

SAFETY DATA SHEET



FROSTBERG®

REFRIGERANT AC FLUSH

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product Name : Refrigerant AC Flush

MSDS Number : 0000201410

Chemical Family : Trifluoropropene

Product Use Description : Flushing Solvent

Company : FROSTBERG INTERNATIONAL LLC
16192 Coastal Highway Lewes, Delaware 19958, USA

For More Information : www.frostbergint.com

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Nature : Mixture

CHEMICAL NAME	CAS – NO	CONCENTRATION
Trans-1-chloro-3,3,3-trifluoropropene	102687-65-0	>98.00 %

SECTION 3: HAZARD IDENTIFICATION

Emergency Overview

Form : GAS (Liquefied)

Color : Colorless

Odor : Strong

Classification of the substance or mixture

Classification of the substance or mix: Gases under pressure, Liquefied gas simple Asphyxiant

GHS Label elements, including precautionary statements

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Symbol(s)

:

Signal Word

: warning

Hazard statement

: contains gas under pressure; May explode if heated.

May displace oxygen and cause rapid suffocation.

Precautionary statements

: **Prevention:**

Use personal protective equipment as required.

Storage:

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

Hazards not otherwise

: May Cause frostbite.

Classified

SECTION 4: FIRST AID MEASURES

General advice

: First aider needs to protect himself. Move out of dangerous area. Take off all contaminated clothing immediately.

Inhalation

: remove to fresh air, if not breathing, give artificial respiration. If breathing is difficult, give oxygen. Use oxygen as required, provided a qualified operator is present. Call a physician.

Skin contact

: Rapid evaporation of the liquid may cause frostbite. 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. Call a physician if irritation develops or persists.

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Eye contact	: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician if irritation develops or persists.
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	: Treat frost-bitten areas as needed.
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SECTION 5: FIREFIGHTING MEASURES

Suitable extinguishing media	: The product is not flammable. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. • Water mist • Dry powder • Foam • Carbon dioxide (CO₂)
Specified Hazard During	: This product is not flammable at ambient temperatures and atmospheric pressure.
Firefighting	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 firefighting to enter drains or water courses. Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing. Exposure to decomposition products may be a hazard to health.



In case of fire hazardous decomposition products may be produced such as:

- Hydrogen fluoride
- Gaseous hydrogen chloride (HCl).
- Carbon monoxide
- Carbon dioxide (CO₂)
- Carbonyl halides

Special protective equipment: In the Event of fire and/or explosion do not breathe fumes. For firefighting 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.

Ventilate the area. Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing.

Avoid accumulation of vapors in low areas.

Unprotected personnel should not return until air has been tested and determined safe.

Ensure that the oxygen content is $\geq 19.5\%$.

Environmental Precautions

: Do not flush into surface water or sanitary sewer system. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers).

Method for cleaning up

: Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations

(see section 13).



SECTION 7: HANDLING AND STORAGE HANDLING

HANDLING

: Handle with care.

Do not use in areas without adequate ventilation.

Do not breathe vapors or spray mist.

Avoid contact with skin, eyes and clothing.

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 atmospheric pressure.

: can form a combustible mixture with air at pressure above fire and Explosion

Keep product and empty container away from heat and sources of ignition.

Storage

Requirement for storage areas and containers

: Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 55 °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.

Store away from incompatible substances

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures	: Ensure that eyewash stations and safety showers are close to the workstation location.
	Do not breathe vapors or spray mist.
	Avoid contact with skin, eyes and clothing.
Engineering measures	: Use with local exhaust ventilation.
	Perform filling operations only at stations with exhaust ventilation facilities.
Eye Protection	: Do not wear contact lenses.
	Wear as appropriate:
	Goggles or face shield, giving complete protection to eyes.
Hand Protection	: Impervious gloves
	Gloves must be inspected prior to use.
	Replace when worn.
Skin and body protection	: Wear as appropriate: Solvent-resistant gloves Solvent-resistant apron and boots if splashes are likely to occur, wear: Protective suit.
Respiratory protection	: In case of insufficient ventilation wear suitable respiratory equipment. Wear a positive-pressure supplied-air respirator. Use NIOSH approved respiratory protection.

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Hygiene measures : Handle in accordance with good industrial hygiene and safety practice.

Ensure adequate ventilation, especially in confined areas. Remove and wash contaminated clothing before re-use. Keep working clothes separately. Wash thoroughly after handling.

EXPOSURE GUIDELINES

COMPONENTS	CAS-NO.	VALUE	CONTROL PARAMETERS	UPDATE	BASIS
Trans-1-chloro-3,3,3-trifluoropropene	102687-65-0	TWA: Time weighted average	800 ppm	2014	Weel: us.Oars. Weels workplace environmental Exposure level guide
Trans-1-chloro-3,3,3-trifluoropropene	102687-65-0	TWA : Time weighted average	800 ppm	2013	Weel:Oars-workplace environmental Exposure level(weel) guide

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical estate : Liquefied gas

Color : clear colorless

Odor : slight

Melting point/range : <-90°C

Boiling point/range : 19°C

Flash point : Method: ISO 2719



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NOTE : not applicable

Flammability

: The Product is not flammable.

Method: Flammability (gases)

Lower explosion limit

: NOTE: NONE

Upper explosion limit

: NOTE: NONE

Vapor pressure

: 1.516 hpa

At 30 °C (86 °F)

Vapor density

: 1.27 g/cm³ at 20 °C

Water solubility

: ca. 1.90 g/l at 20 °C

Partition coefficient

: log *pow*: 2.2 at 25 °C

Ignition temperature

: 380 °C at 986.8 – 1,035.9 hpa

Method: DIN 51794

Oxidizing properties

: the substance or mixture is not classified as oxidizing.

Section 10: STABILITY AND REACTIVITY

Chemical stability

: stable under recommended storage conditions.

Possibility of hazardous reaction : polymerization can occur.

Condition to avoid

: Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 55 °C.

Can form a combustible mixture with air at pressures above atmospheric pressure.

Do not mix with oxygen or air above atmospheric pressure.

Incompatible material to avoid

: Strong oxidizing agents

Finely divided magnesium



Finely divided aluminium

Hazardous Decomposition

: In case of fire hazardous decomposition products may be produced such as:

- Carbon monoxide
- Carbon dioxide (CO₂)
- Carbonyl halides
- Gaseous hydrogen chloride (HCl).
- Gaseous hydrogen fluoride (HF).

SECTION 11: TOXICOLOGICAL INFORMATION

Acute inhalation trans-1-chloro-3,3,3-trifluoropropene : LC50: 120000 ppm Exposure time: 4 h species: rat

skin irritation trans-1-chloro-3,3,3-trifluoropropene

: species: rabbit

result: no skin irritation

classification: not classified as a skin irritant in animal testing.

Method: OECD test guidelines 404

Exposure time : 4 h

Sensitisation trans-1-chloro-3,3,3-trifluoropropene : Cardiac sensitization

:species: dogs

Note: Cardiac sensitisation threshold (dog): 25000 ppm.

Result: Does not cause skin sensitisation.

Classification: Patch test on human volunteers did not demonstrate sensitisation properties.



Repeated dose toxicity : Species: Rat

trans-1-Chloro-3,3,3-trifluoro application route : Inhalation

propene exposure time: (4 weeks)

NOEL : 4500 ppm

Genotoxicity in vitro : Mutagenicity (Salmonella typhimurium - reverse

Trans-1-Chloro-3,3,3-trifluoro mutation assay)

Propene Result: negative

Genotoxicity in vivo : Species: Rat

trans-1-Chloro-3,3,3-trifluoro Cell type: Bone marrow

propene : Method: Mutagenicity (micronucleus test)

Result: negative

: Test Method: Unscheduled DNA synthesis

Species: Rat

Result: negative

: Species: Mouse

Cell type: Bone marrow

Method: Mutagenicity (micronucleus test)

Result: negative

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Reproductive toxicity	: Species: Rabbit
trans-1-Chloro-3,3,3-trifluoro propene :	Note: No-observed-effect level - 15,000 ppm
	Species: Rat
	Note: No-observed-effect level - 10,000 ppm
Teratogenicity	:Species: Rabbit
trans-1-Chloro-3,3,3-trifluoro propene :	Note: No-observed-effect level - 15,000 ppm
	Species: Rat :
	Note: No-observed-effect level - 10,000 ppm
Further information :	Note: Excessive exposure may cause central nervous system effects including drowsiness and dizziness. Excessive exposure may also cause cardiac arrhythmia.

SECTION 12: ECOLOGICAL INFORMATION

Toxicity to fish trans-1-Chloro-3,3,3-trifluoro Propene	: LC50: 38 mg/l
	Exposure time: 96 h
	species: Oncorhynchus mykiss (rainbow trout)
	Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates trans-1-Chloro-3,3,3-trifluoro propene	: Immobilization EC50: 82 mg/l Exposure time: 48 h
	Species: Daphnia magna (Water flea)
	Method: OECD Test Guideline 202

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Toxicity to algae trans-1- :Growth inhibition

Chloro-3,3,3-trifluoro propene : EC50: 106.7 mg/l

Exposure time: 72 h

Species: *Pseudokirchneriella subcapitata* (green algae)

Method: OECD Test Guideline 201

Growth rate

NOEC: 115 mg/l

Exposure time: 72 h

Species: *Pseudokirchneriella subcapitata* (green algae)

Method: OECD Test Guideline 201

Elimination information (persistence and degradability)

Bioaccumulation : Note: Due to the distribution coefficient n-octanol/water, accumulation in organisms is not expected.

Biodegradability Trans-1- : Result: Not readily biodegradable. Value: 0 % Method: OECD

Chloro-3, 3, 3-trifluoro

Propene

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SECTION 13: DISPOSAL CONSIDERATIONS

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

Note : Where possible recycling is preferred to disposal or incineration

SECTION 14: TRANSPORT INFORMATION

DOT	UN/ID No.	: UN 3163
	Proper shipping name	: LIQUEFIED GAS, N.O.S. (Trans-1-Chloro-3,3,3-trifluoropropene, Nitrogen)
	Class	: 2.2
	Packing group Hazard Labels	: 2.2
IATA	UN/ID No.	: UN 3163
	Description of the goods	: LIQUEFIED GAS, N.O.S. (Trans-1-Chloro-3,3,3-trifluoropropene, Nitrogen)
	Class	: 2.2
	Hazard Labels	: 2.2
	Packing instruction (Cargo aircraft)	: 200
	Packing instruction (Passenger aircraft)	: 200
IMDG	UN/ID No.	: UN 3163
	Description of the goods	: LIQUEFIED GAS, N.O.S. (TRANS-1-CHLORO-3,3,3-TRIFLUOROPROPEN E, NITROGEN)
	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 : On the inventory, or in compliance with the inventory

Chemical (Notification and Assessment) Act Canada.

Canadian Environmental
Protection Act (CEPA).
Domestic Substances List (DSL) : All components of this product are on the Canadian DSL

Japan. Kashin-Hou Law List : On the inventory, or in compliance with the inventory

Korea. Toxic Chemical Control
Law (TCCL) List : On the inventory, or in compliance with the inventory

Philippines. The Toxic
Substances and Hazardous
and Nuclear Waste
Control Act : Not in compliance with the inventory

China. Inventory of Existing
Chemical Substances : On the inventory, or in compliance with the inventory

New Zealand. Inventory of
Chemicals (NZIoC), as
published by ERMA
New Zealand : Not in compliance with the inventory

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National regulatory information

SARA 302 Components : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

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

SARA 311/312 Hazards : Acute Health Hazard Sudden Release of Pressure Hazard

California Prop. 65 : This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

New Jersey RTK : trans-1-Chloro-3,3,3-trifluoropropane 102687-65-0

Pennsylvania RTK : trans-1-Chloro-3,3,3-trifluoropropane 102687-65-0

SECTION 16: OTHER INFORMATION

	HMIS III	NFPA
Health hazard	2	2
Flammability	0	0
Physical Hazard	0	0
Instability	0	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 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.

