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MSDS V1.1	Oxygen	DG001G



Label 2.2: Non flammable, non toxic gas.



Label 5.1: Oxidizing Substance.



NFPA RATING



O: Oxidizing

1 IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY / UNDERTAKING

Trade Name	: Oxygen
Chemical Formula	: O ₂
MSDS No	: DG001G
Company Identification	: Aldakheel Industrial Gases and Plant (DIGAS)
Emergency Phone Number	: 04-8455-101


2 COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT	CAS NUMBER	CONCENTRATION
Oxygen	7782-44-7	>99%*

*The symbol > means "greater than"

3 HAZARDS IDENTIFICATION

Emergency Overview	: Warning! High-pressure, oxidizing gas. Vigorously accelerates combustion. Self-contained breathing apparatus may be required by rescue workers.
Effects of a Single (Acute) Overexposure	
-Inhalation	: Breathing 80% or more oxygen at atmospheric pressure for more than a few hours may cause nasal stuffiness, cough, sore throat, chest pain, and breathing difficulty. Breathing oxygen at higher pressure increases the likelihood of adverse effects within a shorter time period. Breathing pure oxygen under pressure may cause lung damage and also Central Nervous System (CNS) effects resulting in dizziness, poor coordination, tingling sensation, visual and hearing disturbances, muscular twitching, unconsciousness, and convulsions. Breathing oxygen under pressure may cause prolongation of adaptation to darkness and reduced peripheral vision.
Skin Contact	: No harm expected.
Swallowing	: This product is a gas at normal temperature and pressure.
Eye Contact	: No harm expected.
Effects of Repeated (Chronic) Overexposure	: No harm expected.
Other Effects of Overexposure	: See Toxicological Information.
Medical Conditions Aggravated by Overexposure	: See Toxicological Information.
Potential Environmental Effects	: See Ecological Information.

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4 FIRST AID MEASURES

Inhalation	: Immediately remove to fresh air. If not breathing, give artificial respiration. Keep victim warm and at rest. Call a physician. Advise the physician that the victim has been exposed to a high concentration of oxygen.
Skin contact	: Wash with soap and water; seek medical attention if discomfort persists.
Swallowing	: This product is a gas at normal temperature and pressure.
Eye Contact	: Flush eyes thoroughly with water. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Get medical attention if discomfort persists.
Notes to Physician	: Supportive treatment should include immediate sedation, anticonvulsive therapy if needed, and rest. Victim may not be aware of asphyxiation.

5 FIRE-FIGHTING MEASURES


Flammable class	: Oxidizing agent; vigorously accelerates combustion. Contact with flammable materials may cause fire or explosion.
Extinguishing media	
Suitable extinguishing media	: All known extinguishants can be used.
Hazardous combustion products	: None.
Specific physical and chemical hazards	: Heat of fire can build a pressure in cylinder and cause it to rupture. Oxygen cylinders are equipped with a pressure relief device. (Exceptions may exist) No part of cylinder should be subjected to a temperature higher than 52°C (125°F). Smoking, flames, and electric sparks in the presence of enriched oxygen atmospheres are potential explosion hazards.
Specific methods	: If possible, stop flow of product. Evacuate all personnel from danger area. Immediately deluge cylinders with water from maximum distance until cool; then move them away from fire area if without risk. Self-contained breathing apparatus may be required by rescue workers.
Protective equipment and precautions for firefighters	: Firefighters should wear personal protective equipment and fire-fighting turnout gear as appropriate for surrounding fire.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions	: High-pressure, oxidizing gas. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation.
Environmental precautions	: Try to stop release. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Clean up methods	: Ventilate area.

7 HANDLING AND STORAGE

Precautions to be taken in handling	: Avoid breathing gas. Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap penings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Open valve slowly. If valve is hard to open, discontinue use and contact DIGAS. Close cylinder valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the cylinder. High temperatures may damage the cylinder and could cause the pressure relief device to fail prematurely, venting the cylinder contents.
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7 HANDLING AND STORAGE (Continued)

Precautions to be taken in storage : Store and use with adequate ventilation, away from oil, grease, and other hydrocarbons. Separate oxygen cylinders from flammables by at least 20 ft (6.1 m) or use a barricade of noncombustible material. This barricade should be at least 5 ft (1.53 m) high and have a fire resistance rating of at least ½ hour. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Store only where temperature will not exceed 52°C (125°F). Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls
Local exhaust : Use a local exhaust system, if necessary, to prevent increased oxygen concentration and, in welding, to keep hazardous fumes and gases below the applicable exposure limits in the worker's breathing zone.

Mechanical (General) : General exhaust ventilation may be acceptable if it can maintain a supply of air that is not too rich in oxygen and, during welding, can keep hazardous fumes and gases below applicable TLVs in the worker's breathing zone.

Special : None.

Other : None.


Personal protective equipment
Skin Protection : Wear work gloves when handling cylinders; welding gloves for welding. Gloves must be free of oil and grease. Metatarsal shoes for cylinder handling. As needed for welding, wear hand, head, and body protection to help prevent injury from radiation and sparks. At a minimum, this includes welder's gloves and protective goggles, and may include arm protectors, aprons, hats, shoulder protection, as well as substantial clothing. Regardless of protective equipment, never touch live electrical parts.

Eye/Face Protection : Wear safety glasses when handling cylinders. For welding, wear goggles with filter lens. Provide protective screens and goggles, if necessary, to protect others.

Respiratory Protection : None required under normal use. However, air-supplied respirators are required while working in confined spaces with this product. For welding, use air-purifying or air-supplied respirators, as appropriate, where local or general exhaust ventilation is inadequate. Adequate ventilation must keep worker exposure below applicable TLVs for fumes, gases, and other by-products of welding with oxygen.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Colorless, odorless, tasteless gas at normal temperature and pressure.
Odor	: None.
Odor Threshold	: Not available.
Physical State	: Gas at normal temperature and pressure.
pH	: Not applicable.
Melting Point at 1 atm	: -218.79°C (-361.82°F)
Boiling Point at 1 atm	: -182.98°C (-297.36°F)
Flash Point (test method)	: -52.2°C (-62°F)
Evaporation Rate (Butyl Acetate = 1)	: Not applicable.
Flammability	: Not applicable.
Flammable Limits In Air, % by volume	: Lower Not applicable Upper Not applicable
Vapor Pressure at 20°C (68°F)	: Not applicable.

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9 PHYSICAL AND CHEMICAL PROPERTIES (Continued)

Vapor Density at 21.1°C (70°F) and 1 atm : 0.0827 lb/ft3 (1.325 kg/m3).

Specific Gravity (H2O = 1) at boiling point : 1.141

Specific Gravity (Air = 1) at 21.1°C (70°F) and 1 atm : 1.105

Solubility In Water, vol/vol at 0°C (32°F) and 1 atm : 0.0489

Partition Coefficient: n-octanol/water : Not available.

Autoignition Temperature : Not applicable.

Decomposition Temperature : Not available.

Percent Volatiles By Volume : 100

Molecular Weight : 31.9988

Molecular Formula : O2

10 STABILITY AND REACTIVITY

Chemical Stability : Unstable. Stable.

Conditions to Avoid : None known.

Incompatible Materials : Combustible materials, asphalt, flammable materials, especially oils and greases. Oxygen reacts with many materials.

Hazardous Decomposition Products : None known.

Possible Of Hazardous Reactions : May Occur. Will Not Occur.

11 TOXICOLOGICAL INFORMATION

Acute Dose Effect

: At atmospheric concentration and pressure, oxygen poses no toxicity hazards. At high concentrations, newborn premature infants may suffer delayed retinal damage (retrolental fibroplasia) that can progress to retinal detachment and blindness. Retinal damage may also occur in adults exposed to 100% oxygen for extended periods (24 to 48 hours) or at pressures exceeding atmospheric pressure, particularly in individuals whose retinal circulation has been previously compromised. All individuals exposed for long periods to oxygen at high pressure and all who exhibit overt oxygen toxicity should have ophthalmologic examinations.


At two or more atmospheres, CNS toxicity occurs. Symptoms include nausea, vomiting, dizziness or vertigo, muscle twitching, vision changes, and loss of consciousness and generalized seizures. At three atmospheres, CNS toxicity occurs in less than two hours; at six atmospheres, in only a few minutes.

Patients with chronic obstructive pulmonary disease retain carbon dioxide abnormally. If oxygen is administered, raising their blood-oxygen concentration, their breathing becomes depressed, and retained carbon dioxide rises to a dangerous level.

Airway obstruction during high oxygen tension may cause alveolar collapse following absorption of the oxygen. Similarly, occlusion of the eustachian tubes may cause retraction of the eardrum, and obstruction of the paranasal sinuses may produce vacuum-type headache.

Study Results

: Animal studies suggest that the administration of certain drugs, including phenothiazine drugs and chloroquine, increases the susceptibility to toxicity from oxygen at high concentrations or pressures. Animal studies also indicate that vitamin E deficiency may increase susceptibility to oxygen toxicity.

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12 ECOLOGICAL INFORMATION

Ecotoxicity : No known effects.
Ecological Effects Information : The atmosphere contains approximately 21% oxygen. No adverse ecological effects expected. Oxygen does not contain any Class I or Class II ozone depleting chemicals.

13 DISPOSAL CONSIDERATION

Waste Disposal Method : Do not attempt to dispose of residual or unused quantities. Return cylinder to DIGAS. For emergency disposal, secure cylinder in a well-ventilated area or outdoors; then slowly discharge gas to the atmosphere.

14 TRANSPORT INFORMATION

Transport Information : Avoid transport on vehicles where the load space is not separated from the driver's compartment.
: Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency.
: Before transporting product containers:
- Ensure that containers are firmly secured.
- Ensure cylinder valve is closed and not leaking.
- Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
- Ensure valve protection device (where provided) is correctly fitted.
- Ensure there is adequate ventilation.
- Compliance with applicable regulations.

15 OTHER INFORMATION

Ensure all national/local regulations are observed.
Ensure operators understand the hazard of oxygen enrichment.

Hazard Rating Systems

NFPA Ratings

Health = 0
Flammability = 0
Instability = 0
SPECIAL = OX

HMIS Ratings

Health = 0
Flammability = 0
Physical Hazard = 3

Standard Valve Connections

Threaded : CGA-540
Pin-indexed yoke : CGA-870 (Medical Use)

Use the proper CGA connections. **DO NOT USE ADAPTERS.**

This Material Safety Data Sheet has been established for the best knowledge of DIGAS.

Details given in this document are believed to be correct at the best of DIGAS knowledge. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

End of Documents.