

Safety data sheet according to 91/155/EEC	Created at: 08.11.2005	Art. No.: 0080
Company: GHC Gerling, Holz & Co. Handels GmbH	Revised at: 08.11.2005	Version: 0001
Product: R 134a - Profi	Print date: 14.11.2005	Seite: 1 von 5

R 134a - Profi

1. Identification of the substance / preparation and of the company

Substance / preparation:

Trade name:	R 134a - Profi
Other means of identification:	1,1,1,2-Tetrafluoroethane, HFC 134a
Use of the substance / preparation:	Refrigerant

Company identification:

GHC Gerling, Holz & Co. Handels GmbH	Telephone: +49 (0) 40 - 853 123 - 0
Ruhrstraße 113	Telefax: +49 (0) 40 - 853 123 - 66
D - 22761 Hamburg	E-Mail: hamburg@ghc.de

Emergency Phone:

GHC Gerling, Holz & Co. Handels GmbH	Telephone: +49 (0) 40 - 853 123 - 0
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2. Composition / Information on ingredients

Product name:	1,1,1,2-Tetrafluoroethane	Chem. formula:	F ₃ C-CH ₂ F
Hazardous symbols:	not applicable	Concentration:	≥ 99 %
R-phrases:	not applicable	CAS-No.:	811-97-2
		EC-No. (EINECS):	212-377-0
Hazard(ous) impurity(ies):	not applicable	UN-No.:	2037

3. Hazards identification

Classification:

This product does not require labelling in pursuant to directive 67/548/EEC.

Additional human health effect(s) and environmental effect(s):

Acute toxicity: Only in case of exposure to high concentration of vapours / aerosols slight irritations, disorder of the cardiovascular system, and narcotic effects are expected.
 Chronical toxicity: No data available for human.

Liquified gas: Contact with the product may cause cold burns / frostbite.

Dangerous substances are released in case of decomposition.

The vapour of the product is heavier than air and may accumulate below ground level, in pits, channels and basements in higher concentration.

4. First-aid measures

General information:

Take off immediately all contaminated clothing not adhering to the body. Seek medical advice. Note precautions for self-protection of first-aider.

On inhalation:

Move affected person into fresh air, keep warm and allow to rest. If there is difficulty in breathing, give oxygen. In case of respiratory arrest, ventilation with Ambu bag or ventilator or perform mouth to nose or mouth to mouth respiration. Medical treatment necessary.

On contact with skin:

Do not tear away clothing frozen to the skin. Defrost with plenty of lukewarm not hot water. Do not rub! Cover with sterile bandage, prevention of further heat loss. Take affected person for medical treatment (emergency physician).

On contact with the eyes:

On contact with the eyes, rinse immediately with plenty of water with the eyelids open for 10 minutes. Seek ophthalmic treatment.

If swallowed: Swallowing is not considered a potential route of exposure (gas).

Information for the doctor:

On inhalation as soon as practicable treat initially with a corticosteroid spray e.g. Ventolair metered dose inhaler. Do not give adrenergic drugs. Prophylaxis to pulmonary oedema after inhalation of decomposition products / fumes.

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5. Fire-fighting measures

Suitable extinguishing media:

Water spray jet, dry powder, carbon dioxide, alcohol resistant foam.

Extinguishing media which must not be used for safety reasons:

Water full jet

Special exposure hazards arising from the substance, combustion products or resulting gases:

On certain conditions risk of formation of explosive gas air mixtures.

Substances potentially set free in case of fire: hydrogen fluoride, carbonyl fluoride

Special protective equipment for firefighting:

Use breathing apparatus with independent air supply (isolated).

Additional information:

Product itself does not burn Co-ordinate fire measure to the surrounding fire. Move containers out of danger zone (where possible). Cool containers with water spray. Risk of pressure increase, bursting and explosion hazard upon heating.

6. Accidental release measures

Personal precautions: see section 8. Evacuate area.

Environmental precautions:

Prevent spread over a wide area (e.g. by containment). Transfer leaking cylinders to a salvage packaging (pressure receptacle).

Do not allow to enter into soil / subsoil. Do not allow to enter drains / surface waters / groundwater.

In case of entry into waterways, soil or drains, inform the responsible authorities.

Methods for cleaning up:

Pick up liquid phase with absorbent material (e.g. active carbon, lime, sand, sawdust). Disposal of the recovered material according to the regulations. Clean affected area with water, ventilate area.

7. Handling and Storage

Handling:

- Hints for safe handling: It is essential to design all working procedures principally to avoid the following: Inhalation of substance, skin contact, eye contact. Open and handle container with care. Vapours / aerosols should be exhausted directly at place of formation. Keep vapours away from hot surfaces (risk of decomposition). Avoid decomposition of vapours by electric arc (welding).
- Technical measures: When filling, transferring, measuring out or sampling have to be used: closed arrangements, which is properly specified and suitable for the product, its supply pressures and temperatures. Dangerous pressure levels can result from the effect of heat. Therefore suitable safety arrangements must be used.
- Hints for protection against fire and explosion: Product is not combustible. Adjust measures against fire and explosion to the flammable substances in the area.
- Other hints: Ensure good aeration and ventilation of the workplace. Since vapours / gases are heavier than air, corresponding ventilation must be provided in the basement area.

Storage:

- Requirements for storage rooms and vessels: Keep container tightly closed and store in a cool, well ventilated place. Protect from heat.
- Packaging materials: steel, stainless steel. Unsuitable: plastics, alloys with < 2 % magnesium
- Hints on storage assembly: Do not store with pharmaceuticals, foods, and animal feeds including additives; infectious, radioactive and explosive materials; spontaneously flammable gases in contact with water; organic peroxides; oxidizing agents of group 1 - 3 of TRGS 515; extremely flammable, highly flammable and flammable substances; high toxic and toxic substances. This product should not be stored with substances, with which dangerous chemical reactions are possible (see section 10).
- Further information on storage conditions: max. storage temperature: 50 °C.
- Germany: The provisions of TRGS 280 should be observed.

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Storage class: 2A (Compressed, liquefied or dissolved gases.)

Specific use(s): Not applicable.

8. Exposure limitation and personal protective equipment

Exposure limits:

PEL (OSHA):	None established	
TLV (ACGIH):	None established	
WEEL (AIHA):	1000 ppm	(8 hours TWA)
MAK (TRGS 900):	4200 mg/m ³ = 1000 ppm	Threshold limit factor: 4

Occupational exposure controls:

- Respiratory protection: Escapes with adequate ventilation. In an emergency (e.g. unintentional release of substance) respiratory protection must be worn. Observe the wear time limits. Use only breathing apparatus with independent air supply (isolated). Use only respiratory protection equipment that complies with national / international standards. No Filter apparatus
- Hand protection: Leather gloves as protection against frostbite as well as chemical resistant protective gloves. Suitable materials: Polyvinyl alcohol.
- Eye protection: Eye glasses with side protection. Basket eye glasses.
- Protective clothing: Depending on the danger, wear thick aprons and boots or chemical protection clothing.
- General health and safety measures: Do not eat, drink, smoke or take snuff while working. Keep away of foods drinks and feeding stuffs. Wash hands before breaks and on finishing work. Avoid contact with eyes, skin and clothing. Do not breathe gas/fume/vapour.

Environmental exposure controls: See section 7. No additional measures necessary.

9. Physical and chemical Properties

General information:

Physical state:	Liquified under pressure
Colour:	Colourless, clear
Odor:	slightly etheric

Important health, safety and environmental information:

pH-value:	Not applicable	
Melting-point / Melting range:	- 101 °C	
Boiling point / Boiling range:	- 26.1 °C	
Flash point:	None	
Explosion limits: lower / upper:	None	
Ignition temperature:	743 °C	
Critical temperature:	101 °C	
Critical pressure:	40600 hPa	
Vapour pressure:	5700 hPa	(at 20 °C)
Vapour pressure:	13171 hPa	(at 50 °C)
Density:	1.226 g/cm ³	(at 20 °C)
Vapour density:	5.3 g/l	(at 0 °C)
Relative vapour density (air = 1):	4.32	
Water solubility:	1.5 g/l	(at 20 °C)
Fat solubility:	No data available.	
Solubility in org. menstruum:	No data available.	
Partition coefficient:	1.06	n-Octanol / water (log p O/W)
Viscosity (dynamic):	0.22 mPa*s	(at 20 °C)

10. Stability and Reactivity

Conditions to avoid:

Warmth, warmth sources, sources of ignition, hot surfaces,

Materials to avoid:

Reaction with alkaline metal and their alloys and alkaline-earth metal. Pulverized aluminium and zinc catalyse the decomposition.

Hazardous decomposition products: hydrogen fluoride, carbonyl fluoride

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Further informations:

No decomposition if used as prescribed. Decomposition of R 134a takes place at temperatures above 25 °C.

11. Toxicological information

Toxicity tests:

- Acute toxicity:
 LC₅₀ inhalative, rat: > 80 Vol.-% (15 min. exposure, in case of oxygen supply)
 LD₅₀ inhalative, rat: > 50 Vol.-% (4 h exposure, in case of oxygen supply)
- Specific symptoms in animal studies: Eye contact with vapour (duration of contact: 5 – 15 seconds) caused to rabbits only low irritation; skin sensitisation through liquefied R 134a could not be proven. Studies in experimental animals have shown very low toxicity of vapours upon acute inhalation. In mice could be observed central nervous symptoms from 200000 ppm up; 270000 ppm had a narcotic effect to 50% of the animals. Lethal effects have shown up in 4 different types of animal (exposition duration: 1 minute to 4 hours) only from 500000 ppm up. A sensitisation of dog heart through exogenous adrenaline could be observed after short-term inhalation (80000 ppm) . Neither modified survival rates nor weight developmental disorders have been observed during a chronic study in rats (0 to 50000 ppm, 6 h/d, 5 d/w over 104 weeks). However, significant increase in weight of testicles and increased incidence of certain cell alterations in testicles (inter alia benign tumours) have been found out in the highest-dose group.
- Irritant-/corrosive effects: No alteration of vital functions or effect to the ECG could be ascertained upon inhalation of 970 mg of R 134a over 4 minutes (20 guinea-pig). Similar to comparable fluorohydrocarbons must be assumed, that direct eye or skin contact with the fluid is leading to hypothermia or cold burns of the affected tissue. A clearly irritative effect of this gas is considered as being unlikely. In case of excessive release of R 134a atmospheric oxygen will be displaced in areas that are inadequately ventilated and will result in asphyxiation. In case of fire or chemical decomposition fluorohydrocarbon, whose inhalation causes severe lung damages, can be released.
- Sensitization: A sensitising effect of this gas is considered as being unlikely.
- Subacute to chronic toxicity: No data available for humans. According to animal tests the risk of chronic exposition can be considered as being low. Health disorders have not been reported in employees of the manufacturing industry (with an average exposition of 10 ppm approx. and in some cases with a maximum exposition of 100 ppm).
- Carcinogenic, mutagenic and reproductive toxic effects:
 Carcinogenicity: According to the studies carried out hitherto, it was not possible to deduce a carcinogenic potential to humans.
 Genotoxicity: Various mutagenicity tests (in vitro and in vivo) lead to the conclusion that R 134a has no genotoxic potential.
 Reproductive toxicity and fetotoxicity: If the exposure limits are observed no risk of teratogenic effects must be expected.

Experiences made in practice: Observations relevant for classification / Other observations: No data available.

12. Ecological information

Ecotoxicity:

Fish toxicity:	LC50: 350 mg/l (Salmo gairdneri)	(96 h exposition; semistatic test)
Daphnia toxicity:	EC50: 980 mg/l (Daphnia magna)	(48 h exposition; static test)
Bacteria toxicity:	EC10: >730 mg/l (Pseudomonas putida)	(6 h exposition; growth)

Mobility:

- Transport soil-water: Adsorption coefficient: log KOC = ca. 1,5 (calculated value).
- Transport water-air: High volatility. Henry-Constant (H) ca. 65 Pa*m³/mol (at 20 °C, calculated value).
- Transport soil-air and Surface tension: no data available.
- Evaluation: Very volatile or gaseous product at normal temperatures which may be released into the atmosphere.

Information about elimination (persistence and degradation):

- Abiotic degradation: air, Indirect photo oxidation: t_{1/2} = 10.9 years (sensibilisator OH-radicals)
 Decomposition products: carbon oxide, hydrogen fluoride, trifluoroacetic acid. The product is persistent in the air (atmospheric life span: 15.7 years).
- Biotic degradation: Not readily biodegradable (Aerobic, test: poor biodegradable / closed vessel, Aerobic degradation = 2 to 3 % in 28 days). Not biodegradable (Aerobic degradation, test: Biodegradation by methane oxidation; conditions: inoculum: Methylosinus trichosporium OB3b).

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Taking up and accumulation in organisms (bioaccumulation potential):

Partition coefficient - Octanol / water (log p O/W) = 1.06. Evaluation: low bioaccumulation potential.

Other adverse effects:

- Ozone depletion potential (ODP)= 0 - No effects on the stratospheric ozone. (reference value R11: ODP = 1).
- Global warming potential: GWP = 0,25 (reference value R11: GWP = 1).

Further ecological information:

- Chemical oxygen demand (COD): / Biochemical oxygen demand (BOD): no data available.
- Other hints: The product is not hazardous to the aquatic environment for the following reasons: very weak toxicity to aquatic organisms, high volatility, very low bioaccumulation.

13. Disposal considerations

Disposal / Waste (product): Ask the supplier / manufacturer.

Disposal in accordance with national / local legislation / regulations.

List of proposed waste codes / waste designations in accordance with EWC:

14 06 01 - chlorofluorocarbons, HCFC, HFC. Hazardous waste pursuant to Directive 91/689/EEC.

Uncleaned Packages: Return packaging at residual pressure and with the cap nut screwed closed on the side connective fitting to the supplier / manufacturer.

14. Transport information

Land transport (ADR/GGVs, RID/GGVE):

Label:	2	Hazard No.:	-	Class / classification code:	2 / 5 A
UN-No.:	2037	Name of substance:	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable		

Marine transport (IMDG):

Class:	2.2	packing groupe:	-	EmS:	F-D, S-U	marine pollutant:	no
UN-No.:	2037	Name of substance:	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable				

Air transport ICAO/IATA:

Class:	2	packing instruction:	Y203
UN/ID-No.:	2037	Name of substance:	GAS CARTRIDGES, SMALL, CONTAINING GAS

Other informations: None.

15. Regulatory information

Labelling:

This product does not require labelling in terms of preparation guideline 1999/45/EC.

National regulations:

Observe the national legislative regulations.

- Water hazard class (Germany): WGK 1 (slightly water hazardous) (Classification according VwVwS, Annex 3)
- EU
- Directive 96/82/EC : Not applicable
- Directive 1999/13/EC: This chemical is a VOC according to Directive 1999/13/EC.

Other regulations: None.

16. Other informations

The information given corresponds to the current state of our knowledge and experience of the product, and is not exhaustive. This applies to product which conforms to the specification, unless otherwise stated. In the case of combinations and mixtures one must make sure that no new dangers can arise. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and protection of human welfare and the environment.