

# SAFETY DATA SHEET



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

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 14.04.2023  |
| 7.5     | 19.10.2023     | 1325464-00050 | Date of first issue: 27.02.2017 |

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### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1 Product identifier

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

SDS-Identcode : 130000000349

REACH Registration Number : 01-2119459374-33-0002

Substance name : 1,1,1,2-Tetrafluoroethane

EC-No. : 212-377-0

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

Use of the Sub-stance/Mixture : Refrigerant

Recommended restrictions : For professional and industrial installation and use only.  
on use

#### 1.3 Details of the supplier of the safety data sheet

Company : Chemours Netherlands B.V.  
Baanhoekweg 22  
3313 LA Dordrecht Netherlands

Telephone : +31-(0)-78-630-1011

Telefax : +31-78-6163737

E-mail address of person responsible for the SDS : sds-support@chemours.com

#### 1.4 Emergency telephone number

+(44)-870-8200418 (CHEMTREC - Recommended)

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### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

##### Classification (REGULATION (EC) No 1272/2008)

Gases under pressure, Liquefied gas H280: Contains gas under pressure; may explode if heated.

#### 2.2 Label elements

##### Labelling (REGULATION (EC) No 1272/2008)

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|                |                              |                              |   |
|----------------|------------------------------|------------------------------|---|
| Version<br>7.5 | Revision Date:<br>19.10.2023 | SDS Number:<br>1325464-00050 | Date of last issue: 14.04.2023<br>Date of first issue: 27.02.2017 |
|----------------|------------------------------|------------------------------|---|

Hazard pictograms :



Signal word : Warning

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

Precautionary statements : **Storage:**  
P410 + P403 Protect from sunlight. Store in a well-ventilated place.

### 2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Vapours 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 cardiac effects.

Rapid evaporation of the product may cause frostbite.

May displace oxygen and cause rapid suffocation.

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

Substance name : 1,1,1,2-Tetrafluoroethane

EC-No. : 212-377-0

#### Components

| Chemical name             | CAS-No.<br>EC-No.     | Concentration (% w/w) |
|---------------------------|-----------------------|-----------------------|
| 1,1,1,2-Tetrafluoroethane | 811-97-2<br>212-377-0 | >= 99,9 - <= 100      |

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.  
When symptoms persist or in all cases of doubt seek medical advice.

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

If inhaled : If inhaled, remove to fresh air.

# SAFETY DATA SHEET



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|                |                              |                              |   |
|----------------|------------------------------|------------------------------|---|
| Version<br>7.5 | Revision Date:<br>19.10.2023 | SDS Number:<br>1325464-00050 | Date of last issue: 14.04.2023<br>Date of first issue: 27.02.2017 |
|----------------|------------------------------|------------------------------|---|

- If not breathing, give artificial respiration.  
If breathing is difficult, give oxygen.  
Get medical attention immediately.
- In case of skin contact : Thaw frosted parts with lukewarm water. Do not rub affected area.  
Get medical attention immediately.
- In case of eye contact : Get medical attention immediately.
- If swallowed : Ingestion is not considered a potential route of exposure.

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

- Symptoms : May cause cardiac arrhythmia.
- Other symptoms potentially related to misuse or inhalation abuse are  
Cardiac sensitisation  
Anaesthetic effects  
Light-headedness  
Dizziness  
confusion  
Lack of coordination  
Drowsiness  
Unconsciousness
- Risks : Gas reduces oxygen available for breathing.  
Contact with liquid or refrigerated gas can cause cold burns and frostbite.

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

- Treatment : 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

### 5.1 Extinguishing media

- Suitable extinguishing media : Not applicable  
Will not burn
- Unsuitable extinguishing media : Not applicable  
Will not burn

### 5.2 Special hazards arising from the substance or mixture

- 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- : Hydrogen fluoride

# SAFETY DATA SHEET



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|                |                              |                              |   |
|----------------|------------------------------|------------------------------|---|
| Version<br>7.5 | Revision Date:<br>19.10.2023 | SDS Number:<br>1325464-00050 | Date of last issue: 14.04.2023<br>Date of first issue: 27.02.2017 |
|----------------|------------------------------|------------------------------|---|

ucts  
carbonyl fluoride  
Carbon oxides

### 5.3 Advice for firefighters

- Special protective equipment for firefighters : Wear self-contained breathing apparatus for firefighting if necessary. Use personal protective equipment.
- Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances 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.

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

- Personal precautions : 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 protective equipment recommendations (see section 8).

### 6.2 Environmental precautions

- Environmental precautions : Avoid release to the environment.  
Prevent further leakage or spillage if safe to do so.  
Retain and dispose of contaminated wash water.

### 6.3 Methods and material for containment and cleaning up

- Methods for cleaning up : Ventilate the area.  
Local or national regulations may apply to releases and disposal 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.  
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

### 6.4 Reference to other sections

See sections: 7, 8, 11, 12 and 13.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

- Technical measures : Use equipment rated for cylinder pressure. Use a backflow preventative device in piping. Close valve after each use and when empty.

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

|         |                |               |                                 |
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| 7.5     | 19.10.2023     | 1325464-00050 | Date of first issue: 27.02.2017 |

- 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 assessment  
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.  
Prevent backflow into the gas tank.  
Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.  
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.
- Hygiene measures : If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place. When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

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

- Requirements for storage areas and containers : Cylinders should be stored upright and firmly secured to prevent 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 labelled containers. Keep in a cool, well-ventilated place. Keep away from direct sunlight. Store in accordance with the particular national regulations.
- Advice on common storage : 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  
Self-heating substances and mixtures  
Substances and mixtures, which in contact with water, emit flammable gases  
Explosives  
Very acutely toxic substances and mixtures

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Acutely toxic substances and mixtures  
Substances and mixtures with chronic toxicity

Storage period : > 10 yr

Recommended storage temperature : < 52 °C

Further information on storage stability : The product has an indefinite shelf life when stored properly.

### 7.3 Specific end use(s)

Specific use(s) : No data available

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

Contains no substances with occupational exposure limit values.

#### Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

| Substance name            | End Use   | Exposure routes | Potential health effects   | Value                   |
|---------------------------|-----------|-----------------|----------------------------|-------------------------|
| 1,1,1,2-Tetrafluoroethane | Workers   | Inhalation      | Long-term systemic effects | 13936 mg/m <sup>3</sup> |
|                           | Consumers | Inhalation      | Long-term systemic effects | 2476 mg/m <sup>3</sup>  |

#### Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

| Substance name            | Environmental Compartment | Value                        |
|---------------------------|---------------------------|------------------------------|
| 1,1,1,2-Tetrafluoroethane | Fresh water               | 0,1 mg/l                     |
|                           | Marine water              | 0,01 mg/l                    |
|                           | Intermittent use/release  | 1 mg/l                       |
|                           | Fresh water sediment      | 0,75 mg/kg dry weight (d.w.) |
|                           | Sewage treatment plant    | 73 mg/l                      |

### 8.2 Exposure controls

#### Engineering measures

Ensure adequate ventilation, especially in confined areas.  
Minimize workplace exposure concentrations.

#### Personal protective equipment

Eye/face protection : Wear the following personal protective equipment:  
Chemical resistant goggles must be worn.  
Face-shield

Hand protection  
Material : Low temperature resistant gloves

# SAFETY DATA SHEET



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|                |                              |                              |   |
|----------------|------------------------------|------------------------------|---|
| Version<br>7.5 | Revision Date:<br>19.10.2023 | SDS Number:<br>1325464-00050 | Date of last issue: 14.04.2023<br>Date of first issue: 27.02.2017 |
|----------------|------------------------------|------------------------------|---|

|                          |   |
|--------------------------|---|
| Remarks                  | : Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and 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 product. Change gloves often! |
| Skin and body protection | : Skin should be washed after contact.  |
| Respiratory protection   | : If adequate local exhaust ventilation is not available or exposure assessment demonstrates exposures outside the recommended guidelines, use respiratory protection.  |
| Filter type              | : Organic gas and low boiling vapour type (AX)  |
| Protective measures      | : Wear cold insulating gloves/ face shield/ eye protection.   |

### SECTION 9: Physical and chemical properties

#### 9.1 Information on basic physical and chemical properties

|  |  |
|--|--|
| Appearance                                       | : Liquefied gas  |
| Colour   | : colourless   |
| Odour  | : slight, ether-like                                     |
| Odour 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<br>(CCL4=1.0)                                      |
| Flammability (solid, gas)                        | : Will not burn  |
| Upper explosion limit / Upper flammability limit | : Upper flammability limit<br>Method: ASTM E681<br>None. |
| Lower explosion limit / Lower flammability limit | : Lower flammability limit<br>Method: ASTM E681<br>None. |

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|                |                              |                              |   |
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|----------------|------------------------------|------------------------------|---|

|  |  |
|--|--|
| Vapour pressure                        | : 5.700 hPa (20 °C)  |
| Relative vapour density                | : No data available  |
| Relative density                       | : 1,208 (25 °C)  |
| Density                                | : 1,21 g/cm <sup>3</sup> (25 °C)<br>(as liquid)            |
| Solubility(ies)<br>Water solubility    | : 1,5 g/l (25 °C)  |
| Partition coefficient: n-octanol/water | : log Pow: 1,06 (25 °C)                                    |
| Auto-ignition temperature              | : > 743 °C   |
| Decomposition temperature              | : No data available  |
| Viscosity<br>Viscosity, kinematic      | : Not applicable   |
| Explosive properties                   | : Not explosive  |
| Oxidizing properties                   | : The substance or mixture is not classified as oxidizing. |

### 9.2 Other information

|               |   |
|---------------|---|
| Particle size | : Not applicable  |
| Self-ignition | : The substance or mixture is not classified as pyrophoric. |

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

Not classified as a reactivity hazard.

### 10.2 Chemical stability

Stable if used as directed. Follow precautionary advice and avoid incompatible materials and conditions.

### 10.3 Possibility of hazardous reactions

|                     |   |
|---------------------|---|
| Hazardous reactions | : Can react with strong oxidizing agents. |
|---------------------|---|

### 10.4 Conditions to avoid

|                     |   |
|---------------------|---|
| 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 be- |
|---------------------|---|



# SAFETY DATA SHEET



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|         |                |               |                                 |
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| 7.5     | 19.10.2023     | 1325464-00050 | Date of first issue: 27.02.2017 |

come 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.

### 10.5 Incompatible materials

Materials to avoid : Oxidizing agents

### 10.6 Hazardous decomposition products

No hazardous decomposition products are known.

## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

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 toxicity

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 sensitisation

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

# SAFETY DATA SHEET



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|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 14.04.2023  |
| 7.5     | 19.10.2023     | 1325464-00050 | Date of first issue: 27.02.2017 |

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

### Respiratory or skin sensitisation

#### Skin sensitisation

Not classified based on available information.

#### Respiratory sensitisation

Not classified based on available information.

### Components:

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

Exposure routes : Skin contact  
Result : negative

Exposure routes : Inhalation  
Species : Rat  
Result : negative

Exposure routes : 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

# SAFETY DATA SHEET



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

|                |                              |                              |   |
|----------------|------------------------------|------------------------------|---|
| Version<br>7.5 | Revision Date:<br>19.10.2023 | SDS Number:<br>1325464-00050 | Date of last issue: 14.04.2023<br>Date of first issue: 27.02.2017 |
|----------------|------------------------------|------------------------------|---|

|                                    |  |
|------------------------------------|--|
|                                    | Test Type: Chromosome aberration test in vitro<br>Method: OECD Test Guideline 473<br>Result: negative  |
| Genotoxicity in vivo               | : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)<br>Species: Mouse<br>Application Route: inhalation (gas)<br>Method: OECD Test Guideline 474<br>Result: negative |
|                                    | Test Type: Unscheduled DNA synthesis (UDS) test with mammalian liver cells in vivo<br>Species: Rat<br>Application Route: inhalation (gas)<br>Method: OECD Test Guideline 486<br>Result: negative |
| Germ cell mutagenicity- Assessment | : Weight of evidence does not support classification as a germ cell mutagen.   |

### 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 - Assessment | : Weight of evidence does not support classification as a carcinogen |
|------------------------------|--|

### Reproductive toxicity

Not classified based on available information.

#### Components:

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

|                      |   |
|----------------------|---|
| Effects on fertility | : Species: Mouse<br>Application Route: Inhalation<br>Result: negative |
|----------------------|---|

|                               |   |
|-------------------------------|---|
| Effects on foetal development | : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test<br>Species: Rabbit<br>Application Route: inhalation (gas)<br>Method: OECD Test Guideline 414<br>Result: negative |
|-------------------------------|---|

# SAFETY DATA SHEET



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

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 14.04.2023  |
| 7.5     | 19.10.2023     | 1325464-00050 | Date of first issue: 27.02.2017 |

Reproductive toxicity - Assessment : Weight of evidence does not support classification for reproductive toxicity

### STOT - single exposure

Not classified based on available information.

#### Components:

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

Exposure routes : inhalation (gas)  
Assessment : No significant health effects observed in animals at concentrations of 20000 ppmV/4h or less

### STOT - repeated exposure

Not classified based on available information.

#### Components:

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

Exposure routes : inhalation (gas)  
Assessment : No significant health effects observed in animals at concentrations 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 yr  
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

### 12.1 Toxicity

#### Components:

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

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

# SAFETY DATA SHEET



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

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 14.04.2023  |
| 7.5     | 19.10.2023     | 1325464-00050 | Date of first issue: 27.02.2017 |

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 plants : ErC50 (green algae): > 100 mg/l  
Exposure time: 96 h  
Remarks: Based on data from similar materials

### 12.2 Persistence and degradability

#### Components:

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

Biodegradability : Result: Not readily biodegradable.  
Method: OECD Test Guideline 301D

### 12.3 Bioaccumulative potential

#### Components:

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

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

Partition coefficient: n-octanol/water : log Pow: 1,06

### 12.4 Mobility in soil

#### Product:

Distribution among environmental compartments : Koc: 37,26, log Koc: 1,571

### 12.5 Results of PBT and vPvB assessment

#### Product:

Assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

### 12.6 Other adverse effects

#### Product:

Endocrine disrupting potential : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

# SAFETY DATA SHEET



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

|                |                              |                              |   |
|----------------|------------------------------|------------------------------|---|
| Version<br>7.5 | Revision Date:<br>19.10.2023 | SDS Number:<br>1325464-00050 | Date of last issue: 14.04.2023<br>Date of first issue: 27.02.2017 |
|----------------|------------------------------|------------------------------|---|

### SECTION 13: Disposal considerations

#### 13.1 Waste treatment methods

- |                        |   |
|------------------------|---|
| Product                | : Dispose of in accordance with local regulations. According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities. |
| 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

#### 14.1 UN number

- |      |           |
|------|-----------|
| ADN  | : UN 3159 |
| ADR  | : UN 3159 |
| RID  | : UN 3159 |
| IMDG | : UN 3159 |
| IATA | : UN 3159 |

#### 14.2 UN proper shipping name

- |      |                             |
|------|-----------------------------|
| ADN  | : 1,1,1,2-TETRAFLUOROETHANE |
| ADR  | : 1,1,1,2-TETRAFLUOROETHANE |
| RID  | : 1,1,1,2-TETRAFLUOROETHANE |
| IMDG | : 1,1,1,2-TETRAFLUOROETHANE |
| IATA | : 1,1,1,2-Tetrafluoroethane |

#### 14.3 Transport hazard class(es)

- |      | Class | Subsidiary risks |
|------|-------|------------------|
| ADN  | : 2   | 2.2              |
| ADR  | : 2   | 2.2              |
| RID  | : 2   | 2.2, (13)        |
| IMDG | : 2.2 |                  |
| IATA | : 2.2 |                  |

#### 14.4 Packing group

- |     |
|-----|
| ADN |
|-----|

# SAFETY DATA SHEET



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

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 14.04.2023  |
| 7.5     | 19.10.2023     | 1325464-00050 | Date of first issue: 27.02.2017 |

Packing group : Not assigned by regulation  
Classification Code : 2A  
Hazard Identification Number : 20  
Labels : 2.2

### ADR

Packing group : Not assigned by regulation  
Classification Code : 2A  
Hazard Identification Number : 20  
Labels : 2.2  
Tunnel restriction code : (C/E)

### RID

Packing group : Not assigned by regulation  
Classification Code : 2A  
Hazard Identification Number : 20  
Labels : 2.2 ((13))

### IMDG

Packing group : Not assigned by regulation  
Labels : 2.2  
EmS Code : F-C, S-V

### IATA (Cargo)

Packing instruction (cargo aircraft) : 200  
Packing group : Not assigned by regulation  
Labels : Non-flammable, non-toxic Gas

### IATA (Passenger)

Packing instruction (passenger aircraft) : 200  
Packing group : Not assigned by regulation  
Labels : Non-flammable, non-toxic Gas

## 14.5 Environmental hazards

### ADN

Environmentally hazardous : no

### ADR

Environmentally hazardous : no

### RID

Environmentally hazardous : no

### IMDG

Marine pollutant : no

## 14.6 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.

## 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Remarks : Not applicable for product as supplied.

# SAFETY DATA SHEET



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

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 14.04.2023  |
| 7.5     | 19.10.2023     | 1325464-00050 | Date of first issue: 27.02.2017 |

### SECTION 15: Regulatory information

#### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

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

#### 15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

### SECTION 16: Other information

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.

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

#### Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; 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; 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 Chemical 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; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; 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



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Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of very high concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; 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

### Further information

Sources of key data used to compile the Safety Data Sheet : Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <http://echa.europa.eu/>

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.

EG / EN