



Version Revision Date: SDS Number: Date of last issue: 09/12/2017 7.1 10/23/2017 1329809-00036 Date of first issue: 02/27/2017

SECTION 1. IDENTIFICATION

Product name : Freon™ 22 (R-22) Refrigerant

SDS-Identcode : 130000024323

Manufacturer or supplier's details

Company name of supplier : The Chemours Company FC, LLC

Address : 1007 Market Street

Wilmington, DE 19899 United States of America (USA)

Telephone : 1-844-773-CHEM (outside the U.S. 1-302-773-1000)

Emergency telephone : Medical emergency: 1-866-595-1473 (outside the U.S. 1-302-

773-2000); Transport emergency: +1-800-424-9300 (outside

the U.S. +1-703-527-3887)

Recommended use of the chemical and restrictions on use

Recommended use : Refrigerant

Restrictions on use : For industrial use only.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200

Gases under pressure : Liquefied gas

Simple Asphyxiant

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.

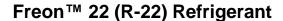
Precautionary Statements : Storage:

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

place.

Other hazards

Dangerous for the ozone layer.





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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 : Substance

Substance name : Chlorodifluoromethane

CAS-No. : 75-45-6

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
Chlorodifluoromethane	75-45-6	100

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

May cause cardiac arrhythmia.

Inhalation of high concentration may cause

Anaesthetic effects

Dizziness confusion

Light-headedness Drowsiness Unconsciousness Irregular cardiac activity

fainting Weakness

Lack of coordination

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.

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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

No hazardous combustion products are known

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 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

equipment 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

determine which regulations are applicable.

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.

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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.

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

hazardous 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.

Conditions for safe storage : 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 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

Self-heating substances and mixtures

Substances and mixtures which in contact with water emit

flammable gases Explosives

Acutely toxic substances and mixtures

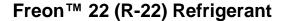
Substances and mixtures with chronic toxicity

Recommended storage tem-

perature

< 52 °C

Storage period : > 10 y





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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

Ingredients	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Chlorodifluoromethane	75-45-6	TWA	1,000 ppm	ACGIH
		ST	1,250 ppm 4,375 mg/m ³	NIOSH REL
		TWA	1,000 ppm 3,500 mg/m ³	NIOSH REL

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

Minimize workplace exposure concentrations.

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to

maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided

by air purifying respirators against exposure to any

hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other

circumstance where air purifying respirators may not provide

adequate protection.

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

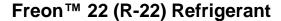
product. Change gloves often!

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.





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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 : odorless, slight, sweet

Odor Threshold : No data available

pH : No data available

Melting point/freezing point : -160 °C

Initial boiling point and boiling

range

-40.8 °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 : 9,135 hPa (20 °C)

Relative vapor density : 3

Relative density : 1.19 (25 °C)

Density : 1.191 g/cm³ (25 °C)

(as liquid)

Solubility(ies)

Water solubility : 2.6 g/l (25 °C)

Partition coefficient: n- : log Pow: 0.053 (25 °C)





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octanol/water

Autoignition temperature : 632 - 635 °C

Decomposition temperature : 632 °C

Viscosity

Viscosity, dynamic : 0.22 mPa.s (10 °C)

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 : 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.

Ingredients:

Chlorodifluoromethane:

Acute inhalation toxicity : LC50 (Mouse): > 150000 ppm

Exposure time: 4 h Test atmosphere: gas

Lowest observed adverse effect concentration (Dog): 50000

ppm

Test atmosphere: gas

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Symptoms: Cardiac sensitization

No observed adverse effect concentration (Dog): 25000 ppm

Test atmosphere: gas

Symptoms: Cardiac sensitization

Cardiac sensitisation threshold limit (Dog): 175,000 mg/m³

Test atmosphere: gas

Symptoms: Cardiac sensitization

Skin corrosion/irritation

Not classified based on available information.

Serious eye damage/eye irritation

Not classified based on available information.

Respiratory or skin sensitization

Skin sensitization

Not classified based on available information.

Respiratory sensitization

Not classified based on available information.

Ingredients:

Chlorodifluoromethane:

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

Result: negative

Germ cell mutagenicity

Not classified based on available information.

Ingredients:

Chlorodifluoromethane:

Germ cell mutagenicity -

: Weight of evidence does not support classification as a germ

Assessment cell mutagen.

Carcinogenicity

Not classified based on available information.

Ingredients:

Chlorodifluoromethane:

Carcinogenicity - Assess-

ment

: Weight of evidence does not support classification as a car-

cinogen

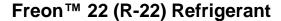
IARC No ingredient of this product present at levels greater than or

equal to 0.1% is identified as probable, possible or confirmed

human carcinogen by IARC.

OSHA No component of this product present at levels greater than or

equal to 0.1% is on OSHA's list of regulated carcinogens.





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NTP No ingredient of this product present at levels greater than or

equal to 0.1% is identified as a known or anticipated carcinogen

by NTP.

Reproductive toxicity

Not classified based on available information.

Ingredients:

Chlorodifluoromethane:

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

sessment reproductive toxicity

STOT-single exposure

Not classified based on available information.

STOT-repeated exposure

Not classified based on available information.

Ingredients:

Chlorodifluoromethane:

Assessment: No significant health effects observed in animals at concentrations of 250

ppmV/6h/d or less.

Repeated dose toxicity

Ingredients:

Chlorodifluoromethane:

Species: Mouse NOAEL: 10000 ppm LOAEL: 50000 ppm

Application Route: inhalation (gas)

Exposure time: 581 d

Remarks: No significant adverse effects were reported

Aspiration toxicity

Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Ingredients:

Chlorodifluoromethane:

Toxicity to fish : LC50 (Zebrafish): 777 mg/l

Exposure time: 96 h

Toxicity to daphnia and other :

aquatic invertebrates

EC50 (Daphnia magna (Water flea)): 433 mg/l

Exposure time: 48 h

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Toxicity to algae : EC50 (algae): 250 mg/l

Exposure time: 96 h

Persistence and degradability

Ingredients:

Chlorodifluoromethane:

Biodegradability : Result: Not readily biodegradable.

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

Product:

Results of PBT and vPvB

assessment

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be

very persistent and very bioaccumulating (vPvB).

Ingredients:

Chlorodifluoromethane:

Ozone-Depletion Potential

0.055

Where a range of ODPs is indicated, the highest value in that range shall be used for the purposes of the Protocol. The ODPs listed as a single value have been determined from calculations based on laboratory measurements. Those listed as a range are based on estimates and are less certain. The range pertains to an isomeric group. The upper value is the estimate of the ODP of the isomer with the highest ODP, and the lower value is the estimate of the ODP of the isomer with the lowest ODP.

Regulation: UNEP - Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer (Update: 2006-10-01)

Group: Annex C - Group I: HCFCs (consumption and production)

0.055

Includes all isomers of the substance, regardless of whether the isomer is explicitly listed on its own.

Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class II

Substances (Update: 2014-10-28)

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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 1018

Proper shipping name **REFRIGERANT GAS R 22**

Class 2.2

Packing group Not assigned by regulation

Labels 2.2

IATA-DGR

UN/ID No. UN 1018

Refrigerant gas R 22 Proper shipping name

Class 2.2

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

Packing instruction (cargo

aircraft)

Packing instruction (passen:

ger aircraft)

200

IMDG-Code

UN number UN 1018

REFRIGERANT GAS R 22 Proper shipping name

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

49 CFR

UN/ID/NA number UN 1018

Proper shipping name Refrigerant gas R 22

Class 2.2

Not assigned by regulation Packing group NON-FLAMMABLE GAS Labels

ERG Code 126

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Marine pollutant : no

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Gases under pressure

Simple Asphyxiant

SARA 313 : The following components are subject to reporting levels

established by SARA Title III, Section 313:

Chlorodifluoromethane 75-45-6 100 %

US State Regulations

Pennsylvania Right To Know

Chlorodifluoromethane 75-45-6

California Prop. 65

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

California List of Hazardous Substances

Chlorodifluoromethane 75-45-6

California Permissible Exposure Limits for Chemical Contaminants

Chlorodifluoromethane 75-45-6

International Regulations

Montreal Protocol (Ozone Depleting Substances) : Chlorodifluoromethane

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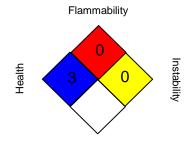


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SECTION 16. OTHER INFORMATION

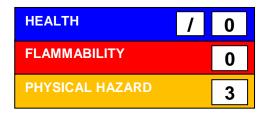
Further information

NFPA:



Special hazard.

HMIS® IV:



HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

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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.

All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

Full text of other abbreviations

ACGIH : USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL : USA. NIOSH Recommended Exposure Limits

ACGIH / TWA : 8-hour, time-weighted average

NIOSH REL / TWA : Time-weighted average concentration for up to a 10-hour

workday during a 40-hour workweek

NIOSH REL / ST : STEL - 15-minute TWA exposure that should not be exceeded

at any time during a workday

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; 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; HMIS - Hazardous Materials Identification System; 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

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50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; 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; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance 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

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

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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