1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Oxygen, compressed
CHEMICAL NAME: Oxygen
CHEMICAL FAMILY: Oxidizer
SYNONYMS: Oxygen USP, life gas
CHEMICAL FORMULA: O_2
USE: Medical, welding

NAME AND ADDRESS: **Refrigeration & Oxygen Co.**
Corporate Office
Area No 1, Block 21 C,
Central Slaughter House Street
Shuwaikh Industrial Area
Kuwait.

WEB ADDRESS: www.rockuwait.com; E-mail: info@rocq8.com
TELEPHONE: (+965) 844 844

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:
WARNING! Odorless, colorless high pressure oxidizing gas.
Vigorously accelerates combustion.

POTENTIAL HEALTH EFFECTS INFORMATION:

ROUTES OF EXPOSURE:
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 effects resulting in dizziness, poor coordination, tingling sensation, visual and hearing disturbances, muscular twitching, unconsciousness and convulsions. Breathing oxygen under pressure may cause prolonged adaptation to darkness and reduced peripheral vision.
EYE CONTACT: Not applicable.
SKIN CONTACT: Not applicable.
SKIN ABSORPTION: Not applicable.
INGESTION: Not applicable.
CHRONIC EFFECTS: None established
MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Patients with chronic obstructive pulmonary disease retain carbon dioxide abnormally. If oxygen is administered to them, raising the oxygen concentration in the blood depresses their breathing and raises their retained carbon dioxide to a dangerous level.
OTHER EFFECTS OF OVEREXPOSURE: See Section 11, Toxicological Information.
CARCINOGENICITY: Oxygen is not listed by NTP, OSHA, or IARC.
POTENTIAL ENVIRONMENTAL EFFECTS: No adverse ecological effects are expected.

3. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME OXYGEN
PERCENTAGE >99%
CAS NUMBER 7782-44-7

4. FIRST AID MEASURES

FIRST AID PROCEDURES:
INHALATION: Move victim to fresh air or if in elevated pressures reduce oxygen pressures to 1 atmosphere. Call a physician. The physician should be advised that the victim has been exposed to a high concentration of oxygen.
Rescue personnel should be aware of the extreme fire hazards associated with oxygen-enriched atmospheres.
EYE CONTACT: None
SKIN CONTACT: None
INGESTION: None

NOTES TO PHYSICIAN: Supportive treatment should include immediate sedation, anti-convulsive therapy if needed, and rest. More detailed information can be found in Section 11, Toxicological Information.

5. FIREFIGHTING MEASURES

FLAMMABLE PROPERTIES: Oxygen is nonflammable and will accelerate combustion.
EXTINGUISHING MEDIA: Use extinguishing media appropriate for surrounding fire.

PROTECTION OF FIREFIGHTERS:
SPECIFIC HAZARDS ARISING FROM THE CHEMICAL: Oxidizing agent, vigorously accelerates combustion. Some materials that are noncombustible in air will burn in the presence of an oxygen-enriched atmosphere (over 23.5%). Oxygen may form explosive compounds when exposed to combustible materials or oil, grease, and other hydrocarbon materials.
Upon exposure to intense heat or flame, cylinder will vent rapidly and or rupture violently. Most cylinders are designed to vent contents when exposed to elevated temperatures.
Pressure in a container can build up due to heat and it may rupture if pressure relief devices should fail to function.

PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS: Evacuate all personnel from the danger area. If possible, shut off flow of oxygen that is supporting the fire. Immediately try to cool containers with water spray from maximum distance. When cool, move containers from fire area, if without risk.

SENSITIVITY TO STATIC DISCHARGE: None
SENSITIVITY TO MECHANICAL IMPACT: None

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: Use personal protection recommended in Section 8. Evacuate all unnecessary personnel from the affected area. Remove sources of heat, ignition and, if possible, separate combustibles from the leak.
Ventilate enclosed area or move leaking container to a well-ventilated area. If leaking from cylinder or its valve, contact your supplier.
ENVIRONMENTAL PRECAUTIONS: Not applicable.
METHODS FOR CONTAINMENT: Shut off source of oxygen, if possible.
METHODS FOR CLEAN-UP: Not applicable.
OTHER INFORMATION: None.

7. HANDLING AND STORAGE

HANDLING: Use a suitable hand truck for cylinder movement. Never attempt to lift a cylinder by its valve protection cap. Keep cylinders and their valves free from oil and grease. Open valve slowly. If user experiences difficulty operating cylinder valve, discontinue use and contact supplier. Never insert an object (e.g., wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit. Use an adjustable strap wrench to remove over-tight or rusted caps. For additional precautions in using oxygen see Section 16, Other Information.
When used in welding and cutting: Read and understand the manufacturer's instructions and the precautionary label on the products.

STORAGE: Store and use with adequate ventilation. Compressed gas cylinders shall be separated from materials and conditions that present exposure hazards to or from each other. Cylinders should be separated from flammables by a minimum distance of 20 feet or by a barrier of noncombustible material at least 5 feet high having a fire resistance rating of at least 1/2 hour. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling or being knocked over. Post "No Smoking or Open Flames" signs in the storage area. Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area temperature to exceed 125 °F (52°C). Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE GUIDELINES:
OSHA PEL-TWA: None NIOSH IDLH: None
ACGIH TLV: None

ENGINEERING CONTROLS:
VENTILATION: Natural or mechanical to prevent oxygen-enriched atmospheres above 23.5% oxygen.
PERSONAL PROTECTIVE EQUIPMENT:
EYE/FACE PROTECTION: Safety glasses are recommended when handling cylinders.
SKIN PROTECTION: Work gloves are recommended when handling cylinders. If used, gloves must be clean and free of oil and grease. Safety shoes are recommended when handling cylinders.
RESPIRATORY PROTECTION (SPECIFY TYPE):

General Use: Not required
Emergency Use: Not required.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless
ODOR AND STATE: Odorless, tasteless at normal temperature and pressure.
ODOR THRESHOLD: Not applicable
PHYSICAL STATE: Gaseous
pH: Not applicable
FREEZING POINT: -361.1 °F (-218.4 °C) @ 1 atm
BOILING POINT (1 ATM): -297.3 °F (-182.9 °C)
FLASH POINT: Not applicable

EVAPORATION RATE (Butyl Acetate=1): Not applicable
FLAMMABILITY: Nonflammable gas
FLAMMABLE LIMITS IN AIR BY VOLUME:
LOWER: Not applicable UPPER: Not applicable

VAPOR PRESSURE (AT 20°C): Not applicable
GAS DENSITY: 0.083 lb/ft^3 (1.326 kg/m^3) @ 70 °F (21.1 °C) and 1 atm
SPECIFIC GRAVITY (Air =1): 1.105 @ 70 of (21.1 °C) and 1 atm
SOLUBILITY IN WATER: Vol/ Vol at 32 °F (0 °C): 0.0491
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable
AUTOIGNITION: Not applicable
DECOMPOSITION TEMPERATURE: Not applicable
MOLECULAR WEIGHT: 32.00
EXPANSION RATIO: Not applicable

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable
CONDITIONS TO AVOID: None
INCOMPATIBLE MATERIALS: Flammable materials, hydrocarbons such as oils and grease, asphalt, ethers, alcohols, acids and aldehydes. Compatibility to plastics/polymers should be confirmed prior to use.
HAZARDOUS DECOMPOSITION PRODUCTS: None
POSSIBILITY OF HAZARDOUS REACTIONS: Will not occur

11. TOXICOLOGICAL INFORMATION

ACUTE DOSE EFFECTS:
LD_{50}: None; LC_{50}: None

REPEATED DOSE EFFECTS: At atmospheric concentration and pressure, oxygen poses no toxicity hazards.

Premature infants exposed to high oxygen concentrations may suffer delayed retinal damage, which can progress to retinal detachment and blindness. Retinal damage may also occur in adults exposed to 100% oxygen for extended periods (24 to 48 hr).
At two or more atmospheres central nervous system (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, and at six atmospheres in only a few minutes.

ADDITIONAL NOTES TO PHYSICIAN: Animal studies suggest that the administration of certain drugs, including phenothiazine drugs and chloroquine, increase the susceptibility to toxicity from oxygen at high pressures. Animal studies also indicate that vitamin "E" deficiency may increase susceptibility to oxygen toxicity.
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.
All individuals exposed for long periods to oxygen at high pressure and who exhibit overt oxygen toxicity should have ophthalmologic examinations.

IRRITATION: None
GENETIC EFFECTS: None
DEVELOPMENTAL EFFECTS: None
TERATOGENICITY: None
SYNERGISTIC MATERIALS: None

SENSITIZATION: None
REPRODUCTIVE EFFECTS: None
TARGET ORGAN EFFECTS: None
MUTAGENICITY: None

12. ECOLOGICAL INFORMATION

ECOTOXICITY: The atmosphere contains approximately 21 % oxygen. No adverse ecological effects are expected. Oxygen does not contain any Class I or Class II ozone depleting chemicals. Oxygen is not listed as a marine pollutant by DOT.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.
For emergency disposal, secure the cylinder and slowly discharge gas to the atmosphere in a well-ventilated area or outdoors away from all sources of ignition.

14. TRANSPORT INFORMATION

BASIC SHIPPING DESCRIPTION:
PROPER SHIPPING NAME: Oxygen, compressed
HAZARD CLASS: 2.2 (5.1)
IDENTIFICATION NUMBER: UN 1072

ADDITIONAL INFORMATION:
PRODUCT RQ: Not applicable
SHIPPING LABEL(s): Oxygen.
PLACARD (when required): Nonflammable gas or oxygen
SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position, in a well ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards and should be discouraged.

15. REGULATORY INFORMATION & OTHER INFORMATION

SPECIAL PRECAUTIONS: All gauges, valves, regulators, piping and equipment to be used in oxygen service must be cleaned for oxygen service. Use piping and equipment adequately designed to withstand pressures to be encountered. Oxygen is not to be used as a substitute for compressed air. Never use an oxygen jet for cleaning purposes of any sort, especially clothing, as it increases the likelihood of an engulfing fire. Use a check valve or other protective apparatus in any line or piping from the cylinder to prevent reverse flow. Cross contamination of gases, liquids, or both can also create a hazardous condition inside a cylinder, dewar, or vessel (e.g., flammable and oxidizing gases can create an explosive mixture), which may result in rupture.
Personnel who have been exposed to high concentrations of oxygen should stay in a well-ventilated or open area for 30 minutes before going into a confined space or near an ignition source.

MIXTURES: When two or more gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Gases have properties that can cause serious injury or death.

HAZARD RATINGS AND RATING SYSTEMS:

NFPA RATINGS:

HEALTH: =0; FLAMMABILITY: =0; INSTABILITY: =0; SPECIAL: OX

STANDARD VALVE CONNECTIONS:

THREADED:

	0-3000 psig	CGA 540
	3001-4000 psig	CGA 577
	4001-5500 psig	CGA 701
PIN-INDEXED YOKE:	0-3000 psig	CGA 870 (Medical Use)
ULTRA HIGH INTEGRITY:	0-3000 psig	714

Use the proper connections; DO NOT USE ADAPTERS. DONOT FORCE FIT CONNECTIONS. DONOT OIL/ GREASE THE CONNECTIONS.

The information and recommendations in this Material Safety Data Sheet relate only to the specific material mentioned herein and do not relate to use otherwise ie., in combination with any other material or in any process.

The information and recommendations herein are taken from our extensive experiences and the data contained in recognized references and believed by us to be accurate. Refrigeration group of companies make no warranties either expressed or implied with respect there to and assume no liability in connection with the use of such information and recommendation.