



SAFETY DATA SHEET

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

1.1 Product identifier

Product name R449A
Synonym(s) Chemours Opteon™ XP40 **REALCOLD CODE:** L0169

1.2 Uses and uses advised against

Use(s) REFRIGERANT

1.3 Details of the supplier of the product

Supplier name Realcold NZ Ltd
Address Beijer Ref Support Office, 27 Pukekiwiriki Place, Highbrook, Auckland 2013.
Telephone +64 9 573 0060
Fax +64 9 573 0061
Email sales@realcold.co.nz
Website www.realcold.co.nz

1.4 Emergency telephone number(s)

Emergency 09 526 5700
24 Hour Information 0800 243 622 (NZ) or 0800 CHEMCALL



2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO THE HAZARDOUS SUBSTANCES CLASSIFICATION NOTICE 2017.
 CLASSIFIED AS A DANGEROUS GOOD ACCORDING TO UN, IMDG, IATA and LAND TRANSPORT RULE: DANGEROUS GOODS 2005; NZS5433:2012.

UN No.	1078	DG Class	2.2	Subsidiary Risk(s)	None allocated
Packing Group	None	Hazchem Code	2TE	Marine Pollutant	No

GHS classification Compressed Gases

2.2 Label elements

Signal word **WARNING**
Pictograms **GHS04 Gas under pressure**



Hazard Statement

H280 Contains gas under pressure; may explode if heated.

Prevention

P103 Read label before use.

Response

None allocated

Storage

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

Disposal

None allocated

2.3 Other hazards

Inhalation may produce health effects: headache, loss of consciousness, drowsiness, dizziness, cardiac rhythm problems. 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.

3. COMPOSITION / INFORMATION ON INGREDIENTS**3.1 Substances / Mixtures**

Ingredient	CAS Number	EC Number	Content (v/v)
1,1,1,2-Tetrafluoroethane (HFC-134a)	811-97-2	212-377-0	25.7%
2,3,3,3-Tetrafluoropropene (HFO-1234yf)	754-12-1	468-710-7	25.3%
Pentafluoroethane (HFC-125)	354-33-6	206-557-8	24.7%
Difluoromethane (HFC-32)	75-10-5	200-839-4	24.3%

4. FIRST-AID MEASURES**4.1 Description of first-aid measures**

Eye	Cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.
Inhalation	If inhaled, remove from contaminated area. To protect rescuer, use an air-line respirator or self-contained breathing apparatus (SCBA). Apply artificial respiration if not breathing. Give oxygen if available. Keep patient warm and at rest. Consult a physician.
Skin	Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30°C) for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.
Ingestion	Ingestion is not considered a potential route of exposure.
First aid facilities	No information provided.

4.2 Most important symptoms and effects, both acute and delayed

Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects. Other symptoms potentially related to misuse or inhalation abuse are: anaesthetic effects, light-headedness, dizziness, confusion, incoordination, drowsiness, or unconsciousness, irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness.

Contact with liquid or refrigerated gas can cause cold burns and frostbite.

Skin contact may provoke the following symptoms: irritation, discomfort, itching, redness, or swelling of tissue.

Eye contact may provoke the following symptoms: irritation, tearing, redness, or discomfort.

4.3 Immediate medical attention and special treatment needed

Treat for asphyxia and cold burns.

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.

Notes to physician: Treat symptomatically and supportively.

5. FIRE-FIGHTING MEASURES**5.1 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.

5.2 Special hazards arising from the substance or mixture

The product is not flammable.

Pressure build-up: Fire or intense heat may cause violent rupture of packages.

Hazardous combustion products: Hydrogen fluoride, fluorinated compounds, carbon oxides.

Exposure to decomposition products may be a hazard to health.

5.3 Advice for firefighters

Ventilate area, especially low or enclosed places where heavy vapours might collect. Refer to protective measures listed in sections 7 and 8.

Temperatures in a fire may cause cylinders to rupture. Cool cylinders or containers exposed to fire by applying water from a protected location. Remove cool cylinders from the path of the fire. Evacuate personnel to safe areas if unable to keep cylinders cool. Do not approach cylinders or containers suspected of being hot.

5.4 Hazchem code 2TE

2 Fine water spray.

T Full fire kit and breathing apparatus. Dilute spill and run-off.

E Evacuation of people in and around the immediate vicinity of the incident should be considered.

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where heavy vapours might collect. Use Personal Protective Equipment (PPE) as detailed in Section 8 of the SDS.

6.2 Environmental precautions

Should not be released into the environment, in accordance with legislation. Prevent from entering sewers, basements and work-pits, or any place where its accumulation can be dangerous.

6.3 Methods of cleaning up

Evaporates. Do not attempt to repair leaking valve or cylinder safety devices. Carefully move material to a well-ventilated remote area, then allow to discharge if safe to do so.

6.4 Reference to other sections

See Sections 8 and 13 for exposure controls and disposal.

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

Only experienced and properly instructed personnel should handle compressed gases.

Do not drag, drop, slide or roll cylinders. Use a suitable hand truck for cylinder movement. The uncontrolled release of a gas under pressure may cause physical harm. Use of safe work practices is recommended to avoid inhalation.

Wear appropriate PPE at all times when handling or using this product. Refer to Section 8.

7.2 Conditions for safe storage, including any incompatibilities

Storage of compressed gas cylinders shall be in compliance with New Zealand regulations. Cylinders shall be stored in a cool, dry, well-ventilated area out of direct sunlight and away from heat and ignition sources. No part of cylinders shall be exposed to temperatures above 50°C. Cylinders shall be stored upright on a level, fireproof floor, secure in position and protected from damage. Full cylinders shall be stored separately from empty cylinders. Avoid any contact with oil or grease, particularly to the cylinder valve. Valve caps must remain in place when cylinder is not in use, and must be replaced as soon as the container is disconnected from equipment. Any defects, damage, or faulty valves should be reported to the supplier. Always lift cylinders by the handles.

7.3 Specific end use(s)

No information provided.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**8.1 Control parameters****Exposure standards**

Ingredient	Reference	TWA		STEL	
		ppm	mg/m3	ppm	mg/m3
1,1,1,2-Tetrafluoroethane (HFC-134a)	WES (NZ)	1000	4240		
Pentafluoroethane (HFC-125)	WEEL (AIHA)	1000	4900		
Difluoromethane (HFC-32)	WEEL (AIHA)	1000			
2,3,3,3-Tetrafluoropropene (HFO-1234yf)	WEL	500			

Biological limits

No biological limit values have been entered for this product.

8.2 Exposure controls**Engineering controls**

Avoid inhalation. Use in well-ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended. Maintain vapour levels below the recommended exposure standard.

PPE:	Eye / face	Wear safety glasses. Additionally, wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.
	Hands	Gloves: Leather gloves are suitable for handling sealed and insulated cylinders. Where the possibility of exposure to the product exists, impermeable gloves (PVA, butyl rubber) should be used.
	Body	Wear safety boots and overalls
	Respiratory	Where an inhalation risk exists, wear an air-line respirator. Self-contained breathing apparatus (SCBA) is required if large release occurs.



Please refer to the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016 for information on the duties of a PCBU and workers with regard to the provision and use of personal protective equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on basic physical and chemical properties**

Appearance	COLOURLESS GAS (LIQUEFIED UNDER PRESSURE)
Odour	SLIGHT ETHEREAL ODOUR
Odour threshold	NOT AVAILABLE
Flammability	NOT APPLICABLE
Flash point	NOT APPLICABLE
Boiling point	-46 °C
Melting point	NOT AVAILABLE
Evaporation rate	>1 (CCL4=1.0)
pH	NOT AVAILABLE
Vapour density	3.07 @25 °C (Air =1)
Specific gravity	1.1 @25 °C
Solubility (water)	NOT AVAILABLE
Vapour pressure	1,274.8kPa @25 °C
Upper explosion limit	NOT APPLICABLE
Lower explosion limit	NOT APPLICABLE
Partition coefficient	NOT AVAILABLE
Autoignition	NOT AVAILABLE
Decomposition temperature	NOT AVAILABLE
Viscosity	NOT APPLICABLE
Explosive properties	NOT EXPLOSIVE
Oxidising properties	NOT CLASSIFIED AS OXIDISING

9.2 Other information

Critical pressure	4447kPa (abs.)
Critical temperature	81.5 °C
Density	1113.3kg/m ³ (Liquid @21.1 °C)
GWP	1282
ODP	0
ASHRAE Safety Class.	A1

10. STABILITY AND REACTIVITY**10.1 Reactivity**

Not classified as a reactivity hazard. Carefully review all information provided in sections 10.2 to 10.6

10.2 Chemical stability

Stable under recommended conditions of storage and if used as directed. Follow precautionary advice and avoid incompatible materials and conditions.

10.3 Possibility of hazardous reactions

Polymerisation will not occur. Can react with strong oxidising agents.

10.4 Conditions to avoid

Heat, flame and sparks.

10.5 Incompatible materials

Oxidising agents.

10.6 Hazardous decomposition products

May evolve toxic gases (carbon oxides, hydrogen fluoride) and other harmful products when heated to decomposition.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity	Not classified as acutely toxic.
Aspiration hazard	Not classified as an aspiration hazard.
Respiratory irritation	Not classified as a respiratory irritant.
Skin	Not classified as a skin irritant or corrosive.
Eye	Not classified as an eye irritant. Contact with the liquefied material or escaping compressed gas may cause frostbite injury.
Sensitisation	Not classified as causing skin or respiratory sensitisation.
Mutagenicity	Not classified as a mutagen.
Carcinogenicity	Not classified as a carcinogen.
Reproductive	Not classified as a reproductive toxin.
STOT-SE (single Exposure)	Not classified based on available information.
STOT-RE (repeated Exposure)	Not classified based on available information.
Narcotic effects	Not classified based on available information.

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity

Not classified as ecotoxic according to GHS or the Hazardous Substances (Minimum Degrees of Hazard) Notice 2017.

Ingredient	Fish	Daphnia and other aquatic invertebrates EC50, 48h (Water flea)	Algae/aquatic plants (Algae)
1,1,1,2-Tetrafluoroethane (HFC-134a)	450mg/l (LC50, 96h [Rainbow trout])	980mg/l	142mg/l (ErC50, 96h [Algae])
2,3,3,3-Tetrafluoropropene (HFO-1234yf)	197mg/l (LC50, 96h [Carp])	>100mg/l	>100mg/l (NOEC, 72h)
Pentafluoroethane (HFC-125)	450mg/l (LC50, 96h [Rainbow trout])	980mg/l*	13.2mg/l NOEC, 72h**
Difluoromethane (HFC-32)	1,507mg/l (LC50, 96h [Fish]) 65.8mg/l (Chronic) (NOEC, 30d [Fish])	652mg/l	142mg/l (EC50, 96h [Algae])

* (Method: Directive 67/548/EEC, Annex V, c.2. Based on data from similar materials)

** (Method: OECD test Guideline 201. Based on data from similar materials)

12.2 Persistence and degradability

This product is not readily biodegradable.

Ingredient	Biodegradability
1,1,1,2-Tetrafluoroethane (HFC-134a)	Not readily biodegradable.
2,3,3,3-Tetrafluoropropene (HFO-1234yf)	Not readily biodegradable. (Method: OECD test Guideline 301F)
Pentafluoroethane (HFC-125)	Not readily biodegradable. Biodegradation, 28d: 5% (Method: OECD test Guideline 301D)
Difluoromethane (HFC-32)	Not readily biodegradable. Biodegradation, 28d: 5% (Method: OECD test Guideline 301D)

12.3 Bioaccumulative potential

This product is not expected to bioaccumulate.

1,1,1,2-Tetrafluoroethane Partition coefficient: n-octanol/water log P_{ow}: 1.06

2,3,3,3-Tetrafluoropropene No bioaccumulation expected. Log P_{ow}: <4

Pentafluoroethane Partition coefficient: n-octanol/water log P_{ow}: 1.48 (@ 25 °C)

Difluoromethane Partition coefficient: n-octanol/water log P_{ow}: 0.714

12.4 Mobility in soil

No data available but, because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5 Other adverse effects

This mixture contains fluorinated synthetic greenhouse gases (SGG) which may contribute to the global warming effect, and which are covered by the Kyoto Protocol.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal Unwanted refrigerant should be transferred into an approved recovery cylinder and delivered to an accredited Refrigerant Recovery NZ depot. Empty containers of this product can be disposed of as scrap metal once the remaining refrigerant has been recovered.

Legislation It is an offence under the Climate Change Response Act 2002, with a penalty of up to \$50,000, to wilfully and knowingly release this refrigerant into the atmosphere.

The Health and Safety at Work (Hazardous Substances) Regulations 2017 require a PCBU in control of a workplace to ensure that no person at the workplace charges this product into a recovery cylinder unless the person is an Approved Filler, or is undertaking training and is supervised at all times by an Approved Filler. A PCBU who contravenes this regulation is liable to a fine of up to \$6,000 for an individual or \$30,000 for any other person (body corporate, company etc.).

14. TRANSPORT INFORMATION

CLASSIFIED AS A DANGEROUS GOOD ACCORDING TO LAND TRANSPORT RULE: DANGEROUS GOODS 2005; NZS 5433:2012, UN, IMDG OR IATA



	LAND TRANSPORT (NZS 5433)	SEA TRANSPORT (IMDG / IMO)	AIR TRANSPORT (IATA / ICAO)
14.1 UN Number	1078	1078	1078
14.2 Proper Shipping Name	REFRIGERANT GAS, N.O.S. (Contains R134a, R125, R32, R1234yf)	REFRIGERANT GAS, N.O.S. (Contains R134a, R125, R32, R1234yf)	REFRIGERANT GAS, N.O.S. (Contains R134a, R125, R32, R1234yf)
14.3 Transport Hazard Class (DG Code)	2.2	2.2	2.2
14.4 Packing Group	None allocated	None allocated	None allocated

14.5 **Environmental hazards** No information provided.

14.6 **Special precautions for user**

Hazchem code 2TE

EmS F-C, S-V

ERG 06

Marine pollutant No

Other information Before transporting product containers:

- Ensure that containers are firmly secured.
- Ensure that cylinder valve is closed and not leaking.
- Ensure that there is adequate ventilation.

Comply with applicable regulations.

15. REGULATORY INFORMATION

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

Approval code HSR002533

Group Standard Compressed Gas Mixtures (Non-hazardous) Group Standard 2006

Inventory listing(s) **New Zealand: NZIoC (New Zealand Inventory of Chemicals)**
All components are listed on the NZIoC, and the following inventories.
Canada: DSL
Japan: ENCS
Korea: KECI
USA: TSCA

Regulatory Controls:

- **Climate Change Response Act 2002;**
It is an offence under the Climate Change Response Act 2002, with a penalty of up to \$50,000, to wilfully and knowingly release this refrigerant into the atmosphere.
- **HSW (Hazardous Substances) Regulations 2017;**
A PCBU in control of a workplace must ensure that no person at the workplace charges this product into a recovery cylinder unless the person is an Approved Filler or is undertaking training and is supervised at all times by an Approved Filler. A PCBU who contravenes this regulation is liable to a fine of up to \$6,000 for an individual or \$30,000 for any other person (body corporate, company etc.).
A person who charges this product into a recovery cylinder who is not an Approved Filler is liable to an Infringement Fee of \$500 or, upon conviction, a fine of up to \$2,000.

- **HSNO Act 1996 Part 7;**
Gases under pressure are covered by this Part (Inspection, enforcement, and ancillary powers) whether or not they are classified as hazardous.
- **HSW (General Risk and Workplace Management) Regulations 2016**
These regulations set out the requirements for the provision and use of personal protective equipment (PPE).
- This product is subject to the **Kigali Amendment to the Montreal Protocol**.

16. OTHER INFORMATION

Additional information Cylinder colour: Greyish Blue
Cylinder valve outlet: Right-hand (clockwise)

ASPHYXIANT: There is a significant hazard associated with workers entering poorly-ventilated areas where oxygen may be deficient. An air-supplied breathing apparatus may be required if adequate ventilation is not ensured.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:

The recommendation for protective equipment contained within this report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

HEALTH EFFECTS FROM EXPOSURE:

It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used; and method of application. Given that it is impractical to prepare a report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

Abbreviations

AIHA	American Industrial Hygiene Association
CAS	Chemical Abstract Service (number) - used to uniquely identify chemical compounds
CCID	Chemical Classification and Information Database
CCL4	Carbon Tetrachloride
DG	Dangerous Good(s)
DSL	Domestic Substances List (Canada)
EC50	Half maximal Effective Concentration. The concentration which induces a response halfway between the baseline and maximum after a specified exposure time
EC No.	EC No - European Community Number
EEC	European Economic Commission
EmS	Emergency Schedules (Emergency Procedures for Ships Carrying Dangerous Goods)
EN	European Norm
ENCS	Japanese Existing and New Chemical Substances
ErC50	Concentration at which 50% reduction of the biomass is observed
ERG	Emergency Response Guide (number)
F-C	IMDG Emergency Procedure code for fire – non-flammable gases
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
GWP	Global Warming Potential
HFC	Hydrofluorocarbon
HFO	Hydrofluoroolefin
HSNO	Hazardous Substances and New Organisms (Act 1996)
HSW	Health and Safety at Work (Act)
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organisation
KECI	Korea Existing Chemicals Inventory
LC50	The concentration of the compound in feed, or water in the case of fish, that is lethal for 50% of the exposed population. The Median Lethal Concentration.
kg/m ³	Kilograms per cubic metre
kPa	Kilopascals
log P _{ow}	Partition co-efficient. Ratio of concentrations of a substance in octanol/water mixture
N.O.S.	Not Otherwise Specified
NOEC	No Observed Effect Concentration
NZS	New Zealand Standard
ODP	Ozone Depletion Potential
OECD	Organisation for Economic Co-operation and Development
PCBU	Person in Control of a Business or Undertaking (HSW Act)
pH	Relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly

alkaline).
 PPE Personal Protective Equipment
 SCBA Self-contained Breathing Apparatus
 SDS Safety Data Sheet
 S-V IMDG Emergency Procedure code for spillage – non-flammable, non-toxic gases
 STEL Short-term Exposure Limit
 STOT-RE Specific Target Organ Toxicity (repeated exposure)
 STOT-SE Specific Target Organ Toxicity (single exposure)
 TSCA Toxic Substances Control Act (Chemical Substance Inventory) (USA)
 TWA Time Weighted Average
 UFL Upper Flammability Limit (according to EN1839)
 UN No. United Nations (Recommendations on the Transport of Dangerous Goods) number
 WEEL Workplace Environmental Exposure Limit (AIHA)
 WEL Workplace Exposure Limits
 WES Workplace Exposure Standards

References

The CCID Database, and the New Zealand Inventory of Chemicals:

<https://www.epa.govt.nz/database-search/chemical-classification-and-information-database-ccid/>

Chemours Opteon™ XP40 SDS Version 1.6, 26.03.2019

Hazardous Substances (Safety Data Sheets) Notice 2017

Hazardous Substances (Minimum Degrees of Hazard) Notice 2017

Report status

This document has been compiled by Beijer Ref Support Office for **Realcold NZ Ltd.**

It is based on information concerning the product which has been provided to Beijer Ref by the manufacturer, importer or supplier or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer, importer or supplier.

While Beijer Ref has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, Beijer Ref accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

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End of SDS