

PRODUCT NAME: OXYGEN, COMPRESSED GAS
1. Chemical Product and Company Identification

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PRODUCT NAME: OXYGEN Industrial / Medical

CHEMICAL NAME: Oxygen

2. Composition, Information on Ingredients

| Ingredient | % Volume | TLV-ACGIH ² |
|-----------------------------------|----------|------------------------|
| Oxygen FORMULA: O ₂ | 99.5 % | Not available |

3. Hazards Identification
EMERGENCY OVERVIEW

Elevated oxygen levels may result in cough and other pulmonary changes. High concentrations of oxygen (greater than 75%) causes symptoms of hyperopia which included cramps, nausea, dizziness, hypothermia, amblyopia, respiration difficulties, bradycardia, fainting spells and convulsions capable of leading to death. Nonflammable. Oxidizer will accelerate combustion.

ROUTE OF ENTRY:

| | | | | |
|---------------------------|------------------------------|--------------------------|--------------------------|------------------------|
| Skin Contact No | Skin Absorption No | Eye Contact No | Inhalation Yes | Ingestion No |
|---------------------------|------------------------------|--------------------------|--------------------------|------------------------|

HEALTH EFFECTS:

| | | | |
|----------------------|------------|----------|----------|
| Exposure Limits: | No | | |
| Irritant: | No | | |
| Sensitization: | No | | |
| Teratogen: | No | | |
| Reproductive Hazard: | No | | |
| Mutagen: | Yes | | |
| Synergistic Effects: | None known | | |
| Carcinogenicity: | NTP: No | IARC: No | OSHA: No |

EYE EFFECTS:

Adverse effects not anticipated.

SKIN EFFECTS:

Adverse effects not anticipated

INGESTION EFFECTS:

Adverse effects not anticipated.

PRODUCT NAME: OXYGEN, COMPRESSED GAS**INHALATION EFFECTS:**

High concentrations of oxygen (greater than 75%) causes symptoms of hyperopia which included cramps, nausea, dizziness, hypothermia, amblyopia, respiration difficulties, bradycardia, fainting spells and convulsions capable of leading to death. The property is that of hyperopia which leads to pneumonia. Concentrations between 25 and 75% present a risk of inflammation of organic matter in the body.

Oxygen concentrations between 20 to 95% have produced genetic changes in mammalian cell assay test systems.

4. First Aid Measures**EYES:**

Never introduce ointment or oil into the eyes without medical advice. If pain is present, refer the victim to an ophthalmologist for treatment and follow up.

SKIN:

Remove contaminated clothing and flush affected areas with lukewarm water. If irritation persists, seek medical attention.

INGESTION:

Ingestion is not anticipated.

INHALATION:

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO OXYGEN. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Further treatment should be symptomatic and supportive. Inform the treating physician that the patient could be experiencing hyperopia.

5. Fire Fighting Measures

| Conditions of Flammability | Flash Point | Method |
|-------------------------------|---------------------------------|---------------------------------|
| Not flammable, Oxidizer | None | Not applicable |
| Auto-ignition Temperature | LEL % | UEL % |
| None | None | None |
| Hazardous combustion products | Sensitivity to mechanical shock | Sensitivity to static discharge |
| None | None | None |

FIRE AND EXPLOSION HAZARDS:

High oxygen concentrations vigorously accelerate combustion.

EXTINGUISHING MEDIA:

Water spray to keep cylinders cool. Extinguishing agent appropriate for the combustible material.

FIRE FIGHTING INSTRUCTIONS:

If possible, stop the flow of oxygen which is supporting the fire.

6. Accidental Release Measures

Equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate person in **Linde Gas Middle East LLC**.

PRODUCT NAME: OXYGEN, COMPRESSED GAS**7. Handling and Storage****Electrical classification:**

Nonhazardous

Dry product is noncorrosive and may be used with all materials of construction. Moisture causes metal oxides which are formed with air to be hydrated so that they include volume and lose their protective role (rust formation). Concentrations of SO₂, Cl₂, salt, etc. in the moisture enhances the rusting of metals in air.

Carbon steels and low alloy steels are acceptable for use at lower pressures.

For high pressure applications stainless steels are acceptable as are copper and its alloys, nickel and its alloys, metallic gasket materials.

Check with the supplier to verify oxygen compatibility for the service conditions.

Oxygen should not be used as a substitute for compressed air in pneumatic equipment since this type generally contains flammable lubricants.

Do not attempt to repair, adjust or in any other way modify the operation of these vessels. If there is a malfunction or other type of operations problem with the vessel, contact **Linde Gas Middle East LLC** immediately.

Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the system.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked

Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "NO SMOKING OR OPEN FLAMES" signs in the storage area or use area. There should be no sources of ignition in the storage or use area.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

8. Exposure Controls, Personal Protection**EXPOSURE LIMITS¹:**

| Ingredient | % Volume | TLV-ACGIH ² |
|-----------------------------------|----------|------------------------|
| Oxygen FORMULA: O ₂ | 99.5% | Not available |

ENGINEERING CONTROLS:

Use local exhaust to prevent accumulation of high concentrations that increase the oxygen level in air to more than 25%.

PRODUCT NAME: OXYGEN, COMPRESSED GAS**EYE/FACE PROTECTION:**

Safety goggles or glasses as appropriate for the job.

SKIN PROTECTION:

Protective gloves made of any suitable material appropriate for the job.

OTHER/GENERAL PROTECTION:

Safety shoes, safety shower.

9. Physical and Chemical Properties

| PARAMETER | VALUE | UNITS |
|-------------------------------------|---------------------------|-------|
| Physical state (gas, liquid, solid) | : Gas | |
| Vapor pressure | : Above critical temp. | |
| Vapor density (Air = 1) | : 1.11 | |
| Evaporation point | : Not Available | |
| Boiling point | : -297.3 | |
| | : -182.9 | |
| Freezing point | : -361.8 | |
| | : -218.8 | |
| pH | : Not Applicable | |
| Specific gravity at STP | : Not Available | |
| Oil/water partition coefficient | : Not Available | |
| Solubility (H ₂ O) | : Slightly soluble | |
| Odor threshold | : Not Applicable | |
| Odor and appearance | : Colorless, odorless gas | |

10. Stability and Reactivity**STABILITY:**

Stable

INCOMPATIBLE MATERIALS:

All flammable materials

HAZARDOUS DECOMPOSITION PRODUCTS:

None

HAZARDOUS POLYMERIZATION:

Will not occur

11. Toxicological Information**MUTAGENIC:**

Oxygen concentrations between 20 to 95% have produced genetic changes in mammalian cell assay test systems.

PRODUCT NAME: OXYGEN, COMPRESSED GAS**12. Disposal Considerations**

Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to **Linde Gas Middle East LLC** or authorized distributor for proper disposal.

13. Transport Information

| Parameter | United States DOT |
|-----------------------|-----------------------------|
| Proper Shipping Name | Oxygen, compressed |
| Hazard Class | 2.2 |
| Identification Number | UN 1072 |
| Shipping Label | Non Flammable Gas, Oxidizer |

14. Hazard Classes

Fire Hazard

Sudden Release of Pressure Hazard

15. Other Information

Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of transportation regulations.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES:

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