

SAFETY DATA SHEET



Opteon™ XP40 (R-449A) Refrigerant

Sid Harvey item #'s XP40X110 & XP40X25

SDS# Z0575

Version 7.1 Revision Date: 10/03/2017 SDS Number: 1349484-00038 Date of last issue: 09/11/2017
Date of first issue: 02/27/2017

SECTION 1. IDENTIFICATION

Product name : Opteon™ XP40 (R-449A) Refrigerant, Opteon™ XP40 (R-449A) Refrigerant

Product code : D15437192, D15437192

SDS-Identcode : 130000133420

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 : Consumer use, For professional users 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.

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Other hazards

Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.
Rapid evaporation of the product may cause frostbite.
Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture
Chemical nature : Fluorinated hydrocarbons

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
1,1,1,2-Tetrafluoroethane*	811-97-2	25.7
2,3,3,3-Tetrafluoropropene*	754-12-1	25.3
Pentafluoroethane*	354-33-6	24.7
Difluoromethane*	75-10-5	24.3

* 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 : May cause cardiac arrhythmia.
Contact with liquid or refrigerated gas can cause cold burns and frostbite.
Other symptoms potentially related to misuse or inhalation abuse are
Cardiac sensitization
Anaesthetic effects
Light-headedness
Dizziness
confusion
Lack of coordination
Drowsiness
Unconsciousness
Skin contact may provoke the following symptoms:
Irritation

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Swelling of tissue
Itching
Discomfort
Redness
Eye contact may provoke the following symptoms
tearing
Redness
Discomfort

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
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 products : Hydrogen fluoride
carbonyl fluoride
Carbon oxides
Fluorine compounds

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.

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, protective equipment and emergency procedures : Evacuate personnel to safe areas.
Avoid skin contact with leaking liquid (danger of frostbite).
Ventilate the area.
Follow safe handling advice and personal protective equipment recommendations.

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

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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.

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

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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 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

Ingredients	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
1,1,1,2-Tetrafluoroethane	811-97-2	TWA	1,000 ppm	US WEEL
2,3,3,3-Tetrafluoropropene	754-12-1	TWA	500 ppm	US WEEL
Pentafluoroethane	354-33-6	TWA	1,000 ppm	US WEEL
Difluoromethane	75-10-5	TWA	1,000 ppm	US WEEL

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

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- 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 : clear
- 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 : -46 °C
- 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.
- Vapor pressure : 12,748 hPa (25 °C)

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Relative vapor density : 3.07
(Air = 1.0)

Relative density : 1.10 (25 °C)

Solubility(ies)
Water solubility : No data available

Partition coefficient: n-
octanol/water : Not applicable

Autoignition temperature : No data available

Decomposition temperature : No data available

Viscosity
Viscosity, kinematic : Not applicable

Explosive properties : Not explosive

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

Particle size : Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Not classified as a reactivity hazard.

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

Possibility of hazardous reac-
tions : Can react with strong oxidizing agents.

Conditions to avoid : 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:

1,1,1,2-Tetrafluoroethane:

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Acute inhalation toxicity : LC50 (Rat): > 567000 ppm
Exposure time: 4 h
Test atmosphere: gas

No observed adverse effect concentration (Dog): 40000 ppm
Test atmosphere: gas
Symptoms: Cardiac sensitization

Lowest observed adverse effect concentration (Dog): 80000 ppm
Test atmosphere: gas
Symptoms: Cardiac sensitization

Cardiac sensitisation threshold limit (Dog): 334,000 mg/m³
Test atmosphere: gas
Symptoms: Cardiac sensitization

2,3,3,3-Tetrafluoropropene:

Acute inhalation toxicity : LC50 (Rat): > 405000 ppm
Exposure time: 4 h
Test atmosphere: gas

Lowest observed adverse effect concentration (Dog): > 120000 ppm
Test atmosphere: gas
Symptoms: Cardiac sensitization

No observed adverse effect concentration (Dog): 120000 ppm
Test atmosphere: gas
Symptoms: Cardiac sensitization

Cardiac sensitisation threshold limit (Dog): > 559,509 mg/m³
Test atmosphere: gas
Symptoms: Cardiac sensitization

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

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

Skin corrosion/irritation

Not classified based on available information.

Ingredients:

1,1,1,2-Tetrafluoroethane:

Species: Rabbit

Result: No skin irritation

2,3,3,3-Tetrafluoropropene:

Species: Not tested on animals

Result: No skin irritation

Difluoromethane:

Species: Not tested on animals

Result: No skin irritation

Serious eye damage/eye irritation

Not classified based on available information.

Ingredients:

1,1,1,2-Tetrafluoroethane:

Species: Rabbit

Result: No eye irritation

2,3,3,3-Tetrafluoropropene:

Species: Not tested on animals

Result: No eye irritation

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.

Ingredients:

1,1,1,2-Tetrafluoroethane:

Routes of exposure: Skin contact

Species: Guinea pig

Result: negative

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Species: Rat
Result: negative

2,3,3,3-Tetrafluoropropene:

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

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.

Ingredients:

1,1,1,2-Tetrafluoroethane:

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

2,3,3,3-Tetrafluoropropene:

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

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.

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Ingredients:

1,1,1,2-Tetrafluoroethane:

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

2,3,3,3-Tetrafluoropropene:

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

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.

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:

1,1,1,2-Tetrafluoroethane:

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

2,3,3,3-Tetrafluoropropene:

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

Pentafluoroethane:

Effects on fertility : Test Type: One-generation reproduction toxicity study
Species: Rat
Application Route: inhalation (vapor)
Result: negative
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: inhalation (gas)
Method: OECD Test Guideline 414
Result: negative

Difluoromethane:

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

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STOT-single exposure

Not classified based on available information.

STOT-repeated exposure

Not classified based on available information.

Ingredients:

1,1,1,2-Tetrafluoroethane:

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

2,3,3,3-Tetrafluoropropene:

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

Difluoromethane:

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

Repeated dose toxicity

Ingredients:

1,1,1,2-Tetrafluoroethane:

Species: Rat
NOAEL: 50000 ppm
LOAEL: > 50000 ppm
Application Route: inhalation (gas)
Exposure time: 90 d
Method: OECD Test Guideline 413
Remarks: No significant adverse effects were reported

2,3,3,3-Tetrafluoropropene:

Species: Rat
NOAEL: 50000 ppm
LOAEL: >50000 ppm
Application Route: inhalation (gas)
Exposure time: 90 d
Method: OECD Test Guideline 413
Remarks: No significant adverse effects were reported

Pentafluoroethane:

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

Difluoromethane:

Species: Rat

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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

Ingredients:

1,1,1,2-Tetrafluoroethane:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 450 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 980 mg/l
Exposure time: 48 h

Toxicity to algae : ErC50 (algae): 142 mg/l
Exposure time: 96 h
Remarks: Based on data from similar materials

NOEC (Pseudokirchneriella subcapitata (green algae)): 13.2 mg/l
Exposure time: 72 h
Remarks: Based on data from similar materials

2,3,3,3-Tetrafluoropropene:

Toxicity to fish : LC50 (Cyprinus carpio (Carp)): > 197 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 100 mg/l
Exposure time: 48 h

Toxicity to algae : NOEC (algae): > 100 mg/l
Exposure time: 72 h

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 : EC50 (Pseudokirchneriella subcapitata (green algae)): > 114 mg/l

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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): 652 mg/l
Exposure time: 48 h

Toxicity to algae : EC50 (algae): 142 mg/l
Exposure time: 96 h

Toxicity to fish (Chronic toxicity) : NOEC (Fish): 65.8 mg/l
Exposure time: 30 d

Persistence and degradability

Ingredients:

1,1,1,2-Tetrafluoroethane:

Biodegradability : Result: Not readily biodegradable.

2,3,3,3-Tetrafluoropropene:

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

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

Ingredients:

1,1,1,2-Tetrafluoroethane:

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Partition coefficient: n-octanol/water : log Pow: 1.06

2,3,3,3-Tetrafluoropropene:

Bioaccumulation : Remarks: No bioaccumulation is to be expected (log Pow <= 4).

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 persistent, bioaccumulating and toxic (PBT). This mixture contains no substance considered to be very persistent and very bioaccumulating (vPvB).

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 1078
Proper shipping name : REFRIGERANT GAS, N.O.S.
(1,1,1,2-Tetrafluoroethane, 2,3,3,3-Tetrafluoropropene)
Class : 2.2
Packing group : Not assigned by regulation
Labels : 2.2

IATA-DGR

UN/ID No. : UN 1078

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Proper shipping name : Refrigerant gas, n.o.s.
(1,1,1,2-Tetrafluoroethane, 2,3,3,3-Tetrafluoropropene)
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 1078
Proper shipping name : REFRIGERANT GAS, N.O.S.
(1,1,1,2-Tetrafluoroethane, 2,3,3,3-Tetrafluoropropene)
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 1078
Proper shipping name : Refrigerant gases, n.o.s.
(1,1,1,2-Tetrafluoroethane, 2,3,3,3-Tetrafluoropropene)
Class : 2.2
Packing group : Not assigned by regulation
Labels : NON-FLAMMABLE GAS
ERG Code : 126
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 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

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US State Regulations

Pennsylvania Right To Know

1,1,1,2-Tetrafluoroethane	811-97-2
2,3,3,3-Tetrafluoropropene	754-12-1
Pentafluoroethane	354-33-6
Difluoromethane	75-10-5

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

Difluoromethane	75-10-5
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Additional regulatory information

2,3,3,3-Tetrafluoropropene	754-12-1
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The United States Environmental Protection Agency (USEPA) has established a Significant New Use Rule (SNUR) for one of the components in this product.

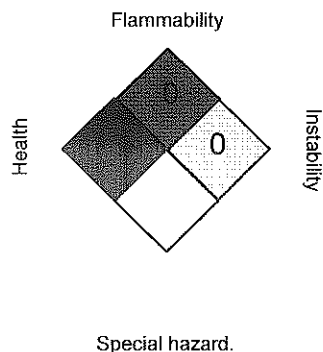
See 40 CFR § 721.10182

This material contains one or more substances which requires export notification under TSCA Section 12(b) and 40 CFR Part 707 Subpart D:

SECTION 16. OTHER INFORMATION

Further information

NFPA:



HMIS® IV:

HEALTH	/	0
FLAMMABILITY		0
PHYSICAL HAZARD		3

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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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

SAFETY DATA SHEET



Opteon™ XP40 (R-449A) Refrigerant

Version	Revision Date:	SDS Number:	Date of last issue: 09/11/2017
7.1	10/03/2017	1349484-00038	Date of first issue: 02/27/2017

US WEEL : USA Workplace Environmental Exposure Levels (WEEL)
US WEEL / TWA : 8-hr TWA

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 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 Agency, <http://echa.europa.eu/>

Revision Date : 10/03/2017

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.

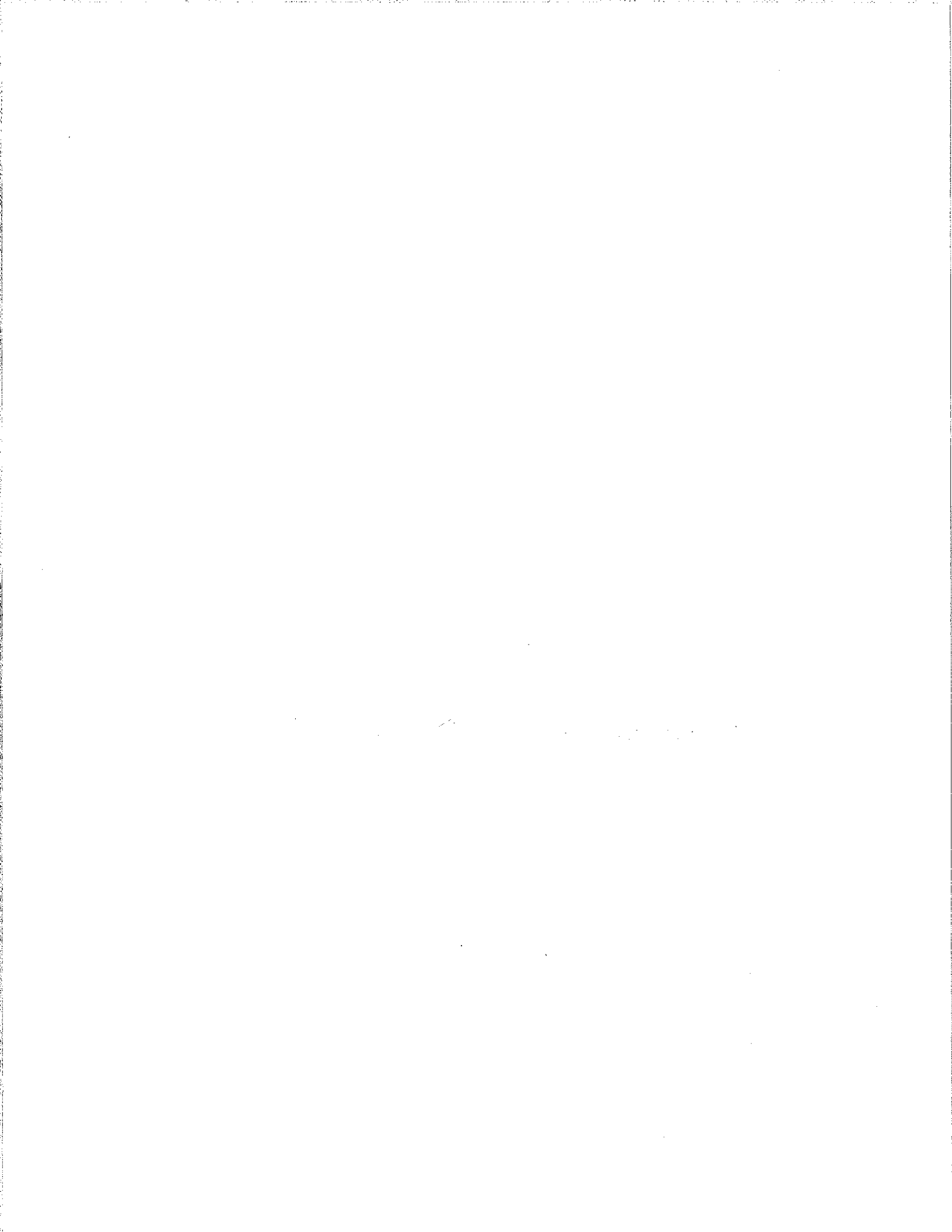
SAFETY DATA SHEET



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Version	Revision Date:	SDS Number:	Date of last issue: 09/11/2017
7.1	10/03/2017	1349484-00038	Date of first issue: 02/27/2017

US / Z8



Sid Harvey Item #'s XP40X10 & XP40X25



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This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Opteon™ XP40 (R-449A) Refrigerant
Tradename/Synonym	:	Opteon™ 449A R-449A 449A XP40
Product Grade/Type	:	ASHRAE Refrigerant Number Designation: R-449A
Product Use	:	Refrigerant, For professional users only.
Restrictions on use	:	Consumer use
Manufacturer/Supplier	:	The Chemours Company FC, LLC 1007 Market Street Wilmington, DE 19899 United States of America
Product Information	:	1-844-773-CHEM (outside the U.S. 1-302-773-1000)
Medical Emergency	:	1-866-595-1473 (outside the U.S. 1-302-773-2000)
Transport Emergency	:	CHEMTREC: +1-800-424-9300 (outside the U.S. +1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION

Product hazard category	
Gases under pressure	Liquefied gas

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Label content

Pictogram

:



Signal word

: Warning

Hazardous warnings

: Contains gas under pressure; may explode if heated.

Hazardous prevention
measures

: Protect from sunlight. Store in a well-ventilated place.

Other hazards

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing., Rapid evaporation of the liquid may cause frostbite., Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects., May cause cardiac arrhythmia.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
1,1,1,2-Tetrafluoroethane (HFC-134a)	811-97-2	25.7 %
2,3,3,3-Tetrafluoropropene (HFO-1234yf)	754-12-1	25.3 %

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Pentafluoroethane (HFC-125)	354-33-6	24.7 %
Difluoromethane (HFC-32)	75-10-5	24.3 %

SECTION 4. FIRST AID MEASURES

- General advice : Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice.
- Inhalation : Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.
- Skin contact : Take off contaminated clothing and shoes immediately. Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.
- Eye contact : Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Get medical attention.
- Ingestion : Is not considered a potential route of exposure.
- Most important symptoms/effects, acute and delayed : Anaesthetic effects Light-headedness irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness
- Protection of first-aiders : If potential for exposure exists refer to Section 8 for specific personal protective equipment.
- Notes to physician : 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.



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SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment., Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
- Unsuitable extinguishing media : No applicable data available.
- Specific hazards : The product is not flammable.
- Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment. Wear neoprene gloves during cleaning up work after a fire.
- Further information : Evacuate personnel to safe areas.

SECTION 6. ACCIDENTAL RELEASE MEASURES

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

- Safeguards (Personnel) : Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where heavy vapours might collect. Refer to protective measures listed in sections 7 and 8.
- Environmental precautions : Should not be released into the environment. In accordance with local and national regulations.
- Spill Cleanup : Evaporates.
- Accidental Release Measures : Avoid open flames and high temperatures. Self-contained breathing apparatus (SCBA) is required if a large release occurs.

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SECTION 7. HANDLING AND STORAGE

- Handling (Personnel) : Avoid breathing vapours or mist. Avoid contact with skin, eyes and clothing. Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8.
- Handling (Physical Aspects) : The product should not be mixed with air for leak testing or used with air for any other purpose above atmospheric pressure. Contact with chlorine or other strong oxidizing agents should also be avoided.
- Dust explosion class : No applicable data available.
- Storage : Do not drag, slide or roll cylinders. Never attempt to lift cylinder by its cap. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Keep at temperature not exceeding 52°C. Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from contamination. Protect cylinders from damage. Keep away from direct sunlight. Store only in approved containers. The product has an indefinite shelf life when stored properly.
- Storage period : > 10 yr
- Storage temperature : < 52 °C (< 126 °F)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- Engineering controls : Ensure adequate ventilation, especially in confined areas.
- Personal protective equipment
- Respiratory protection : For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
- Hand protection : Additional protection: Impervious gloves
- Eye protection : Wear safety glasses or coverall chemical splash goggles. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.

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Skin and body protection : Where there is potential for skin contact have available and wear as appropriate impervious gloves, apron, pants, and jacket.

Exposure Guidelines
Exposure Limit Values

This product does not contain any exposure limits that require disclosure according to OSHA Hazard Communication Standard 2012.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state : gaseous
Form : Liquefied gas
Color : clear

Odor : slight, ether-like

Odor threshold : No applicable data available.

pH : neutral

Melting point/range : No applicable data available.

Boiling point/boiling range : Boiling point
-46.0 °C (-50.8 °F)

Flash point : does not flash

Evaporation rate : > 1
(CCL4=1.0)

Flammability (solid, gas) : The product is not flammable.

Upper explosion limit : Method: None per ASTM E681

Lower explosion limit : Method: None per ASTM E681

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Vapor pressure	: 12,748 hPa at 25 °C (77 °F)
Vapor density	: 3.07 at 25 °C (77 °F) (Air = 1.0)
Specific gravity (Relative density)	: 1.10 at 25 °C (77 °F)
Water solubility	: No applicable data available.
Solubility(ies)	: No applicable data available.
Partition coefficient: n-octanol/water	: No applicable data available.
Auto-ignition temperature	: No applicable data available.
Decomposition temperature	: No applicable data available.
Viscosity, kinematic	: No applicable data available.
Viscosity, dynamic	: No applicable data available.
% Volatile	: 100 %

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: Decomposes on heating.
Chemical stability	: The product is chemically stable under recommended conditions of storage, use and temperature.
Possibility of hazardous reactions	: Polymerization will not occur.
Conditions to avoid	: Avoid open flames and high temperatures.
Incompatible materials	: Strong bases Alkaline earth metals, finely divided metal powders, such as, Aluminium, Magnesium, Zinc, or, strong oxidizers



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Hazardous decomposition products : Hazardous thermal decomposition products may include:, Hydrogen fluoride, Carbon oxides, Fluorocarbons, Carbonyl fluoride

SECTION 11. TOXICOLOGICAL INFORMATION

1,1,1,2-Tetrafluoroethane (HFC-134a)

- | | | |
|--|---|---|
| Inhalation 4 h LC50 | : | > 567000 ppm , Rat |
| Inhalation No Observed Adverse Effect Concentration | : | 40000 ppm , Dog
Cardiac sensitization |
| Inhalation Low Observed Adverse Effect Concentration (LOAEC) | : | 80000 ppm , Dog
Cardiac sensitization |
| Skin irritation | : | No skin irritation, Rabbit |
| Eye irritation | : | No eye irritation, Rabbit |
| Skin sensitization | : | Does not cause skin sensitisation., Guinea pig

Does not cause respiratory sensitisation., Rat |
| Repeated dose toxicity | : | Inhalation
Rat
-
gas
NOAEL: 50000,
No toxicologically significant effects were found. |
| Carcinogenicity | : | Not classifiable as a human carcinogen.
Overall weight of evidence indicates that the substance is not carcinogenic. |
| Mutagenicity | : | Animal testing did not show any mutagenic effects.
Tests on bacterial or mammalian cell cultures did not show mutagenic effects. |
| Reproductive toxicity | : | No toxicity to reproduction |



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No effects on or via lactation
Animal testing showed no reproductive toxicity.

Teratogenicity : Animal testing showed no developmental toxicity.

Further information : Cardiac sensitisation threshold limit : 334000 mg/m3

2,3,3,3-Tetrafluoropropene (HFO-1234yf)

Inhalation 4 h LC50 : > 405000 ppm , Rat

Inhalation Low Observed Adverse Effect Concentration (LOAEC) : > 120000 ppm , Dog
Cardiac sensitization

Inhalation No Observed Adverse Effect Concentration : 120000 ppm , Dog
Cardiac sensitization

Skin irritation : No skin irritation, Not tested on animals
Not expected to cause skin irritation based on expert review of the properties of the substance.

Eye irritation : No eye irritation, Not tested on animals
Not expected to cause eye irritation based on expert review of the properties of the substance.

Skin sensitization : Not tested on animals
Not expected to cause sensitization based on expert review of the properties of the substance.

There are no reports of human respiratory sensitization.

Repeated dose toxicity : Inhalation
Rat
-
gas
NOAEL: 233 mg/l, 50,000 ppm,
No toxicologically significant effects were found.

Inhalation
Rabbit
-



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gas
 NOAEL: 2.33 mg/l, 500 ppm,
 No toxicological effects warranting significant target organ toxicity
 classification were seen below the recommended guidance values for
 classification.

Inhalation
 Mini-pig

-
 gas
 NOAEL: 50 mg/l, 10,000 ppm,
 No toxicologically significant effects were found.

- Carcinogenicity : Not classifiable as a human carcinogen.
 Sufficient data are available to conclude that the substance is not
 expected to be carcinogenic.
- Mutagenicity : Animal testing did not show any mutagenic effects.
 Did not cause genetic damage in cultured mammalian cells.
 Experiments showed mutagenic effects in cultured bacterial cells.
- Reproductive toxicity : No toxicity to reproduction
 Animal testing showed no reproductive toxicity.
- Teratogenicity : Animal testing showed effects on embryo-fetal development at levels
 equal to or above those causing maternal toxicity.
- Further information : Cardiac sensitisation threshold limit : > 559509 mg/m3
- Pentafluoroethane (HFC-125)
 Inhalation 4 h LC50 : > 800000 ppm , Rat
- Inhalation No Observed
 Adverse Effect : 75000 ppm , Dog
 Cardiac sensitization
 Concentration
- Inhalation Low Observed
 Adverse Effect : 100000 ppm , Dog
 Cardiac sensitization
 Concentration (LOAEC)
- Skin sensitization : Does not cause respiratory sensitisation., human



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Repeated dose toxicity	: Inhalation Rat - gas No toxicologically significant effects were found.
Carcinogenicity	: Not classifiable as a human carcinogen. Overall weight of evidence indicates that the substance is not carcinogenic.
Mutagenicity	: Animal testing did not show any mutagenic effects. Evidence suggests this substance does not cause genetic damage in cultured mammalian cells. Did not cause genetic damage in cultured bacterial cells.
Reproductive toxicity	: No toxicity to reproduction Animal testing showed no reproductive toxicity.
Teratogenicity	: Animal testing showed no developmental toxicity.
Further information	: Cardiac sensitisation threshold limit : 490000 mg/m3

Difluoromethane (HFC-32)

Inhalation 4 h LC50	: > 520000 ppm , Rat
Inhalation Low Observed Adverse Effect Concentration (LOAEC)	: > 350000 ppm , Dog Cardiac sensitization
Inhalation No Observed Adverse Effect Concentration	: 350000 ppm , Dog Cardiac sensitization
Skin irritation	: No skin irritation, Not tested on animals Not expected to cause skin irritation based on expert review of the properties of the substance.
Eye irritation	: No eye irritation, Not tested on animals Not expected to cause eye irritation based on expert review of the properties of the substance.
Skin sensitization	: Does not cause skin sensitisation., Not tested on animals

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Not expected to cause sensitization based on expert review of the properties of the substance.

There are no reports of human respiratory sensitization.

Repeated dose toxicity : Inhalation
Rat

-

No toxicologically significant effects were found.

Mutagenicity : Animal testing did not show any mutagenic effects.
Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

Reproductive toxicity : No toxicity to reproduction
Animal testing showed no reproductive toxicity.
Information given is based on data obtained from similar substances.

Teratogenicity : Animal testing showed no developmental toxicity.

Further information : Cardiac sensitisation threshold limit : > 735000 mg/m3

Carcinogenicity

The carcinogenicity classifications for this product and/or its ingredients have been determined according to HazCom 2012, Appendix A.6. The classifications may differ from those listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or those found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest edition).

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.

SECTION 12. ECOLOGICAL INFORMATION**Aquatic Toxicity**

1,1,1,2-Tetrafluoroethane (HFC-134a)

96 h LC50

: *Oncorhynchus mykiss* (rainbow trout) 450 mg/l



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96 h ErC50 : Algae 142 mg/l
Information given is based on data obtained from similar substances.

72 h NOEC : Pseudokirchneriella subcapitata (green algae) 13.2 mg/l
Information given is based on data obtained from similar substances.

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

2,3,3,3-Tetrafluoropropene (HFO-1234yf)

96 h LC50 : Cyprinus carpio (Carp) > 197 mg/l

72 h NOEC : Algae > 100 mg/l

48 h EC50 : Daphnia magna (Water flea) > 100 mg/l

Pentafluoroethane (HFC-125)

96 h LC50 : Oncorhynchus mykiss (rainbow trout) 450 mg/l
Information given is based on data obtained from similar substances.

96 h ErC50 : Algae 142 mg/l
Information given is based on data obtained from similar substances.

72 h NOEC : Pseudokirchneriella subcapitata (green algae) 13.2 mg/l
Information given is based on data obtained from similar substances.

48 h EC50 : Daphnia magna (Water flea) 980 mg/l
Information given is based on data obtained from similar substances.

Difluoromethane (HFC-32)

96 h LC50 : Fish 1,507 mg/l

96 h EC50 : Algae 142 mg/l

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

30 d : NOEC Fish (unspecified species) 65.8 mg/l

Environmental Fate

Difluoromethane (HFC-32)

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Biodegradability : 5 % OECD Test Guideline 301D
Not readily biodegradable.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste disposal methods - Product : Can be used after re-conditioning. If re-conditioning is not practicable, dispose of in compliance with local regulations.

Contaminated packaging : Empty pressure vessels should be returned to the supplier.

SECTION 14. TRANSPORT INFORMATION

DOT	UN number	: 1078
	Proper shipping name	: Refrigerant gases, n.o.s. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
	Class	: 2.2
	Labelling No.	: 2.2
IATA_C	UN number	: 1078
	Proper shipping name	: Refrigerant gas, n.o.s. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
	Class	: 2.2
	Labelling No.	: 2.2
IMDG	UN number	: 1078
	Proper shipping name	: REFRIGERANT GAS, N.O.S. (1,1,1,2-Tetrafluoroethane, Pentafluoroethane)
	Class	: 2.2
	Labelling No.	: 2.2

SECTION 15. REGULATORY INFORMATION



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TSCA 5E : This material contains one or more substances which are subject to a TSCA Section 5 Consent Order or Significant New Use Rule (SNUR).

: 2,3,3,3-Tetrafluoropropene
PMN Number: P-07-0601 (Honeywell)

TSCA 12B This material contains one or more substances which requires export notification under TSCA Section 12(b) and 40 CFR Part 707 Subpart D:

2,3,3,3-Tetrafluoropropene
PMN Number: P-07-0601 (Honeywell)

The approved uses are: refrigerant in motor vehicle air conditioning systems.

Processors and users of this substance must also comply with the applicable general SNUR requirements set forth in 40 CFR 721 subpart A, including export notification requirements if applicable (40 CFR 721.20), and the applicable record keeping requirements set forth at 40 CFR 721.125.

Contact your local Chemours sales or technical representative for more information.

SARA 313 Regulated Chemical(s) : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

PA Right to Know Regulated Chemical(s) : Substances on the Pennsylvania Hazardous Substances List present at a concentration of 1% or more (0.01% for Special Hazardous Substances): Difluoromethane

NJ Right to Know Regulated Chemical(s) : Substances on the New Jersey Workplace Hazardous Substance List present at a concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens): Difluoromethane



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California Prop. 65 : Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known

SECTION 16. OTHER INFORMATION

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.

Revision Date : 08/31/2015

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Significant change from previous version is denoted with a double bar.