

SAFETY DATA SHEET



Opteon™ XL41 (R-454B) Refrigerant

| | | | |
|---------|----------------|----------------|---------------------------------|
| Version | Revision Date: | SDS Number: | Date of last issue: 11.06.2024 |
| 3.0 | 05.03.2025 | 11363030-00003 | Date of first issue: 12.03.2024 |

Section 1: Identification

Product identifier : Opteon™ XL41 (R-454B) Refrigerant

SDS-Identcode : 130000143545

Recommended use of the chemical and restrictions on use

Recommended use : Refrigerant

Restrictions on use : For professional and industrial installation and use only.
Do not use product for anything outside of the above specified uses

Manufacturer or supplier's details

Company : The Chemours Company Singapore PTE. LTD.

Address : 1 HarbourFront Place, #16-01 HarbourFront Tower One
Singapore 098633

Telephone : 65-6715-8688

Emergency telephone number : 1800 315 8134

Telefax : 65-6715-8697

Section 2: Hazard identification

Classification of the substance or mixture

Flammable gases : Category 1B

Gases under pressure : Liquefied gas

GHS Label elements, including precautionary statements

Hazard pictograms :



Signal word : Danger

Hazard statements : H221 Flammable gas.
H280 Contains gas under pressure; may explode if heated.

Precautionary statements : **Prevention:**
P210 Keep away from heat, hot surfaces, sparks, open flames

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and other ignition sources. No smoking.

Response:

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 In case of leakage, eliminate all ignition sources.

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.

Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.

Rapid evaporation of the product may cause frostbite.

May displace oxygen and cause rapid suffocation.

Section 3: Composition/information on ingredients

Substance / Mixture : Mixture

Components

| Chemical name | CAS-No. | Concentration (% w/w) |
|-----------------------------|----------|-----------------------|
| Difluoromethane# | 75-10-5 | 68.9 |
| 2,3,3,3-Tetrafluoropropene# | 754-12-1 | 30.9445 |

Voluntarily-disclosed substance

Section 4: First-aid measures

Description of necessary 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.
If not breathing, give artificial respiration.
If breathing is difficult, give oxygen.
Get medical attention immediately.

In case of skin contact : Thaw frosted parts with lukewarm water. Do not rub affected area.
Get medical attention immediately.

In case of eye contact : Get medical attention immediately.

If swallowed : Ingestion is not considered a potential route of exposure.

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Most important symptoms and effects, both acute and delayed

Risks : 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
Gas reduces oxygen available for breathing.
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.

Indication of any immediate medical attention and special treatment needed

Treatment : Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.

Section 5: Fire-fighting measures**Extinguishing media**

Suitable extinguishing media : Water spray
Alcohol-resistant foam
Carbon dioxide (CO₂)
Dry chemical

Unsuitable extinguishing media : None known.

Special hazards arising from the substance or mixture

Specific hazards during fire-fighting : Vapours may form flammable mixture with air
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

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Special protective actions for fire-fighters

Special protective equipment for firefighters : Wear self-contained breathing apparatus for firefighting if necessary.
Use personal protective equipment.

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Fight fire remotely due to the risk of explosion.
Use water spray to cool unopened containers.
Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
Remove undamaged containers from fire area if it is safe to do so.
Evacuate area.

Section 6: Accidental release measures**Personal precautions, protective equipment and emergency procedures**

Personal precautions : Evacuate personnel to safe areas.
Only trained personnel should re-enter the area.
Remove all sources of ignition.
Avoid skin contact with leaking liquid (danger of frostbite).
Ventilate the area.
Follow safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).

Environmental precautions

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

Methods and materials for containment and cleaning up

Methods for cleaning up : Ventilate the area.
Non-sparking tools should be used.
Suppress (knock down) gases/vapours/mists with a water spray jet.
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**Precautions for safe handling**

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

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when empty.

Local/Total ventilation : If sufficient ventilation is unavailable, use with local exhaust ventilation.
If advised by assessment of the local exposure potential, use only in an area equipped with explosion-proof exhaust 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
Keep container tightly closed.
Wear cold insulating gloves/ face shield/ eye protection.
Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point.
Prevent backflow into the gas tank.
Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.
Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems.
Close valve after each use and when empty. Do NOT change or force fit connections.
Prevent the intrusion of water into the gas tank.
Never attempt to lift cylinder by its cap.
Do not drag, slide or roll cylinders.
Use a suitable hand truck for cylinder movement.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Take precautionary measures against static discharges.
Take care to prevent spills, waste and minimize release to the environment.

Hygiene measures : If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place.
When using do not eat, drink or smoke.
Wash contaminated clothing before re-use.

Conditions for safe storage, including any incompatibilities

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 labelled containers.
Keep tightly closed.
Keep in a cool, well-ventilated place.
Keep away from direct sunlight.
Store in accordance with the particular national regulations.
Keep away from heat and sources of ignition.

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Materials to avoid : Do not store with the following product types:
Self-reactive substances and mixtures
Organic peroxides
Oxidizing agents
Flammable liquids
Pyrophoric liquids
Pyrophoric solids
Self-heating substances and mixtures
Explosives

Recommended storage temperature : < 52 °C

Storage period : > 10 yr

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

Section 8: Exposure controls/personal protection**Control parameters****Occupational Exposure Limits**

Contains no substances with occupational exposure limit values.

Appropriate engineering control measures : Minimize workplace exposure concentrations.
If sufficient ventilation is unavailable, use with local exhaust ventilation.
If advised by assessment of the local exposure potential, use only in an area equipped with explosion-proof exhaust ventilation.

Individual protection measures, such as personal protective equipment (PPE)

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

Skin protection : Wear the following personal protective equipment:
If assessment demonstrates that there is a risk of explosive atmospheres or flash fires, use flame retardant antistatic protective clothing.

Respiratory protection : Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown.

Hand protection : Impervious gloves

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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!

Protective measures : Wear cold insulating gloves/ face shield/ eye protection.

Section 9: Physical and chemical properties

| | |
|--|--|
| Appearance | : Liquefied gas |
| Colour | : colourless |
| Odour | : slight, ether-like |
| Odour Threshold | : No data available |
| pH | : No data available |
| Melting point/freezing point | : No data available |
| Initial boiling point and boiling range | : -50.9 °C |
| Flash point | : Not applicable |
| Evaporation rate | : > 1 (CCL4=1.0) |
| Flammability (solid, gas) | : Flammable |
| Upper explosion limit / Upper flammability limit | : Upper flammability limit 23.6 %(V) Method: ASTM E681 |
| Lower explosion limit / Lower flammability limit | : Lower flammability limit 11.3 %(V) Method: ASTM E681 |
| Vapour pressure | : 15,856 hPa (25 °C) |

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|---|--|
| Relative vapour density | : 2.2 (Air = 1.0) |
| Relative density | : 0.98 (25 °C) |
| Density | : 0.98 g/cm ³ (25 °C) (as liquid) |
| Solubility(ies) Water solubility | : No data available |
| Partition coefficient: n-octanol/water | : Not applicable |
| Auto-ignition temperature | : 496 °C |
| 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 characteristics Particle size | : Not applicable |

Section 10: Stability and reactivity

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|------------------------------------|--|
| Reactivity | : Not classified as a reactivity hazard. |
| Chemical stability | : Stable if used as directed. Follow precautionary advice and avoid incompatible materials and conditions. |
| Possibility of hazardous reactions | : Vapours may form flammable mixture with air Can react with strong oxidizing agents. Flammable gas. |
| Conditions to avoid | : Heat, flames and sparks. |
| Incompatible materials | : Avoid impurities (e.g. rust, dust, ash), risk of decomposition. Incompatible with acids and bases. Incompatible with oxidizing agents. Oxygen Peroxides peroxide compounds Powdered metals |
| Hazardous decomposition products | : No hazardous decomposition products are known. |

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Section 11: Toxicological information

Information on likely routes of exposure : Inhalation
Skin contact
Eye contact

Acute toxicity

Not classified based on available information.

Components:**Difluoromethane:**

| | |
|---------------------------|---|
| Acute oral toxicity | : Assessment: The substance or mixture has no acute oral toxicity |
| Acute inhalation toxicity | : LC50 (Rat): > 520000 ppm Exposure time: 4 h Test atmosphere: gas Method: OECD Test Guideline 403 No observed adverse effect concentration (Dog): 350000 ppm Test atmosphere: gas Remarks: Cardiac sensitisation Lowest observed adverse effect concentration (Dog): > 350000 ppm Test atmosphere: gas Remarks: Cardiac sensitisation Cardiac sensitisation threshold limit (Dog): > 735,000 mg/m3 Test atmosphere: gas Remarks: Cardiac sensitisation |
| Acute dermal toxicity | : Assessment: The substance or mixture has no acute dermal toxicity |

2,3,3,3-Tetrafluoropropene:

| | |
|---------------------------|---|
| Acute inhalation toxicity | : LC50 (Rat): > 405800 ppm Exposure time: 4 h Test atmosphere: gas Method: OECD Test Guideline 403 No observed adverse effect concentration (Dog): 120000 ppm Test atmosphere: gas Remarks: Cardiac sensitisation Lowest observed adverse effect concentration (Dog): > 120000 ppm Test atmosphere: gas Remarks: Cardiac sensitisation |
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|| Cardiac sensitisation threshold limit (Dog): > 559,509 mg/m³
Test atmosphere: gas
Remarks: Cardiac sensitisation

Skin corrosion/irritation

Not classified based on available information.

Components:

Difluoromethane:

|| Result : No skin irritation

2,3,3,3-Tetrafluoropropene:

|| Result : No skin irritation

Serious eye damage/eye irritation

Not classified based on available information.

Components:

Difluoromethane:

|| Result : No eye irritation

2,3,3,3-Tetrafluoropropene:

|| 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
|| Result : negative

2,3,3,3-Tetrafluoropropene:

|| Exposure routes : Skin contact
|| Result : negative

Germ cell mutagenicity

Not classified based on available information.

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Components:**Difluoromethane:**

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| Genotoxicity in vitro | : Test Type: Bacterial reverse mutation assay (AMES) Method: OECD Test Guideline 471 Result: negative 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 |
| Germ cell mutagenicity - Assessment | : Weight of evidence does not support classification as a germ cell mutagen. |

2,3,3,3-Tetrafluoropropene:

| | |
|-------------------------------------|---|
| Genotoxicity in vitro | : Test Type: Bacterial reverse mutation assay (AMES) Method: OECD Test Guideline 471 Result: positive 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 Test Type: In vivo mammalian alkaline comet assay Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 489 Result: negative Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 474 Result: negative |
| Germ cell mutagenicity - Assessment | : Weight of evidence does not support classification as a germ cell mutagen. |

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II

Carcinogenicity

Not classified based on available information.

Components:**2,3,3,3-Tetrafluoropropene:**

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| Result | : negative |
|--------|------------|

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

Not classified based on available information.

Components:**Difluoromethane:**

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|----------------------|--|
| Effects on fertility | : Species: Mouse Application Route: Inhalation Result: negative Remarks: Based on data from similar materials |
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| Effects on foetal development | : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 414 Result: negative |
|-------------------------------|--|

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|--|---|
| | : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rabbit Application Route: inhalation (gas) Method: OECD Test Guideline 414 Result: negative |
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| Reproductive toxicity - Assessment | : Weight of evidence does not support classification for reproductive toxicity |
|------------------------------------|--|

2,3,3,3-Tetrafluoropropene:

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| Effects on fertility | : Test Type: Two-generation reproduction toxicity study Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 416 Result: negative |
|----------------------|---|

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| Effects on foetal development | : Test Type: Prenatal development toxicity study (teratogenicity) Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 414 |
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Result: negative

Reproductive toxicity - Assessment : Weight of evidence does not support classification for reproductive toxicity, No effects on or via lactation

STOT - single exposure

Not classified based on available information.

Components:

Difluoromethane:

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

2,3,3,3-Tetrafluoropropene:

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

STOT - repeated exposure

Not classified based on available information.

Components:

Difluoromethane:

Exposure routes : inhalation (gas)
Assessment : No significant health effects observed in animals at concentrations of 250 ppmV/6h/d or less.

2,3,3,3-Tetrafluoropropene:

Exposure routes : inhalation (gas)
Assessment : No significant health effects observed in animals at concentrations of 250 ppmV/6h/d or less.

Repeated dose toxicity

Components:

Difluoromethane:

Species : Rat, male and female
NOAEL : 49100 ppm
LOAEL : > 49100 ppm
Application Route : inhalation (gas)
Exposure time : 13 Weeks
Method : OECD Test Guideline 413

2,3,3,3-Tetrafluoropropene:

Species : Rat, male and female

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

Aspiration toxicity

Not classified based on available information.

Components:

Difluoromethane:

|| No aspiration toxicity classification

2,3,3,3-Tetrafluoropropene:

|| No aspiration toxicity classification

Section 12: Ecological information

Toxicity

Components:

Difluoromethane:

| | |
|---|--|
| Toxicity to fish | : LC50 (Fish): 1,507 mg/l Exposure time: 96 h Method: ECOSAR (Ecological Structure Activity Relationships) |
| Toxicity to daphnia and other aquatic invertebrates | : EC50 (Daphnia (water flea)): 652 mg/l Exposure time: 48 h Method: ECOSAR (Ecological Structure Activity Relationships) |
| Toxicity to algae/aquatic plants | : EC50 (green algae): 142 mg/l Exposure time: 96 h Method: ECOSAR (Ecological Structure Activity Relationships) |

2,3,3,3-Tetrafluoropropene:

| | |
|---|---|
| Toxicity to fish | : LC50 (Cyprinus carpio (Carp)): > 197 mg/l Exposure time: 96 h Method: OECD Test Guideline 203 |
| Toxicity to daphnia and other aquatic invertebrates | : EC50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 |
| Toxicity to algae/aquatic | : EC50 (Selenastrum capricornutum (green algae)): > 100 mg/l |

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plants

Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Selenastrum capricornutum (green algae)): > 75 mg/l
Exposure time: 3 d
Method: OECD Test Guideline 201

Persistence and degradability

Components:

Difluoromethane:

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

2,3,3,3-Tetrafluoropropene:

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

Bioaccumulative potential

Components:

Difluoromethane:

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

2,3,3,3-Tetrafluoropropene:

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

Partition coefficient: n-octanol/water : log Pow: 2 (25 °C)

Mobility in soil

No data available

Other adverse effects

No data available

Section 13: Disposal considerations

Disposal methods

Waste from residues : Dispose of in accordance with local regulations.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.
Empty pressure vessels should be returned to the supplier.
Empty containers retain residue and can be dangerous.
Do not pressurize, cut, weld, braze, solder, drill, grind, or ex-

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pose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury and/or death. If not otherwise specified: Dispose of as unused product.

Section 14: Transport information

International Regulations

UNRTDG

| | |
|----------------------------|---|
| UN number | : UN 3161 |
| UN proper shipping name | : LIQUEFIED GAS, FLAMMABLE, N.O.S. (Difluoromethane, 2,3,3,3-Tetrafluoropropene) |
| Transport hazard class(es) | : 2.1 |
| Packing group | : Not assigned by regulation |
| Labels | : 2.1 |
| Environmental hazards | : no |

IATA-DGR

| | |
|--|---|
| UN/ID No. | : UN 3161 |
| UN proper shipping name | : Liquefied gas, flammable, n.o.s. (Difluoromethane, 2,3,3,3-Tetrafluoropropene) |
| Transport hazard class(es) | : 2.1 |
| Packing group | : Not assigned by regulation |
| Labels | : Flammable Gas |
| Packing instruction (cargo aircraft) | : 200 |
| Packing instruction (passenger aircraft) | : Not permitted for transport |

IMDG-Code

| | |
|----------------------------|---|
| UN number | : UN 3161 |
| Proper shipping name | : LIQUEFIED GAS, FLAMMABLE, N.O.S. (Difluoromethane, 2,3,3,3-Tetrafluoropropene) |
| Transport hazard class(es) | : 2.1 |
| Packing group | : Not assigned by regulation |
| Labels | : 2.1 |
| EmS Code | : F-D, S-U |
| 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.

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Section 15: Regulatory information

Safety, health and environmental regulations specific for the product in question

Workplace Safety and Health Act and Workplace Safety and Health (General Provisions) Regulations: This product is subjected to the SDS, labelling, PEL and other requirements in the Act/Regulations.

Environmental Protection and Management Act and : Hydrofluorocarbons
Environmental Protection and Management (Hazardous Substances) Regulations

Fire Safety (Petroleum and Flammable Materials) : Not applicable
Regulations

Montreal Protocol : Difluoromethane

Section 16: Other information

Revision Date : 05.03.2025

Other information : Opteon™ and any associated logos are trademarks or copyrights of The Chemours Company FC, LLC.
Chemours™ and the Chemours Logo are trademarks of The Chemours Company.
Before use read Chemours safety information.
For further information contact the local Chemours office or nominated distributors.

Further information

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

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

Date format : dd.mm.yyyy

Full text of other abbreviations

AIIC - Australian Inventory of Industrial Chemicals; 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

Opteon™ XL41 (R-454B) Refrigerant

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- 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; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; 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 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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