SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Freon™ 134a Refrigerant
Tradename/Synonym : HFA-134a
HFC-134a
Product Use : Propellant, Refrigerant, For industrial use only.
Restrictions on use : Do not use product for anything outside of the above specified uses
Manufacturer/Supplier : The Chemours Company FC, LLC
1007 Market Street
Wilmington, DE 19899
United States of America
Product Information : 1-844-773-CHEM (outside the U.S. 1-302-773-1000)
Transport Emergency : CHEMTREC: +1-800-424-9300 (outside the U.S. +1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION

Product hazard category
Gases under pressure Liquefied gas
**Freon™ 134a Refrigerant**

Version 3.0

Revision Date 02/16/2016

Ref. 130000000343

**Label content**

**Pictogram:**

![Pictogram]

**Signal word:** Warning

**Hazardous warnings:** Contains gas under pressure; may explode if heated.

**Hazardous prevention measures:** Protect from sunlight. Store in a well-ventilated place.

**Other hazards**

Misuse or intentional inhalation abuse may lead to death without warning. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Rapid evaporation of the liquid may cause frostbite.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1,1,2-Tetrafluoroethane (HFC-134a)</td>
<td>811-97-2</td>
<td>100 %</td>
</tr>
</tbody>
</table>
SECTION 4. FIRST AID MEASURES

| General advice | Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice. |
| Inhilation | Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician. |
| Skin contact | In case of contact, immediately flush skin with plenty of water for at least 15 minutes. Take off all contaminated clothing immediately. Consult a physician. Wash contaminated clothing before re-use. Treat for frostbite if necessary by gently warming affected area. |
| Eye contact | In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Consult a physician if necessary. |
| Ingestion | Is not considered a potential route of exposure. |
| Most important symptoms/effects, acute and delayed | Anaesthetic effects Light-headedness irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness |
| Protection of first-aiders | If potential for exposure exists refer to Section 8 for specific personal protective equipment. |
| Notes to physician | Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution. |

SECTION 5. FIREFIGHTING MEASURES

| Suitable extinguishing media | Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. |
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<table>
<thead>
<tr>
<th>Unsuitable extinguishing media</th>
<th>No applicable data available.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific hazards</td>
<td>Cylinders are equipped with pressure and temperature relief devices, but may still rupture under fire conditions. Decomposition may occur. Contact of welding or soldering torch flame with high concentrations of this substance can result in visible changes in the size and color of the torch flame. This flame effect will only occur in concentrations of this substance well above the recommended exposure limit. Therefore stop all work and ventilate to disperse vapors from the work area before using any open flames.</td>
</tr>
<tr>
<td>Special protective equipment for firefighters</td>
<td>In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment. Wear neoprene gloves during cleaning up work after a fire.</td>
</tr>
<tr>
<td>Further information</td>
<td>Cool containers/tanks with water spray. Water runoff should be contained and neutralized prior to release.</td>
</tr>
</tbody>
</table>

### SECTION 6. ACCIDENTAL RELEASE MEASURES

**NOTE:** Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

<table>
<thead>
<tr>
<th>Safeguards (Personnel)</th>
<th>Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where heavy vapours might collect.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental precautions</td>
<td>Should not be released into the environment. In accordance with local and national regulations.</td>
</tr>
<tr>
<td>Spill Cleanup</td>
<td>Evaporates. Ventilate area using forced ventilation, especially low or enclosed places where heavy vapors might collect.</td>
</tr>
<tr>
<td>Accidental Release Measures</td>
<td>Self-contained breathing apparatus (SCBA) is required if a large release occurs. Avoid open flames and high temperatures.</td>
</tr>
</tbody>
</table>
**SECTION 7. HANDLING AND STORAGE**

<table>
<thead>
<tr>
<th>Handling (Personnel)</th>
<th>Use sufficient ventilation to keep employee exposure below recommended limits. For personal protection see section 8. Handle in accordance with good industrial hygiene and safety practice.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handling (Physical Aspects)</td>
<td>Contact with chlorine or other strong oxidizing agents should also be avoided.</td>
</tr>
<tr>
<td>Dust explosion class</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Storage</td>
<td>Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (&lt;3000 psig) piping or systems. Never attempt to lift cylinder by its cap. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Separate full containers from empty containers. Keep at temperature not exceeding 52°C. Do not store near combustible materials. Avoid area where salt or other corrosive materials are present. The product has an indefinite shelf life when stored properly.</td>
</tr>
<tr>
<td>Storage period</td>
<td>&gt; 10 yr</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>&lt; 52 °C (&lt; 126 °F)</td>
</tr>
</tbody>
</table>

**SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

| Engineering controls | Normal ventilation for standard manufacturing procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low or enclosed places. Concentration monitors may be necessary to determine vapour concentrations in work areas prior to use of torches or other open flames, or if employees are entering enclosed areas. |
Personal protective equipment

Respiratory protection: For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

Hand protection: Additional protection: Wear approved gloves that are suitable for the task and have been shown to be impervious for the duration of their use.

Eye protection: Wear safety glasses with side shields. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.

Protective measures: When using do not smoke. Self-contained breathing apparatus (SCBA) is required if a large release occurs.

Exposure Guidelines

Exposure Limit Values

1,1,1,2-Tetrafluoroethane
No applicable data available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state: gaseous

Form: Liquefied gas

Color: colourless

Odor: slight, ether-like

Odor threshold: No applicable data available.

pH: No applicable data available.

Melting point/range: No applicable data available.
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling point/boiling range</td>
<td>-26.1 °C (-15.0 °F) at 1,013 hPa</td>
</tr>
<tr>
<td>Flash point</td>
<td>does not flash</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>&gt; 1 (CCL4=1.0)</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No applicable data available.</td>
</tr>
<tr>
<td>Upper explosion limit</td>
<td>Method: None per ASTM E681</td>
</tr>
<tr>
<td>Lower explosion limit</td>
<td>Method: None per ASTM E681</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>6,661 hPa at 25 °C (77 °F)</td>
</tr>
<tr>
<td>Vapor density</td>
<td>3.6 at 25 °C (77 °F) (Air = 1.0)</td>
</tr>
<tr>
<td>Density</td>
<td>1.21 g/cm3 at 25 °C (77 °F) (as liquid)</td>
</tr>
<tr>
<td>Specific gravity (Relative density)</td>
<td>1.208 at 25 °C (77 °F)</td>
</tr>
<tr>
<td>Water solubility</td>
<td>1.5 g/l at 25 °C (77 °F) at 1,013 hPa</td>
</tr>
<tr>
<td>Solubility(ies)</td>
<td>No applicable data available.</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>No applicable data available.</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>No applicable data available.</td>
</tr>
<tr>
<td>Ignition temperature</td>
<td>&gt;743 °C</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No applicable data available.</td>
</tr>
</tbody>
</table>

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**Viscosity, kinematic**: No applicable data available.

**Viscosity, dynamic**: No applicable data available.

**% Volatile**: 100 %

**SECTION 10. STABILITY AND REACTIVITY**

**Reactivity**: Decomposes on heating.

**Chemical stability**: Stable under recommended storage conditions.

**Possibility of hazardous reactions**: Polymerization will not occur.

**Conditions to avoid**: No applicable data available.

**Incompatible materials**: Alkali metals, Alkaline earth metals, Powdered metals, Powdered metal salts

**Hazardous decomposition products**: Decomposition products are hazardous. This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid and possibly carbonyl fluoride. These materials are toxic and irritating. Avoid contact with decomposition products.

**SECTION 11. TOXICOLOGICAL INFORMATION**

1,1,1,2-Tetrafluoroethane (HFC-134a)

**Inhalation 4 h LC50**: > 567000 ppm, Rat

**Inhalation No Observed Adverse Effect Concentration**: 40000 ppm, Dog

**Inhalation Low Observed Adverse Effect Concentration (LOAEC)**: 80000 ppm, Dog

**Skin irritation**: No skin irritation, Rabbit

**Eye irritation**: No eye irritation, Rabbit

**Skin sensitization**: Does not cause skin sensitisation, Guinea pig
Does not cause respiratory sensitisation, Rat

Repeated dose toxicity  
    : Inhalation
    Rat
    -
    gas
    NOAEL: 50000,
    No toxicologically significant effects were found.

Carcinogenicity  
    : Not classifiable as a human carcinogen.
    Overall weight of evidence indicates that the substance is not carcinogenic.

Mutagenicity  
    : Animal testing did not show any mutagenic effects.
    Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

Reproductive toxicity  
    : No toxicity to reproduction
    No effects on or via lactation
    Animal testing showed no reproductive toxicity.

Teratogenicity  
    : Animal testing showed no developmental toxicity.

Further information  
    : Cardiac sensitisation threshold limit: 334000 mg/m³

Carcinogenicity

The carcinogenicity classifications for this product and/or its ingredients have been determined according to HazCom 2012, Appendix A.6. The classifications may differ from those listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or those found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest edition).

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.
SECTION 12. ECOLOGICAL INFORMATION

Aquatic Toxicity
1,1,1,2-Tetrafluoroethane (HFC-134a)

96 h LC50 : Oncorhynchus mykiss (rainbow trout) 450 mg/l

96 h ErC50 : Algae 142 mg/l
Information given is based on data obtained from similar substances.

72 h NOEC : Pseudokirchneriella subcapitata (green algae) 13.2 mg/l
Information given is based on data obtained from similar substances.

48 h EC50 : Daphnia magna (Water flea) 980 mg/l

SECTION 13. DISPOSAL CONSIDERATIONS

Waste disposal methods - Product : Can be used after re-conditioning. Recover by distillation or remove to a permitted waste disposal facility. Comply with applicable Federal, State/Provincial and Local Regulations.

Contaminated packaging : Empty pressure vessels should be returned to the supplier.

SECTION 14. TRANSPORT INFORMATION

DOT UN number : 3159

Proper shipping name : 1,1,1,2-Tetrafluoroethane
Class : 2.2
Labelling No. : 2.2
IATA_C UN number : 3159
**Freon™ 134a Refrigerant**

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Proper shipping name: 1,1,1,2-Tetrafluoroethane

Class: 2.2

Labelling No.: 2.2

UN number: 3159

Proper shipping name: 1,1,1,2-TETRAFLUOROETHANE

Class: 2.2

Labelling No.: 2.2

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**SECTION 15. REGULATORY INFORMATION**

TSCA: On the inventory, or in compliance with the inventory

SARA 313 Regulated Chemical(s): This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

California Prop. 65: Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known

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**SECTION 16. OTHER INFORMATION**

Freon™ and any associated logos are trademarks or copyrights of The Chemours Company FC, LLC. Chemours™ and the Chemours Logo are trademarks of The Chemours Company.

Before use read Chemours safety information. For further information contact the local Chemours office or nominated distributors.

Revision Date: 02/16/2016

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material.
Enhanced with new features, Freon™ 134a Refrigerant is designed for improved performance and efficiency. In addition to its characteristics, it is used in various applications, including air conditioning and refrigeration systems. Significant change from previous version is denoted with a double bar.

other materials or in any process, unless specified in the text.

Significant change from previous version is denoted with a double bar.