

SAFETY DATA SHEET

According to OSHA Hazcom Standard 29 CFR 1910.1200

Chloro difluoro methane 5 µmol/mol and 7 others mix / Helium

Date of issue: 2022-08-30

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Version: 3.0

1. IDENTIFICATION

A. Product name

- Chloro difluoro methane 5 µmol/mol and 7 others mix / Helium

B. Recommended use and restriction on use

- General use : Not available
- Restriction on use : Not available

C. Manufacturer / Supplier / Distributor information

o Manufacturer information

- Company name : RIGAS Co.,Ltd
- Address : 46,Munpyeongseo-ro 17 beon-gil, Daedeok-gu,Daejeon, KOREA
- Emergency telephone number : 82-42-934-6900

o Supplier/Distributor information

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2. HAZARD IDENTIFICATION

A. GHS Classification

- Gases under pressure : Compressed gas

B. GHS label elements

o Hazard symbols



o Signal words

- Warning

o Hazard statements

- H280 Compressed gas ; Contains gas under pressure; may explode if heated

o Precautionary statements

1) Prevention

- Not applicable

2) Response

- Not applicable

3) Storage

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

4) Disposal

- Not applicable

C. Other hazards which do not result in classification

- Not available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Trade names and Synonyms	CAS No.	Content(%)
Helium	Helium, refrigerated liquid (cryogenic) liquid ; Helium Gas ; Helium, compressed ; Atomic helium ; o-Helium ; p-Helium ;	7440-59-7	Balance
Chloromethane	Methane, chloro- ; Monochloromethane ; Methyl chloride ;	74-87-3	5.0E-4
Difluoromethane(HFC-32)	Difluoromethane(HFC-32)	75-10-5	5.0E-4
Monochlorodifluoromethane	Methane, chlorodifluoro- ; Chlorodifluoromethane ; 1-Chloro-1,1-difluoromethane ; Difluorochloromethane ; Difluoromonochloromethane ;	75-45-6	5.0E-4
Trifluoromethane	Fluoroform	75-46-7	5.0E-4
Dichlorodifluoromethane	Algofrene type 2	75-71-8	5.0E-4
1,1,1,2,2-pentafluoroethane	Ethane,pentafluoro- (6Cl,7Cl,8Cl,9Cl)	354-33-6	5.0E-4
1,1,1-Trifluoroethane	Not available	420-46-2	5.0E-4
Fluoromethane	Not available	593-53-3	5.0E-4

4. FIRST AID MEASURES

A. Eye contact

- Do not rub your eyes.
- Immediately flush eyes with plenty of water for at least 15 minutes and call a doctor/physician.

B. Skin contact

- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Wash contaminated clothing thoroughly before re-using.

C. Inhalation contact

- Take specific treatment if needed.
- When exposed to large amounts of steam and mist, move to fresh air.

D. Ingestion contact

- Please be advised by doctor whether induction of vomit is demanded or not.
- Rinse your mouth with water immediately.

E. Delayed and immediate effects and also chronic effects from short and long term exposure

- Not available

F. Notes to physician

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.

5. FIREFIGHTING MEASURES

A. Suitable (Unsuitable) extinguishing media

- Avoid use of water jet for extinguishing
- Dry chemical, carbon dioxide, regular foam extinguishing agent, spray

B. Specific hazards arising from the chemical

- Compressed gas ; Contains gas under pressure; may explode if heated

C. Special protective actions for firefighters

- Avoid inhalation of materials or combustion by-products.
- Cool containers with water until well after fire is out.
- Do not approach the tank surrounded by fire until it is extinguished.
- In case of conflagration, use automatic fire sprinkler. Major fire may require withdrawal, allowing the object itself to burn.
- Keep unauthorized personnel out.

6. ACCIDENTAL RELEASE MEASURES

A. Personal precautions, protective equipment and emergency procedures

- Do not touch spilled material. Stop leak if you can do it without risk.
- Handle the damaged containers or spilled material after wearing appropriate protective equipment
- Move container to safe area from the leak area.
- Must work against the wind, let the upwind people to evacuate.

- Remove all sources of ignition.

B. Environmental precautions

- If large amounts have been spilled, inform the relevant authorities.
- Prevent runoff and contact with waterways, drains or sewers.

C. Methods and materials for containment and cleaning up

- Appropriate container for disposal of spilled material collected.
- Disposal of waste shall be in compliance with the Wastes Control Act
- Large spill : Stay upwind and keep out of low areas. Dike for later disposal.
- Notify the central and local government if the emission reach the standard threshold.

7. HANDLING AND STORAGE

A. Precautions for safe handling

- Avoid contact with incompatible materials.
- Avoid direct physical contact.
- Comply with all applicable laws and regulations for handling
- Dealing only with a well-ventilated place.
- Do not handle until all safety precautions have been read and understood.

B. Conditions for safe storage, including any incompatibilities

- Avoid direct sunlight.
- Check regularly for leaks.
- Do not apply any physical shock to container.
- Do not apply direct heat.
- Do not use damaged containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure limits

- **ACGIH TLV**
 - [Helium] : Asphyxia
 - [Chloromethane] : TWA, 50 ppm (103 mg/m³) STEL, 100 ppm (207 mg/m³)
 - [Monochlorodifluoromethane] : TWA, 1000 ppm (3540 mg/m³)
 - [Dichlorodifluoromethane] : TWA, 1000 ppm (4950 mg/m³)
- **OSHA PEL**
 - [Chloromethane] : 100 ppm, (C) 200 ppm
 - [Dichlorodifluoromethane] : 4950

B. Engineering controls

- Business owner is recommended to maintain below recommended exposure limits for the working place with general exhaust of gas/vapour/mist/fume.

C. Individual protection measures, such as personal protective equipment

- **Respiratory protection**
 - Consider warning properties before use.
 - Respiratory protection is ranked in order from minimum to maximum.
- **Eye protection**
 - Provide an emergency eye wash station and quick drench shower in the immediate work area.
 - Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.
- **Hand protection**
 - Wear appropriate chemical resistant glove.
- **Skin protection**
 - Wear appropriate chemical resistant protective clothing.
- **Others**
 - Not available

9. PHYSICAL AND CHEMICAL PROPERTIES

A. Appearance	
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- Appearance	Not available
- Color	Not available
B. Odor	Not available
C. Odor threshold	Not available
D. pH	Not available
E. Melting point/Freezing point	Not available
F. Initial Boiling Point/Boiling Ranges	Not available
G. Flash point	Not available
H. Evaporation rate	Not available
I. Flammability(solid, gas)	Not available
J. Upper/Lower Flammability or explosive limits	Not available
K. Vapour pressure	Not available
L. Solubility	Not available
M. Vapour density	Not available
N. Specific gravity(Relative density)	Not available
O. Partition coefficient of n-octanol/water	Not available
P. Autoignition temperature	Not available
Q. Decomposition temperature	Not available
R. Viscosity	Not available
S. Molecular weight	Not available

10. STABILITY AND REACTIVITY

A. Chemical Stability

- high-pressure gas; May explode when heated.

B. Possibility of hazardous reactions

- Contact with other combustible material may cause fire.

C. Conditions to avoid

- Avoid : Accumulation of electrostatic charges, Heating, Flames and hot surfaces
- Avoid contact with incompatible materials and condition.
- Avoid contact with heat, sparks, flame or other ignition sources.

D. Incompatible materials

- Not available

E. Hazardous decomposition products

- May emit flammable vapour if involved in fire.

11. TOXICOLOGICAL INFORMATION

A. Information on the likely routes of exposure

- **Respiratory tracts**
 - Not available
- **Oral**
 - Not available
- **Eye/Skin**
 - Not available

B. Delayed and immediate effects and also chronic effects from short and long term exposure

- **Acute toxicity**
 - * **Oral**
 - Product (ATEmix) : Not available
 - [Chloromethane] : LD50 1800 mg/kg Rat (SIDS, NITE)
 - [Difluoromethane(HFC-32)] : LD50 1890 mg/kg Rat (RTECS)
 - [Dichlorodifluoromethane] : LD50 >1000 mg/kg Rat (other guideline: Section 8, Read-across CAS No.75-71-8)(ECHA)
 - * **Dermal**
 - Product (ATEmix) : Not available
 - Not available

- * **Inhalation**
 - Product (ATEmix) : Not available
 - [Chloromethane] : LC50 2566 ppm/4hr Rat (SIDS, NITE)
 - [Difluoromethane(HFC-32)] : gas LC50 520000 ppm 4 hr Rat (SIDS)
 - [Monochlorodifluoromethane] : gas LC50 87500 ppm/4hr (350000 ppm/15min) Rat (NLM: ChemIDPlus)
 - [Dichlorodifluoromethane] : LD50 760000 ppm (ECHA)
- o **Skin corrosion/irritation**
 - Not available
- o **Serious eye damage/irritation**
 - Not available
- o **Respiratory sensitization**
 - Not available
- o **Skin sensitization**
 - Not available
- o **Carcinogenicity**
 - * **IARC**
 - [Chloromethane] : Group 3
 - [Monochlorodifluoromethane] : Group 3
 - * **OSHA**
 - Not available
 - * **ACGIH**
 - [Chloromethane] : A4
 - [Monochlorodifluoromethane] : A4
 - [Dichlorodifluoromethane] : A4
 - * **NTP**
 - Not available
 - * **EU CLP**
 - Not available
- o **Germ cell mutagenicity**
 - Not available
- o **Reproductive toxicity**
 - Not available
- o **STOT-single exposure**
 - Not available
- o **STOT-repeated exposure**
 - Not available
- o **Aspiration hazard**
 - Not available

12. ECOLOGICAL INFORMATION

A. Ecotoxicity

- o **Fish**
 - [Helium] : LC50 12.245 mg/l 96 hr (Estimate)
 - [Chloromethane] : LC50 270 mg/l 96 hr (NITE)
 - [Difluoromethane(HFC-32)] : LC50 542.928 mg/l 96 hr Other(Neutral Organics, gas) (Estimate)
 - [Monochlorodifluoromethane] : LC50 777 mg/l 96 hr Brachydanio rerio(OECD Guideline 203, GLP, read-across CAS No.75-45-6) (EU RAR/ECHA)
 - [Trifluoromethane] : LC50 1121.984 mg/l 96 hr (Estimate)
 - [Dichlorodifluoromethane] : LC50 67.384 mg/l 96 hr Other (estimate) (ECHA)
 - [1,1,1,2,2-pentafluoroethane] : LC50 126 mg/l 96 hr Brachydanio rerio (OECD Screening Information Data Set)
 - [1,1,1-Trifluoroethane] : LC50 109.846 mg/l 96 hr (Estimate)
 - [Fluoromethane] : LC50 314.969 mg/l 96 hr (Estimate)
- o **Crustaceans**
 - [Helium] : LC50 116.827 mg/l 48 hr (Estimate)
 - [Chloromethane] : EC50 200 mg/l 48 hr Daphnia magna (NITE: SIDS (2004) and others)
 - [Difluoromethane(HFC-32)] : LC50 253.148 mg/l 48 hr Other(Neutral Organics, gas) (Estimate)
 - [Monochlorodifluoromethane] : EC50 433 mg/l 48 hr Daphnia magna(OECD Guideline 202, read-across CAS No.75-45-6) (EU RAR/ECHA)

- [Trifluoromethane] : EC50 1089.900 mg/ℓ 48 hr (Estimate)
- [Dichlorodifluoromethane] : LC50 38.909 mg/ℓ 48 hr Other(estimate) EC(50)=95mg/L Crustaceans(Daphnia magna) (ECHA)
- [1,1,1-Trifluoroethane] : EC50 59.600 mg/ℓ 48 hr (Estimate)
- [Fluoromethane] : EC50 148.152 mg/ℓ 48 hr (Estimate)
- **Algae**
 - [Helium] : EC50 66.152 mg/ℓ 96 hr (Estimate)
 - [Difluoromethane(HFC-32)] : EC50 68.741 mg/ℓ 96 hr Other(Neutral Organics, gas)(Estimate)
 - [Monochlorodifluoromethane] : EC50 250 mg/ℓ 96 hr Other(algae, calculation method acc. to. Van Leuwen et al 1992) (ECHA)
 - [Trifluoromethane] : EC50 627.895 mg/ℓ 96 hr (Estimate)
 - [Dichlorodifluoromethane] : EC50 19.798 mg/ℓ 96 hr Other (estimate) (ECHA)
 - [1,1,1-Trifluoroethane] : EC50 25.263 mg/ℓ 96 hr (Estimate)
 - [Fluoromethane] : EC50 41.279 mg/ℓ 96 hr (Estimate)

B. Persistence and degradability

- **Persistence**
 - [Helium] : log Kow 0.28 (Estimate)
 - [Chloromethane] : log Kow 0.91 (ICSC)
 - [Difluoromethane(HFC-32)] : log Kow 0.21 (25°C) (OECD SIDS)
 - [Monochlorodifluoromethane] : log Kow 1.08 (ICSC) log Kow 1.16~1.11 (OECD Guideline 107) (ECHA)
 - [Trifluoromethane] : log Kow 0.64 (NLM)
 - [Dichlorodifluoromethane] : 2.16 log Kow (Read-across CAS No. 75-71-8)(ECHA)
 - [1,1,1,2,2-pentafluoroethane] : log Kow 1.48 (OECD Screening Information Data Set)
 - [1,1,1-Trifluoroethane] : log Kow 1.740 (NLM)
 - [Fluoromethane] : log Kow 0.51 (NLM; chemIDplus, experimental)
- **Degradability**
 - [Monochlorodifluoromethane] : (BOD5: 0 g O2/g test mat, OECD Guideline 301 D, read-across CAS No.75-45-6)
 - [Dichlorodifluoromethane] : non-degradable (HSDB)

C. Bioaccumulative potential

- **Bioaccumulative potential**
 - [Helium] : BCF 3.162 (Estimate)
 - [Difluoromethane(HFC-32)] : BCF 3.162 (Estimate)
 - [Trifluoromethane] : BCF 3.2 (HSDB)
 - [1,1,1,2,2-pentafluoroethane] : BCF 2.75 (OECD Screening Information Data Set)
 - [1,1,1-Trifluoroethane] : BCF 6.525 (Estimate)
 - [Fluoromethane] : BCF 3.162 (Estimate)
- **Biodegradation**
 - [Difluoromethane(HFC-32)] : 5 (%) 28 day; not degraded and has a high potential to accumulate in vivo (OECD SIDS)
 - [Monochlorodifluoromethane] : 0 (%) 28 day (Biodegradation is not) (EU RAR)
 - [Dichlorodifluoromethane] : Nonbiodegradable (ECHA)
 - [1,1,1-Trifluoroethane] : (Cut-off value = -11.9635; Non-degradable(BIOWIN6))(Estimate)
 - [Fluoromethane] : Non-degradable; not degraded and has a high potential to accumulate in vivo (estimate)

D. Mobility in soil

- [Difluoromethane(HFC-32)] : Koc 0.173 (estimate)
- [Trifluoromethane] : Koc 53 (HSDB)
- [1,1,1,2,2-pentafluoroethane] : Koc 1.345 (estimate)
- [1,1,1-Trifluoroethane] : Koc 1.51(Estimate)
- [Fluoromethane] : Koc 2.768

E. Other adverse effects

- [Monochlorodifluoromethane] : May affect the ozone layer

13. DISPOSAL CONSIDERATIONS

A. Disposal methods

- It shall be treated by incineration
- Oil water separation technology shall be applied as pre-waste treatment if it is applicable

- Stabilization and minimization treatment by incineration or similar method can be applied, if more than two kinds of designated wastes are in mixture state and it is impractical to separate them

B. Special precautions for disposal

- Anyone with business license number who generates industrial wastes shall treat the waste by him/herself or by entrusting to the legal entities who treat the wastes, recycle the wastes of others or install and operate the waste treatment facilities according to the Wastes Control Act

- Dispose of waste in accordance with all applicable laws and regulations.

14. TRANSPORT INFORMATION

A. UN No. (IMDG)

- 1956

B. Proper shipping name

- COMPRESSED GAS, N.O.S.

C. Hazard Class

- 2.2

D. IMDG CODE/IATA DGR Packing group

- Not applicable

E. Marine pollutant

- Not applicable

F. Special precautions for user related to transport or transportation measures

- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : F-C (Non-flammable gases)
- EmS SPILLAGE SCHEDULE : S-V (Gases (non-flammable, non-toxic))

15. REGULATORY INFORMATION

A. National and/or international regulatory information

- **POPs Management Law**
 - [Helium] : Not applicable
 - [Chloromethane] : Not applicable
 - [Difluoromethane(HFC-32)] : Not applicable
 - [Monochlorodifluoromethane] : Not applicable
 - [Trifluoromethane] : Not applicable
 - [Dichlorodifluoromethane] : Not applicable
 - [1,1,1,2,2-pentafluoroethane] : Not applicable
 - [1,1,1-Trifluoroethane] : Not applicable
 - [Fluoromethane] : Not applicable
- **Information of EU Classification**
 - * **Classification**
 - [Chloromethane] : H220,H280,H351,H373
- **U.S. Federal regulations**
 - * **OSHA PROCESS SAFETY (29CFR1910.119)**
 - [Chloromethane] : 6803.985 kg 15000 lb
 - * **CERCLA Section 103 (40CFR302.4)**
 - [Chloromethane] : 45.3599 kg 100 lb
 - [Dichlorodifluoromethane] : 2267.995 kg 5000 lb
 - * **EPCRA Section 302 (40CFR355.30)**
 - Not applicable
 - * **EPCRA Section 304 (40CFR355.40)**
 - Not applicable
 - * **EPCRA Section 313 (40CFR372.65)**
 - [Chloromethane] : Applicable

- [Monochlorodifluoromethane] : Applicable
- [Dichlorodifluoromethane] : Applicable
- **Rotterdam Convention listed ingredients**
 - Not applicable
- **Stockholm Convention listed ingredients**
 - Not applicable
- **Montreal Protocol listed ingredients**
 - [Monochlorodifluoromethane] : Applicable
 - [Dichlorodifluoromethane] : Applicable

16. OTHER INFORMATION

A. Reference

- The information contained herein is believed to be accurate. It is provided independently of any sale of the product for purpose of hazard communication. It is not intended to constitute performance information concerning the product. No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.
- This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS

B. Issue date

- 2022-08-30

C. Revision number and Last date revised

- 3 times, 2020-01-16

D. Other

- This SDS is prepared according to the Globally Harmonized System (GHS).