



Used Refrigerants and Refrigerant Blends

Version 3.1

Revision Date 01/13/2017

Ref. 130000120029

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	:	Used Refrigerants and Refrigerant Blends
Tradename/Synonym	:	USED REFRIGERANT R-22
		USED REFRIGERANT R-134a
		USED REFRIGERANT R-125
		USED REFRIGERANT R-32
		USED REFRIGERANT R-124
		USED REFRIGERANT R-12
		USED REFRIGERANT R-13
		USED REFRIGERANT R-14
		USED REFRIGERANT R-11
		USED REFRIGERANT R-23
		USED REFRIGERANT R-113
		USED REFRIGERANT R-114
		USED REFRIGERANT R-116
		USED REFRIGERANT R-123
		USED REFRIGERANT R-401A
		USED REFRIGERANT R-401B
		USED REFRIGERANT R-401C
		USED REFRIGERANT R-402A
		USED REFRIGERANT R-402B
		USED REFRIGERANT R-404A
		USED REFRIGERANT R-407A
		USED REFRIGERANT R-407C
		USED REFRIGERANT R-408A
		USED REFRIGERANT R-409A
		USED REFRIGERANT R-410A
		USED REFRIGERANT R-417A
		USED REFRIGERANT R-422A
		USED REFRIGERANT R-422D
		USED REFRIGERANT R-423A
		USED REFRIGERANT R-437A
		USED REFRIGERANT R-438A
		USED REFRIGERANT R-449A
		USED REFRIGERANT R-452A



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USED REFRIGERANT R-500
USED REFRIGERANT R-503
USED REFRIGERANT R-502
USED REFRIGERANT R-507
USED REFRIGERANT R-508B
USED REFRIGERANT R-513A
USED REFRIGERANT R-236fa
USED REFRIGERANT R-1234yf
USED REFRIGERANT R-514A

Restrictions on use : Do not use product for anything outside of the above specified uses
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)

Other information : The above components represent Chemours Refrigerant and Refrigerant Blends that are returned for reclamation. Any (and/or all) components may be contained in the material returned. The information is representative for any and all components.
This specification for used refrigerant returned for reclamation is a maximum of 30% TOTAL lubricating oil content. Most used refrigerant contains significantly less.

SECTION 2. HAZARDS IDENTIFICATION

Product hazard category

Gases under pressure
Gases under pressure

Compressed gas
Liquefied gas
Category 2A

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Label content

Pictogram

:



Signal word

: Warning

Hazardous warnings

: Contains gas under pressure; may explode if heated.
May cause respiratory irritation.
May cause drowsiness or dizziness.



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Hazardous prevention measures

: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
 Wash skin thoroughly after handling.
 Do not eat, drink or smoke when using this product.
 Use only outdoors or in a well-ventilated area.
 Avoid release to the environment.
 Wear protective gloves/ protective clothing/ eye protection/ face protection.
 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
 IF ON SKIN: Wash with plenty of soap and water.
 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
 IF exposed or concerned: Get medical advice/ attention.
 IF exposed or if you feel unwell: Call a POISON CENTER or doctor/ physician.
 Specific treatment (see supplemental first aid instructions on this label).
 Rinse mouth.
 If skin irritation occurs: Get medical advice/ attention.
 If eye irritation persists: Get medical advice/ attention.
 Take off contaminated clothing and wash it before reuse.
 Store in a well-ventilated place. Keep container tightly closed.
 Store locked up.
 Protect from sunlight. Store in a well-ventilated place.
 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

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



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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
Chlorodifluoromethane (HCFC-22)	75-45-6	0 - 100 %
1,1,1,2-Tetrafluoroethane (HFC-134a)	811-97-2	0 - 100 %
Pentafluoroethane (HFC-125)	354-33-6	0 - 70 %
Difluoromethane (HFC-32)	75-10-5	0 - 50 %
2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)	2837-89-0	0 - 100 %
Trifluoromethane (HFC-23)	75-46-7	0 - 100 %
2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	306-83-2	0 - 100 %
1-Chloro-1,1-difluoroethane (HCFC-142b)	75-68-3	0 - 100 %
1,1,1,3,3,3-Hexafluoropropane (HFC-236fa)	690-39-1	0 - 100 %
2,3,3,3-Tetrafluoropropene (HFO-1234yf)	754-12-1	0 - 56 %
1,1,1-Trifluoroethane (HFC-143a)	420-46-2	0 - 55 %



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1,1,1,2,3,3,3-Heptafluoropropane (HFC-227ea)	431-89-0	0 - 50 %
1,1-Difluoroethane (HFC-152a)	75-37-6	0 - 30 %
Perfluoropropane (FC-218)	76-19-7	0 - 10 %
Trichlorofluoromethane (CFC-11)	75-69-4	0 - 60 %
Dichlorodifluoromethane (CFC-12)	75-71-8	0 - 60 %
Chlorotrifluoromethane (CFC-13)	75-72-9	0 - 60 %
Carbon Tetrafluoride(FC-14)	75-73-0	0 - 60 %
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	76-13-1	0 - 60 %
1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC-114)	76-14-2	0 - 60 %
Chloropentafluoroethane (CFC-115)	76-15-3	0 - 60 %
Perfluoroethane (FC-116)	76-16-4	0 - 60 %
Propane(HC-290)	74-98-6	0 - 6 %
n-Butane (HC-600)	106-97-8	0 - 5 %



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Pentane(HC-601)	109-66-0	0 - 1 %
Isobutane (HC-600a)	75-28-5	0 - 5 %
2-Methylbutane (HC-601a)	78-78-4	0 - 1 %
Alkylated Benzene	68648-86-2	0 - 30 %
Polypropylene Glycol, monobutyl ether	9003-13-8	0 - 30 %
Polyalkylene Glycol, monobutyl ether	9038-95-3	0 - 30 %
Distillates (Petroleum), clay treated heavy naphthenic; base oil unspecified	64742-44-5	0 - 30 %
Distillates (Petroleum), Solvent-Refined Heavy Paraffinic	64741-88-4	0 - 30 %
Pentaerythritol esters of heptanoic and isononionic acids	118685-29-3	0 - 30 %
Unspecified impurities		0 - 3 %

SECTION 4. FIRST AID MEASURES

General advice : When symptoms persist or in all cases of doubt seek medical advice.

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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	: Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.
Eye contact	: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Consult a physician if necessary.
Ingestion	: Do not induce vomiting. If conscious, give 2 glasses of water. Get immediate medical attention. Never give anything by mouth to an unconscious person.
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.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	: As appropriate for combustibles in area. Extinguishant for other burning material in area is sufficient to stop burning.
Unsuitable extinguishing media	: No applicable data available.
Specific hazards	: Drums may rupture under fire conditions. Cylinders are equipped with pressure and temperature relief devices, but may still rupture under fire conditions. Decomposition may occur.



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Special protective equipment for firefighters : No applicable data available.

Further information : Use water spray or fog to protect the fire fighters and to cool container. Self-contained breathing apparatus (SCBA) is required if containers rupture and contents are released under fire conditions.

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) : Ventilate spill area. Comply with Federal, State and Local regulations on reporting releases

Environmental precautions : Prevent material from entering sewers, waterways, or low areas.

Spill Cleanup : Dike spill. Collect on absorbent material and transfer to steel drums for recovery/disposal.

Accidental Release Measures : Self-contained breathing apparatus (SCBA) is required if a large release occurs.

SECTION 7. HANDLING AND STORAGE

Handling (Personnel) : Avoid breathing vapours or mist. Avoid contact with skin, eyes and clothing. Wash thoroughly after handling. Use sufficient ventilation to keep employee exposure below recommended limits.

Handling (Physical Aspects) : No applicable data available.
Dust explosion class : Not applicable

Storage : Keep containers tightly closed and in an upright position. Store in a clean, dry place. Keep away from direct sunlight. Do not expose recovery cylinders to temperature above 52°C (125°F). Do not expose drums to direct heat or



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temperature above 46°C (115°F) to avoid pressurizing and possibly distorting the drums.

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 : Normal ventilation for standard manufacturing procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low or enclosed places.

Personal protective equipment

Respiratory protection : Where there is potential for airborne exposures in excess of applicable limits, wear NIOSH approved respiratory protection.

Hand protection : Additional protection: Impervious gloves

Eye protection : Wear safety glasses with side shields. Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.

Exposure Guidelines

Exposure Limit Values

Dichlorodifluoromethane (CFC-12)				
Permissible exposure limit:	(OSHA)	1,000 ppm	4,950 mg/m ³	8 hr. TWA
TLV	(ACGIH)	1,000 ppm	TWA	
Trichlorofluoromethane (CFC-11)				
Permissible exposure limit:	(OSHA)	1,000 ppm	5,600 mg/m ³	8 hr. TWA
TLV	(ACGIH)	1,000 ppm	TLV-C	



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

No applicable data available.

1-Chloro-1,1-difluoroethane (HCFC-142b)

No applicable data available.

2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)

No applicable data available.

Chlorotrifluoromethane (CFC-13)

No applicable data available.

Chlorodifluoromethane (HCFC-22)

TLV	(ACGIH)	1,000 ppm	TWA
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2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)

No applicable data available.

Trichlorotrifluoroethane (CFC-113A)

No applicable data available.

1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC-114)

Permissible exposure limit:	(OSHA)	1,000 ppm	7,000 mg/m ³	8 hr. TWA
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TLV	(ACGIH)	1,000 ppm	TWA
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Pentafluoroethane (HFC-125)

No applicable data available.

1,1,1-Trifluoroethane (HFC-143a)



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No applicable data available.

1,1,1,2,3,3,3-Heptafluoropropane (HFC-227ea)

No applicable data available.

1,1-Difluoroethane (HFC-152a)

No applicable data available.

Difluoromethane (HFC-32)

No applicable data available.

Perfluoropropane (FC-218)

No applicable data available.

Propane(HC-290)

Permissible exposure limit:	(OSHA)	1,000 ppm	1,800 mg/m3	8 hr. TWA
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Isobutane (HC-600a)

TLV	(ACGIH)	1,000 ppm	STEL	
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TLV	(ACGIH)	1,000 ppm	STEL	
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n-Butane (HC-600)

TLV	(ACGIH)	1,000 ppm	STEL	
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Pentane(HC-601)

Permissible exposure limit:	(OSHA)	1,000 ppm	2,950 mg/m3	8 hr. TWA
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TLV	(ACGIH)	1,000 ppm	TWA	
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2-Methylbutane (HC-601a)
TLV (ACGIH) 1,000 ppm TWA

Carbon Tetrafluoride(FC-14)
No applicable data available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state : gaseous
Form : liquid, Compressed gas, Liquefied gas
Color : clear, colourless, light yellow

Odor : slight

Odor threshold : No applicable data available.

pH : No applicable data available.

Melting point/range : No applicable data available.

Boiling point/boiling range : No applicable data available.

Flash point : Pure refrigerants will not burn. However, the lubricating oil contaminants will burn and they may be at a high enough concentration that the mixture will burn.

Evaporation rate : No applicable data available.

Flammability (solid, gas) : No applicable data available.

Upper explosion limit : No applicable data available.



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Lower explosion limit	:	No applicable data available.
Vapor pressure	:	no data available
Vapour density	:	No applicable data available.
Specific gravity (Relative density)	:	no data available
Water solubility	:	no 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.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No applicable data available.
Chemical stability	:	Stable
Possibility of hazardous reactions	:	Polymerization will not occur.
Conditions to avoid	:	Avoid open flames and high temperatures.
Incompatible materials	:	Alkali metals Alkaline earth metals, Powdered metals, Powdered metal salts, The Refined Mineral Oils are incompatible with strong oxidizers.
Hazardous decomposition products	:	Decomposition products are hazardous., This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrochloric and hydrofluoric acids, and possibly carbonyl halides., Refined

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Mineral Oils, if present, can produce carbon monoxide and carbon dioxide upon combustion.

SECTION 11. TOXICOLOGICAL INFORMATION

Chlorodifluoromethane (HCFC-22)

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|--|---|---|
| Inhalation 4 h LC50 | : | > 150000 ppm , Mouse |
| Inhalation Low Observed Adverse Effect Concentration (LOAEC) | : | 50000 ppm , Dog
Cardiac sensitization |
| Inhalation No Observed Adverse Effect Concentration | : | 25000 ppm , Dog
Cardiac sensitization |
| Skin irritation | : | Not expected to cause skin irritation based on expert review of the properties of the substance. |
| Eye irritation | : | Not expected to cause eye irritation based on expert review of the properties of the substance. |
| Skin sensitization | : | Not expected to cause sensitization based on expert review of the properties of the substance. |
| Repeated dose toxicity | : | Inhalation
Mouse
-
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.
Experiments showed mutagenic effects in cultured bacterial cells. |
| Reproductive toxicity | : | No toxicity to reproduction |
| Teratogenicity | : | Animal testing showed effects on embryo-fetal development at levels |



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equal to or above those causing maternal toxicity.

Further information : Cardiac sensitisation threshold limit : 175000 mg/m3

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



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Teratogenicity : Animal testing showed no developmental toxicity.

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

Pentafluoroethane (HFC-125)

Inhalation 4 h LC50 : > 800000 ppm , Rat

Inhalation No Observed Adverse Effect Concentration : 75000 ppm , Dog
Cardiac sensitization

Inhalation Low Observed Adverse Effect Concentration (LOAEC) : 100000 ppm , Dog
Cardiac sensitization

Skin sensitization : Does not cause respiratory sensitisation., human

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



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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 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

2-Chloro-1,1,1,2-tetrafluoroethane (HCFC-124)

Inhalation 4 h LC50	:	> 230000 ppm , Rat Anaesthetic effects
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Central nervous system effects

Inhalation Low Observed Adverse Effect Concentration (LOAEC)	:	25000 ppm , Dog Cardiac sensitization
Inhalation No Observed Adverse Effect Concentration	:	10000 ppm , Dog Cardiac sensitization
Skin irritation	:	Not expected to cause skin irritation based on expert review of the properties of the substance.
Eye irritation	:	Not expected to cause eye irritation based on expert review of the properties of the substance.
Skin sensitization	:	Not expected to cause sensitization based on expert review of the properties of the substance. Does not cause respiratory sensitisation., There are no reports of human respiratory sensitization.
Repeated dose toxicity	:	Inhalation multiple species - No toxicologically significant effects were found.
Carcinogenicity	:	Not classifiable as a human carcinogen.
Mutagenicity	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Animal testing did not show any mutagenic effects.
Teratogenicity	:	Animal testing showed no developmental toxicity.
Further information	:	Cardiac sensitisation threshold limit : 140000 mg/m3
Trifluoromethane (HFC-23)		
Inhalation 4 h LC50	:	> 663000 ppm , Rat
Inhalation Low Observed Adverse Effect	:	> 500000 ppm , Dog Cardiac sensitization



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Concentration (LOAEC) Inhalation No Observed Adverse Effect Concentration Repeated dose toxicity	:	500000 ppm , Dog Cardiac sensitization Inhalation Rat - NOAEL: 28.634 mg/l No toxicologically significant effects were found.
Mutagenicity	:	Animal testing did not show any mutagenic effects. Evidence suggests this substance does not cause genetic damage in animals.
Reproductive toxicity	:	No toxicity to reproduction Evidence suggests the substance is not a reproductive toxin in animals.
Teratogenicity	:	Animal testing showed no developmental toxicity.
Further information	:	Cardiac sensitisation threshold limit : > 172414 mg/m3

2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)

Inhalation	:	Target Organs: Central nervous system Central nervous system effects
Inhalation Low Observed Adverse Effect Concentration (LOAEC)	:	20000 ppm , Dog Cardiac sensitization
Inhalation No Observed Adverse Effect Concentration	:	10000 ppm , Dog Cardiac sensitization
Dermal LD50	:	> 2,000 mg/kg , Rabbit
Dermal LD50	:	> 2,000 mg/kg , Rat
Oral LD50	:	9,000 mg/kg , Rat Respiratory effects Abnormal posture

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Skin irritation	:	No skin irritation, Rabbit Not expected to cause skin irritation based on expert review of the properties of the substance.
Eye irritation	:	No eye irritation, Rabbit Not expected to cause eye irritation based on expert review of the properties of the substance.
Skin sensitization	:	Does not cause skin sensitisation., Guinea pig Did not cause sensitisation on laboratory animals. Not expected to cause sensitization based on expert review of the properties of the substance. Does not cause respiratory sensitisation., multiple species
Repeated dose toxicity	:	Inhalation Rat - vapour No toxicological effects warranting significant target organ toxicity classification were seen below the recommended guidance values for classification.
Carcinogenicity	:	Not classifiable as a human carcinogen. The observed tumors do not appear to be relevant for men.
Mutagenicity	:	Animal testing did not show any mutagenic effects. Did not cause genetic damage in cultured bacterial cells.
Reproductive toxicity	:	No toxicity to reproduction Animal testing showed no reproductive toxicity. No effects on or via lactation
Teratogenicity	:	Animal testing showed no developmental toxicity.
Further information	:	Cardiac sensitisation threshold limit : 124000 mg/m3
1-Chloro-1,1-difluoroethane (HCFC-142b) Inhalation 4 h LC50	:	> 400000 ppm , Rat Target Organs: Central nervous system



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narcosis
Lethargy
Laboured breathing
lung effects
Kidney effects

Inhalation Low Observed Adverse Effect Concentration (LOAEC) : 50000 ppm , Dog
Cardiac sensitization

Inhalation No Observed Adverse Effect Concentration : 25000 ppm , Dog
Cardiac sensitization

Repeated dose toxicity : Inhalation
multiple species
-
No toxicologically significant effects were found.

Carcinogenicity : Not classifiable as a human carcinogen.

Mutagenicity : Animal testing did not show any mutagenic effects.
Genetic damage in cultured mammalian cells was observed in some laboratory tests but not in others.
Genetic damage in cultured bacterial cells was observed in some laboratory tests but not in others.

Teratogenicity : Animal testing showed no developmental toxicity.

Further information : Cardiac sensitisation threshold limit : 205000 mg/m3

1,1,1,3,3,3-Hexafluoropropane (HFC-236fa)

Inhalation 4 h LC50 : > 457000 ppm , Rat

Inhalation 4 h LC50 : > 189000 ppm , Rat
Target Organs: Central nervous system
Narcotic effects
Central nervous system effects

Inhalation Low Observed Adverse Effect Concentration (LOAEC) : 150000 ppm , Dog
Cardiac sensitization



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Inhalation No Observed Adverse Effect Concentration	:	100000 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 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 No toxicologically significant effects were found.
Mutagenicity	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Animal testing did not show any mutagenic effects.
Reproductive toxicity	:	No toxicity to reproduction Evidence suggests the substance is not a reproductive toxin in animals.
Teratogenicity	:	Animal testing showed no developmental toxicity.
Further information	:	Cardiac sensitisation threshold limit : 932751 mg/m3
2,3,3,3-Tetrafluoropropene (HFO-1234yf)		
Inhalation 4 h LC50	:	> 405000 ppm , Rat
Inhalation Low Observed Adverse Effect	:	> 120000 ppm , Dog Cardiac sensitization



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Concentration (LOAEC) 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 - 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.



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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
1,1,1-Trifluoroethane (HFC-143a)		
Inhalation 4 h LC50	:	> 591000 ppm , Rat
Inhalation No Observed Adverse Effect Concentration	:	250000 ppm , Dog Cardiac sensitization
Inhalation Low Observed Adverse Effect Concentration (LOAEC)	:	300000 ppm , Dog Cardiac sensitization
Skin sensitization	:	Does not cause respiratory sensitisation., human
Repeated dose toxicity	:	Inhalation Rat - gas NOAEL: > 40000, Method: OECD Test Guideline 413 No toxicologically significant effects were found.
Carcinogenicity	:	Not classifiable as a human carcinogen. Animal testing did not show any carcinogenic effects.
Mutagenicity	:	Animal testing did not show any mutagenic effects. Tests on bacterial or mammalian cell cultures did not show mutagenic



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- effects.
- Reproductive toxicity : No toxicity to reproduction
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 : 862068.97 mg/m3

1,1,1,2,3,3,3-Heptafluoropropane (HFC-227ea)

- Inhalation 4 h LC50 : > 788696 ppm , Rat
Central nervous system effects
Respiratory effects
- Inhalation No Observed Adverse Effect Concentration : 90000 ppm , Dog
Cardiac sensitization
- Inhalation Low Observed Adverse Effect Concentration (LOAEC) : 105000 ppm , Dog
Cardiac sensitization
- Skin sensitization : Does not cause respiratory sensitisation., human
- Repeated dose toxicity : Inhalation
Rat
-
gas
NOAEL: 731.69 mg/l
No toxicologically significant effects were found.
- Carcinogenicity : Not classifiable as a human carcinogen.
Animal testing did not show any carcinogenic effects.
- 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.



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Teratogenicity : Animal testing showed no developmental toxicity.

Further information : Cardiac sensitisation threshold limit : 730190 mg/m3

1,1-Difluoroethane (HFC-152a)

Inhalation 4 h LC50 : > 437500 ppm , Rat

Inhalation No Observed Adverse Effect Concentration : 50000 ppm , Dog
Cardiac sensitization

Inhalation Low Observed Adverse Effect Concentration (LOAEC) : 150000 ppm , Dog
Cardiac sensitization

Skin sensitization : Does not cause respiratory sensitisation., Rat

Repeated dose toxicity : Inhalation
Rat
-
NOAEL: 67.485 mg/l
No toxicologically significant effects were found.

Carcinogenicity : Not classifiable as a human carcinogen.
Animal testing did not show any carcinogenic effects.

Mutagenicity : Animal testing did not show any mutagenic effects.
Did not cause genetic damage in cultured bacterial cells.
Tests on mammalian cell cultures showed mutagenic effects.

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 : 405000 mg/m3

Perfluoropropane (FC-218)

Inhalation 4 h LC50 : 400000 ppm , Rat

Inhalation No Observed Adverse Effect : 300000 ppm , Dog
Cardiac sensitization



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Concentration
 Inhalation Low Observed Adverse Effect Concentration (LOAEC)
 Mutagenicity : 400000 ppm , Dog
 Cardiac sensitization
 : Animal testing did not show any mutagenic effects.
 Did not cause genetic damage in cultured bacterial cells.

Further information : Cardiac sensitisation threshold limit : 3080000 mg/m3

Trichlorofluoromethane (CFC-11)

Inhalation 4 h LC50 : > 65680 ppm , Rat

Inhalation Low Observed Adverse Effect Concentration (LOAEC)
 Inhalation No observed adverse effect level : Dog
 Cardiac sensitization

: Dog
 Cardiac sensitization

Dermal LD50 : > 9,300 mg/kg , Rabbit

Oral LD50 : > 11,000 mg/kg , Rat

Repeated dose toxicity : Ingestion
 multiple species
 - 90 d
 NOAEL: > 450 mg/kg
 No toxicologically significant effects were found.

Inhalation
 multiple species
 - 28 d
 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.



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Dichlorodifluoromethane (CFC-12)

Inhalation 4 h LC50	:	1200000 ppm , Rat Central nervous system effects
Inhalation No observed adverse effect level	:	25000 ppm , multiple species Cardiac sensitization
Dermal	:	no data available
Oral LD50	:	> 1,000 mg/kg , Rat
Skin irritation	:	No skin irritation, Guinea pig
Eye irritation	:	slight irritation, Rabbit
Repeated dose toxicity	:	Inhalation Rat - No toxicologically significant effects were found. Oral multiple species - No toxicologically significant effects were found.
Carcinogenicity	:	Not classifiable as a human carcinogen. Animal testing did not show any carcinogenic effects.
Mutagenicity	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Animal testing did not show any mutagenic effects.
Teratogenicity	:	Animal testing showed no developmental toxicity.

Chlorotrifluoromethane (CFC-13)

Inhalation 4 h LC50	:	> 425000 ppm , Rat narcosis
Inhalation	:	Dog



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Cardiac sensitization

Dermal	:	Not applicable
Oral	:	Not applicable
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.
Repeated dose toxicity	:	Inhalation Rat - No toxicologically significant effects were found.
Mutagenicity	:	Did not cause genetic damage in cultured bacterial cells.
Further information	:	Cardiac sensitisation threshold limit : 3419222 mg/m3

Carbon Tetrafluoride(FC-14)
Inhalation

:
Target Organs: Central nervous system
Central nervous system depression

1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)

Inhalation 4 h : 521 mg/l , Rat
Target Organs: Central nervous system
Central nervous system effects
Breathing difficulties
Tremors
Hyperactivity
Convulsions

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		altered hematology
Inhalation 4 h LC50	:	404 mg/l , Rat Target Organs: Central nervous system Central nervous system effects Liver effects Kidney effects lung effects Altered respiratory rate Anaesthetic effects Incoordination Convulsions
Inhalation	:	5000 ppm , Dog Cardiac sensitization
Dermal LD50	:	> 11,000 mg/kg , Rabbit
Oral LD50	:	43,000 mg/kg , Rat Liver effects Kidney effects lung effects Gastrointestinal effects Lethargy Altered respiratory rate Fluid retention in lungs (pulmonary oedema)
Skin irritation	:	slight irritation, Rabbit
Eye irritation	:	slight irritation, Rabbit
Skin sensitization	:	Did not cause sensitisation on laboratory animals., Guinea pig
Repeated dose toxicity	:	Dermal Rabbit - Skin irritation, Kidney damage, Liver damage Oral Rabbit



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-
Increased mortality or reduced survival

Inhalation
Rat

-
Weight loss, altered blood chemistry

Inhalation
Rat

-
No toxicologically significant effects were found.

Inhalation
Rat

-
lung effects

Inhalation
human

-
No toxicologically significant effects were found.

Carcinogenicity : Not classifiable as a human carcinogen.

Mutagenicity : Animal testing did not show any mutagenic effects.
Tests on mammalian cell cultures showed mutagenic effects.
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 : 38300 mg/m3

1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC-114)

Inhalation 4 h ALC - : > 424000 ppm , Rat
Approximate Lethal Concentration Target Organs: Central nervous system
Central nervous system depression



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Inhalation	:	Cardiac sensitization
Repeated dose toxicity	:	Inhalation multiple species - No toxicologically significant effects were found. Oral multiple species - No toxicologically significant effects were found.
Carcinogenicity	:	Not classifiable as a human carcinogen. Animal testing did not show any carcinogenic effects.
Mutagenicity	:	Animal testing did not show any mutagenic effects. 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 : 175000 mg/m3
Chloropentafluoroethane (CFC-115)		
Inhalation 4 h LC50	:	> 800000 ppm , Rat
Inhalation Low Observed Adverse Effect Concentration (LOAEC)	:	150000 ppm , Dog Cardiac sensitization
Repeated dose toxicity	:	Inhalation multiple species - gas No toxicologically significant effects were found.
Mutagenicity	:	Did not cause genetic damage in cultured bacterial cells.



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Further information : Cardiac sensitisation threshold limit : 947669 mg/m³

Further information : Cardiac sensitisation threshold limit : 1263803 mg/m³

Perfluoroethane (FC-116)

Inhalation 4 h LC50 : > 500000 ppm , Rat

Inhalation No Observed Adverse Effect Concentration : 200000 ppm , Dog
Cardiac sensitization

Repeated dose toxicity : Inhalation
Rat
- Method: OECD Test Guideline 412
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.

Teratogenicity : Animal testing showed no developmental toxicity.

Further information : Cardiac sensitisation threshold limit : 1129943.5 mg/m³

Propane(HC-290)

Inhalation 4 h LC50 : > 200000 ppm , Rat

Inhalation Low Observed Adverse Effect Concentration (LOAEC) : 100000 ppm , Dog
Cardiac sensitization

Inhalation No Observed Adverse Effect Concentration : 50000 ppm , Dog
Cardiac sensitization

Dermal : Not applicable

Oral : Not applicable

Skin irritation : Not applicable



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Eye irritation	:	Not applicable
Skin sensitization	:	Not applicable
Repeated dose toxicity	:	Inhalation Rat - gas No toxicologically significant effects were found.
Mutagenicity	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Animal testing did not show any mutagenic effects.
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 : 180369 mg/m3

n-Butane (HC-600)		
Inhalation 4 h LC50	:	277018 ppm , Rat Target Organs: Respiratory Tract, Central nervous system Irritating to respiratory system. Central nervous system depression narcosis
Dermal	:	Not applicable
Oral	:	Not applicable
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.

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Skin sensitization : Not tested on animals
There are no reports of human skin sensitization. Not expected to cause sensitization based on expert review of the properties of the substance.

Repeated dose toxicity : Inhalation
multiple species
-
No toxicologically significant effects were found.

Mutagenicity : Animal testing did not show any mutagenic effects.

Pentane(HC-601)

Inhalation 4 h LC50 : 70000 ppm , Mouse
Irritating to respiratory system.
narcosis

Inhalation 4 h LC50 : > 20 mg/l , Rat

Dermal : Not applicable

Oral LD50 : > 2,000 mg/kg , Rat
Not applicable

Skin irritation : slight irritation, Rabbit

Eye irritation : No eye irritation, Rabbit

Skin sensitization : Animal test did not cause sensitization by skin contact., Guinea pig

Repeated dose toxicity : Oral
Rat
-
No toxicologically significant effects were found.

Inhalation
Rat
-
No toxicologically significant effects were found.

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- Mutagenicity : Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Animal testing did not show any mutagenic effects.
- Reproductive toxicity : No toxicity to reproduction
Animal testing showed no reproductive toxicity.
- Teratogenicity : Animal testing showed no developmental toxicity.

Isobutane (HC-600a)

- Inhalation 4 h LC50 : 276808 ppm , Rat
The toxicological data has been taken from products of similar composition.
- Inhalation 4 h LC50 : > 31 mg/l , Rat
- Inhalation Low Observed Adverse Effect Concentration (LOAEC) : 50000 ppm , Dog
Cardiac sensitization
- Inhalation No Observed Adverse Effect Concentration : 25000 ppm , Dog
Cardiac sensitization
- Dermal : Not applicable
- Oral : Not applicable
- 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.
- Repeated dose toxicity : Inhalation



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Rat

-

No toxicologically significant effects were found.

- Mutagenicity : Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Animal testing did not show any mutagenic effects.
- 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 : 118.9 mg/m³

2-Methylbutane (HC-601a)

- Inhalation 4 h LC50 : 1,281.9 mg/l , Rat
Target Organs: Central nervous system
Central nervous system depression
narcosis
- Inhalation 4 h LC50 : 70000 ppm , Rat
- Oral LD50 : > 2,000 mg/kg , Rat
- Skin irritation : slight irritation, human
- Eye irritation : No eye irritation, Rabbit
- Skin sensitization : Did not cause sensitisation on laboratory animals., Guinea pig
- Repeated dose toxicity : Inhalation
Rat
-
No toxicologically significant effects were found.
- Mutagenicity : Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Animal testing did not show any mutagenic effects.

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Reproductive toxicity : No toxicity to reproduction
Animal testing showed no reproductive toxicity.

Teratogenicity : Animal testing showed no developmental toxicity.

Alkylated Benzene

Dermal LD50 : > 2,000 mg/kg , Rat

Oral LD50 : > 5,000 mg/kg , Rat

Skin irritation : No skin irritation, Rabbit
slight irritation

Eye irritation : No eye irritation, Rabbit
slight irritation

Skin sensitization : Patch test on human volunteers did not demonstrate sensitisation
properties., human

Repeated dose toxicity : Inhalation
Rat
-
No toxicologically significant effects were found.

Dermal
Mouse
-
No toxicologically significant effects were found.

Carcinogenicity : Not classifiable as a human carcinogen.
Animal testing did not show any carcinogenic effects.

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.

Teratogenicity : Animal testing showed effects on embryo-fetal development at levels

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equal to or above those causing maternal toxicity.

Polypropylene Glycol, monobutyl ether

Inhalation 4 h LC50	:	> 100 mg/l , Rat
Dermal LD50	:	> 2,000 mg/kg , Rat
Oral LD50	:	300 - 2,000 mg/kg , Rat
Skin irritation	:	Skin irritation, Rabbit
Eye irritation	:	Eye irritation, Rabbit
Skin sensitization	:	Does not cause skin sensitisation., human Patch test on human volunteers did not demonstrate sensitisation properties.
Repeated dose toxicity	:	Oral Rat - No toxicologically significant effects were found. Inhalation Rat - No toxicologically significant effects were found.
Carcinogenicity	:	Not classifiable as a human carcinogen. Animal testing did not show any carcinogenic effects.
Mutagenicity	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Evidence suggests this substance does not cause genetic damage in animals.
Reproductive toxicity	:	No toxicity to reproduction No effects on or via lactation Animal testing showed no reproductive toxicity.
Teratogenicity	:	Animal testing showed no developmental toxicity.

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Polyalkylene Glycol, monobutyl ether

Dermal LD50	:	> 2,000 mg/kg , Rabbit
Oral LD50	:	> 5,000 mg/kg , Rat
Skin irritation	:	No skin irritation, Rabbit slight irritation
Eye irritation	:	No eye irritation, Rabbit
Skin sensitization	:	Does not cause skin sensitisation., human Patch test on human volunteers did not demonstrate sensitisation properties.
Repeated dose toxicity	:	Oral Rat - No adverse effect has been observed in chronic toxicity tests. Inhalation Rat - lung effects, Reversible
Carcinogenicity	:	Not classifiable as a human carcinogen. Animal testing did not show any carcinogenic effects.

Distillates (Petroleum), clay treated heavy naphthenic; base oil unspecified

Inhalation 4 h LC50	:	> 5.53 mg/l , Rat
Dermal LD50	:	> 2,000 mg/kg , Rat
Oral LD50	:	> 5,000 mg/kg , Rat
Skin irritation	:	No skin irritation, Rabbit slight irritation
Eye irritation	:	No eye irritation, Rabbit slight irritation

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Skin sensitization	:	Does not cause skin sensitisation., animals (unspecified species)
Repeated dose toxicity	:	Dermal Rat - No toxicologically significant effects were found.
	:	Inhalation Rat - No toxicologically significant effects were found.
Carcinogenicity	:	Not classifiable as a human carcinogen. Animal testing did not show any carcinogenic effects.
Mutagenicity	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Evidence suggests this substance does not cause genetic damage in animals.
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.

Distillates (Petroleum), Solvent-Refined Heavy Paraffinic

Inhalation 4 h LC50	:	> 5.0 mg/l , Rat The toxicological data has been taken from products of similar composition.
Dermal LD50	:	> 5,000 mg/kg , Rabbit The toxicological data has been taken from products of similar composition.
Oral LD50	:	> 5,000 mg/kg , Rat The toxicological data has been taken from products of similar composition.

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Skin irritation	:	No skin irritation, Rabbit The toxicological data has been taken from products of similar composition.
Eye irritation	:	No eye irritation, Rabbit The toxicological data has been taken from products of similar composition.
Skin sensitization	:	Did not cause sensitisation on laboratory animals., Guinea pig The toxicological data has been taken from products of similar composition. Does not cause respiratory sensitisation., Not tested on animals The toxicological data has been taken from products of similar composition.
Repeated dose toxicity	:	Inhalation Rat - No toxicologically significant effects were found., The toxicological data has been taken from products of similar composition. Dermal Rabbit - No toxicologically significant effects were found., The toxicological data has been taken from products of similar composition.
Carcinogenicity	:	Not classifiable as a human carcinogen. Information given is based on data obtained from similar substances.
Mutagenicity	:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Animal testing did not show any mutagenic effects. Information given is based on data obtained from similar substances.
Reproductive toxicity	:	No toxicity to reproduction Animal testing showed no reproductive toxicity. The toxicological data has been taken from products of similar composition.



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Teratogenicity : Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity.
Information given is based on data obtained from similar substances.

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

Chlorodifluoromethane (HCFC-22)

- 96 h LC50 : Zebra fish 777 mg/l
96 h EC50 : Algae 250 mg/l
48 h EC50 : Daphnia magna (Water flea) 433 mg/l

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

- 96 h LC50 : Oncorhynchus mykiss (rainbow trout) 450 mg/l
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

Pentafluoroethane (HFC-125)

- 96 h LC50 : Oncorhynchus mykiss (rainbow trout) 450 mg/l



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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

Trifluoromethane (HFC-23)

96 h LC50	:	Pimephales promelas (fathead minnow) 633.26 mg/l
96 h EC50	:	Algae 154.54 mg/l
48 h EC50	:	Daphnia magna (Water flea) 323.05 mg/l

2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)

96 h LC50	:	Oncorhynchus mykiss (rainbow trout) 55.5 mg/l
96 h ErC50	:	Pseudokirchneriella subcapitata (green algae) 96.6 mg/l
96 h EbC50	:	Pseudokirchneriella subcapitata (green algae) 67.8 mg/l
48 h EC50	:	Daphnia magna (Water flea) 17.3 mg/l

1-Chloro-1,1-difluoroethane (HCFC-142b)

96 h LC50	:	Oncorhynchus mykiss (rainbow trout) 36 mg/l
48 h EC50	:	Daphnia magna (Water flea) > 190 mg/l



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1,1,1,3,3,3-Hexafluoropropane (HFC-236fa)

- 96 h LC50 : Zebra fish 292 mg/l
- 96 h ErC50 : Pseudokirchneriella subcapitata (microalgae) > 186 mg/l
- 48 h EC50 : Daphnia magna (Water flea) 299 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

1,1,1-Trifluoroethane (HFC-143a)

- 96 h LC50 : Oncorhynchus mykiss (rainbow trout) > 40 mg/l OECD Test Guideline 203
- 96 h ErC50 : Pseudokirchneriella subcapitata (green algae) > 44 mg/l OECD Test Guideline 201
- 48 h EC50 : Daphnia magna (Water flea) 300 mg/l OECD Test Guideline 202

1,1,1,2,3,3,3-Heptafluoropropane (HFC-227ea)

- 96 h LC50 : Danio rerio (zebra fish) > 200 mg/l OECD Test Guideline 203
Information given is based on data obtained from similar substances.
- 72 h ErC50 : Pseudokirchneriella subcapitata (green algae) > 114 mg/l OECD Test Guideline 201
Information given is based on data obtained from similar substances.
- 72 h NOEC : Pseudokirchneriella subcapitata (green algae) 13.2 mg/l OECD Test Guideline 201
Information given is based on data obtained from similar substances.
- 48 h EC50 : Daphnia magna (Water flea) > 200 mg/l OECD Test Guideline 202
Information given is based on data obtained from similar substances.

1,1-Difluoroethane (HFC-152a)



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96 h LC50	:	Fish 295.78 mg/l
96 h EC50	:	Algae 47.76 mg/l
48 h EC50	:	Daphnia (water flea) 146.7 mg/l

Perfluoropropane (FC-218)

- : This product has no known ecotoxicological effects.
- : This product has no known ecotoxicological effects.
- : This product has no known ecotoxicological effects.
- : NOEC Fish (unspecified species)
Due to its physical properties, there is no potential for adverse effects.
- : NOEC Daphnia (water flea)
Due to its physical properties, there is no potential for adverse effects.

Trichlorofluoromethane (CFC-11)

96 h LC50	:	Oncorhynchus mykiss (rainbow trout) 190 mg/l
48 h EC50	:	Daphnia magna (Water flea) 130 mg/l

Dichlorodifluoromethane (CFC-12)

48 h LC50	:	Oryzias latipes (Orange-red killifish) 67 mg/l
48 h EC50	:	Daphnia magna (Water flea) 95 mg/l

1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)

96 h LC50	:	Oncorhynchus mykiss (rainbow trout) 7.4 mg/l
96 h LC50	:	Pimephales promelas (fathead minnow) > 1,000 mg/l
96 h EC50	:	Algae 8.75 mg/l
48 h EC50	:	Daphnia magna (Water flea) 71 mg/l

1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC-114)

96 h LC50	:	Fish 21.5 mg/l
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96 h EC50 : Algae 16 mg/l
48 h EC50 : Daphnia (water flea) 24.4 mg/l

Chloropentafluoroethane (CFC-115)
: No acute toxicity effects at concentrations up to the limit of aqueous solubility
: No acute toxicity effects at concentrations up to the limit of aqueous solubility

Perfluoroethane (FC-116)
96 h LC50 : Pimephales promelas (fathead minnow) 82.3 mg/l
96 h EC50 : Algae 37.5 mg/l
48 h EC50 : Daphnia magna (Water flea) 47.4 mg/l

Propane(HC-290)
96 h LC50 : Fish 24.11 mg/l
72 h EC50 : Algae 7.71 mg/l
48 h EC50 : Daphnia (water flea) 14.22 mg/l

n-Butane (HC-600)
96 h LC50 : Fish (unspecified species) > 1,000 mg/l

Pentane(HC-601)
96 h LC50 : Oncorhynchus mykiss (rainbow trout) 4.26 mg/l
72 h ErC50 : Scenedesmus capricornutum (fresh water algae) 10.7 mg/l
72 h EbC50 : Scenedesmus capricornutum (fresh water algae) 7.51 mg/l
48 h EC50 : Daphnia magna (Water flea) 2.7 mg/l
28 d : NOEC Oncorhynchus mykiss (rainbow trout) 6.165 mg/l



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21 d	:	NOEC Daphnia magna (Water flea) 10.76 mg/l
Isobutane (HC-600a)		
96 h LC50	:	Fish 24.11 mg/l
72 h EC50	:	Algae 7.71 mg/l
48 h EC50	:	Daphnia (water flea) 14.22 mg/l
2-Methylbutane (HC-601a)		
96 h LC50	:	Oncorhynchus mykiss (rainbow trout) 4.26 mg/l
72 h ErC50	:	Pseudokirchneriella subcapitata (green algae) 25.12 mg/l
72 h ErC50	:	Scenedesmus capricornutum (fresh water algae) 10.7 mg/l
72 h EbC50	:	Scenedesmus capricornutum (fresh water algae) 7.51 mg/l
48 h EC50	:	Daphnia magna (Water flea) 2.3 mg/l
28 d	:	NOEC Oncorhynchus mykiss (rainbow trout) 7.6 mg/l
21 d	:	NOEC Daphnia magna (Water flea) 13.29 mg/l
Alkylated Benzene		
96 h LC50	:	Lepomis macrochirus (Bluegill sunfish) > 1,000 mg/l Aquatic toxicity is unlikely due to low solubility.
96 h LC50	:	Pimephales promelas (fathead minnow) > 1,000 mg/l Aquatic toxicity is unlikely due to low solubility.
96 h	:	Selenastrum capricornutum (green algae) Aquatic toxicity is unlikely due to low solubility.
48 h EC50	:	Daphnia magna (Water flea) OECD Test Guideline 202 Aquatic toxicity is unlikely due to low solubility.
Polypropylene Glycol, monobutyl ether		
96 h LC50	:	Danio rerio (zebra fish) 104 mg/l OECD Test Guideline 203



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72 h ErC50 : Pseudokirchneriella subcapitata (green algae) 333 mg/l OECD Test Guideline 201

72 h EbC50 : Pseudokirchneriella subcapitata (green algae) 112 mg/l OECD Test Guideline 201

48 h EC50 : Daphnia magna (Water flea) > 100 mg/l OECD Test Guideline 202

Distillates (Petroleum), clay treated heavy naphthenic; base oil unspecified

96 h LC50 : Pimephales promelas (fathead minnow) > 100 mg/l

48 h EC50 : Daphnia magna (Water flea) > 10,000 mg/l

21 d : NOEC Daphnia magna (Water flea) 1,000 mg/l

Distillates (Petroleum), Solvent-Refined Heavy Paraffinic

96 h LC50 : Pimephales promelas (fathead minnow) > 100 mg/l OECD Test Guideline 203
The toxicological data has been taken from products of similar composition.

72 h NOEC : Pseudokirchneriella subcapitata (green algae) > 100 mg/l OECD Test Guideline 201
The toxicological data has been taken from products of similar composition.

48 h EC50 : Daphnia magna (Water flea) > 10,000 mg/l OECD Test Guideline 202
The toxicological data has been taken from products of similar composition.

21 d : NOEC Daphnia magna (Water flea) 10 mg/l OECD Test Guideline 211
The toxicological data has been taken from products of similar composition.

Environmental Fate

Chlorodifluoromethane (HCFC-22)
Biodegradability

: According to the results of tests of biodegradability this product is not readily biodegradable.

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Difluoromethane (HFC-32)	Biodegradability	: 5 % OECD Test Guideline 301D Not readily biodegradable.
Trifluoromethane (HFC-23)	Biodegradability	: Not readily biodegradable.
	Bioaccumulation	: Bioconcentration factor (BCF) : 3.2 Bioaccumulation is unlikely.
2,2-Dichloro-1,1,1-trifluoroethane (HCFC-123)	Biodegradability	: 24 % Not readily biodegradable.
	Bioaccumulation	: Bioconcentration factor (BCF) : 33 Bioaccumulation is unlikely.
1-Chloro-1,1-difluoroethane (HCFC-142b)	Biodegradability	: Not readily biodegradable.
	Bioaccumulation	: Bioaccumulation is unlikely.
1,1,1-Trifluoroethane (HFC-143a)	Bioaccumulation	: Information given is based on data obtained from similar substances.
Perfluoropropane (FC-218)	Biodegradability	: Not biodegradable Not readily biodegradable.
Dichlorodifluoromethane (CFC-12)	Bioaccumulation	: Bioconcentration factor (BCF) : < 10 Bioaccumulation is unlikely.
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	Bioaccumulation	: Bioconcentration factor (BCF) : 11 - 86 Bioaccumulation is unlikely.
1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC-114)	Biodegradability	: Not readily biodegradable.

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Bioaccumulation	:	Bioaccumulation is unlikely.
Perfluoroethane (FC-116)		
Bioaccumulation	:	Bioaccumulation is unlikely.
n-Butane (HC-600)		
Biodegradability	:	100 % Readily biodegradable
Pentane(HC-601)		
Biodegradability	:	71 % Readily biodegradable
Bioaccumulation	:	Bioconcentration factor (BCF) : 171 Bioaccumulation is unlikely.
2-Methylbutane (HC-601a)		
Biodegradability	:	71.43 % Readily biodegradable
Bioaccumulation	:	Bioconcentration factor (BCF) : 171 Bioaccumulation is unlikely.
Alkylated Benzene		
Biodegradability	:	60 % OECD Test Guideline 301 Readily biodegradable
Bioaccumulation	:	Bioconcentration factor (BCF) : 35 Bioaccumulation is unlikely.
Polypropylene Glycol, monobutyl ether		
Biodegradability	:	79 % OECD Test Guideline 301 Readily biodegradable
Bioaccumulation	:	Bioconcentration factor (BCF) : 3.16 Bioaccumulation is unlikely.
Distillates (Petroleum), clay treated heavy naphthenic; base oil unspecified		
Biodegradability	:	Not readily biodegradable.



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Distillates (Petroleum), Solvent-Refined Heavy Paraffinic

Biodegradability : 31 % OECD Test Guideline 301
Inherently biodegradable.

Information given is based on data obtained from similar substances.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste disposal methods - Product : Comply with applicable Federal, State/Provincial and Local Regulations.

Contaminated packaging : Dispose of contents/ container to an approved waste disposal plant.

SECTION 14. TRANSPORT INFORMATION

DOT	UN number	: 1078
	Proper shipping name	: Refrigerant gases, n.o.s. (Fluorinated Hydrocarbons)
	Class	: 2.2
	Labelling No.	: 2.2
	Reportable Quantity	: 10 lbs Chlorotrifluoromethane
IATA_C	UN number	: 1078
	Proper shipping name	: Refrigerant gas, n.o.s. (Fluorinated Hydrocarbons)
	Class	: 2.2
	Labelling No.	: 2.2
IMDG	UN number	: 1078
	Proper shipping name	: REFRIGERANT GAS, N.O.S. (Fluorinated Hydrocarbons)
	Class	: 2.2
	Labelling No.	: 2.2

The above shipping information applies to all the Used Refrigerants and Refrigerant Blends except Used



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Refrigerant 11, Used Refrigerant 113, and Used Refrigerant 123. These 3 blends are not classified as dangerous in the meaning of transport regulations.

SECTION 15. REGULATORY INFORMATION

SARA 313 Regulated Chemical(s)	: 2,2-Dichloro-1,1,1-trifluoroethane, 1-Chloro-1,1-difluoroethane , Trichlorofluoromethane , Dichlorodifluoromethane , Chlorotrifluoromethane , Chlorodifluoromethane , 1-Chloro-1,2,2,2-tetrafluoroethane , Cryofluorane
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): Trifluoromethane, 1-Chloro-1,1-difluoroethane, Trichlorofluoromethane, Dichlorodifluoromethane, Chlorotrifluoromethane, Carbon tetrafluoride, Chlorodifluoromethane, Cryofluorane, Difluoromethane, Propane, Butane (<0.1% butadiene), Isobutane (containing $\geq 0,1$ % butadiene (203-450-8)), Isobutane (<0.1% butadiene), Pentane, 2-Methylbutane
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): Isobutane (<0.1% butadiene), Pentane, 2-Methylbutane, Trifluoromethane, Perfluoroethane, 2,2-Dichloro-1,1,1-trifluoroethane, 1-Chloro-1,1-difluoroethane, Trichlorofluoromethane, Dichlorodifluoromethane, Chlorotrifluoromethane, Carbon tetrafluoride, Chlorodifluoromethane, 1-Chloro-1,2,2,2-tetrafluoroethane, Cryofluorane, 1,1,1-Trifluoroethane, 1,1-Difluoroethane, Difluoromethane, Octafluoropropane, Propane, Butane (<0.1% butadiene), Isobutane (containing $\geq 0,1$ % butadiene (203-450-8))
CERCLA Reportable Quantity	: 1 lbs Based on the percentage composition of this chemical in the product.: Chlorotrifluoromethane
California Prop. 65	: WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Carbon monoxide



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SECTION 16. OTHER INFORMATION

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