

Tetrafluoroethane (R134a)

133-RR



2.2 : Non-flammable, non-toxic gases

Warning**SECTION 1. Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Trade name : STAR COLD 134a.
SDS Nr : 133-RR
Chemical description : Tetrafluoroethane (R134a)
CAS No :811-97-2
EC No :212-377-0
Index No :---
Registration-No. : 01-2119459374-33-
Chemical formula : C2H2F4

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

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
Test gas/Calibration gas. Laboratory use. Use as refrigerant.
Contact supplier for more information on uses.

1.3. Details of the supplier of the safety data sheet

Company identification : Rivoira Refrigerants S.r.l.
Via Benigno Crespi, 19
20159 MILANO Italia
Tel. +39.02.771191 - Fax. +39.02.77119601
E-Mail address (competent person) : RivoiraMSDS@praxair.com.

1.4. Emergency telephone number

Emergency telephone number : +39.800.011.566

SECTION 2. Hazards identification**2.1. Classification of the substance or mixture****Hazard Class and Category Code Regulation EC 1272/2008 (CLP)**

• Physical hazards : Gases under pressure - Liquefied gas - Warning - (CLP : Press. Gas) - H280

Classification EC 67/548 or EC 1999/45

: Not classified as dangerous substance / mixture.
Not included in Annex VI.
No EC labelling required.

2.2. Label elements**Labelling Regulation EC 1272/2008 (CLP)**

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SECTION 2. Hazards identification (continued)

• Hazard pictograms



- Hazard pictograms code : GHS04
- Signal word : Warning
- Hazard statements : H280 - Contains gas under pressure; may explode if heated.
- Precautionary statements
 - Storage : P403 - Store in a well-ventilated place.

2.3. Other hazards

: Asphyxiant in high concentrations.

SECTION 3. Composition/information on ingredients

3.1. Substance / 3.2. Mixture

Substance.

| Substance name | Contents | CAS No EC No Index No Registration no | Classification(DSD) | Classification(CLP) |
|---------------------------|----------|---|----------------------|------------------------------|
| Tetrafluoroethane (R134a) | : 100 % | 811-97-2 212-377-0 ----- 01-2119459374-33- | Not classified (DSD) | Press. Gas Compressed (H280) |

Contains no other components or impurities which will influence the classification of the product.

* 1: Listed in Annex IV / V REACH, exempted from registration.

* 2: Registration deadline not expired.

* 3: Registration not required: Substance manufactured or imported < 1t/y.

Full text of R-phrases see section 16. Full text of H-statements see section 16.

SECTION 4. First aid measures

4.1. Description of first aid measures

- 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.
- Skin contact : In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- 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 co-ordination.

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

: None.

Tetrafluoroethane (R134a)**133-RR****SECTION 5. Firefighting measures****5.1. Extinguishing media**

- Suitable extinguishing media : Water spray or fog.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

- Specific hazards** : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products** : If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Carbon monoxide. Hydrogen fluoride. Carbonyl fluoride.

5.3. Advice for fire-fighters

- Specific methods** : If possible, stop flow of product.
Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from being used to knock down fire fumes if possible.
- Special protective equipment for fire fighters** : Use self-contained breathing apparatus.
Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.

SECTION 6. Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

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

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.

SECTION 7. Handling and storage**7.1. Precautions for safe handling**

- Safe use of the product** : 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 was (or is regularly) checked for leaks before use.
Consider pressure relief device(s) in gas installations.
- Safe handling of the gas receptacle** : Refer to supplier's container handling instructions.
Suck back of water into the container must be prevented.
Do not allow backfeed into the container.
Protect cylinders from physical damage; do not drag, roll, slide or drop.

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When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
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 cylinder 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 contaminants 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 cylinder/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 cylinder contents.

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. Containers should be stored in the vertical position and properly secured to prevent toppling. Stored containers should be periodically checked for general condition 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.
Containers should not be stored in conditions likely to encourage corrosion. Keep away from combustible materials.

7.3. Specific end use(s)

: None.

SECTION 8. Exposure controls/personal protection**8.1. Control parameters**

DNEL: Derived no effect level (Workers)

Tetrafluoroethane (R134a) : Inhalation-long term (systemic) [mg/m³] : 14000

PNEC: Predicted no effect concentration

Tetrafluoroethane (R134a) : Aqua (freshwater) [mg/l] : 0.1
: Aqua (marine water) [mg/l] : 0.01
: Aquatic, intermittent releases [mg/l] : 1
: Sediment, freshwater [mg/kg dw] : 0.75
: Micro-organisms or PNEC sewage treatment plant (STP) [mg/l] : 73

8.2. Exposure controls

8.2.1. Appropriate engineering controls : Systems under pressure should be regularly checked for leakages.
Oxygen detectors should be used when asphyxiating gases may be released.
Ensure exposure is below occupational exposure limits (where available).
Provide adequate general and local exhaust ventilation.
Consider work permit system e.g. for maintenance activities.

8.2.2. Individual protection measures, e.g. personal protective equipment : 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:
PPE compliant to the recommended EN/ISO standards should be selected.
Protect eyes, face and skin from liquid splashes.

• **Eye/face protection** : Wear safety glasses with side shields.
Wear safety glasses with side shields or goggles when transfilling or breaking transfer connections.
Standard EN 166 - Personal eye-protection.

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SECTION 8. Exposure controls/personal protection (continued)

- **Skin protection**
 - **Hand protection** : Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk.
 - **Other** : Wear safety shoes while handling containers.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
 - **Respiratory protection** : Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
 - **Thermal hazards** : None necessary.
 - **Head protection** : Protective helmet.
 - Industrial hygiene** : Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
When using, do not eat, drink or smoke.
- 8.2.3. Environmental exposure controls** : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9. Physical and chemical properties**9.1. Information on basic physical and chemical properties**

- Appearance**
- Physical state at 20°C / 101.3kPa** : Gas.
- Colour** : Colourless.
- Odour** : Ethereal.
- Odour threshold** : Odour threshold is subjective and inadequate to warn for overexposure.
- pH value** : Not applicable.
- Molar mass [g/mol]** : 102
- Melting point [°C]** : -101
- Boiling point [°C]** : -26.5
- Critical temperature [°C]** : 101
- Flash point [°C]** : Not applicable for gases and gas-mixtures.
- Evaporation rate (ether=1)** : Not applicable for gases and gas-mixtures.
- Flammability range [vol% in air]** : Non flammable.
- Vapour pressure [20°C]** : 4.7 bar
- Relative density, gas (air=1)** : 3.6
- Solubility in water [mg/l]** : 1930
- Partition coefficient n-octanol/water [log Kow]** : 0.94
- Auto-ignition temperature [°C]** : Not applicable.
- Viscosity at 20°C [mPa.s]** : Not applicable.
- Explosive Properties** : Not applicable.
- Oxidising Properties** : None.

9.2. Other information

- Other data** : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

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SECTION 10. Stability and reactivity**10.1. Reactivity**

: No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

: Stable under normal conditions.

10.3. Possibility of hazardous reactions

: None.

10.4. Conditions to avoid

: None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials: Moisture.
For additional information on compatibility refer to ISO 11114.**10.6. Hazardous decomposition products**

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11. Toxicological information**11.1. Information on toxicological effects**

| | |
|-----------------------------------|---|
| Acute toxicity | : No known toxicological effects from this product. |
| Skin corrosion/irritation | : No known effects from this product. |
| Serious eye damage/irritation | : No known effects from this product. |
| Respiratory or skin sensitisation | : No known effects from this product. |
| Carcinogenicity | : No known effects from this product. |
| Germ cell mutagenicity | : No known effects from this product. |
| Reproductive toxicity | : No known effects from this product. |
| STOT-single exposure | : No known effects from this product. |
| STOT-repeated exposure | : No known effects from this product. |
| Aspiration hazard | : Not applicable for gases and gas-mixtures. |

SECTION 12. Ecological information**12.1. Toxicity**

| | |
|---------------------------------|----------------------|
| EC50 48h - Daphnia magna [mg/l] | : 930 |
| EC50 72h Algae [mg/l] | : No data available. |
| LC50-96 h - fish [mg/l] | : 450 |

12.2. Persistence and degradability

: Not readily biodegradable.

12.3. Bioaccumulative potential: Not expected to bioaccumulate due to the low log Kow (log Kow < 4).
Refer to section 9.**12.4. Mobility in soil**

: Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Results of PBT and vPvB assessment

: Not classified as PBT or vPvB.

Tetrafluoroethane (R134a)**133-RR****SECTION 12. Ecological information (continued)****12.6. Other adverse effects**

| | |
|---|--|
| Effect on ozone layer | : None. |
| Global warming potential [CO ₂ =1] | : 1300 |
| Effect on the global warming | : When discharged in large quantities may contribute to the greenhouse effect. Contains Fluorinated greenhouse gases covered by the Kyoto protocol. |

SECTION 13. Disposal considerations**13.1. Waste treatment methods**

- : Avoid discharge to atmosphere.
Do not discharge into any place where its accumulation could be dangerous.
Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org> for more guidance on suitable disposal methods.
Refer to supplier's waste gas recovery programme.
Ensure that the emission levels from local regulations or operating permits are not exceeded.
- List of hazardous wastes : 14 06 01: Chlorofluorocarbons, HCFC, HFC.

13.2. Additional information

: None.

SECTION 14. Transport information

UN number : 3159
Labelling ADR, IMDG, IATA



: 2.2 : Non-flammable, non-toxic gases

Land transport (ADR/RID)

H.I. nr : 20
UN proper shipping name : 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134A)
Transport hazard class(es) : 2
Classification code : 2 A
Packing Instruction(s) : P200
Tunnel Restriction : C/E Tank carriage: Passage forbidden through tunnels of category C, D and E; Other carriage:
Passage forbidden through tunnels of category E
Environmental hazards : None.

Sea transport (IMDG)

Proper shipping name : 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134A)
Class : 2.2
Emergency Schedule (EmS) - Fire : F-C
Emergency Schedule (EmS) - Spillage : S-V
Packing instruction : P200
IMDG-Marine pollutant : No

Air transport (ICAO-TI / IATA-DGR)

Proper shipping name (IATA) : 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134A)

Tetrafluoroethane (R134a)**133-RR****SECTION 14. Transport information (continued)**

Class : 2.2
Passenger and Cargo Aircraft : Allowed.
Packing instruction - Passenger and Cargo Aircraft : 200
Cargo Aircraft only : Allowed.
Packing instruction - Cargo Aircraft only : 200

Special precautions for user

: 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 containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.
- Ensure there is adequate ventilation.

Transport in bulk according to Annex II of MARPOL 73/78 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 legislation**

Restrictions on use : None.
Seveso directive 96/82/EC : Not covered.

National legislation

National legislation : Ensure all national/local regulations are observed.

15.2. Chemical safety assessment

: CSA has been carried out.

SECTION 16. Other information

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010.
Training advice : The hazard of asphyxiation is often overlooked and must be stressed during operator training.
List of full text of H-statements in section 3. : H280 - Contains gas under pressure; may explode if heated.
Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
DISCLAIMER OF LIABILITY : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

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