



ACCORDING TO US CFR 1910.1200

1. SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

| | |
|--------------|-----------------------------------|
| Product Name | 1,1,1,2-Tetrafluoroethane (R134a) |
| Trade Name | REFRIGERANT 134A, HFC 134A. |
| Synonym(s) | Tetrafluoroethane. |
| CAS No. | 811-97-2 |
| EC No. | 212-377-0 |

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

| | |
|----------------------|--------------|
| Identified Use(s) | Refrigerant. |
| Uses Advised Against | Not known. |

1.3 Details of the supplier of the safety data sheet

| | |
|------------------------|--|
| Company Identification | Hudson Technologies Company |
| Address | PO Box 1541 One Blue Hill Plaza Pearl River, New York USA |
| Postal code | 10965 |
| Telephone | +1 (845) 735 3905 |
| Fax | +1 (845) 512 6070 |
| E-mail | information@hudsontech.com |

1.4 Emergency telephone number

| | |
|-----------------|-------------------|
| Company | +1 (800) 501 4376 |
| CHEMTREC (U.S.) | +1 (800) 424 9300 |
| INTERNATIONAL | +1 (703) 527 3887 |

2. SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

| | |
|------------------|--|
| US CFR 1910.1200 | Gases under pressure; Press. Gas; Liquefied gas. |
|------------------|--|

2.2 Label elements

Product Name 1,1,1,2-Tetrafluoroethane (R134a)

Hazard Pictogram(s)



GHS04

Signal Word(s) Warning.

Hazard Statement(s) H280: Contains gas under pressure; may explode if heated.
OSHA-H01: MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION.
CGA-HG01: MAY CAUSE FROSTBITE.

Precautionary Statement(s) P202: Do not handle until all safety precautions have been read and understood.
P262: Do not get in eyes, on skin, or on clothing.
P271+P403: Use and store only outdoors or in a well-ventilated place.
P304, P340, P313: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Get medical advice/attention.
P302, P336, P315: IF ON SKIN: Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.
P410+P403: Protect from sunlight. Store in a well-ventilated place.

2.3 Other hazards

May cause asphyxiation when concentrations are sufficient to reduce oxygen below safe breathing levels.

May cause frost-bite.

2.4 Additional Information

CGA-PG05: Use a back flow preventive device in the piping.
CGA-PG06: Close valve after each use and when empty.
CGA-PG02 : Protect from sunlight when ambient temperature exceeds 52 °C (125 °F).

CGA-PG27: Read and follow the Safety Data Sheet (SDS) before use.

This SDS is available in languages other than English.

3. SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

| HAZARDOUS INGREDIENT(S) | Common Names | CAS No. | %W/W | Hazard Statement(s) | Hazard Pictogram(s) |
|---------------------------|--|----------|------|---------------------------------|---------------------|
| 1,1,1,2-Tetrafluoroethane | Tetrafluoroethane, REFRIGERANT 134A, HFC 134A. | 811-97-2 | 100 | Press. Gas, Liquefied gas; H280 | GHS04 |

4. SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

| | |
|--------------|--|
| Inhalation | If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing has stopped, apply artificial respiration. Get medical attention. |
| Skin Contact | Flush skin with large amounts of water. Thaw frosted parts with lukewarm water. Do not rub affected area. If symptoms persist, obtain medical attention. |
| Eye Contact | Flush eyes with water for at least 15 minutes while holding eyelids open. If symptoms persist, obtain medical attention. |
| Ingestion | Unlikely route of exposure. |

4.2 Most important symptoms and effects, both acute and delayed

Inhalation: High concentrations: Headache, Dizziness, Confusion, Loss of coordination, Nausea, Unconsciousness.

4.3 Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

5. SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable Extinguishing media As appropriate for surrounding fire.

Unsuitable extinguishing media None.

5.2 Special hazards arising from the substance or mixture

Contains gas under pressure; may explode if heated. The product should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. Decomposes in a fire giving off toxic fumes: Hydrofluoric acid, Carbonyl fluoride.

5.3 Advice for fire-fighters

Fire fighters should wear complete protective clothing including self-contained breathing apparatus. Keep containers cool by spraying with water if exposed to fire. If it is safe to do so, containers should be removed from fire area because they are likely to rupture under fire conditions.

6. SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Stop leak if safe to do so. Wear appropriate personal protective equipment, avoid direct contact.

6.2 Environmental precautions

Do not allow to enter drains, sewers or watercourses.

6.3 Methods and material for containment and cleaning up

Allow small spillages to evaporate provided there is adequate ventilation.

6.4 Reference to other sections

See Also Section 8, 13.

7. SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Provide sufficient ventilation. Avoid breathing gas. Avoid contact with skin and eyes. Wear protective gloves/protective clothing/eye

protection/face protection. Do not drag, roll, slide or drop cylinders. Use a suitable hand truck design for cylinder movement. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object into valve cap openings. Doing so may damage valve causing a leak to occur. Secure cylinders in an upright position at all times, close all valves when not in use. Keep closed even when empty. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

7.2 Conditions for safe storage, including any incompatibilities

Protect from sunlight. Store in a well-ventilated place.

Storage temperature

<125°F (52°C)

Storage life

Stable under normal conditions.

Incompatible materials

Potassium, Calcium, Powdered Aluminium, Magnesium and Zinc.

8. SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Occupational Exposure Limits

| SUBSTANCE | CAS No. | LTEL (8 hr TWA ppm) | LTEL (8 hr TWA mg/m ³) | STEL (ppm) | STEL (mg/m ³) | Note |
|---------------------------|----------|---------------------|------------------------------------|------------|---------------------------|------|
| 1,1,1,2-Tetrafluoroethane | 811-97-2 | 1000 | 4240 | | | |

Remark Workplace Environmental Exposure Level (AIHA)

8.2 Exposure controls

Appropriate engineering controls Ensure adequate ventilation.

Personal protection equipment



Eye Protection

Wear eye/face protection.



Skin protection

Wear suitable gloves.



Respiratory protection

Where engineering controls are not fitted or inadequate wear suitable respiratory protective equipment. A suitable mask with filter type A may be appropriate.

Thermal hazards

Not applicable.

9. SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

| | |
|--|--|
| Appearance | Gas. |
| | Color: Colorless. |
| Color | Colorless. |
| Odor | Slight ethereal. |
| Odor threshold | Not established. |
| pH | Neutral. |
| Melting point/freezing point | Not available. |
| Initial boiling point and boiling range | -15.7°F (-26.5°C) |
| Flash Point | Not applicable. |
| Evaporation rate | >1 (CC14 =1) |
| Flammability (solid, gas) | Not applicable. |
| Upper/lower flammability or explosive limits | Not applicable. |
| Vapor pressure | 96 psia @ 77°F (25°C) |
| Vapor density | 3.6 @ 77°F (25°C) (Air = 1) |
| Density (g/ml) | Not available. |
| Relative density | 1.208 @ 77°F (25°C) |
| Solubility(ies) | Solubility (Water): 0.15 WT% @ 77°F (25°C) Solubility (Other): Not available. |
| Partition coefficient: n-octanol/water | Not available. |
| Auto-ignition temperature | >1369°F (>743°C) |
| Decomposition Temperature (°C) | >482°F (250°C) |
| Viscosity | Not applicable. |
| Explosive properties | Not explosive. |

| | |
|-----------------------|----------------|
| Oxidizing properties | Not oxidizing. |
| 9.2 Other information | |
| Percent Volatile (%) | 100% |

10. SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Stable under normal conditions.

10.2 Chemical Stability

Stable under normal conditions.

10.3 Possibility of hazardous reactions

No hazardous reactions known if used for its intended purpose.

10.4 Conditions to avoid

Keep away from heat and direct sunlight.

10.5 Incompatible materials

Potassium, Calcium, Powdered Aluminium, Magnesium and Zinc.

10.6 Hazardous decomposition product(s)

Halogens, halogen acids and possibly carbonyl halides.

11. SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

| | |
|--------------------------------|--|
| Acute toxicity - Ingestion | Low acute toxicity. |
| Acute toxicity - Skin Contact | Low acute toxicity. |
| Acute toxicity - Inhalation | Low acute toxicity. |
| | LCLo (4h) (rat) ≥ 567, 000 ppm |
| Skin corrosion/irritation | Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite. |
| Serious eye damage/irritation | Liquid can cause burns similar to frostbite. |
| Skin sensitization data | Not classified. |
| Respiratory sensitization data | Not classified. |
| Germ cell mutagenicity | There is no evidence of mutagenic potential. |
| Carcinogenicity | No evidence of carcinogenicity. |
| Reproductive toxicity | Not classified. |
| Lactation | Not classified. |



| | |
|--------------------------|-------------------|
| STOT - single exposure | None anticipated. |
| STOT - repeated exposure | None anticipated. |
| Aspiration hazard | Not classified. |
| 11.2 Other information | |
| | Not known. |

12. SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

| | |
|----------------------------------|--|
| Toxicity - Aquatic invertebrates | Low toxicity to invertebrates. EC50 (48 hour) (Daphnia magna) = 980mg/l |
| Toxicity - Fish | Low toxicity to fish. LC50 (96 hour) (Oncorhynchus mykiss) = 450mg/l |
| Toxicity - Algae | Low toxicity to algae. |
| Toxicity - Sediment | Not classified. |
| Compartment | |
| Toxicity - Terrestrial | Not classified. |
| Compartment | |

12.2. Persistence and Degradation

Not readily biodegradable.

12.3. Bioaccumulative potential

The substance has low potential for bioaccumulation.

12.4. Mobility in soil

Not applicable.

12.5 Other adverse effects

None anticipated.

13. SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Containers must not be punctured or destroyed by burning, even when empty. Refer to manufacturer/supplier for information on recovery/recycling.

13.2 Additional Information

Disposal should be in accordance with local, state or national legislation.

R-134A is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

14. SECTION 14: TRANSPORT INFORMATION

14.1 UN number

UN No. 3159

14.2 UN proper shipping name

UN proper shipping name 1,1,1,2-TETRAFLUOROETHANE.

14.3 Transport hazard class(es)

ADR/RID Class 2.2
 IMDG Class 2.2
 IMDG EMS Not available.

ICAO/IATA

Excepted Quantities E1
 Passenger and Cargo Aircraft 75kg

Limited Quantities Packing

Instructions

Cargo Aircraft Limited Quantities 150kg

Max net Qty

Special Provisions Not applicable.

Emergency Response 126

Guidebook (ERG) Code

ADR Classification Code 2A

ADR HIN 20

ADR Transport Category 3

Tunnel Restriction Code C/E

Emergency Action Code 2TE

Advice on Additional Personal Not applicable.

Protection (APP)

14.4 Packing group

Packing group Not applicable.

Labels 2.2





Special Provisions Not applicable.
Limited Quantities 120 m
Excepted Quantities E1
Mixed Packing Instructions for Packages P200
Special Packing Provisions for Packages Not applicable.
Mixed Packing Instructions for Packages MP9
14.5 Environmental hazards
Environmental hazards Not classified as a Marine Pollutant.
14.6 Special precautions for user
Special precautions for user Not known.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Packing Instructions for Portable (M) T50
Tanks
Special Provisions for Portable Tanks Not applicable.
Tank Code for Tanks PxBN(M)
Special Provisions for Tanks TA4 TT9
Vehicle for Tank Carriage AT
Special Provisions for Carriage - Packages Not applicable.
Special Provisions for Carriage - Bulk Not applicable.
Special Provisions for Carriage - Loading, Unloading and Handling CV9 CV10 CV36
Special Provisions for Carriage - Operation Not applicable.

15. SECTION 15: REGULATORY INFORMATION

15.1 Federal
Toxic and hazardous substances (29 CFR 1910; Subpart Z) Not listed.
National emission standards for Not listed.



hazardous air pollutants (40 CFR
61.01)

Title III Consolidated List of Lists Not listed.

TSCA (Toxic Substance Control Act) 1,1,1,2-Tetrafluoroethane (CAS No. 811-97-2).

CAA 602 - Ozone Depleting Substances (ODS) Not listed.

15.2 State

State Right to Know Lists Not listed.

Proposition 65 (California) Not listed.

15.3 Other

OSPAR List of Chemicals for Priority Action Not listed.

NTP (National Toxicology Program) Not listed.

OSHA (List of Highly Hazardous Chemicals, Toxics and Reactives) Not listed.

IARC (International Agency for Research on Cancer) Not listed.

16. SECTION 16: OTHER INFORMATION

The following sections contain 1-16 revisions or new statements:

| NFPA | | HMIS | |
|--------|---|--------|---|
| Health | 1 | Health | 1 |

| | | | |
|-------------|---|------------------|---|
| Fire | 0 | Flammability | 1 |
| Instability | 1 | Physical hazards | 0 |

LEGEND:

Hazard Pictogram(s)



GHS04

Hazard Statement(s) H280: Contains gas under pressure; may explode if heated.

Precautionary Statement(s) P410+P403: Protect from sunlight. Store in a well-ventilated place.

Additional Information required by Federal Standard 313 Rev. E:

Contract or Solicitation Number: SPE4A6-16-D-0226

Prime Contractor: Hudson Technologies, Inc.

Prime Contractor CAGE: 7DSQ0

Manufacturer/Contractor CAGE: 7AHB8

National Stock Number (NSN): 6830013706207, 6830013708756, 6830013909622, 6830014126362, 6830015278354, 6830015558678

Specification Reference: A-A-58060B NOT 1

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