

# TETRAFLUOROETHANE (R134a)

## Safety Data Sheet



### 1. IDENTIFICATION

**Product identifier**

**Product Name** TETRAFLUOROETHANE (R134a)

**Other means of identification**

**Safety data sheet number** LIND-P113  
**UN/ID no.** UN3159

**Recommended use of the chemical and restrictions on use**

**Recommended Use** Industrial and professional use.  
**Uses advised against** Consumer use

**Details of the supplier of the safety data sheet**

Messer North America, Inc. - Messer LLC - Messer Merchant Production LLC  
200 Somerset Corporate Blvd, Suite 7000  
Bridgewater, NJ 08807  
Phone: 908-464-8100  
www.messer-us.com

Messer Gas Puerto Rico, Inc.  
Road 869, Km 1.8  
Barrio Palmas, Catano, PR 00962  
Phone: 787-641-7445

\* May include subsidiaries or affiliate companies/divisions.

For additional product information contact your local customer service.

**Emergency telephone number**

**Company Phone Number** +1 800-232-4726 (Messer National Operations Center, US)

CHEMTREC: 1-800-424-9300 (North America) +1-703-527-3887 (International)

## 2. HAZARDS IDENTIFICATION

### Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Gases under pressure	Liquefied gas
Simple asphyxiants	Yes

### Label elements



**Signal word**

**Warning**

### **Hazard Statements**

Contains gas under pressure; may explode if heated  
 May displace oxygen and cause rapid suffocation  
 May cause frostbite

### **Precautionary Statements - Prevention**

Do not handle until all safety precautions have been read and understood  
 Do not get in eyes, on skin, or on clothing  
 Use and store only outdoors or in a well ventilated place  
 Use a backflow preventive device in piping  
 Close valve after each use and when empty

### **Precautionary Statements - Response**

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Get medical attention/advice.  
 IF ON SKIN: Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

### **Precautionary Statements - Storage**

Protect from sunlight when ambient temperature exceeds 52°C/125°F

### **Hazards not otherwise classified (HNOC)**

Not applicable

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Single Substance

Chemical Name	CAS No.	Volume %	Chemical Formula
1,1,1,2-TETRAFLUOROETHANE	811-97-2	>99	C <sub>2</sub> H <sub>2</sub> F <sub>4</sub>

## 4. FIRST AID MEASURES

### Description of first aid measures

<b>General advice</b>	Show this safety data sheet to the doctor in attendance.
<b>Inhalation</b>	Remove to fresh air and keep comfortable for breathing. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get medical attention immediately.
<b>Skin contact</b>	For dermal contact or suspected frostbite, remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if contact with the product has resulted in blistering of the dermal surface or in deep tissue freezing.
<b>Eye contact</b>	If frostbite is suspected, flush eyes with cool water for 15 minutes and obtain immediate medical attention.
<b>Ingestion</b>	Not an expected route of exposure.
<b>Self-protection of the first aider</b>	RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

### Most important symptoms and effects, both acute and delayed

<b>Symptoms</b>	High concentrations may cause asphyxia from lack of oxygen or act as a narcotic causing central nervous system depression. May cause nausea, dizziness, headaches, shortness of breath, lethargy, narcosis, unconsciousness and possibly cardiac arrhythmias. Contact with evaporating liquid may cause cold burns/frostbite.
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### Indication of any immediate medical attention and special treatment needed

<b>Note to physicians</b>	A patient adversely affected by exposure to this product should not be given adrenaline (epinephrine) or similar heart stimulant since these would increase the risk of cardiac arrhythmias.
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## 5. FIRE-FIGHTING MEASURES

### Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

### Specific extinguishing methods

Continue to cool fire exposed cylinders until flames are extinguished. Damaged cylinders should be handled only by specialists.

### Specific hazards arising from the chemical

Non-flammable gas. Cylinders may rupture under extreme heat.

#### **Hazardous combustion products**

Hydrogen fluoride. Carbonyl fluoride.

### Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH (approved or equivalent) and full protective gear.

## 6. ACCIDENTAL RELEASE MEASURES

### Personal precautions, protective equipment and emergency procedures

<b>Personal precautions</b>	Evacuate personnel to safe areas. Ensure adequate ventilation, especially in confined areas. Monitor oxygen level. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
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### Environmental precautions

**Environmental precautions** Prevent spreading of vapors through sewers, ventilation systems and confined areas.

**Methods and material for containment and cleaning up**

**Methods for containment** Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. If leak is in container or container valve, contact the appropriate emergency telephone number in Section 1 or call your closest Messer location.

**Methods for cleaning up** Return cylinder to Messer or an authorized distributor.

## 7. HANDLING AND STORAGE

**Precautions for safe handling**

**Advice on safe handling** Product is non-corrosive and may be used with any common structural material. Silver and carbon bearing alloys can act as catalysts for decomposing the product at high temperatures. Alloys containing more than 2% magnesium should not be used if water is present.

Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distance, use a cart designed to transport cylinders. Never attempt to lift a cylinder by its valve protection cap. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing leak to occur. Use an adjustable strap wrench to remove over-tight or rusted caps. Use only with adequate ventilation. Use a backflow preventive device in piping. Use only with equipment rated for cylinder pressure. Close valve after each use and when empty. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Ensure the complete gas system has been checked for leaks before use.

Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never attempt to refill a compressed gas cylinder without the owner's written consent. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit.

Only experienced and properly instructed persons should handle gases under pressure. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association publication CGA-P1, Safe Handling of Compressed Gases in Containers.

For additional recommendations consult CGA P-76 Hazards of Oxygen-Deficient Atmospheres.

**Conditions for safe storage, including any incompatibilities**

**Storage Conditions** Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Keep at temperatures below 52°C / 125°F. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Stored containers should be periodically checked for general condition and leakage.

**Incompatible materials** May produce highly toxic fumes on contact with acids or acid fumes.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Control parameters**

**Exposure Guidelines** This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

**Other Information** The American Industrial Hygiene Association (AIHA) has established a Workplace Environmental Exposure Level (WEEL) 8 hour Time-Weighted Average (TWA) of 1000 ppm for 1,1,1,2-Tetrafluoroethane (HFC 143a).

**Appropriate engineering controls**

**Engineering Controls** Provide general ventilation, local exhaust ventilation, process enclosure or other engineering controls to maintain airborne levels below recommended exposure limits and to maintain oxygen levels above 19.5%. Oxygen detectors should be used when asphyxiating gases may be released. Systems under pressure should be regularly checked for leakages. Showers. Eyewash stations.

**Individual protection measures, such as personal protective equipment**

**Eye/face protection** Wear safety glasses with side shields (or goggles). If there is potential for exposure to liquid, wear Goggles face-shield over either safety glasses with side shields or safety goggles.

**Skin and body protection** Work gloves and safety shoes are recommended when handling cylinders. Wear loose fitting, cold insulating gloves and suitable clothing to prevent skin contact with liquid, cold gas and cold equipment or piping.

**Respiratory protection** Use positive pressure airline respirator with escape cylinder or self contained breathing apparatus for oxygen-deficient atmospheres (<19.5%).

**General Hygiene Considerations** Handle in accordance with good industrial hygiene and safety practice. Do not get in eyes, on skin, or on clothing.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Information on basic physical and chemical properties**

<b>Physical state</b>	Gas
<b>Appearance</b>	Colorless
<b>Odor</b>	Slight ethereal
<b>Odor threshold</b>	No information available
<b>pH</b>	Not applicable
<b>Melting/freezing point</b>	-101 °C / -149.8 °F
<b>Boiling point / boiling range</b>	-27 °C / -17 °F
<b>Evaporation rate</b>	Not applicable
<b>Flammability (solid, gas)</b>	Non-flammable gas
<b>Lower flammability limit:</b>	Not applicable
<b>Upper flammability limit:</b>	Not applicable
<b>Flash point</b>	Not applicable
<b>Autoignition temperature</b>	No data available
<b>Decomposition temperature</b>	No data available
<b>Water solubility</b>	67 mg/L @ 25°C
<b>Partition coefficient</b>	No data available
<b>Kinematic viscosity</b>	Not applicable

**Component Level Information:**

Chemical Name	Molecular weight	Boiling point/range	Vapor Pressure	Vapor density (air =1)	Gas Density kg/m <sup>3</sup> @20°C	Critical Temperature
1,1,1,2-TETRAFLUOROETHANE	102.03	-26.55 °C	5.71 bar @ 50 °C	3.3	4.326	101 °C

## 10. STABILITY AND REACTIVITY

**Reactivity**

Not reactive under normal conditions

**Chemical stability**

Stable under normal conditions.

**Explosion data**

Sensitivity to Mechanical Impact None.

Sensitivity to Static Discharge None.

**Possibility of Hazardous Reactions**

None under normal processing.

**Conditions to avoid**

Heat, flames and sparks.

**Incompatible materials**

May produce highly toxic fumes on contact with acids or acid fumes.

**Hazardous Decomposition Products**

Hydrogen fluoride. Carbonyl fluoride.

**11. TOXICOLOGICAL INFORMATION****Information on likely routes of exposure**

<b>Inhalation</b>	High concentrations may cause ventricular fibrillation and CNS effects. The No-Observable-Effect Level (NOEL) for cardiac sensitization was 50,000 ppm in dogs.
<b>Skin contact</b>	May cause irritation. Contact with evaporating liquid may cause cold burns/frostbite.
<b>Eye contact</b>	May cause slight irritation. Slight eye irritation in rabbits resulted from a 5-second and a 15-second spray from a distance of 10 centimeters. Slight irritation was also seen after occlusive application of 0.5 mL (24 H) Contact with evaporating liquid may cause cold burns/frostbite.
<b>Ingestion</b>	Not an expected route of exposure.

**Information on toxicological effects**

<b>Symptoms</b>	High concentrations may cause asphyxia from lack of oxygen or act as a narcotic causing central nervous system depression. May cause nausea, dizziness, headaches, shortness of breath, lethargy, narcosis, unconsciousness and possibly cardiac arrhythmias.
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**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

<b>Irritation</b>	Not classified.
<b>Sensitization</b>	Not classified.
<b>Germ cell mutagenicity</b>	Not classified.
<b>Carcinogenicity</b>	This product does not contain any carcinogens or potential carcinogens listed by OSHA, IARC or NTP.
<b>Reproductive toxicity</b>	Not classified.
<b>Developmental Toxicity</b>	Reductions in maternal weight gains were seen in rabbits exposed to 40,000 ppm and signs of delayed fetal development was seen in rats following maternal exposure to 50,000 ppm.
<b>STOT - single exposure</b>	Not classified.
<b>STOT - repeated exposure</b>	No signs of toxicity were observed in rats exposed to levels of 0, or 100,000 ppm Halocarbon 134a for 6 H/day, 5 days/week for 2 weeks; however, there was a slight increase in urinary fluoride levels at 100,000 ppm. Clinical observations, hematology, blood chemistry, and body weight gains were all normal in rats exposed to 0, 1000, 10,000 and 50,000 ppm HCF 134a for 6 H/day, 5 days/week for 4 weeks. Rats exposed to levels of 0, 2500, 10,000 or 50,000 ppm, 6 H/day, 5 days/week for 18 months have exhibited no significant signs of toxicity.

**Chronic toxicity**  
**Target Organ Effects**  
**Aspiration hazard**

Possible risks of irreversible effects.  
 Heart. Central nervous system (CNS).  
 Not applicable.

**Numerical measures of toxicity**

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50	Inhalation LC50 (CGA P-20)
1,1,1,2-TETRAFLUOROETHANE 811-97-2	-	-	= 1500 g/m <sup>3</sup> ( Rat ) 4 h	-

**Product Information**

**Oral LD50** No information available  
**Dermal LD50** No information available  
**Inhalation LC50** No information available  
**Inhalation LC50**

**12. ECOLOGICAL INFORMATION****Ecotoxicity**

No known acute aquatic toxicity.

**Persistence and degradability**

No information available.

**Bioaccumulation**

Will not bioconcentrate.

Chemical Name	Partition coefficient
1,1,1,2-TETRAFLUOROETHANE 811-97-2	1.06

**Other adverse effects**

Contains fluorinated greenhouse gas.

**Global warming potential (GWP)** 1430

**13. DISPOSAL CONSIDERATIONS****Waste treatment methods****Disposal of wastes**

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to Messer for proper disposal.

**14. TRANSPORT INFORMATION**

**Note:** For DOT, Refrigerant gas R 134a is also acceptable as proper shipping name if used consistently on package markings, shipping papers and emergency response information.

**DOT**

<b>UN/ID no.</b>	UN3159
<b>Proper shipping name</b>	1,1,1,2-Tetrafluoroethane
<b>Hazard Class</b>	2.2
<b>Special Provisions</b>	T50
<b>Description</b>	UN3159, 1,1,1,2-Tetrafluoroethane, 2.2
<b>Emergency Response Guide Number</b>	126

**TDG**

<b>UN/ID no.</b>	UN3159
<b>Proper shipping name</b>	1,1,1,2-Tetrafluoroethane
<b>Hazard Class</b>	2.2
<b>Description</b>	UN3159, Refrigerant gas R 134a, 2.2

**IATA**

<b>UN/ID no.</b>	UN3159
<b>Proper shipping name</b>	1,1,1,2-Tetrafluoroethane
<b>Hazard Class</b>	2.2
<b>ERG Code</b>	2L
<b>Description</b>	UN3159, 1,1,1,2-Tetrafluoroethane, 2.2

**IMDG**

<b>UN/ID no.</b>	UN3159
<b>Proper shipping name</b>	1,1,1,2-Tetrafluoroethane
<b>Hazard Class</b>	2.2
<b>EmS-No.</b>	F-C, S-V
<b>Description</b>	UN3159 1,1,1,2-Tetrafluoroethane 2.2



## 15. REGULATORY INFORMATION

### INTERNATIONAL INVENTORIES

<b>TSCA</b>	Complies
<b>DSL/NDSL</b>	Complies
<b>EINECS/ELINCS</b>	Complies

#### Legend:

**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory

**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List

**EINECS/ELINCS** - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

### US FEDERAL REGULATIONS

#### **SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

#### **SARA 311/312 Hazard Categories**

Should this product meet EPCRA 311/312 reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

#### **CERCLA**

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

#### **Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)**

This product does not contain any substances regulated as hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act Amendments of 1990.

#### **CWA (Clean Water Act)**

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

#### **Risk and Process Safety Management Programs**

This material, as supplied, does not contain any regulated substances with specified thresholds under 40 CFR Part 68. This product does not contain any substances regulated as Highly Hazardous Chemicals pursuant to the 29 CFR Part 1910.110.

### US STATE REGULATIONS

#### **California Proposition 65**

This product does not contain any Proposition 65 chemicals

#### **U.S. State Right-to-Know Regulations**

Chemical Name	New Jersey	Massachusetts	Pennsylvania
1,1,1,2-Tetrafluoroethane 811-97-2	X	-	-

**16. OTHER INFORMATION**

**NFPA**                      **Health hazards 0**                      **Flammability 0**                      **Instability 0**                      **Physical and Chemical Properties \***

**Note:** Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2019, CGA Recommended Hazard Ratings for Compressed Gases, 4th Edition.

**Issue Date**    17-Feb-2015  
**Revision Date**    03-May-2021  
**Revision Note**    SDS sections updated; 1

LIND-P113

**General Disclaimer**

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Messer LLC, Messer Merchant Production LLC, Messer North America, Inc., Messer Gas Puerto Rico, Inc. or Messer Canada Inc. (or any of their affiliates and subsidiaries) and the purchaser.

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**End of Safety Data Sheet**