

Safety Data Sheet
according to Regulation (EC) No 1907/2006



R134a

Print date: 14.11.2014

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

1.1. Product identifier

R134a

REACH Registration Number: 01-2119459374-33-XXXX
CAS No: 811-97-2
EC No: 212-377-0

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

Use of the substance/mixture

Coolants for transport refrigeration systems, other commercial refrigeration units, household refrigerators and deep freezers.

Uses advised against

Only use for the intended purpose. In case of doubt please contact our responsible department.

1.3. Details of the supplier of the safety data sheet

Company name: Arthur Friedrichs Kältemittel GmbH
Street: Bei den Kämpen 22
Place: D-21220 Seevetal
Telephone: +49 (0)41 85 / 70 01-0
Telefax: +49 (0)41 85 / 70 01-22
Contact person: Nils Mecklenburg
Telephone: +49 (0)41 85 / 70 01-34
e-mail: Nils.Mecklenburg@friedrichs-kaeltemittel.de
Internet: www.friedrichs-kaeltemittel.de

1.4. Emergency telephone number:

Poison Control Center (Mayence, GER):
+49 (0)6131-19240 (24h)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

This substance is not classified as hazardous according to Directive 67/548/EEC.

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Hazard categories:
Gases under pressure: Liquefied gas
Hazard Statements:
Contains gas under pressure; may explode if heated.

2.2. Label elements

Signal word: Warning
Pictograms: GHS04



Hazard statements

H280 Contains gas under pressure; may explode if heated.

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Precautionary statements

P410+P403 Protect from sunlight. Store in a well-ventilated place.

2.3. Other hazards

Frostbite and burns through contact with liquefied product. Inhalation of high concentrations of gases can have health impairing effects due to the reduced oxygen content. Suffocating in high concentrations. Misuse or intentional inhalation can be fatal as a result of effects on the heart, without alarming symptoms. Following inhalation: disordered cardiac rhythm.

Contains the following fluorinated greenhouse gas recorded in the Kyoto Protocol (chemical name):
1,1,1,2-Tetrafluoroethane

The product does not meet the PBT or vPvB criteria in Annex XIII of the REACH Regulation. An environmental hazard cannot be ruled out in case of improper handling or disposal.

SECTION 3: Composition/information on ingredients

3.1. Substances

Sum formula: C₂H₂F₄
Molecular weight: 102,04 g/mol

Hazardous components

EC No	Chemical name	Quantity
CAS No	Classification according to Directive 67/548/EEC	
Index No	Classification according to Regulation (EC) No. 1272/2008 [CLP]	
212-377-0	1,1,1,2-Tetrafluoroethane	100 %
811-97-2		
	Liquefied gas; H280	

Full text of R-, H- and EUH-phrases: see section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

General information

First aider: Pay attention to self-protection!

After inhalation

Move victim to fresh air. Put victim at rest and keep warm. Call a physician immediately. In case of irregular breathing or respiratory arrest, perform artificial respiration.

After contact with skin

Wash with plenty of water. Change contaminated clothing. In the event of cold damage due to contact with liquid gas, cut open and carefully remove clothing. Leave clothing stuck to the skin for the moment. Rinse the cold-damaged areas with warm (not hot) water. Do not move (no rubbing). Sterile covering, protect against further heat loss. Call a physician immediately.

After contact with eyes

Rinse immediately carefully and thoroughly with eye-bath or water. In case of frostbite due to direct contact with liquid gas escaping from the pressure container, firstly leave any contact lenses worn. Consult an ophthalmologist.

After ingestion

Not considered as a possible means of exposure.

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

Frostbite and burns through contact with liquefied product. On inhalation of the concentrated gas: oxygen deficiency. Misuse or intentional inhalation can be fatal as a result of effects on the heart, without alarming symptoms. May cause respiratory irritation. Possible irritation of eyes and skin. Symptoms in the event of large scale exposure: unconsciousness, difficulty in breathing, agitation, headache, nausea, drowsiness, dizziness. disordered cardiac rhythm.

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

Treat symptomatically. To supervise the blood circulation. Do not give adrenaline or other stimulants.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media

Co-ordinate fire-fighting measures to the fire surroundings.
Water fog. alcohol resistant foam. Dry extinguishing powder. Carbon dioxide.

Unsuitable extinguishing media

none known

5.2. Special hazards arising from the substance or mixture

This coolant is not flammable under normal conditions. Certain coolant/air mixtures can be flammable under increased pressure. Certain HFC mixtures and chlorine can be flammable and react with one another under certain conditions. Heating causes rise in pressure with risk of bursting. In case of fire may be liberated: Carbon dioxide. Carbon monoxide. Halogen hydride. Pyrolysis products containing fluorine.

5.3. Advice for firefighters

In case of fire: Wear self-contained breathing apparatus. Full protective suit.

Additional information

Use water spray jet to protect personnel and to cool endangered containers.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Remove all sources of ignition. Provide adequate ventilation.
Clear the area. Keep away from unprotected people. Keep upwind.

6.2. Environmental precautions

Avoid environmental exposure. If possible, stop the escape of gas. Do not allow to enter into surface water or drains. Do not allow to enter into soil/subsoil. Do not allow to enter underground levels or inspection pits as vapours can generate a suffocating atmosphere.

6.3. Methods and material for containment and cleaning up

Ventilate affected area.

6.4. Reference to other sections

For required personal protective equipment see section 8. Disposal in accordance with section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling

Use only in well-ventilated areas. Vapours are heavier than air and will spread at floor level. Do not

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breathe gas/vapour. Avoid contact with skin, eyes and clothes.
Transfer and handle product only in closed systems. Take precautionary measures against static discharge. Ground/bond container and receiving equipment. Use only antistatically equipped (spark-free) tools. Protect pressurised gas bottles against overturning. The ventilation protection equipment, valve closing nut or the valve plug (if applicable) must be mounted correctly. Open valves slowly to avoid pressure surges. Prevent backflow into the gas container. No water in the gas container, allow access to valves, flange and other parts of equipment.

Advice on protection against fire and explosion

Keep away from sources of ignition. - No smoking. Take precautionary measures against static discharge.
This coolant is not flammable under normal conditions. Certain coolant/air mixtures can be flammable under increased pressure. Certain HFC mixtures and chlorine can be flammable and react with one another under certain conditions.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels

Keep container tightly closed. Keep in a cool, well-ventilated place. Keep away from sources of ignition.
- No smoking. Avoid heating. Protect against direct sunlight.

Advice on storage compatibility

Do not store together with: self-igniting, flammable, explosive, infectious, radioactive, toxic, oxidising substances

Further information on storage conditions

Protect pressurised gas bottles against overturning. The ventilation protection equipment, valve closing nut or the valve plug (if applicable) must be mounted correctly.
storage temperature: <math>< 50^{\circ}\text{C}</math>

7.3. Specific end use(s)

Coolants for transport refrigeration systems, other commercial refrigeration units, household refrigerators and deep freezers.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure limits (EH40)

CAS No	Substance	ppm	mg/m ³	fibres/ml	Category	Origin
811-97-2	1,1,1,2-Tetrafluoroethane (HFC 134a)	1000	4240		TWA (8 h)	WEL
		-	-		STEL (15 min)	WEL

Additional advice on limit values

1,1,1,2-Tetrafluoroethane
DNEL worker: 13936 mg/m³ (Exposure route: inhalation.)
DNEL Consumer: 2476 mg/m³ (Exposure route: inhalation.)
PNEC: 0,1 mg/l (fresh water)
PNEC: 0,01 mg/l (seawater)
PNEC: 1 mg/l (Water.)
PNEC: 0,75 mg/kg TW (fresh water sediment)
PNEC: 73 mg/l (Water., wastewater treatment plant)

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8.2. Exposure controls

Appropriate engineering controls

Provide adequate ventilation as well as local exhaustion at critical locations. If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.

Protective and hygiene measures

Change contaminated clothing. Wash hands before breaks and after work. When using do not eat or drink. When using do not smoke.

Eye/face protection

Use framed glasses with side shields. Wear additional facial protection if facial contact with this substance is possible through splashing, spraying or material in the air.

Hand protection

Use leather gloves to protect against injuries in handling compressed gas cylinders and against frostbite from rapidly expanding gas.

Skin protection

Safety boots with steel toecap. Work clothing covering the entire body.

Respiratory protection

Only required in exceptional situations, e.g. in case of inadvertent release of substances, for maintenance work in storage containers or in case of fire: Protective respiration apparatus not using surrounding air (breathing apparatus) (DIN EN 133).

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state:	gaseous, pressure liquefied
Colour:	colourless
Odour:	like: Ether

pH-Value:	neutral
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Changes in the physical state

Melting point:	No data available
Initial boiling point and boiling range:	-26 °C
Sublimation point:	No data available
Softening point:	No data available
Freezing point:	-108 °C
Flash point:	non flammable

Flammability

Solid:	not applicable
Gas:	No data available

Explosive properties

No data available

Lower explosion limits:	not applicable
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Upper explosion limits:	not applicable
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Test method

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Ignition temperature:	No data available
Auto-ignition temperature	
Solid:	not applicable
Gas:	743 °C
Decomposition temperature:	No data available
Oxidizing properties	
No data available	
Vapour pressure: (at 25 °C)	5740 hPa
Density:	No data available
Bulk density:	not applicable
Water solubility: (at 25 °C)	1 g/L
Solubility in other solvents	
No data available	
Partition coefficient:	1,06
Viscosity / dynamic:	No data available
Vapour density: (at 20 °C)	4,24
Evaporation rate:	not determined

9.2. Other information

No further information available.

SECTION 10: Stability and reactivity

10.1. Reactivity

No dangerous reactivity under regular conditions. Decomposes on heating.

10.2. Chemical stability

The product is stable under regular conditions.

10.3. Possibility of hazardous reactions

Reacts with : Alkali metals. Alkaline earth metals. Metallic salts in powder form. Metals in powder form.

10.4. Conditions to avoid

Avoid having contact with excessive heat, open flames, sparks or sources of ignition.
This coolant is not flammable under normal conditions. Certain coolant/air mixtures can be flammable under increased pressure. Certain HFC mixtures and chlorine can be flammable and react with one another under certain conditions.

10.5. Incompatible materials

Alkali metals. Alkaline earth metals. Metallic salts in powder form. Metals in powder form.

10.6. Hazardous decomposition products

Carbon dioxide. Carbon monoxide. Carbonyl halogenides. Fluorhydric acid.
Fluorines-carbon-hydrogens.

SECTION 11: Toxicological information

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11.1. Information on toxicological effects

Acute toxicity

1,1,1,2-Tetrafluoroethane
Acute toxicity (inhalant): 567.000 ppm (4h; Species: Rat)
LOAEC: 75.000 ppm (Species: Dog.; Heart sensitisation)
NOAEC: 50.000 ppm (Species: Dog.; Heart sensitisation)

Irritation and corrosivity

Irritant effect on the eye: none known
Irritant effect on the skin: none known

Sensitising effects

Respiratory or skin sensitisation: No data available

STOT-single exposure

No data available

Severe effects after repeated or prolonged exposure

No evidence is available from animal testing of serious effects after repeated or prolonged exposure .

Carcinogenic/mutagenic/toxic effects for reproduction

No CMR characteristics known.

Further information

Can cause frostbite. Suffocating in high concentrations.

SECTION 12: Ecological information

12.1. Toxicity

Acute fish toxicity:
LC50: / 96h / Oncorhynchus mykiss (Rainbow trout): 450 mg/l
Acute Daphnia toxicity:
LC50: / 48h / Daphnia magna: 980 mg/l
Algae toxicity:
LC50: / 72h / algae: >118 mg/l (medium: structurally similar substances)

12.2. Persistence and degradability

3% / 28d - Not easily bio-degradable (according to OECD-criteria).

12.3. Bioaccumulative potential

No indication of bioaccumulation potential.

12.4. Mobility in soil

No data available.

12.5. Results of PBT and vPvB assessment

This substance does not meet the criteria for classification as PBT or vPvB.

12.6. Other adverse effects

Global Warming potential (GWP): 1430
The product does not decompose ozone.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Advice on disposal

Dispose of waste according to applicable legislation. Reclaim and reprocess.

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Waste disposal number of waste from residues/unused products


140601 WASTE ORGANIC SOLVENTS, REFRIGERANTS AND PROPELLANTS (except 07 and 08); waste organic solvents, refrigerants and foam/aerosol propellants; chlorofluorocarbons, HCFC, HFC
Classified as hazardous waste.

Contaminated packaging

Transportable pressure equipment (empty, residual pressure): return to the supplier/manufacturer.

SECTION 14: Transport information

Land transport (ADR/RID)


14.1. UN number: UN3159
14.2. UN proper shipping name: 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)
14.3. Transport hazard class(es): 2
14.4. Packing group: -
Hazard label: 2.2


Classification code: 2A
Limited quantity: 120 mL
Transport category: 3
Hazard No: 20
Tunnel restriction code: C/E

Other applicable information (land transport)

Excepted Quantity: E1

Inland waterways transport (ADN)

14.1. UN number: UN3159
14.2. UN proper shipping name: 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)
14.3. Transport hazard class(es): 2
14.4. Packing group: -
Hazard label: 2.2


Classification code: 2A
Limited quantity: 120 mL

Other applicable information (inland waterways transport)

Excepted Quantity: E1

Marine transport (IMDG)

14.1. UN number: UN3159
14.2. UN proper shipping name: 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)
14.3. Transport hazard class(es): 2.2

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14.4. Packing group: -
Hazard label: 2.2

Special Provisions: -
Limited quantity: 120 mL
EmS: F-C, S-V

Other applicable information (marine transport)
Excepted Quantity: E1

Air transport (ICAO)

14.1. UN number: UN3159
14.2. UN proper shipping name: 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)
14.3. Transport hazard class(es): 2.2
14.4. Packing group: -
Hazard label: 2.2



Limited quantity Passenger: -
IATA-packing instructions - Passenger: 200
IATA-max. quantity - Passenger: 75 kg
IATA-packing instructions - Cargo: 200
IATA-max. quantity - Cargo: 150 kg

Other applicable information (air transport)
Excepted Quantity: E1
Passenger-LQ: -

14.5. Environmental hazards

ENVIRONMENTALLY HAZARDOUS: no

14.6. Special precautions for user

Follow the information given in the safety datasheet.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

not applicable

SECTION 15: Regulatory information

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

EU regulatory information

Additional information

Avoid environmental exposure.

National regulatory information

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Employment restrictions:	Observe employment restrictions for young people. Observe employment restrictions for child bearing mothers and nursing. Observe employment restrictions for women of child-bearing age.
Water contaminating class (D):	1 - slightly water contaminating

Additional information

TRGS 510 "Lagerung von Gefahrstoffen in ortsbeweglichen Behältern"
BGR 500 "Betreiben von Arbeitsmitteln" - Kapitel 2.33 "Anlagen für den Umgang mit Gasen"
BGV D34 "Verwendung von Flüssiggas"

15.2. Chemical safety assessment

For the following substances of this mixture a chemical safety assessment has been carried out:
1,1,1,2-Tetrafluoroethane

SECTION 16: Other information

Changes

Version 1,00 - 13.08.2013 - first creation
Version 1,01 - 14.11.2014 - changes in section 12.6

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)
IMDG: International Maritime Code for Dangerous Goods
RID: Regulation Concerning the International Transport of Dangerous Goods by Rail
IATA: International Air Transport Association
ICAO: International Civil Aviation Organization
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service
CLP: Classification, Labeling, Packaging
INCI: International Nomenclature of Cosmetic Ingredients
DNEL: Derived No Effect Level
PNEC: Predicted No Effect Concentration
LC50: Lethal concentration, 50% of test population
LD50: Lethal dose, 50% of test population
STOT: Specific Target Organ Toxicity
TLV: Threshold Limiting Value
TWATLV: Threshold Limit Value for the Time Weighted Average 8 hour day (ACGIH Standard)
WGK: German Water Hazard Class
ASTM - American Society for Testing and Materials

Relevant H- and EUH-phrases (Number and full text)

H280 Contains gas under pressure; may explode if heated.

Further Information

The information given in this safety data sheet is to describe the product's safety regulations. It is not for guaranteeing certain characteristics and is based on today's knowledge. The safety data sheet was generated upon information of pre-suppliers by:
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