

SAFETY DATA SHEET

Oxygen 99.999%

Date of issue: 2020-05-15

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Version: 3.0

1. IDENTIFICATION

A. Product name

- Oxygen 99.999%

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
- Dept. : Management Planning Dept.
- Telephone number : 82-42-934-6900
- Emergency telephone number : 82-42-934-6900
- Fax number : 82-42-935-8814
- E-mail address : master@rigas.co.kr

o Supplier/Distributor information

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2. HAZARD IDENTIFICATION

A. GHS Classification

- Oxidizing gases : Category1
- Gases under pressure : Compressed gas

B. GHS label elements

o Hazard symbols



o Signal words

- Danger

o Hazard statements

- H270 May cause or intensify fire; oxidizer
- H280 Compressed gas ; Contains gas under pressure; may explode if heated

o Precautionary statements

1) Prevention

- P220 Keep/Store away from clothing//combustible materials.

- P244 Keep reduction valves free from grease and oil.

2) Response

- P370+P376 In case of fire: Stop leak if safe to do so.

3) Storage

- P403 Store in a well-ventilated place.

- 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(%) |
|---------------|---|-----------|------------|
| Oxygen | Oxygen, compressed ; Dioxygen ; Oxygen molecule ; Oxygen, liquid ; Oxygen, refrigerated liquid (cryogenic liquid) ; Liquid oxygen ; | 7782-44-7 | 99.999 |

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

- When exposed to large amounts of steam and mist, move to fresh air.

- Take specific treatment if needed.

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

- Dry chemical, carbon dioxide, regular foam extinguishing agent, spray

- Avoid use of water jet for extinguishing

B. Specific hazards arising from the chemical

- high-pressure gas; May explode when heated.

C. Special protective actions for firefighters

- Move containers from fire area, if you can do without the risk.

- In case of conflagration, use automatic fire sprinkler. Major fire may require withdrawal, allowing the object itself to burn.

- Do not approach the tank surrounded by fire until it is extinguished.

- Use appropriate extinguishing measure suitable for surrounding fire.

- Wear appropriate protective equipment.
- Keep containers cool with water spray.
- Explosion hazards : Keep people away and fight fire from a safe distance.
- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Move people from the area.

6. ACCIDENTAL RELEASE MEASURES

A. Personal precautions, protective equipment and emergency procedures

- Ventilate closed spaces before entering.
- Do not touch spilled material. Stop leak if you can do it without risk.
- Move container to safe area from the leak area.
- Remove all sources of ignition.

B. Environmental precautions

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

C. Methods and materials for containment and cleaning up

- 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.
- Disposal of waste shall be in compliance with the Wastes Control Act
- Appropriate container for disposal of spilled material collected.

7. HANDLING AND STORAGE

A. Precautions for safe handling

- Avoid contact with incompatible materials.
- Comply with all applicable laws and regulations for handling
- Refer to Engineering controls and personal protective equipment.
- Operators should wear antistatic footwear and clothing.
- Handling only authorized person.

B. Conditions for safe storage, including any incompatibilities

- Do not apply direct heat.
- Avoid direct sunlight.
- Please pay attention to incompatibilities materials and conditions to avoid.
- No open fire.
- Prevent static electricity and keep away from combustible materials or heat sources.
- Store in well ventilated area.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure limits

- o ACGIH TLV
 - Not available
- o OSHA PEL
 - Not available

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

- o Respiratory protection
 - Respiratory protection is ranked in order from minimum to maximum.
 - Consider warning properties before use.
 - Any chemical cartridge respirator with organic vapor cartridge(s).
 - Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s).

- Any air-purifying respirator with a full facepiece and an organic vapor canister.
- For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.
- Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.
- **Eye protection**
 - Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.
 - Provide an emergency eye wash station and quick drench shower in the immediate work area.
- **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 | O₂ |
|---|---|
| - Appearance | gas |
| - Color | Blue, colorless |
| B. Odor | Odorless |
| C. Odor threshold | Not available |
| D. pH | Not available |
| E. Melting point/Freezing point | -218 °C |
| F. Initial Boiling Point/Boiling Ranges | -183 °C |
| 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 | 760 mmHg (at -183 C) |
| L. Solubility | (Water solubility: 3.2% at 25 C Solvent solubility: Soluble: alcohol) |
| M. Vapour density | 1.1 ((ai=1) |
| N. Specific gravity | 1.1407 (at -183 C (water = 1)) |
| O. Partition coefficient of n-octanol/water | 0.65 |
| P. Autoignition temperature | Not available |
| Q. Decomposition temperature | Not available |
| R. Viscosity | 0.156 cP (at -173 C) |
| S. Molecular weight | 31.9988 |

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

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**
 - Not available
 - * **Dermal**
 - Not available
 - * **Inhalation**
 - Not available
- **Skin corrosion/irritation**
 - Not available
- **Serious eye damage/irritation**
 - Not available
- **Respiratory sensitization**
 - Not available
- **Skin sensitization**
 - Not available
- **Carcinogenicity**
 - * **IARC**
 - Not available
 - * **OSHA**
 - Not available
 - * **ACGIH**
 - Not available
 - * **NTP**
 - Not available
 - * **EU CLP**
 - Not available
- **Germ cell mutagenicity**
 - Not available
- **Reproductive toxicity**
 - Not available
- **STOT-single exposure**
 - Not available
- **STOT-repeated exposure**
 - Not available
- **Aspiration hazard**
 - Not available

12. ECOLOGICAL INFORMATION

A. Ecotoxicity

- **Fish**
 - [Oxygen] : LC50 440.691 mg/l 96 hr (Estimate)
- **Crustaceans**
 - [Oxygen] : LC50 430.164 mg/l 48 hr (Estimate)
- **Algae**
 - [Oxygen] : EC50 248.819 mg/l 96 hr (Estimate)

B. Persistence and degradability

- **Persistence**
 - [Oxygen] : log Kow 0.65 (ICSC)
- **Degradability**
 - Not available

C. Bioaccumulative potential

- **Bioaccumulative potential**
 - [Oxygen] : (Bioconcentration: Will not occur.)
- **Biodegradation**
 - Not available

D. Mobility in soil

- Not available

E. Other adverse effects

- Not available

13. DISPOSAL CONSIDERATIONS**A. Disposal methods**

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

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)**

- 1072

B. Proper shipping name

- OXYGEN, COMPRESSED

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-W (Oxidizing gases)

15. REGULATORY INFORMATION**A. National and/or international regulatory information**

- **POPs Management Law**

- [Oxygen] : Not applicable
- **Information of EU Classification**
 - * **Classification**
 - [Oxygen] : H270
- **U.S. Federal regulations**
 - * **OSHA PROCESS SAFETY (29CFR1910.119)**
 - Not applicable
 - * **CERCLA Section 103 (40CFR302.4)**
 - Not applicable
 - * **EPCRA Section 302 (40CFR355.30)**
 - Not applicable
 - * **EPCRA Section 304 (40CFR355.40)**
 - Not applicable
 - * **EPCRA Section 313 (40CFR372.65)**
 - Not applicable
- **Rotterdam Convention listed ingredients**
 - Not applicable
- **Stockholm Convention listed ingredients**
 - Not applicable
- **Montreal Protocol listed ingredients**
 - Not 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

- 2020-05-07

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).