

Oxygen Material Safety Data Sheet

ISSUE DATE	01 March 2016	TRADE NAME AND SYNONYMS Oxygen, LOX (Liquid only) GOX (Gas only)	CHEMICAL NAME AND SYNONYMS Oxygen
REVISIONS	V1-02.2016	FORMULA O ₂ MW : 32.00	CHEMICAL FAMILY Oxidizing gas CAS #7782-44-7

HEALTH HAZARD DATA

EXPOSURE LIMITS

OSHA and ACGIH : None established. Oxygen is not listed as a carcinogen by NTP, IARC, or OSHA.

SYMPTOMS IF INGESTED, CONTACTED WITH SKIN, OR VAPOR INHALED

Oxygen is nontoxic under most conditions of use and is necessary to support life. Liquid oxygen or cold gas will freeze tissues and can cause severe cryogenic (extremely low temperature) burns.

TOXICOLOGICAL PROPERTIES

Oxygen is nontoxic under usual conditions of use. Breathing pure oxygen at one atmosphere, however, may produce cough and chest pains within 8 - 24 hours. Concentrations of 60% may produce these symptoms in several days. At two atmosphere symptoms occur in 2 - 3 hours. Partial pressure of oxygen in excess of two atmospheres may produce a variety of central nervous system manifestations including tingling of fingers and toes, visual and hearing disturbances, abnormal sensations, impaired coordination, confusion, muscle twitching, and seizures resembling those of epilepsy. Severe hazards may be present when confusion and impaired judgement lead to operational errors. Infants exposed to oxygen level in excess of 35% - 40% may suffer permanent visual impairment or blindness due to retrolental fibroplasia.

RECOMMENDED FIRST AID AND TREATMENT

If cryogenic liquid or cold boil-off gas contacts a worker's skin or eyes, frozen tissues should be flooded or soaked with tepid water (105 - 115F; 41-46C). DO NOT USE HOT WATER. Burns which result in blistering or deeper tissue freezing should be seen promptly by a physician.

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used) N/A	AUTO IGNITION TEMP N/A	FLAMMABLE LIMITS N/A	LEL N/A	UEL N/A
EXTINGUISHING MEDIA N/A		ELECTRICAL CLASSIFICATION GROUP N/A		

SPECIAL FIRE FIGHTING PROCEDURES

Oxygen is non-flammable, but supports and VIGOROUSLY ACCELERATES COMBUSTION of flammable. To fight fires, shut off sources of oxygen and fight like conventional fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Oxygen is non-flammable, but supports and VIGOROUSLY ACCELERATES COMBUSTION of flammable. Some materials which are non-combustible in air will burn in the presence of oxygen.

PHYSICAL DATA

BOILING POINT (°F) @ 1 atm - 297.3F (-183.0 C)	FREEZING POINT (°F) @ 1 atm - 361.8F (-218.8C)		
VAPOR PRESSURE (psia) N/A	SOLUBILITY IN WATER @ 77F (25C), 1 atm 3.16% by volume		
VAPOR DENSITY (lb/cu ft) @ 70F (21.1C), 1 atm 0.08279	SPECIFIC GRAVITY (AIR = 1) @ 68F (20C), 1 atm 1.10	LIQUID DENSITY (lb/uc ft) @ boiling point, 1 atm 71.23	SPECIFIC GRAVITY (H2O=1) @ boiling point, 1 atm 1.14

APPEARANCE AND ODOR

Gaseous oxygen is colorless and odorless. Liquid oxygen is pale-blue and odorless.

REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	Materials which burn in air will burn violently in atmosphere richer than approx. 25% oxygen. Some materials will burn in pure oxygen which are non-flammable in air.

INCOMPATIBILITY (Materials to avoid) All flammable , especially petroleum products , asphalt , other volatile flammables.			
HAZARDOUS DECOMPOSITION PRODUCTS None			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	None
SPILL OR LEAK PROCEDURES			
STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Prevent liquid oxygen from contacting grease , oil , asphalt or combustibles. Ventilate area to evaporate and disperse oxygen. Flush area with large quantities of water. DO NOT ENTER areas of high oxygen concentration , which can saturate clothing and increase its flammability. Avoid smoking and contact with sources of ignition after exposure to concentration of oxygen higher than the normal atmosphere.			
WASTE DISPOSAL METHOD Allow liquid oxygen to evaporate in a well ventilated outdoor area. Vent oxygen gas slowly to outside location. Disposal site should be remote from work areas , open flames or sources of ignition and combustibles. Flushing with water will increase the vaporization rate of the liquid. Do not attempt to dispose of residual oxygen in compressed gas cylinders. Return cylinders with residual pressure , the cylinder valve tightly closed and valve cap in place.			
SPECIAL PROTECTION INFORMATION			
RESPIRATORY PROTECTION (Specify Type) N/A			
VENTILATION Prevent accumulation with natural or forced air.	LOCAL EXHAUST As necessary	SPECIAL None normally required	
	MECHANICAL (General) As necessary	OTHER Vents should be situated to avoid higher than normal concentration of oxygen in work areas.	
PROTECTIVE GLOVES (Liquid) Loose-fitting gloves of impermeable material , such as leather. (Gas) Leather work gloves are recommended when handling compressed gas cylinders.			
EYE PROTECTION (Liquid) Chemical glasses or safety glasses. (Gas) Safety glasses are recommended when handling high-pressure cylinders			
OTHER PROTECTIVE EQUIPMENT None			
SPECIAL PRECAUTIONS *			
SPECIAL LABELLING INFORMATION DOT Shipping Name : Oxygen , or Oxygen Compressed ; (Liquid) Oxygen , refrigerated liquid. DOT Hazard Class : Nonflammable Gas. DOT Shipping label : Oxidizer. I.D. Number : UN 1072			
SPECIAL HANDLING RECOMMENDATIONS Prevent contact of liquid oxygen with exposed skin. Prevent entrapment of liquid in closed systems. Use only in well ventilated areas. Cleanliness and compatibility of materials in contact with oxygen are essential especially internal parts of piping systems. Some elastomers (o-rings , valve seats , etc) are not compatible with oxygen. Open oxygen valves slowly. Compressed gas cylinders contain oxygen at extremely high pressure and should not be handled with care. Use a pressure reducing regulator when connecting to a lower pressure piping systems. Secure cylinders when in use. Never use a direct flame to heat a compressed gas cylinder. Use a check valve to prevent back flow into storage containers. Avoid dragging , rolling , or sliding cylinders , even for a short distance. Use a suitable hand truck.			
SPECIAL STORAGE RECOMMENDATIONS Store liquid containers and cylinders in well ventilated areas. Do not store cylinders of oxygen within 20 ft of flammable of combustible materials , especially oil or grease. Keep cylinders away from source of heat. Storage should not be in heavy traffic areas to prevent accidental knocking over or damage from passing or falling objects. Valve caps should remain on cylinders not connected for use. Never lubricate valves or cylinder caps. Segregate full and empty cylinders. Storage areas should be free of combustible material. Avoid exposure to areas where salt or other corrosive chemicals are present.			
OTHER RECOMMENDATIONS OR PRECAUTIONS Oxygen is not to be used as a substitute for compressed air. Applications such as cleaning , dusting , powering pneumatic tools , etc. are not safe due to lubricating oils and other materials present. Use only with equipment specifically designed and cleaned for oxygen service. Liquid oxygen is cryogenic liquid. Materials of construction must be selected for compatibility with extremely low temperatures. Avoid use of carbon steel and other materials which become brittle at low temperatures. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. If oxygen concentrations exceeding 25% are suspected or can occur , use oxygen monitoring equipment to test for oxygen-enriched atmosphere.			