# SAFETY DATA SHEET

# Freon™ 410A (R-410A) Refrigerant

Chemours

| Version | Revision Date: | SDS Number: | Date of last issue: 06/01/2018 |
|---|---|---|---|
| 7.5 | 09/19/2018 | 1336421-00039 | Date of first issue: 02/27/2017 |

## SECTION 1. IDENTIFICATION

Product name : Freon™ 410A (R-410A) Refrigerant

Other means of identification : No data available

SDS-Identcode : 130000050990

**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 users 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 :

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.

**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

cardiac effects.
Rapid evaporation of the product may cause frostbite.

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

**Components**

| Chemical name | CAS-No. | Concentration (% w/w) |
|---|---|---|
| Pentafluoroethane* | 354-33-6 | 50 |
| Difluoromethane* | 75-10-5 | 50 |

* Voluntarily-disclosed non-hazardous substance

## SECTION 4. 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.

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 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.

Most important symptoms and effects, both acute and delayed : 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.

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

Notes to physician : Treat symptomatically and supportively.

## SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : Not applicable
Will not burn

| | | |
|---|---|---|
| Unsuitable extinguishing media | : | Not applicable<br>Will not burn |
| Specific hazards during fire fighting | : | Exposure to combustion products may be a hazard to health.<br>If the temperature rises there is danger of the vessels bursting due to the high vapor pressure. |
| Hazardous combustion products | : | Fluorine compounds<br>Carbon oxides<br>Hydrogen fluoride<br>carbonyl fluoride |
| Specific extinguishing methods | : | Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.<br>Fight fire remotely due to the risk of explosion.<br>Use water spray to cool unopened containers.<br>Remove undamaged containers from fire area if it is safe to do so.<br>Evacuate area. |
| Special protective equipment for fire-fighters | : | Wear self-contained breathing apparatus for firefighting if necessary.<br>Use personal protective equipment. |

## SECTION 6. ACCIDENTAL RELEASE MEASURES

| | | |
|---|---|---|
| Personal precautions, protective equipment and emergency procedures | : | Evacuate personnel to safe areas.<br>Avoid skin contact with leaking liquid (danger of frostbite).<br>Ventilate the area.<br>Follow safe handling advice and personal protective equipment recommendations. |
| Environmental precautions | : | Prevent further leakage or spillage if safe to do so.<br>Retain and dispose of contaminated wash water. |
| Methods and materials for containment and cleaning up | : | Ventilate the area.<br>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.<br>Sections 13 and 15 of this SDS provide information regarding certain local or national requirements. |

## SECTION 7. HANDLING AND STORAGE

| | | |
|---|---|---|
| Technical measures | : | Use equipment rated for cylinder pressure. Use a backflow preventative device in piping. Close valve after each use and when empty. |
| Local/Total ventilation | : | Use only with adequate ventilation. |
| Advice on safe handling | : | 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.
Prevent backflow into the gas tank.
Open the valves slowly to prevent pressure surges.
Close valve after each use and when empty. Do NOT change or force fit connections.
Prevent the intrusion of water into the gas tank.
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.

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 hazardous back flow into the cylinder.
Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems.
Never attempt to lift cylinder by its cap.
Do not drag, slide or roll cylinders.
Use a suitable hand truck for cylinder movement.

| | | |
|---|---|---|
| Conditions for safe storage | : | Cylinders should be stored upright and firmly secured to prevent falling or being knocked over.<br>Separate full containers from empty containers.<br>Do not store near combustible materials.<br>Avoid area where salt or other corrosive materials are present.<br>Keep in properly labeled containers.<br>Keep in a cool, well-ventilated place.<br>Keep away from direct sunlight.<br>Store in accordance with the particular national regulations. |
| Materials to avoid | : | Do not store with the following product types:<br>Self-reactive substances and mixtures<br>Organic peroxides<br>Oxidizing agents<br>Flammable liquids<br>Flammable solids<br>Pyrophoric liquids<br>Pyrophoric solids<br>Self-heating substances and mixtures<br>Substances and mixtures which in contact with water emit flammable gases<br>Explosives<br>Acutely toxic substances and mixtures<br>Substances and mixtures with chronic toxicity |
| Recommended storage temperature | : | < 52 °C |
| Storage period | : | > 10 y |
| Further information on storage 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 : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.

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 product. 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 : Ensure that eye flushing systems and safety showers are located close to the working 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 | : | No data available |
| Initial boiling point and boiling range | : | -51.6 °C<br>(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. |
| Vapor pressure | : | 16,530 hPa (25 °C)<br><br>30,520 hPa (50 °C) |
| Relative vapor density | : | 2.5 |
| Relative density | : | 1.06 (25 °C) |
| Density | : | 1.062 g/cm³ (25 °C)<br>(as liquid) |
| Solubility(ies)<br>Water solubility | : | No data available |
| Partition coefficient: n-octanol/water | : | Not applicable |
| Autoignition temperature | : | No data available |
| 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. |
| 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 reactions | : | Can react with strong oxidizing agents. |
| Conditions to avoid | : | Heat, flames and sparks. |
| Incompatible materials | : | Oxidizing agents |
| Hazardous decomposition products | : | No hazardous decomposition products are known. |

## SECTION 11. TOXICOLOGICAL INFORMATION

**Information on likely routes of exposure**

Inhalation
Skin contact
Eye contact

**Acute toxicity**

Not classified based on available information.

**Components:**

**Pentafluoroethane:**

Acute inhalation toxicity : LC0 (Rat): > 800000 ppm
Exposure time: 4 h
Test atmosphere: gas
Method: OECD Test Guideline 403

**Difluoromethane:**

Acute inhalation toxicity : LC50 (Rat): > 520000 ppm
Exposure time: 4 h
Test atmosphere: gas

Lowest observed adverse effect concentration (Dog): > 350000 ppm
Symptoms: Cardiac sensitization

No observed adverse effect concentration (Dog): 350000 ppm
Symptoms: Cardiac sensitization

Cardiac sensitisation threshold limit (Dog): > 735,000 mg/m³
Symptoms: Cardiac sensitization

**Skin corrosion/irritation**

Not classified based on available information.

**Components:**

**Difluoromethane:**

Species : Not tested on animals
Result : No skin irritation

**Serious eye damage/eye irritation**

Not classified based on available information.

**Components:**

**Difluoromethane:**

Species : Not tested on animals
Result : No eye irritation

**Respiratory or skin sensitization**

**Skin sensitization**

Not classified based on available information.

**Respiratory sensitization**

Not classified based on available information.

**Components:**

**Difluoromethane:**

Routes of exposure : Skin contact
Species : Not tested on animals
Result : negative

Species : Not tested on animals
Result : negative

**Germ cell mutagenicity**

Not classified based on available information.

**Components:**

**Pentafluoroethane:**

Genotoxicity in vitro : 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

**Difluoromethane:**

Germ cell mutagenicity - Assessment : Weight of evidence does not support classification as a germ cell mutagen.

**Carcinogenicity**

Not classified based on available information.

**Reproductive toxicity**

Not classified based on available information.

**Components:**

**Pentafluoroethane:**

| | | |
|---|---|---|
| Effects on fertility | : | Test Type: One-generation reproduction toxicity study<br>Species: Rat<br>Application Route: inhalation (vapor)<br>Result: negative<br>Remarks: Based on data from similar materials |
| Effects on fetal development | : | Test Type: Embryo-fetal development<br>Species: Rat<br>Application Route: inhalation (gas)<br>Method: OECD Test Guideline 414<br>Result: negative |

**Difluoromethane:**

| | | |
|---|---|---|
| Reproductive toxicity - Assessment | : | Weight of evidence does not support classification for reproductive toxicity, Based on data from similar materials |

**STOT-single exposure**

Not classified based on available information.

**STOT-repeated exposure**

Not classified based on available information.

**Components:**

**Difluoromethane:**

| | | |
|---|---|---|
| Assessment | : | No significant health effects observed in animals at concentrations of 250 ppmV/6h/d or less. |

**Repeated dose toxicity**

**Components:**

**Pentafluoroethane:**

| | | |
|---|---|---|
| Species | : | Rat |
| NOAEL | : | >= 50000 ppm |
| Application Route | : | inhalation (gas) |
| Exposure time | : | 13 Weeks |
| Method | : | OECD Test Guideline 413 |

**Difluoromethane:**

| | | |
|---|---|---|
| Species | : | Rat |
| NOAEL | : | 49100 ppm |
| Application Route | : | inhalation (gas) |
| Exposure time | : | 90 d |
| Remarks | : | No significant adverse effects were reported |

**Aspiration toxicity**

Not classified based on available information.

## SECTION 12. ECOLOGICAL INFORMATION

**Ecotoxicity**

**Components:**

**Pentafluoroethane:**

| | | |
|---|---|---|
| Toxicity to fish | : | LC50 (Oncorhynchus mykiss (rainbow trout)): 450 mg/l<br>Exposure time: 96 h<br>Method: Directive 67/548/EEC, Annex V, C.1.<br>Remarks: Based on data from similar materials |
| Toxicity to daphnia and other aquatic invertebrates | : | EC50 (Daphnia magna (Water flea)): 980 mg/l<br>Exposure time: 48 h<br>Method: Directive 67/548/EEC, Annex V, C.2.<br>Remarks: Based on data from similar materials |
| Toxicity to algae | : | EC50 (Pseudokirchneriella subcapitata (green algae)): > 114 mg/l<br>Exposure time: 72 h<br>Method: OECD Test Guideline 201<br>Remarks: Based on data from similar materials<br><br>NOEC (Pseudokirchneriella subcapitata (green algae)): 13.2 mg/l<br>Exposure time: 72 h<br>Method: OECD Test Guideline 201<br>Remarks: Based on data from similar materials |

**Difluoromethane:**

| | | |
|---|---|---|
| Toxicity to fish | : | LC50 (Fish): 1,507 mg/l<br>Exposure time: 96 h |
| Toxicity to daphnia and other aquatic invertebrates | : | EC50 (Daphnia): 652 mg/l<br>Exposure time: 48 h |
| Toxicity to algae | : | EC50 (algae): 142 mg/l<br>Exposure time: 96 h |
| Toxicity to fish (Chronic toxicity) | : | NOEC (Fish): 65.8 mg/l<br>Exposure time: 30 d |

**Persistence and degradability**

**Components:**

**Pentafluoroethane:**

| | | |
|---|---|---|
| Biodegradability | : | Result: Not readily biodegradable.<br>Biodegradation: 5 %<br>Exposure time: 28 d<br>Method: OECD Test Guideline 301D |

**Difluoromethane:**

Biodegradability : Result: Not readily biodegradable.
Biodegradation: 5 %
Exposure time: 28 d
Method: OECD Test Guideline 301D

**Bioaccumulative potential**

**Components:**

**Pentafluoroethane:**

Partition coefficient: n-octanol/water : Pow: 1.48 (25 °C)

**Difluoromethane:**

Partition coefficient: n-octanol/water : log Pow: 0.714

**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 3163
Proper shipping name : LIQUEFIED GAS, N.O.S.
(Pentafluoroethane, Difluoromethane)
Class : 2.2
Packing group : Not assigned by regulation
Labels : 2.2

**IATA-DGR**

UN/ID No. : UN 3163
Proper shipping name : Liquefied gas, n.o.s.
(Pentafluoroethane, Difluoromethane)

| | | |
|---|---|---|
| Class | : | 2.2 |
| Packing group | : | Not assigned by regulation |
| Labels | : | Non-flammable, non-toxic Gas |
| Packing instruction (cargo aircraft) | : | 200 |
| Packing instruction (passenger aircraft) | : | 200 |

**IMDG-Code**

| | | |
|---|---|---|
| UN number | : | UN 3163 |
| Proper shipping name | : | LIQUEFIED GAS, N.O.S. (Pentafluoroethane, Difluoromethane) |
| Class | : | 2.2 |
| 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 3163 |
| Proper shipping name | : | LIQUEFIED GAS, N.O.S. (Pentafluoroethane, Difluoromethane) |
| 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

## 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**

AICS - Australian Inventory of Chemical Substances; 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; CPR - Controlled Products Regulations; 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 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; 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 Agency, http://echa.europa.eu/ |
| Revision Date | : | 09/19/2018 |

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.

CA / Z8