SAFETY DATA SHEET

C-Gas R-134a

According to the REACH etc. (Amendment etc.) (EU Exit) Regulations 2020 No. 1577, as amended.
According to Regulation (EC) No 1907/2006, Annex II, as amended.
Commission Regulation (EU) 2020/878 of 18 June 2020.

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

1.1. Product identifier

Product name C-Gas R-134a

Chemical name 1,1,1,2-Tetrafluoroethane

CAS number 811-97-2

EC number 212-377-0

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

Identified uses Heat transfer agents.

Uses advised against No specific uses advised against are identified.

1.3. Details of the supplier of the safety data sheet

Supplier Cantas Chemical Industry And Commerce Inc.
Çerkeşli Mahallesi, Gebze V (Kimya) İhtisas OSB, Fatma Börü Caddesi No:5/1 41455 Dilovası/ Kocaeli T el: 0212 910 1260 / (Monday - Friday, 8:30am-5:30pm)
E-posta: info@cantaskimya.com

1.4. Emergency telephone number

Emergency telephone Cantaş: +90 212 910 12 60

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (SI 2019 No. 720)

Physical hazards Press. Gas (Liq.) - H280

Health hazards Not Classified

Environmental hazards Not Classified

Additional information Classification (Regulation (EC) No. 1272/2008).

2.2. Label elements

EC number 212-377-0

Hazard pictograms

Signal word 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.

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2.3. Other hazards

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects
Rapid evaporation of the product may cause frostbite.
May displace oxygen and cause rapid suffocation

SECTION 3: Composition/information on ingredients

3.1. Substances

Product name	C-Gas R-134a
Chemical name	1,1,1,2-Tetrafluoroethane
CAS number	811-97-2
EC number	212-377-0
Amount w/w	> 99.50%

3.2. Mixtures

Description Not applicable.

SECTION 4: First aid measures

4.1. Description of first aid measures

General information Get medical attention immediately. Show this Safety Data Sheet to the medical personnel.

Inhalation Remove affected person from source of contamination. Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. Maintain an open airway. Loosen tight clothing such as collar, tie or belt. When breathing is difficult, properly trained personnel may assist affected person by administering oxygen. Place unconscious person on their side in the recovery position and ensure breathing can take place.

Ingestion Rinse mouth thoroughly with water. Remove any dentures. Stop if the affected person feels sick as vomiting may be dangerous. Do not induce vomiting unless under the direction of medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. Place unconscious person on their side in the recovery position and ensure breathing can take place. Maintain an open airway. Loosen tight clothing such as collar, tie or belt.

Skin contact Rinse with water. Get medical attention if symptoms are severe or persist after washing.

Eye contact Rinse immediately with plenty of water. Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 10 minutes.

Protection of first aiders First aid personnel should wear appropriate protective equipment during any rescue.

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

General information See Section 11 for additional information on health hazards. The severity of the symptoms described will vary dependent on the concentration and the length of exposure.

Inhalation Overexposure may depress the central nervous system, causing dizziness and intoxication. Vapours may cause headache, fatigue, dizziness and nausea.

Ingestion Due to the physical nature of this product, it is unlikely that ingestion will occur.

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Skin contact	Frostbite.
Eye contact	No specific symptoms known. May be slightly irritating to eyes.

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

Notes for the doctor	Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	The product is not flammable. Extinguish with foam, carbon dioxide, dry powder or water fog. Use fire-extinguishing media suitable for the surrounding fire.
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture

Specific hazards	Containers can burst violently or explode when heated, due to excessive pressure build-up.
Hazardous combustion products	Hydrogen fluoride (HF). Carbon monoxide (CO). Carbon dioxide (CO_2). Carbonyl compounds.

5.3. Advice for firefighters

Protective actions during firefighting	Avoid breathing fire gases or vapours. Evacuate area. Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk. Cool containers exposed to flames with water until well after the fire is out. If a leak or spill has not ignited, use water spray to disperse vapours and protect men stopping the leak. Control run-off water by containing and keeping it out of sewers and watercourses. If risk of water pollution occurs, notify appropriate authorities.
Special protective equipment for firefighters	Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing. Firefighter's clothing will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions	No action shall be taken without appropriate training or involving any personal risk. Keep unnecessary and unprotected personnel away from the spillage. Provide adequate ventilation. Wear protective clothing as described in Section 8 of this safety data sheet. Follow precautions for safe handling described in this safety data sheet. Wash thoroughly after dealing with a spillage. Ensure procedures and training for emergency decontamination and disposal are in place. Do not touch or walk into spilled material. Ensure that the oxygen content is >= 19.5%.

6.2. Environmental precautions

Environmental precautions	Exposure to aquatic environment unlikely. Large Spillages: Inform the relevant authorities if environmental pollution occurs (sewers, waterways, soil or air).

6.3. Methods and material for containment and cleaning up

Methods for cleaning up	Wear protective clothing as described in Section 8 of this safety data sheet. Clear up spills immediately and dispose of waste safely. Approach the spillage from upwind. Flush contaminated area with plenty of water. Wash thoroughly after dealing with a spillage. Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

6.4. Reference to other sections

Reference to other sections	For personal protection, see Section 8. See Section 11 for additional information on health hazards. See Section 12 for additional information on ecological hazards. For waste disposal, see Section 13.

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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Usage precautions

Read and follow manufacturer's recommendations. Wear protective clothing as described in Section 8 of this safety data sheet. Keep away from food, drink and animal feeding stuffs. Do not handle until all safety precautions have been read and understood. Do not handle broken packages without protective equipment.

Advice on general occupational hygiene

Wash promptly if skin becomes contaminated. Take off contaminated clothing. Do not eat, drink or smoke when using this product. Wash at the end of each work shift and before eating, smoking and using the toilet. Change work clothing daily before leaving workplace.

7.2. Conditions for safe storage, including any incompatibilities

Storage precautions

Store away from incompatible materials (see Section 10). Store in accordance with local regulations. Keep only in the original container. Keep horizontal design tube/drum/tanks horizontal, vertical design tube/drum/tank upright. Keep container tightly closed, in a cool, well ventilated place. Protect containers from damage. Protect from sunlight. Keep away from heat, sparks and open flame. Bund storage facilities to prevent soil and water pollution in the event of spillage. The storage area floor should be leak-tight, jointless and not absorbent. Do not drag, slide or roll cylinders. Keep at temperature not exceeding 52°C.

Storage class

Compressed gas storage.

7.3. Specific end use(s)

Specific end use(s)

The identified uses for this product are detailed in Section 1.2.

SECTION 8: Exposure controls/Personal protection

8.1. Control parameters

Occupational exposure limits

Long-term exposure limit (8-hour TWA): WEL 1000 ppm 4240 mg/m³

WEL = Workplace Exposure Limit.

DNEL

Consumer - Inhalation; Long term systemic effects: 2476 mg/m³
Workers - Inhalation; Long term systemic effects: 13936 mg/m³

PNEC

- Fresh water; 0,1 mg/l
- marine water; 0,01 mg/l
- Intermittent release; 1 mg/l
- Sediment (Freshwater); 0,75 mg/kg/day

8.2. Exposure controls

Protective equipment

C-Gas R-134a

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Appropriate engineering controls	Provide adequate ventilation. Personal, workplace environment or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Use process enclosures, local exhaust ventilation or other engineering controls as the primary means to minimise worker exposure. Personal protective equipment should only be used if worker exposure cannot be controlled adequately by the engineering control measures. Ensure control measures are regularly inspected and maintained. Ensure operatives are trained to minimise exposure.
Eye/face protection	Eyewear complying with an approved standard should be worn if a risk assessment indicates eye contact is possible. Personal protective equipment that provides appropriate eye and face protection should be worn. Unless the assessment indicates a higher degree of protection is required, the following protection should be worn: Tight-fitting safety glasses.
Hand protection	Chemical-resistant, impervious gloves complying with an approved standard should be worn if a risk assessment indicates skin contact is possible. The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material. To protect hands from chemicals, wear gloves that are proven to be impervious to the chemical and resist degradation. To protect hands against cold burns, gloves must comply with the EN 511 standard. Considering the data specified by the glove manufacturer, check during use that the gloves are retaining their protective properties and change them as soon as any deterioration is detected. Frequent changes are recommended. It is recommended that gloves are made of the following material: Leather.
Other skin and body protection	Appropriate footwear and additional protective clothing complying with an approved standard should be worn if a risk assessment indicates skin contamination is possible.
Hygiene measures	Provide eyewash station and safety shower. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Clean equipment and the work area every day. Good personal hygiene procedures should be implemented. Wash at the end of each work shift and before eating, smoking and using the toilet. When using do not eat, drink or smoke. Preventive industrial medical examinations should be carried out. Warn cleaning personnel of any hazardous properties of the product.
Respiratory protection	Respiratory protection complying with an approved standard should be worn if a risk assessment indicates inhalation of contaminants is possible. Ensure all respiratory protective equipment is suitable for its intended use and is 'UKCA'-marked. Check that the respirator fits tightly and the filter is changed regularly. Gas and combination filter cartridges suitable for intended use should be used. Full face mask respirators with replaceable filter cartridges suitable for intended use should be used. Half mask and quarter mask respirators with replaceable filter cartridges suitable for intended use should be used.
Environmental exposure controls	Keep container tightly sealed when not in use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	Liquefied gas
Colour	Colourless.
Odour	Odourless.
Odour threshold	No information available.
pH	No information available.
Melting point	-108°C/-162°F

C-Gas R-134a

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Initial boiling point and range	-26°C/-15°F @ 1.013 hPa
Flash point	Not applicable.
Evaporation rate	No information available.
Upper/lower flammability or explosive limits	No information available.
Vapour pressure	5.74 hPa @ 20°C/68°F
Relative density	4,24 @ 20°C
Solubility(ies)	1.0 g/l water @ 25°C
Partition coefficient	log Pow: 1,06 @25°C
Auto-ignition temperature	No information available.
Decomposition Temperature	No information available.
Viscosity	No information available.
Explosive properties	Not considered to be explosive.
Oxidising properties	No information available.

9.2. Other information

Other information	No information required.

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	See the other subsections of this section for further details.

10.2. Chemical stability

Stability	Stable at normal ambient temperatures and when used as recommended. Stable under the prescribed storage conditions.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	The following materials may react with the product: Strong oxidising agents.

10.4. Conditions to avoid

Conditions to avoid	Heat, sparks, flames. Avoid exposure to high temperatures or direct sunlight. Store away from incompatible materials (see Section 10).

10.5. Incompatible materials

Materials to avoid	Alkali metals. Alkaline earth metals. Powdered metal. Salts of metals.

10.6. Hazardous decomposition products

Hazardous decomposition products	Does not decompose when used and stored as recommended. Thermal decomposition or combustion products may include the following substances: Carbon dioxide (CO2). Carbon monoxide (CO). Hydrogen fluoride (HF). Oxides of carbon. Fluorocarbons. Carbonyl fluoride

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SECTION 11: Toxicological information

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

Acute toxicity - oral	
Notes (oral LD_{50})	Based on available data the classification criteria are not met.
Acute toxicity - dermal	
Notes (dermal LD_{50})	Based on available data the classification criteria are not met.
Acute toxicity - inhalation	
Notes (inhalation LC_{50})	Based on available data the classification criteria are not met.
Skin corrosion/irritation	
Skin corrosion/irritation	Based on available data the classification criteria are not met.
Serious eye damage/irritation	
Serious eye damage/irritation	Based on available data the classification criteria are not met.
Respiratory sensitisation	
Respiratory sensitisation	Based on available data the classification criteria are not met.
Skin sensitisation	
Skin sensitisation	Based on available data the classification criteria are not met.
Germ cell mutagenicity	
Genotoxicity - in vitro	Based on available data the classification criteria are not met.
Carcinogenicity	
Carcinogenicity	Based on available data the classification criteria are not met.
IARC carcinogenicity	None of the ingredients are listed or exempt.
Reproductive toxicity	
Reproductive toxicity - fertility	Based on available data the classification criteria are not met.
Reproductive toxicity - development	Based on available data the classification criteria are not met.
Specific target organ toxicity - single exposure	
STOT - single exposure	Not classified as a specific target organ toxicant after a single exposure.
Specific target organ toxicity - repeated exposure	
STOT - repeated exposure	Not classified as a specific target organ toxicant after repeated exposure.
Aspiration hazard	
Aspiration hazard	Not relevant. Gas.
General information	The severity of the symptoms described will vary dependent on the concentration and the length of exposure.

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Inhalation	Shortness of breath. Lung oedema.
Ingestion	Due to the physical nature of this product, it is unlikely that ingestion will occur.
Skin contact	Frostbite.
Eye contact	No specific symptoms known.
Route of exposure	Inhalation Skin and/or eye contact
Target organs	No specific target organs known.

11.2. Information on other hazards

Information on other hazards	No information available.

SECTION 12: Ecological information

Ecotoxicity	Not regarded as dangerous for the environment. However, large or frequent spills may have hazardous effects on the environment.

12.1. Toxicity

Toxicity	Based on available data the classification criteria are not met.

Acute aquatic toxicity

Acute toxicity - fish	LC_{50}, 96 hours: 450 mg/l, Oncorhynchus mykiss (Rainbow trout)
Acute toxicity - aquatic invertebrates	EC_{50}, 48 hours: 980 mg/l, Daphnia magna
Acute toxicity - aquatic plants	EC_{50}, 72 hours: >118 mg/l, Freshwater algae

12.2. Persistence and degradability

Persistence and degradability	%3, 28 day

12.3. Bioaccumulative potential

Bioaccumulative potential	Bioaccumulation is unlikely.
Partition coefficient	log Pow: 1,06 @25°C

12.4. Mobility in soil

Mobility	No information available.

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment	This product does not contain any substances classified as PBT or vPvB.

12.6. Endocrine disrupting properties

Endocrine disrupting properties	No information available.

12.7. Other adverse effects

Other adverse effects	None known.

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SECTION 13: Disposal considerations

13.1. Waste treatment methods

General information

The generation of waste should be minimised or avoided wherever possible. Disposal of this product, process solutions, residues and by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any local authority requirements. When handling waste, the safety precautions applying to handling of the product should be considered. Empty containers or liners may retain some product residues and hence be potentially hazardous.

Disposal methods

Do not empty into drains. Dispose of surplus products and those that cannot be recycled via a licensed waste disposal contractor. Waste, residues, empty containers, discarded work clothes and contaminated cleaning materials should be collected in designated containers, labelled with their contents. Waste packaging should be collected for reuse or recycling.

SECTION 14: Transport information

14.1. UN number or ID number

UN No. (ADR/RID)	3159
UN No. (IMDG)	3159
UN No. (ICAO)	3159
UN No. (ADN)	3159

14.2. UN proper shipping name

Proper shipping name (ADR/RID)	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R134a)
Proper shipping name (IMDG)	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R134a)
Proper shipping name (ICAO)	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R134a)
Proper shipping name (ADN)	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R134a)

14.3. Transport hazard class(es)

ADR/RID class	2.2
ADR/RID classification code	2A
ADR/RID label	2.2
IMDG class	2.2
ICAO class/division	2.2
ADN class	2.2

Transport labels

C-Gas R-134a

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According to Regulation (EC) No 1907/2006, Annex II, as amended.
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14.4. Packing group

Not applicable.

14.5. Environmental hazards

Environmentally hazardous substance/marine pollutant
No.

14.6. Special precautions for user

EmS	F-C, S-V
ADR transport category	3
Emergency Action Code	2TE
Hazard Identification Number (ADR/RID)	20
Tunnel restriction code	(C/E)
Limited quantities (ADR)	120 ml

14.7. Maritime transport in bulk according to IMO instruments

Maritime transport in bulk according to IMO instruments	Not applicable.

SECTION 15: Regulatory information

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

National regulations	Health and Safety at Work etc. Act 1974 (as amended). The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (SI 2009 No. 1348) (as amended) ["CDG 2009"]. EH40/2005 Workplace exposure limits.
EU legislation	Commission Regulation (EU) 2020/878 of 18 June 2020. Commission Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).
Restrictions (SI 2020 No. 1577 Annex XVII)	No specific restrictions on use are known for this product.
Seveso Directive - Control of major accident hazards	Not relevant.

15.2. Chemical safety assessment

No chemical safety assessment has been carried out.

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SECTION 16: Other information

Abbreviations and acronyms used in the safety data sheet	ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road. ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways. RID: European Agreement concerning the International Carriage of Dangerous Goods by Rail. IATA: International Air Transport Association. ICAO: Technical Instructions for the Safe Transport of Dangerous Goods by Air. IMDG: International Maritime Dangerous Goods. CAS: Chemical Abstracts Service. ATE: Acute Toxicity Estimate. LC50: Lethal Concentration to 50 % of a test population. LD50: Lethal Dose to 50% of a test population (Median Lethal Dose). EC_{50}: 50% of maximal Effective Concentration. PBT: Persistent, Bioaccumulative and Toxic substance. vPvB: Very Persistent and Very Bioaccumulative.
Classification abbreviations and acronyms	Press. Gas (Liq.) = Gas under pressure: Liquefied gas
Key literature references and sources for data	This SDS is prepared based on the information received from the product owner. Source: European Chemicals Agency, http://echa.europa.eu/
Classification procedures according to SI 2019 No. 720	Press. Gas (Liq.) - H280: : Expert judgement., On basis of test data.
Issued by	Büşra Tarakci / CRAD gbf@crad.com.tr Tel.:+90 216 3354600
Note to organizer	The certificate information is used exclusively for this SDS. No changes can be made to this SDS without the knowledge and approval of the certificate holder or the certificate information can not be used for another SDS. Otherwise, the certificate will assume no responsibility for the owner SDS. This SDS is prepared based on the information and documents received from product owner. CRAD or/and SDS author shall not be responsible for incorrect preapared of SDS and pecuniary loss or intangible damages because of deficient or wrong information and documents which comes from product owner.
Revision date	16/01/2023
Revision	1.2
Supersedes date	30/04/2020
SDS number	10141
Hazard statements in full	H280 Contains gas under pressure; may explode if heated.