





SAFETY DATA SHEET

In compliance with EC Regulations No.: 1907/2006, 830/2015 and 1272/2008 (CLP).

Date last modified: 26 October 2020 - Version 5.0

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

1.1 Product Identifier

Product Name: <u>REFRIGERANT R134a</u> Product Code #: 330223

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

Relevant identified uses: Refrigerant. Industrial and professional uses only. Perform risk assessment prior to use.

Uses advised against: This product is not recommended for any industrial, professional or consumer use other than the Intended Uses above and the instructions written in this Safety Data Sheet.

1.3 Details of the supplier of the safety data sheet

Company/undertaking identification

Supplier/Manufacturer:

Marichem Marigases Hellas SA Sfaktirias 64, 185 45 Piraeus, Greece Tel. No.: ++30 210 4148800 Fax No.: ++30 210 4133985 http://www.marichem-marigases.com

e-mail: mail@marichem-marigases.com

<u>1.4 Emergency telephone number</u>

Tel. No.: ++30 210 4148800 (including working hours)

Emergency Information: Inside U.S. and Canada: (800)-424-9300 (CHEMTREC) Outside U.S. and Canada: 1-703-527-3887 (CHEMTREC) National Emergency Centre (Greece): ++30 210 7793777

2. HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

Hazard Class and Category Code Regulation EC 1272/2008 (CLP/GHS)

Physical hazards

Gases under pressure, Liquefied gas.

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

The substance is not classified as hazardous according to EC Directives 67/548/EEC or 1999/45/EC and its amendments. Proposed by the industry: Asphyxiant in high concentrations.

2.2. Label elements

Labelling Regulation EC 1272/2008 (CLP)

Hazard pictograms:



Signal word: Warning

Hazard Statements

H280	Contains gas under pressure; may explode if heated.
EIGA-As	Asphyxiant in high concentrations.
Special labeling of certain substances and mixtures	Contains 1,1,1,2 Tetrafluoroethane / Contains fluorinated greenhouse gases covered by the Kyoto Protocol.

GWP (Global Warming Potential): 1300

Precautionary statements

Storage

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

2.3 Other Hazards

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT). This substance is not considered to be very persistent, nor very bioaccumulating (PBT). Rapid evaporation of the liquid may cause frostbite. Contact with liquid may cause cold burns/frost bite. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

May cause cardiac arrhythmia.

Do not breathe gas. Do not remove this product label. Use only with certified equipment suitable for this particular pressure or gas. Store and transport with protection cap on. Close valve when not in use and when empty. Storage temperature: Under 45^0 C (113^0 F). Refer to Marichem Marigases for recovery/recycling.

Mixture/substance classification and labelling according to Directive 67/548/EEC, European Dangerous Preparations Directive (1999/45/EC), European Regulation 648/2004 and their amendments.

Not classified as hazardous to users. No special information required according to EC directives. Proposed by the industry: Asphyxiant in high concentrations.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Chemical Composition:

Substance	Registration Number	Classification according Directive 67/548/EEC [*]	Classification according Regulation 1272/2008 (CLP) [*]	Concentration
1,1,1,2- Tetrafluoroethane (HFC 134a) (CAS No.: 811–97–2) (EC No.: 212-377-0)	01-2119459374-33- 0002	-	Pressure Gas H280	100%

*See section 16 for the full text of the classifications, the R-phrases and the Hazard code(s) declared above.

Occupational Exposure Limits, if available, are listed in section 8.

4. FIRST AID MEASURES

4.1. Description of first aid measures

First Aid General Information

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

First Aid 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.

First Aid Skin / Eye

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

First Aid Ingestion

Ingestion is not considered a potential route of exposure.

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 coordination.

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

None.

5. FIRE FIGHTING MEASURES

5.1. Extinguishing media

Suitable extinguishing media

Dry powder. Carbon dioxide. Water fog. Foam.

Unsuitable extinguishing media

Do not use a solid water stream.

5.2. Special hazards arising from the substance or mixture

Hazardous combustion products

If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Carbon monoxide, Carbonyl fluoride, Hydrogen fluoride.

5.3. Advice for fire-fighters

Specific methods

If possible, stop flow of product. Move container away or cool with water from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.

Special protective equipment for fire-fighters

Normal fire-fighters' equipment consists of an appropriate SCBA (open-circuit positive pressure compressed air type) in combination with fire kit. Equipment and clothing to the following standards will provide a suitable level of protection for fire-fighters.

Guideline

EN 469:2005: Protective clothing for fire-fighters. Performance requirements for protective clothing for fire fighting., EN 137 Respiratory protective devices — Self-contained open-circuit compressed air breathing apparatus with full face mask — Requirements, testing, marking., EN 15090 Footwear for fire-fighters., EN 443 Helmets for fire fighting in buildings and other structures., EN 659 Protective gloves for fire-fighters.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Evacuate area. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. EN 137 Respiratory protective

devices — Self-contained open-circuit compressed air breathing apparatus with full face mask — Requirements, testing, marking.

6.2. Environmental precautions

Try to stop release.

6.3. Methods and material for containment and cleaning up

Ventilate area.

6.4. Reference to other sections

See also sections 8 and 13.

7. HANDLING AND STORAGE

7.1. Precautions for safe handling

Only experienced and properly instructed persons should handle gases under pressure. The substance must be handled in accordance with good industrial hygiene and safety procedures. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Do not smoke while handling product. Ensure the complete gas system has been (or is regularly) checked for leaks before use. Refer to supplier's handling instructions. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Protect containers from physical damage; do not drag, roll, slide or drop. When moving containers, even for short distances, use appropriate equipment e.g. trolley, hand truck, fork truck etc. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Keep container valve outlets clean and free from

contaminates particularly oil and water. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to transfer gases from one container to another. Never use direct flame or electrical heating devices to raise the pressure of a container. Do not remove or deface labels provided by the supplier for the identification of the container contents. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.

7.2. Conditions for safe storage, including any incompatibilities

Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. Cylinders should be stored in the vertical position and properly secured to prevent falling over. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials. Containers should not be stored in conditions likely to encourage corrosion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limit value

Value type	value	Note
Great Britain - LTEL	1.000 ppm	EH 40/07

Derived No Effect Levels

Туре	Exposure	Value	Population	Effects
DNEL	Long term inhalation	13,936 g/m ³	Workers	Systemic

Predicted No Effect Concentrations

Туре	Environmental	Value
	Compartment	
PNEC	Fresh water	0,1 mg/l
PNEC	Marine	0,01 mg/l
PNEC	Intermittent release	1 mg/l
PNEC	STP (Sewage Treatment Plant)	73 mg/l
PNEC	Fresh water sediment	0,75 mg/kg dw

8.2. Exposure controls

Appropriate engineering controls

A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Product to be handled in a closed system. Oxygen detectors should be used when asphyxiating gases may be released. The substance must be handled in accordance with good industrial hygiene and safety procedures. Consider work permit system e.g. for maintenance activities. Systems under pressure should be regularly checked for leakages. Provide adequate general or local ventilation. Keep concentrations well below occupational exposure limits.

Personal protective equipment

Eye and face protection

Wear a face-shield when transfilling and breaking transfer connections. Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases.

Skin protection

Hand protection

Advice: Wear working gloves and safety shoes while handling containers. Wear cold insulating gloves.

Guideline: EN 511 Protective gloves against cold.

Body protection

Protect eyes, face and skin from contact with product.

Other protection

Wear working gloves and safety shoes while handling containers. EN ISO 20345 Personal protective equipment - Safety footwear.

Thermal hazards

If there is a risk of contact with the liquid, all protective equipment should be suitable for extremely low temperatures.

Environmental Exposure Controls

Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

General information

Appearance/Colour: Colourless gas. Odour: Ethereal Odour threshold: Odour threshold is subjective and inadequate to warn for over exposure. Melting point: -101 °C Boiling point: -26 °C Flash point: Not applicable for gases and gas mixtures. Evaporation rate: Not applicable for gases and gas mixtures. Evaporation rate: Not applicable for gases and gas mixtures. Flammability range: Non flammable. Vapour Pressure 20 °C: 5.7 bar Relative density, gas (Air=1): 3.6 Solubility in water: 1930 mg/l Partition coefficient: n-octanol/water: 0.94 log Pow Autoignition temperature: Not applicable. Molecular weight: 102 g/mol Critical temperature: 100.6 °C

9.2. Other information

Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

10. STABILITY AND REACTIVITY

10.1. Reactivity

Unreactive under normal conditions.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions None.

10.4. Conditions to avoid Heat.

10.5. Incompatible materials

Moisture. Oxidising agents. May react violently with alkaline-earth and alkali metals. For material compatibility see latest version of ISO-11114.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. The following decomposition products may be produced: Carbon monoxide, Carbonyl fluoride, Hydrogen fluoride.

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Acute oral toxicity

Not applicable.

Acute inhalation toxicity

Value: LC50 Species: Rat Exposure time: 4 h Value in non-standard unit: 567000 ppm Method: OECD Test Guideline 403

Acute dermal toxicity

Not applicable.

Acute toxicity other routes

Ingestion is not considered a potential route of exposure.

Skin irritation

Species: Rabbit Result: Slight irritation. Not classified as an irritant.

Eye irritation

Species: Rabbit Result: Slight irritation. Not classified as an irritant.

Sensitization

Species: Guinea-pig This substance is not classified as a sensitizer.

Repeated dose toxicity

Species: Rat Route of application: Inhalation Exposure time: Several years Value type: NOAEL Value: 50000 ppm No known effects from this product.

Genetic toxicity in vitro

Test type: Ames test in vitro: Inactive (Method: OECD Guideline 471) Test type: In vitro chromosomal abnormality test on human lymphocytes: Inactive (Method: OECD Guideline 473) Test type: In vitro gene mutations test on mammalian cells: Inactive

Genetic toxicity in vivo

Test type: Micronucleus test in vivo mouse: Result: Inactive Test type: DNA repair test on rats hepatocytes: Result: Inactive

Assessment mutagenicity

There is no evidence of mutagenic potential.

Carcinogenicity

Species: Rat Route of application: Inhalation Value type: NOAEL Value: 10.000 ppm Species: Rat Route of application: Oral Value type: NOAEL Value: 300 mg/kg bw/day.

Assessment carcinogenicity

No evidence of carcinogenic effects.

Toxicity to reproduction/fertility

Test type: Fertility Species: Mouse Route of application: Inhalation Value type: NOAEL Value: 50.000 ppm

Test type: Gestation Species: Rabbit Route of application: Inhalation Value type: NOAEL Value: 40.000 ppm Value type: NOAEC (maternal toxicity) Value: 2.500 ppm Method: OECD Test Guideline 414 (Prenatal Developmental Toxicity Study).

Assessment toxicity to reproduction

No indication of toxic effects.

Assessment teratogenicity

No data available.

Experiences with human exposure

Inhalation of thermal decomposition products in high concentrations may cause shortness of breath (lung oedema), narcosis and irregular cardiac activity.

12. ECOLOGICAL INFORMATION

12.1. Toxicity

When discharged in large quantities may contribute to the greenhouse effect.

Acute and prolonged toxicity fish

Species: Rainbow trout (Oncorhynchus mykiss) Exposure time: 96 h Value type: LC50 Value in standard unit mg/l: 450 mg/l

Acute toxicity aquatic invertebrates

Species: Water flea (Daphnia magna) Exposure time: 48 h Value type: LC50 Value in standard unit mg/l: 980 mg/l

Species: Crustaceans Exposure time: 48 h Value type: LC50 Value in standard unit mg/l: 980 mg/l

Toxicity aquatic plants

Species: Algae Exposure time: 72 h Value type: EC50 Value in standard unit mg/l: 118 mg/l

Toxicity microorganisms

Species: Pseudomonas putida. Exposure time: 6 h Value type: EC10 Value in standard unit mg/l: > 730 mg/l

12.2. Persistence and degradability

Not readily biodegradable.

Photo degradation

Compartment: Air Degradation products: Carbon dioxide/hydrofluoric acid. Degradation by OH radicals. Half life (direct photolysis): 3.541 d Compartment: Air Degradation by OH radicals. Indirect photo-oxidation.

Stability in water

Non-significant hydrolysis.

Biodegradation

Test type: Aerobic Exposure time: 28 d Method: Closed bottle test Not readily biodegradable.

12.3. Bioaccumulative potential

Does not bioaccumulate.

12.4. Mobility in soil

Log Koc: 1.57 Henry's constant at 25 °C: 102 hPa.m³/mol Because of its high volatility, the product is unlikely to cause ground or water pollution.

Transport between environmental compartments

Medium: Water: 0.07 % Medium: Air: 99.93 % Method: Calculated Volatization Half life: 8.6 - 16.7 Years Method: Calculated

12.5. Results of PBT and vPvB assessment

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT). This substance is not considered to be very persistent, nor very bioaccumulating (PBT).

12.6 Other adverse effects

Ozone Depletion Potential (ODP): 0 (zero)

GWP (Global Warming Potential): 1300

Contains fluorinated greenhouse gases covered by the Kyoto protocol.

13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Avoid discharge to atmosphere. Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required. Gases in pressure containers excluding those, which are mentioned under 16 05 04.

EWC Nr. 16 05 05

14. TRANSPORT INFORMATION

14.1 Proper shipping name: 1,1,1,2 - TETRAFLUOROETHANE (REFRIGERANT GAS R 134 a)

14.2 LAND TRANSPORT

UN number: 3159 Labeling No.: 2.2 ADR class: 2 Proper Shipping Name: 1,1,1,2 Tetrafluoroethane Classification Code: 2A Tunnel restriction code: (C/E) HI Number: 20 Packing group (Packing Instruction): P200

RID-class:

14.3 SEA TRANSPORT

2

UN number:3159Proper Shipping Name:1,1,1,2 TetrafluoroethaneIMDG class:2.2Labeling No.:2.2IMDG Packing group (Packing Instruction):P200EmS:F-C, S-V

14.4 AIR TRANSPORT

UN number:3159Proper Shipping Name:1,1,1,2 TetrafluoroethaneIATA/ICAO class:2.2

Packing group (Packing Instruction):P200Labeling No.:2.2

14.5 GENERAL

Gas cylinders must be equipped with valve protection caps during transportation.

14.6 OTHER TRANSPORT INFORMATION

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. Ensure that the container valve is closed and not leaking. Ensure that the valve outlet cap nut or plug (where provided) is correctly fitted. Ensure that the valve protection device (where provided) is correctly fitted. Ensure adequate ventilation. Ensure compliance with applicable regulations.

15. REGULATORY INFORMATION

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

Seveso Directive 96/82/EC: Not covered.

Other regulations

Regulation on Fluorinated greenhouse gases 842/2006/EC: Listed. Management of Health and Safety at Work Regulations (1999 No. 3242) The Regulatory Reform (Fire Safety) Order 2005 (2005 No. 1541) Control of Substances Hazardous to Health Regulations (COSHH, 2002 No. 2677) Provision and Use of Work Equipment Regulations (PUWER, 1998 No. 2306) Personal Protective Equipment Regulations (1992 No. 2966) Control of Major Accident Hazards Regulations (COMAH, 1999 No. 743) Chemical Hazards Information and Packaging for Supply (CHIP, 1994 No. 3247) Pressure Systems Safety Regulations (PER, 2000 No. 128)

This Safety Data Sheet has been produced to comply with Regulation (EU) 453/2010.

15.2. Chemical safety assessment

A CSA does not need to be carried out for this product.

16. OTHER INFORMATION

16.1 Full test of H-statements referred to under Section 3.

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

16.2 Further information

Read the Product Data Sheet, Product label and the Safety Data Sheet before using the product.

16.3 Abbreviations and acronyms

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road).

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail).

IMDG: International Maritime Code for Dangerous Goods. IATA: International Air Transport Association. ICAO: International Civil Aviation Organization. bw: Body weight. Carc.: Carcinogenicity. CAS number: Chemical Abstracts Service number. CLP: Classification Labelling Packaging Regulation. CSA: Chemical Safety Assessment. CSR: Chemical Safety Report. DNEL: Derived No Effect Level. dw: Dry weight. EC number: EINECS and ELINCS number. EC: European Commission. EC50: Half maximal effective concentration. EINECS: European Inventory of Existing Commercial Chemical Substances. ELINCS: European List of Notified Chemical Substances. EmS: Emergency Schedule. ERC: Environmental Release Category. ES: Exposure scenario. food: oral feed. GHS: Globally Harmonized System of Classification and Labelling of Chemicals. Irrit.: Irritation. LC50: Lethal concentration, 50 %. LD50: Median Lethal dose. LOAEC: Lowest Observed Adverse Effect Concentration. LOAEL: Lowest Observed Adverse Effect Level. MK value: Maximum Concentration value. NCO: An international corporation that provides customer service contracting. NOAEC: No Observed Adverse Effect Concentration. NOAEL: No Observed Adverse Effect Level. NOEC: No Observed Effect Concentration. OECD: Organisation for Economic Cooperation and Development. PBT: Persistent, Bioaccumulative and Toxic. PNEC: Predicted No Effect Concentration. PROC: Process category. REACH: The Registration, Evaluation, Authorisation and Restriction of Chemicals. Resp.: Respiratory. Sens.: Sensitization. STEL value: Short Term Exposure Limit value. STOT RE: Specific target organ toxicity — repeated exposure. STOT SE: Specific target organ toxicity — single exposure. STOT: Specific Target Organ Toxicity. STP: Sewage Treatment Plant. SU: Sector of use. Tox.: Toxicity. TWA value: Time Weighted Average value. vPvB: Very Persistent and Very Bioaccumulative.

16.4 Notice to reader

All information, instructions and statements contained in this Material Safety Data Sheet are compiled in accordance with European Directives, corresponding national legislation and on the basis of information given by our suppliers.

The information disclosed in this Material Safety Data Sheet (which supersedes all previous versions) is believed to be correct, at the date of issue, to the best of our current knowledge and experience. It only relates to the specific product designated herein and it may not be valid when said product is used in combination with any other products or in any processed form, unless specified in

the text. This document aims to provide the necessary health and safety information of the product and is not to be considered a warranty or quality specification. It is the responsibility of the recipient of this Material Safety Data Sheet to ensure that information given here is read and understood by all who use, handle, dispose of or in any way come in contact with the product.

Also, it is the responsibility of the user to comply with local legislation relating to safety, health, environment and waste management. Data and information provided concerning the product are informative, exclusively presented to the customer.