mutagenic according to in vitro and in vivo tests.

Carcinogenicity:

Rats were exposed to a 50000 ppm dose for two years, it was found a slight increase in the incidence of testicular benign tumour. This result was considered irrelevant for humans.

Reproductive toxicity:

No evidence of toxic effects for reproduction (studies conducted on animals).

Specific target organ toxicity – single exposure:

No evidence of specific target organ toxicity effects after single exposure.

Specific target organ toxicity – repeated exposure:

No evidence of specific target organ toxicity effects after repeated exposure (NOEC (inhalation) = 50000 ppm (2-years study on rats))

Aspiration toxicity:

The substance doesn't show toxicity hazards in case of aspiration.

SECTION 12: Ecological information



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12.1. Toxicity

Fish (<i>Salmo gairdneri</i>)	LC50	450 mg / l (96 h)
Aquatic invertebrates (<i>Daphnia magna</i>)	EC50	980 mg / l (48 h)
Microorganisms (<i>Pseudomonas putida</i>)	EC10	EC10 > 730 mg / l (6h)

12.2. Persistence and degradability

Photodegradation in air

- Indirect photo oxidation: half-life time ($t_{1/2}$) = ca. 10 y
- Conditions: reaction with OH radicals
- Degradation products: carbonic anhydride (CO₂) / hydrofluoric acid (HF) / trifluoroacetic acid (TFA) / formic acid (HCOOH)

Biodegradation

Not easily biodegradable (2-3% after 28 days; OECD guideline 301D)
Not biodegradable in anaerobic conditions (test with metanotrophic bacteria, *Methylosinus trichosporium* OB3b)

12.3. Bioaccumulative potential

Considering the value for the Log Pow (1.06), it is foreseen that the product is not bioaccumulable.

12.4. Mobility in soil

Considering the high volatility of the substance (estimated value for Henry constant (H): 10220 Pa · m³/ mol (25°C)), in case of release, the substance will distribute almost completely in air. On the basis of the estimated value for the absorption coefficient related to organic carbon (Log K_{oc} = 1.57), it was estimated that the substance has a high mobility in the soil.

12.5. Results of PBT and vPvB assessment

The substance does not meet the criteria for PBT or vPvB (REACH Annex XIII).

12.6. Other adverse effects




Impact on the formation of tropospheric ozone: negligible.
GWP - Global Warming Potential: 1300 (CE regulation N. 517/2014); 1430 (IPCC Fifth Assessment Report, 2014);
HGWP: 0,25 (R-11 = 1)

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Don't dispose of the residues in the sewage. Avoid direct emission in the atmosphere. Contact an authorised waste disposal company. Refer to local and national legislation concerning waste disposal.

SECTION 14: Transport information

	ADR/RID	IMGD	IATA
14.1. UN number	UN3159	UN3159	UN3159
14.2. UN proper shipping name	1,1,1, 2-TETRAFLUOROETHANE		
14.3. Transport hazard class(es)	2.2	2.2	2.2
Label no. :			
14.4. Packing group	---	---	---
14.5. Environmental hazards	Tunnel restriction codes (C/E)	Emergency schedules (EmS) F-	



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14.6. Special precautions for user

C, S-V
No data

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

No data

SECTION 15: Regulatory information

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

Specific EU legislation on health, safety and environment:

- Reg. (EC) 517/2014 (Fluorinated greenhouse gases)
- Restrictions related to the product or the substances contained according to Annex XVII of Regulation (EC) 1907/2006
None
- Substances in Candidate List (Art. 59 REACH)
According to available data, the product doesn't contain any SVHC substances in a percentage higher than 0,1%.
- Substances subjected to Authorisation (Annex XIV REACH)
None
- Substances subjected to notification for the export Reg. (EC) 649/2012:
None
- Substances under Rotterdam convention:
None
- Substances under Stockholm convention:
None

15.2. Chemical Safety Assessment

A chemical safety assessment was carried out, the exposure scenario was not required.

SECTION 16: Other information

Revision 1.4 : December 4th, 2018

Change respect to previous version: Sections 1, 4-16

Bibliographic sources:

ECHA Database, Norflurane (CAS 811-97-2)
IPCC Fifth Assessment Report, 2014 (AR5)

Full text of Hazard Statements

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

Provisions about workers training:

Provide specific training on asphyxia-correlated risks and the use of breathing apparatus.

Acronyms

CAS Chemical Abstracts Service

LD0 : Dose that does not cause any mortality of the tested population

LD50: Median lethal dose, required to kill 50% of the members of a tested population

CL50: Median lethal concentration

CE50: Median effective concentration

NOAEL/NOAEC: dose/concentration without adverse effect observable (No observed adverse effect level/concentration), the highest dose/concentration of substance at which no adverse effect are observed



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PBT: Persistent, Bioaccumulable and Toxic
vPvB: very persistent and very bioaccumulable

Information added, eliminated o modified during the revision of the safety data sheet

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 guidance for safe handling, use, processing, storage, transportation, disposal and release. The information are not valid for other products, included mixtures of the substance.