R407C

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SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	R407C
Product Use Description	:	Refrigerant
Company	:	Beijing Starget Chemicals Co.,Ltd. No.2 Jinzhan South Road,Chaoyang District,Beijing,China
For more information call	:	0086-10-84340783 0086-10-84340782 (Monday-Friday, 9:00am-5:00pm)
In case of emergency call	:	**Medical (PROSAR): 0086-10-84340783 or 0086-10-84340782**
	:	**Transportation (CHEMTREC): 0086-10-84340783 or 0086-10-84340782**
	:	(24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Form	:	Liquefied gas
Color	:	Colorless
Odor	:	slight
Hazard Summary	:	Warning! Container under pressure. This product is not flammable at ambient temperatures and atmospheric pressure. Gas reduces oxygen available for breathing. Causes asphyxiation in high concentrations. The victim will not realize that he/she is suffocating. Inhalation may cause central nervous system effects. May cause cardiac arrhythmia. May cause drowsiness and dizziness. Do not breathe vapour. Irritating to eyes and skin. Avoid contact with skin, eyes and clothing. At higher temperatures, (>250 C),

decomposition products may include hydrofluoric acid (HF) and carbonyl halides. The ACGIH Threshold Limit Values (2007) for Hydrogen Fluoride are TLV-TWA 0.5 ppm and Ceiling Exposure Limit 2 ppm.

Potential Health Effects

Skin	:	Avoid skin contact with leaking liquid (danger of frostbite). May cause frostbite. Irritating to skin.
Eyes	:	Causes serious eye irritation. May cause frostbite.
Ingestion	:	Unlikely route of exposure. Effects due to ingestion may include: Gastrointestinal discomfort
Inhalation	:	Gas reduces oxygen available for breathing. Causes asphyxiation in high concentrations. The victim will not realize that he/she is suffocating. Inhalation may cause central nervous system effects. May cause cardiac arrhythmia. Vapours may cause drowsiness and dizziness.
Chronic Exposure	:	None known.

Carcinogenicity

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature : Mixture

Chemical Name	CAS-No.	Concentration
1,1,1,2-Tetrafluoroethane	811-97-2	52.00%

Pentafluoroethane	354-33-6	25.00%
Difluoromethane	75-10-5	23.00%

SECTION 4. FIRST AID MEASURES

Inhalation : Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. Use oxygen as required, provided a qualified operator is present. Call a physician. Do not give drugs from adrenaline-ephedrine group.

Skin contact : After contact with skin, wash immediately with plenty of water. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. If symptoms persist, call a physician.

Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of frostbite water should be lukewarm, not hot. If symptoms persist, call a physician.

Ingestion : Unlikely route of exposure. As this product is a gas, refer to the inhalation section. Do not induce vomiting without medical advice. Call a physician immediately.

Notes to physician

Treatment : Because of the possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution and only in situations of emergency life support. Treatment of overexposure should be directed at the control of symptoms and the clinical conditions. Treat frost-bitten areas as needed.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : The product is not flammable.
ASHRAE 34
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Specific hazards during firefighting : Contents under pressure.
This product is not flammable at ambient temperatures and atmospheric pressure.
However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources.
Container may rupture on heating.
Cool closed containers exposed to fire with water spray.
Do not allow run-off from fire fighting to enter drains or water courses.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
In case of fire hazardous decomposition products may be produced such as:
Hydrogen fluoride
Carbon monoxide
Carbon dioxide (CO2)
Carbonyl halides

Special protective equipment for firefighters : In the event of fire and/or explosion do not breathe fumes.
Wear self-contained breathing apparatus and protective suit.
No unprotected exposed skin areas.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Immediately evacuate personnel to safe areas.
Keep people away from and upwind of spill/leak.
Wear personal protective equipment. Unprotected persons must be kept away.
Remove all sources of ignition.
Avoid skin contact with leaking liquid (danger of frostbite).
Ventilate the area.
After release, disperses into the air.
Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Avoid accumulation of vapours in low areas.
Unprotected personnel should not return until air has been tested and determined safe.
Ensure that the oxygen content is >= 19.5%.

Environmental precautions	:	Prevent further leakage or spillage if safe to do so. The product evaporates readily.
Methods for cleaning up	:	Ventilate the area.

SECTION 7. HANDLING AND STORAGE

Handling	:	Handle with care. Avoid inhalation of vapour or mist. Do not get on skin or clothing. Wear personal protective equipment. Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Follow all standard safety precautions for handling and use of compressed gas cylinders. Use authorized cylinders only. Protect cylinders from physical damage. Do not puncture or drop cylinders, expose them to open flame or excessive heat. Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material. Do not remove screw cap until immediately ready for use. Always replace cap after use.
Advice on protection against fire and explosion	:	The product is not flammable. Can form a combustible mixture with air at pressures above atmospheric pressure.

Storage

Requirements for storage areas and containers	:	Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use. Keep containers tightly closed in a dry, cool and well-ventilated place. Storage rooms must be properly ventilated. Ensure adequate ventilation, especially in confined areas. Protect cylinders from physical damage.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures	:	Do not breathe vapour. Do not get in eyes, on skin, or on clothing. Ensure that eyewash stations and safety showers are close to the workstation location.
Engineering measures	:	General room ventilation is adequate for storage and handling. Perform filling operations only at stations with exhaust ventilation facilities.
Eye protection	:	Wear as appropriate: Safety glasses with side-shields If splashes are likely to occur, wear: Goggles or face shield, giving complete protection to eyes
Hand protection	:	Leather gloves In case of contact through splashing: Protective gloves Neoprene gloves Polyvinyl alcohol or nitrile- butyl-rubber gloves
Skin and body protection	:	Avoid skin contact with leaking liquid (danger of frostbite). Wear cold insulating gloves/ face shield/ eye protection.
Respiratory protection	:	In case of insufficient ventilation wear suitable respiratory equipment. Wear a positive-pressure supplied-air respirator. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
Hygiene measures	:	Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation, especially in confined areas. Do not get in eyes, on skin, or on clothing. Remove and wash contaminated clothing before re-use. Keep working clothes separately.

Exposure Guidelines

Components	CAS-No.	Value	Control parameters	Update	Basis

1,1,1,2-Tetrafluoroethane	811-97-2	TWA : time weighted average	(1,000 ppm)	
1,1,1,2-Tetrafluoroethane	811-97-2	TWA : time weighted average	4,240 mg/m3 (1,000 ppm)	2007
Pentafluoroethane	354-33-6	TWA : time weighted average	4,900 mg/m3 (1,000 ppm)	2007
Pentafluoroethane	354-33-6	TWA : time weighted average	(1,000 ppm)	
Difluoromethane	75-10-5	TWA : time weighted average	2,200 mg/m3 (1,000 ppm)	2007
Difluoromethane	75-10-5	TWA : time weighted average	(1,000 ppm)	1994
Dichloromethane	75-09-2	TWA : time weighted average	(50 ppm)	2008

Dichloromethane	75-09-2	REF : Reference:	29 CFR 1910.1052	02 2006
Dichloromethane	75-09-2	SKIN_DES : Skin designation:	Can be absorbed through the skin.	02 2006
Dichloromethane	75-09-2	STEL : Short term exposure limit	(125 ppm)	02 2006
Dichloromethane	75-09-2	OSHA_ACT : OSHA Action level:	(12.5 ppm)	02 2006
Dichloromethane	75-09-2	TWA : time weighted average	(25 ppm)	02 2006

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	:	Liquefied gas
Color	:	Colorless
Odor	:	slight
pH	:	Note: neutral
Boiling point/boiling range	:	-43.9 °C
Flash point	:	Note: not applicable
Evaporation rate	:	> 1 Method: Compared to CCl4.
Lower explosion limit	:	None
Upper explosion limit	:	None
Vapor pressure	:	10,769 hPa at 21.1 °C(70.0 °F) 24,593 hPa at 54.4 °C(129.9 °F)
Vapor density	:	3 Note: (Air = 1.0)
Density	:	1.16 g/cm3 at 21.1 °C
Water solubility	:	1.5 g/l
Partition coefficient: n-octanol/water	:	log Pow: 1.06 Test substance: 1,1,1,2-tetrafluoroethane (HFC-134a) log Pow: 1.48

Test substance: Ethane, pentafluoro- (HFC-125)

Ignition temperature	:	Note: not determined
Decomposition temperature	:	> 250 °C
Global warming potential (GWP)	:	1,653
Ozone depletion potential (ODP)	:	0

SECTION 10. STABILITY AND REACTIVITY

Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Hazardous polymerisation does not occur.
Conditions to avoid	:	Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C. Decomposes under high temperature. Some risk may be expected of corrosive and toxic decomposition products. Can form a combustible mixture with air at pressures above atmospheric pressure. Do not mix with oxygen or air above atmospheric pressure.
Incompatible materials to avoid	:	Finely divided aluminium Potassium Calcium Powdered metals Aluminium Magnesium Zinc
Hazardous decomposition products	:	In case of fire hazardous decomposition products may be produced such as: Gaseous hydrogen fluoride (HF). Carbonyl halides Carbon monoxide Carbon dioxide (CO2)

SECTION 11. TOXICOLOGICAL INFORMATION

Acute inhalation toxicity

1,1,1,2-Tetrafluoroethane	:	LC50: > 500000 ppm Exposure time: 4 h Species: rat
Pentafluoroethane	:	> 769000 ppm Exposure time: 4 h Species: rat
Difluoromethane	:	LC50: > 520000 ppm Exposure time: 4 h Species: rat

Sensitisation

1,1,1,2-Tetrafluoroethane	:	Cardiac sensitization Species: dogs Note: No-observed-effect level 50 000 ppm Lowest observable effect level 75 000 ppm
Pentafluoroethane	:	Cardiac sensitization Species: dogs Note: No-observed-effect level 75 000 ppm Lowest observable effect level 100 000 ppm
Difluoromethane	:	Cardiac sensitization Species: dogs Note: No-observed-effect level >350 000 ppm

Repeated dose toxicity

1,1,1,2-Tetrafluoroethane	:	Species: rat NOEL: 40000 ppm
Pentafluoroethane	:	Species: rat

Application Route: Inhalation
Exposure time: (4 Weeks)
NOEL: 50000 ppm
Subchronic toxicity

Difluoromethane : Species: rat
Application Route: Inhalation
Exposure time: (90 d)
NOEL: 50000 ppm
Subchronic toxicity

Genotoxicity in vitro

1,1,1,2-Tetrafluoroethane : Note: In vitro tests did not show mutagenic effects

Pentafluoroethane : Test Method: Ames test
Result: negative

Difluoromethane : Test Method: Ames test
Result: negative

: Cell type: Human lymphocytes
Result: negative

: Cell type: Chinese Hamster Ovary Cells
Result: negative

: Cell type: Human lymphocytes
Result: negative
Method: Mutagenicity (in vitro mammalian cytogenetic test)

: Test Method: Chromosome aberration test in vitro
Result: negative

Genotoxicity in vivo

Difluoromethane : Species: mouse
Cell type: Bone marrow
Method: Mutagenicity (micronucleus test)
Result: negative

Teratogenicity

Pentafluoroethane	:	Species: rabbit Application Route: Inhalation exposure NOAEL,Teratog: 50,000 ppm NOAEL,Maternal: 50,000 ppm Note: Did not show teratogenic effects in animal experiments. Species: rat Application Route: Inhalation exposure NOAEL,Teratogens: 50,000 ppm NOAEL,Maternal: 50,000 ppm Note: Did not show teratogenic effects in animal experiments.
Difluoromethane	:	Species: rat Dose: NOEL - 50,000 ppm Note: Did not show teratogenic effects in animal experiments. Species: rabbit Dose: NOEL - 50,000 ppm Note: Did not show teratogenic effects in animal experiments.
Further information	:	Acute toxicity Difluoromethane. (HFC-32): Cardiac sensitisation threshold (dog): 350000 ppm. Ethane, pentafluoro- (HFC-125): Cardiac sensitisation threshold (dog): 75000 ppm. 1,1,1,2-tetrafluoroethane (HFC-134a): Cardiac sensitisation threshold (dog): 80000 ppm. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Irritating to eyes and skin. Rapid evaporation of the liquid may cause frostbite. Avoid skin contact with leaking liquid (danger of frostbite). May cause cardiac arrhythmia.

SECTION 12. ECOLOGICAL INFORMATION

Biodegradability

Pentafluoroethane	:	Result: Not readily biodegradable. Value: 5 % Method: OECD 301 D
Difluoromethane	:	Note: Minimal

Further information on ecology

Additional ecological information

This product contains greenhouse gases which may contribute to global warming. Do NOT vent to the atmosphere.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : Observe all Federal, State, and Local Environmental regulations.

SECTION 14. TRANSPORT INFORMATION

DOT	UN/ID No.	:	UN 3340
	Proper shipping name	:	REFRIGERANT GAS R 407C
	Class		2.2
	Packing group		
	Hazard Labels		2.2
IATA	UN/ID No.	:	UN 3340
	Description of the goods	:	REFRIGERANT GAS R 407C
	Class	:	2.2
	Hazard Labels	:	2.2
	Packing instruction (cargo aircraft)	:	200
	Packing instruction (passenger aircraft)	:	200
IMDG	UN/ID No.	:	UN 3340
	Description of the goods	:	REFRIGERANT GAS R 407C
	Class	:	2.2
	Hazard Labels	:	2.2
	EmS Number	:	F-C, S-V

Marine pollutant : no

SECTION 15. REGULATORY INFORMATION

Inventories

US. Toxic Substances Control Act	:	On TSCA Inventory
Australia. Industrial Chemical (Notification and Assessment) Act	:	On the inventory, or in compliance with the inventory
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL)	:	All components of this product are on the Canadian DSL list.
Japan. Kashin-Hou Law List	:	On the inventory, or in compliance with the inventory
Korea. Existing Chemicals Inventory (KECI)	:	On the inventory, or in compliance with the inventory
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	:	On the inventory, or in compliance with the inventory
China. Inventory of Existing Chemical Substances	:	On the inventory, or in compliance with the inventory
NZIOC - New Zealand	:	On the inventory, or in compliance with the inventory

Spill or releases resulting in the loss of any ingredient at or about its RQ require immediate notification to the National Response Center and your local Emergence Planning Committee

Ozone depletion potential (ODP) : 0

SECTION 16. OTHER INFORMATION

		HMIS III	NFPA
Health hazard	:	1	2
Flammability	:	1	1
Physical Hazard	:	0	
Instability	:		0

Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

Further information

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 given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user.This information should not constitute a guarantee for any specific product properties.

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Prepared by:Beijing Starget Chemical Co.,Ltd.