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1. PRODUCT AND COMPANY IDENTIFICATION

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

SDS-Identcode : 13000000570

Manufacturer or supplier's details

Company : Chemours Netherlands B.V.

Address : Baanhoekweg 22

3313 LA Dordrecht Netherlands

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

Emergency telephone number : +(44)-870-8200418 (CHEMTREC - Recommended)

E-mail address : sds-support@chemours.com

Telefax : +31-78-6163737

Recommended use of the chemical and restrictions on use

Recommended use : Refrigerant

Restrictions on use : For professional users only.

2. HAZARDS IDENTIFICATION

GHS Classification

Gases under pressure : Liquefied gas

GHS label elements

Hazard pictograms

Signal word : Warning

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

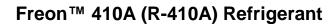
Precautionary statements : Storage:

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

place.

Other hazards which do not result in classification

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.





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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.

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

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

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

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

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 : Because of possible disturbances of cardiac rhythm, cate-

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

cial caution.

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5. FIREFIGHTING 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

Fluorine compounds Carbon oxides

Hydrogen fluoride carbonyl fluoride

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 firefighters

Wear self-contained breathing apparatus for firefighting if nec-

essary.

Use personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emer-

gency procedures

Evacuate personnel to safe areas.

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

Ventilate the area.

Follow safe handling advice and personal protective equip-

ment recommendations.

Environmental precautions : 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 disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to deter-

mine which regulations are applicable.

Sections 13 and 15 of this SDS provide information regarding

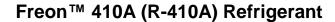
certain local or national requirements.

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.





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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 as-

sessment

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.

Avoid breathing gas.

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 haz-

ardous 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 pre-

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

keep away irom 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

Self-heating substances and mixtures

Substances and mixtures, which in contact with water, emit

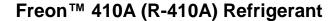
flammable gases

Explosives

Acutely toxic substances and mixtures

Substances and mixtures with chronic toxicity

Recommended storage tem- : < 52 °C





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perature

Storage period : > 10 yr

Further information on stor-

age stability

: The product has an indefinite shelf life when stored properly.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components 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 rec-

ommended guidelines, use respiratory protection.

Filter type : Organic gas and low boiling vapour type

Hand protection

Material : Heat resistant gloves

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!

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.

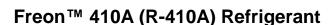
Hygiene measures : If exposure to chemical is likely during typical use, provide eye

flushing systems and safety showers close to the working

place.

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

9. PHYSICAL AND CHEMICAL PROPERTIES





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Appearance : Liquefied gas

Colour : colourless

Odour : slight, ether-like

Odour Threshold : No data available

pH : No data available

Melting point/freezing point : No data available

Initial boiling point and boiling

range

-51.4 °C (1,013 hPa)

Flash point : Not applicable

Evaporation rate : > 1

(CCL4=1.0)

Flammability (solid, gas) : Will not burn

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.

Vapour pressure : 16,574 hPa (25 °C)

Relative vapour density : No data available

Relative density : 1.06 (25 °C)

Density : 1.062 g/cm3 (25 °C)

(as liquid)

Solubility(ies)

Water solubility : No data available

Partition coefficient: n-

octanol/water

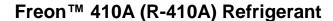
: Not applicable

Auto-ignition temperature : No data available

Decomposition temperature : No data available

Viscosity

Viscosity, kinematic : Not applicable





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Explosive properties : Not explosive

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

Particle size : Not applicable

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 : Heat, flames and sparks.

Incompatible materials : Oxidizing agents

Hazardous decomposition

products

No hazardous decomposition products are known.

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

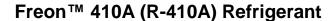
Lowest observed adverse effect concentration (Dog): >

350000 ppm

Symptoms: Cardiac sensitisation

No observed adverse effect concentration (Dog): 350000 ppm

Symptoms: Cardiac sensitisation





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

Symptoms: Cardiac sensitisation

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 sensitisation

Skin sensitisation

Not classified based on available information.

Respiratory sensitisation

Not classified based on available information.

Components:

Difluoromethane:

Exposure routes : 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

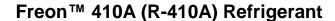
Method: OECD Test Guideline 473

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





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Result: negative

Difluoromethane:

Germ cell mutagenicity -

Weight of evidence does not support classification as a germ

Assessment 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

Species: Rat

Application Route: inhalation (vapour)

Result: negative

Remarks: Based on data from similar materials

Effects on foetal develop-

ment

Test Type: Embryo-foetal development

Species: Rat

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

Result: negative

Difluoromethane:

Reproductive toxicity - As-

sessment

Weight of evidence does not support classification for repro-

ductive 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 concentra-

tions 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

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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.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Pentafluoroethane:

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

Exposure time: 96 h

Method: Directive 67/548/EEC. Annex V. C.1. Remarks: Based on data from similar materials

Toxicity to daphnia and other :

aquatic invertebrates

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

Exposure time: 48 h

Method: Directive 67/548/EEC, Annex V, C.2. Remarks: Based on data from similar materials

Toxicity to algae/aquatic

plants

EC50 (Pseudokirchneriella subcapitata (green algae)): > 114

mg/l

Exposure time: 72 h

Method: OECD Test Guideline 201

Remarks: Based on data from similar materials

NOEC (Pseudokirchneriella subcapitata (green algae)): 13.2

mg/l

Exposure time: 72 h

Method: OECD Test Guideline 201

Remarks: Based on data from similar materials

Difluoromethane:

Toxicity to fish LC50 (Fish): 1,507 mg/l

Exposure time: 96 h

Toxicity to daphnia and other :

aquatic invertebrates

EC50 (Daphnia (water flea)): 652 mg/l

Exposure time: 48 h

Toxicity to algae/aquatic

plants

Exposure time: 96 h

EC50 (algae): 142 mg/l

Toxicity to fish (Chronic tox-

icity)

NOEC: 65.8 mg/l

Exposure time: 30 d

Species: Fish

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Persistence and degradability

Components:

Pentafluoroethane:

Biodegradability : Result: Not readily biodegradable.

Biodegradation: 5 % Exposure time: 28 d

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

Product:

Results of PBT and vPvB

assessment

This mixture contains no substance considered to be persis-

tent, bioaccumulating and toxic (PBT).

This mixture contains no substance considered to be very

persistent and very bioaccumulating (vPvB).

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 han-

dling site for recycling or disposal.

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

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14. TRANSPORT INFORMATION

International Regulations

UNRTDG

UN number : UN 1078

Proper shipping name : REFRIGERANT GAS, N.O.S.

(Pentafluoroethane, Difluoromethane)

Class : 2.2

Packing group : Not assigned by regulation

Labels : 2.2

IATA-DGR

UN/ID No. : UN 1078

Proper shipping name : Refrigerant 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)

Packing instruction (passen- : 200

ger aircraft)

IMDG-Code

UN number : UN 1078

Proper shipping name : REFRIGERANT 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 IMO instruments

Not applicable for product as supplied.

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.

15. REGULATORY INFORMATION

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

Montreal Protocol (Ozone Depleting Substances) : Pentafluoroethane

Difluoromethane

16. OTHER INFORMATION

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Other information : Freon™ and any associated logos are trademarks or copy-

rights 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.

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 Agen-

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

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; 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

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



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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.

AE / EN