

# Freon™ 134a (HFC-134a) Refrigerant - Propellant

Version Revision Date: SDS Number: Date of last issue: 05/14/2020 7.7 10/08/2020 1325450-00044 Date of first issue: 02/27/2017

#### **SECTION 1. IDENTIFICATION**

Product name : Freon™ 134a (HFC-134a) Refrigerant - Propellant

Other means of identification : No data available

SDS-Identcode : 13000000349

Manufacturer or supplier's details

Company name of supplier : The Chemours Canada Company

Address : PO Box 118 Streetsville

Streetsville ON L5M 2B7 Canada

Telephone : 1-844-773-CHEM (2436)

Emergency telephone : 1-866-595-1473 (24 hours)

Recommended use of the chemical and restrictions on use

Recommended use : Refrigerant

Restrictions on use : For professional and industrial installation and use only.

### **SECTION 2. HAZARDS IDENTIFICATION**

GHS classification in accordance with the Hazardous Products Regulations

Gases under pressure : Liquefied gas

Simple Asphyxiant : Category 1

**GHS** label elements

Hazard pictograms :

 $\Diamond$ 

Signal Word : Warning

Hazard Statements : H280 Contains gas under pressure; may explode if heated.

May displace oxygen and cause rapid suffocation.

Precautionary Statements : Storage:

P410 + P403 Protect from sunlight. Store in a well-ventilated

place.



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#### Other hazards

Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing. Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardi-

Rapid evaporation of the product may cause frostbite.

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

Substance / Mixture Substance

Substance name 1,1,1,2-Tetrafluoroethane

CAS-No. 811-97-2

Synonyms No data available

#### Components

Chemical name	CAS-No.	Concentration (% w/w)
1,1,1,2-Tetrafluoroethane#	811-97-2	>= 99.9 - <= 100

<sup>#</sup> Voluntarily-disclosed non-hazardous substance

## **SECTION 4. FIRST AID MEASURES**

General advice In the case of accident or if you feel unwell, seek medical ad-

vice immediately.

When symptoms persist or in all cases of doubt seek medical

advice.

If inhaled If inhaled, remove to fresh air.

Get medical attention if symptoms occur.

In case of skin contact Thaw frosted parts with lukewarm water. Do not rub affected

Get medical attention immediately.

In case of eye contact Get medical attention immediately.

If swallowed Ingestion is not considered a potential route of exposure.

Most important symptoms and effects, both acute and

delayed

May cause cardiac arrhythmia.

Other symptoms potentially related to misuse or inhalation

abuse are

Cardiac sensitization Anaesthetic effects Light-headedness

Dizziness confusion

Lack of coordination

**Drowsiness** Unconsciousness

Contact with liquid or refrigerated gas can cause cold burns

and frostbite.



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Protection of first-aiders : No special precautions are necessary for first aid responders.

Notes to physician : Because of possible disturbances of cardiac rhythm, ca-

techolamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with spe-

cial caution.

#### **SECTION 5. FIRE-FIGHTING MEASURES**

Suitable extinguishing media : Not applicable

Will not burn

Unsuitable extinguishing

media

Not applicable Will not burn

Specific hazards during fire

fighting

Exposure to combustion products may be a hazard to health.

If the temperature rises there is danger of the vessels bursting

due to the high vapor pressure.

Hazardous combustion prod-

ucts

Hydrogen fluoride carbonyl fluoride

Carbon oxides

Specific extinguishing meth-

ods

Use extinguishing measures that are appropriate to local cir-

cumstances and the surrounding environment. Fight fire remotely due to the risk of explosion.

Use water spray to cool unopened containers.

Remove undamaged containers from fire area if it is safe to do

SO.

Evacuate area.

Special protective equipment:

for fire-fighters

Wear self-contained breathing apparatus for firefighting if

necessary.

Use personal protective equipment.

### **SECTION 6. ACCIDENTAL RELEASE MEASURES**

Personal precautions, protec: :

tive equipment and emergency procedures

Evacuate personnel to safe areas.

Avoid skin contact with leaking liquid (danger of frostbite).

Ventilate the area.

Follow safe handling advice (see section 7) and personal pro-

tective equipment recommendations (see section 8).

Environmental precautions : Avoid release to the environment.

Prevent further leakage or spillage if safe to do so. Retain and dispose of contaminated wash water.

Methods and materials for

containment and cleaning up

Ventilate the area.

Local or national regulations may apply to releases and dispo-

sal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine

which regulations are applicable.



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Sections 13 and 15 of this SDS provide information regarding

certain local or national requirements.

#### **SECTION 7. HANDLING AND STORAGE**

Use equipment rated for cylinder pressure. Use a backflow Technical measures

preventative device in piping. Close valve after each use and

when empty.

Local/Total ventilation Use only with adequate ventilation.

Advice on safe handling Avoid breathing gas.

Handle in accordance with good industrial hygiene and safety

practice, based on the results of the workplace exposure as-

sessment

Wear cold insulating gloves/ face shield/ eye protection. Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet

piped to use point.

Use a check valve or trap in the discharge line to prevent ha-

zardous back flow into the cylinder. Prevent backflow into the gas tank.

Use a pressure reducing regulator when connecting cylinder

to lower pressure (<3000 psig) piping or systems.

Close valve after each use and when empty. Do NOT change

or force fit connections.

Prevent the intrusion of water into the gas tank.

Never attempt to lift cylinder by its cap. Do not drag, slide or roll cylinders.

Use a suitable hand truck for cylinder movement.

Keep away from heat and sources of ignition.

Take precautionary measures against static discharges.

Take care to prevent spills, waste and minimize release to the

environment.

Cylinders should be stored upright and firmly secured to pre-Conditions for safe storage

vent falling or being knocked over.

Separate full containers from empty containers.

Do not store near combustible materials.

Avoid area where salt or other corrosive materials are present.

Keep in properly labeled containers. Keep in a cool, well-ventilated place. Keep away from direct sunlight.

Store in accordance with the particular national regulations.

Materials to avoid Do not store with the following product types:

Self-reactive substances and mixtures

Organic peroxides Oxidizing agents Flammable liquids Flammable solids Pyrophoric liquids Pyrophoric solids



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Self-heating substances and mixtures

Substances and mixtures which in contact with water emit

flammable gases

**Explosives** 

Acutely toxic substances and mixtures

Substances and mixtures with chronic toxicity

Recommended storage tem-

perature

< 52 °C

Storage period : > 10 y

Further information on stor-

age stability

The product has an indefinite shelf life when stored properly.

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

#### Ingredients with workplace control parameters

Contains no substances with occupational exposure limit values.

**Engineering measures** : Ensure adequate ventilation, especially in confined areas.

Minimize workplace exposure concentrations.

Personal protective equipment

Respiratory protection : If adequate local exhaust ventilation is not available or expo-

sure assessment demonstrates exposures outside the re-

commended guidelines, use respiratory protection.

Filter type : Organic gas and low boiling vapor type

Hand protection

Material : Low temperature resistant gloves

Remarks : Choose gloves to protect hands against chemicals depending

on the concentration specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday. Breakthrough time is not determined for the pro-

duct. Change gloves often!

Eye protection : Wear the following personal protective equipment:

Chemical resistant goggles must be worn.

Face-shield

Skin and body protection : Skin should be washed after contact.

Protective measures : Wear cold insulating gloves/ face shield/ eye protection.

Hygiene measures : If exposure to chemical is likely during typical use, provide



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eye flushing systems and safety showers close to the wor-

king place.

When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

#### **SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

Appearance : Liquefied gas

Color : colorless

Odor : slight, ether-like

Odor Threshold : No data available

pH : No data available

Melting point/freezing point : -108 °C

Initial boiling point and boiling

range

-26 °C

(1,013 hPa)

Flash point : Not applicable

Evaporation rate : > 1

(CCL4=1.0)

Flammability (solid, gas) : Will not burn

Self-ignition : The substance or mixture is not classified as pyrophoric.

Upper explosion limit / Upper

flammability limit

Upper flammability limit

Method: ASTM E681

None.

Lower explosion limit / Lower

flammability limit

Lower flammability limit

Method: ASTM E681

None.

Vapor pressure : 5,700 hPa (20 °C)

Relative vapor density : No data available

Relative density : 1.208 (25 °C)

Density : 1.21 g/cm³ (25 °C)

(as liquid)

Solubility(ies)



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Water solubility : 1.5 g/l (25 °C)

Partition coefficient: n-

octanol/water

: log Pow: 1.06 (25 °C)

Autoignition temperature : > 743 °C

Decomposition temperature : No data available

Viscosity

Viscosity, kinematic : Not applicable

Explosive properties : Not explosive

Oxidizing properties : The substance or mixture is not classified as oxidizing.

Particle size : Not applicable

#### **SECTION 10. STABILITY AND REACTIVITY**

Reactivity : Not classified as a reactivity hazard.

Chemical stability : Stable if used as directed. Follow precautionary advice and

avoid incompatible materials and conditions.

Possibility of hazardous reac-

tions

Can react with strong oxidizing agents.

Conditions to avoid : This substance is not flammable in air at temperatures up to

100 °C (212 °F) at atmospheric pressure. However, mixtures of this substance with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. This substance can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing this substance and air, or this substance in an oxygen enriched atmosphere become combustible depends on the inter-relationship of 1) the temperature 2) the pressure, and 3) the proportion of oxygen in the mixture. In general, this substance should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example this substance should NOT be mixed with air under pressure for leak testing or other

purposes.

Heat, flames and sparks.

Incompatible materials : Oxidizing agents

Hazardous decomposition

products

No hazardous decomposition products are known.



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#### **SECTION 11. TOXICOLOGICAL INFORMATION**

### Information on likely routes of exposure

Inhalation Skin contact Eye contact

#### **Acute toxicity**

Not classified based on available information.

# **Components:**

#### 1,1,1,2-Tetrafluoroethane:

Acute oral toxicity : Assessment: The substance or mixture has no acute oral tox-

icity

Acute inhalation toxicity : LC50 (Rat): > 567000 ppm

Exposure time: 4 h Test atmosphere: gas

Method: OECD Test Guideline 403

No observed adverse effect concentration (Dog): 40000 ppm

Test atmosphere: gas

Remarks: Cardiac sensitization

Lowest observed adverse effect concentration (Dog): 80000

ppm

Test atmosphere: gas

Symptoms: May cause cardiac arrhythmia.

Cardiac sensitisation threshold limit (Dog): 334,000 mg/m<sup>3</sup>

Test atmosphere: gas

Symptoms: May cause cardiac arrhythmia.

Acute dermal toxicity : Assessment: The substance or mixture has no acute dermal

toxicity

#### Skin corrosion/irritation

Not classified based on available information.

### **Components:**

# 1,1,1,2-Tetrafluoroethane:

Result : No skin irritation

### Serious eye damage/eye irritation

Not classified based on available information.

### **Components:**

## 1,1,1,2-Tetrafluoroethane:

Result : No eye irritation



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#### Respiratory or skin sensitization

#### Skin sensitization

Not classified based on available information.

#### Respiratory sensitization

Not classified based on available information.

#### **Components:**

#### 1,1,1,2-Tetrafluoroethane:

Routes of exposure : Skin contact Result : negative

Routes of exposure : Inhalation Species : Rat : negative

Routes of exposure : Inhalation Species : Humans Result : negative

#### Germ cell mutagenicity

Not classified based on available information.

#### **Components:**

#### 1,1,1,2-Tetrafluoroethane:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)

Method: OECD Test Guideline 471

Result: negative

Test Type: Chromosome aberration test in vitro

Method: OECD Test Guideline 473

Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo

cytogenetic assay) Species: Mouse

Application Route: inhalation (gas) Method: OECD Test Guideline 474

Result: negative

Test Type: Unscheduled DNA synthesis (UDS) test with

mammalian liver cells in vivo

Species: Rat

Application Route: inhalation (gas) Method: OECD Test Guideline 486

Result: negative

Germ cell mutagenicity -

Assessment

Weight of evidence does not support classification as a germ

cell mutagen.



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## Carcinogenicity

Not classified based on available information.

#### **Components:**

# 1,1,1,2-Tetrafluoroethane:

**Species** Rat

**Application Route** inhalation (gas)

Exposure time 2 Years

Method **OECD Test Guideline 453** 

Result negative

Carcinogenicity - Assess-

Weight of evidence does not support classification as a carment

cinogen

#### Reproductive toxicity

Not classified based on available information.

#### **Components:**

#### 1,1,1,2-Tetrafluoroethane:

Effects on fertility Species: Mouse

Application Route: Inhalation

Result: negative

Effects on fetal development Test Type: Combined repeated dose toxicity study with the

reproduction/developmental toxicity screening test

Species: Rabbit

Application Route: inhalation (gas) Method: OECD Test Guideline 414

Result: negative

Reproductive toxicity - As-

sessment

Weight of evidence does not support classification for repro-

ductive toxicity

# STOT-single exposure

Not classified based on available information.

# **Components:**

### 1,1,1,2-Tetrafluoroethane:

Routes of exposure inhalation (gas)

No significant health effects observed in animals at concentra-Assessment

tions of 20000 ppmV/4h or less

# STOT-repeated exposure

Not classified based on available information.

#### Components:

### 1,1,1,2-Tetrafluoroethane:

Routes of exposure inhalation (gas)

Assessment No significant health effects observed in animals at concentra-



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tions of 250 ppmV/6h/d or less.

#### Repeated dose toxicity

#### **Components:**

#### 1,1,1,2-Tetrafluoroethane:

Species : Rat, male and female

NOAEL : 50000 ppm LOAEL : >50000 ppm Application Route : inhalation (gas)

Exposure time : 2 y

Method : OECD Test Guideline 453

# **Aspiration toxicity**

Not classified based on available information.

#### **Components:**

#### 1,1,1,2-Tetrafluoroethane:

No aspiration toxicity classification

#### **SECTION 12. ECOLOGICAL INFORMATION**

#### **Ecotoxicity**

#### Components:

## 1,1,1,2-Tetrafluoroethane:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 450 mg/l

Exposure time: 96 h

Method: Regulation (EC) No. 440/2008, Annex, C.1

Toxicity to daphnia and other :

aquatic invertebrates

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

Exposure time: 48 h

Method: Regulation (EC) No. 440/2008, Annex, C.2

Toxicity to algae/aquatic

ErC50 (green algae): > 100 mg/l

plants

Exposure time: 96 h

Remarks: Based on data from similar materials

## Persistence and degradability

#### Components:

#### 1,1,1,2-Tetrafluoroethane:

Biodegradability : Result: Not readily biodegradable.

Method: OECD Test Guideline 301D



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## **Bioaccumulative potential**

#### Components:

1,1,1,2-Tetrafluoroethane:

Bioaccumulation Remarks: Bioaccumulation is unlikely.

Partition coefficient: n-

octanol/water

log Pow: 1.06

Mobility in soil

No data available

Other adverse effects

No data available

#### **SECTION 13. DISPOSAL CONSIDERATIONS**

**Disposal methods** 

Waste from residues Dispose of in accordance with local regulations.

Contaminated packaging Empty containers should be taken to an approved waste

handling site for recycling or disposal.

Empty pressure vessels should be returned to the supplier. If not otherwise specified: Dispose of as unused product.

#### **SECTION 14. TRANSPORT INFORMATION**

#### International Regulations

**UNRTDG** 

**UN** number UN 3159

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

Class 2.2

Packing group Not assigned by regulation

Labels

IATA-DGR

UN/ID No. UN 3159

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

Class 2.2

Packing group Not assigned by regulation Labels Non-flammable, non-toxic Gas

Packing instruction (cargo

aircraft)

200

200

Packing instruction (passen-

ger aircraft)

**IMDG-Code** 

**UN** number UN 3159

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

Class 2.2



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Packing group : Not assigned by regulation

Labels : 2.2 EmS Code : F-C, S-V Marine pollutant : no

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

Not applicable for product as supplied.

### **Domestic regulation**

**TDG** 

UN number : UN 3159

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

Class : 2.2

Packing group : Not assigned by regulation

Labels : 2.2 ERG Code : 126 Marine pollutant : no

#### Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

# **SECTION 15. REGULATORY INFORMATION**

#### International Regulations

Montreal Protocol : 1,1,1,2-Tetrafluoroethane

#### **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.

### Full text of other abbreviations

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemi-



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cal Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration: NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods: TSCA - Toxic Substances Control Act (United States): UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

Sources of key data used to

compile the Material Safety

Data Sheet

Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agen-

cy, http://echa.europa.eu/

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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 is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

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