

Oxygen, refrigerated liquid

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SECTION 1. IDENTIFICATION

Product identifier used on the label

: **Oxygen, refrigerated liquid**

Other means of identification : InnoPure Liquid Oxygen

Recommended use of the chemical and restrictions on use

: Industrial use; Medical applications.
Restriction on use: None known

Chemical family

: Diatomic gas.

Name, address, and telephone number
of the supplier:

Innovair Industrial Limited

150 McPhillips Street
Winnipeg, MB, Canada
R3E 2J9

Supplier's Telephone # : 800-667-3344

24 Hr. Emergency Tel # : No information available.

Name, address, and telephone number of
the manufacturer:

Refer to supplier

SECTION 2. HAZARDS IDENTIFICATION

Classification of the chemical

Colourless gas. Odourless.

This material is classified as hazardous under U.S. OSHA regulations (29CFR 1910.1200) (Hazcom 2012) and Canadian WHMIS regulations (Hazardous Products Regulations) (WHMIS 2015).

Classification :

Oxidizing gases -Category 1

Refrigerated liquefied gas

Label elements

Hazard pictogram(s)



Signal Word

DANGER!

Hazard statement(s)

May cause or intensify fire; oxidizer.

Contains refrigerated gas; may cause cryogenic burns or injury.

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Precautionary statement(s)

Keep/Store away from clothing and other combustible materials.
 Keep reduction valves free from grease and oil.
 Wear cold insulating gloves/face shield/eye protection.

Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention
 In case of fire: Stop leak if safe to do so.

Store in a well-ventilated place.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Pure gas.

<u>Chemical name</u>	<u>Common name and synonyms</u>	<u>CAS #</u>	<u>Concentration (% by weight)</u>
Oxygen, refrigerated liquid	O2	7782-44-7	100.00

SECTION 4. FIRST-AID MEASURES

Description of first aid measures

- Ingestion* : Not normally required.
- Inhalation* : Overexposure of oxygen is not expected under normal working conditions. Remove exposed person to fresh air immediately. Prompt medical attention is necessary when oxygen is inhaled under pressure. Provide supportive treatment, keeping victim warm and quiet.
- Skin contact* : For exposure to liquid, immediately warm frostbite area with warm water not to exceed temperatures of 105°F/41°C. Maintain skin warming for at least 15 minutes or until normal colouring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Get medical attention.
- Eye contact* : Flush eyes with water for at least 15 minutes while holding eyelids open. Get medical attention immediately.

Most important symptoms and effects, both acute and delayed

- : Oxygen may be toxic when inhaled at elevated pressures.

Indication of any immediate medical attention and special treatment needed

- : Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing media

- Suitable extinguishing media* : CO2, dry chemical, foam, water spray, water fog.
- Unsuitable extinguishing media* : None.

Special hazards arising from the substance or mixture / Conditions of flammability

- : High oxygen concentrations vigorously accelerate combustion. Will support or initiate combustion or explosion of organic matter and other oxidizable material. Container explosion may occur under fire conditions.

Flammability classification (OSHA 29 CFR 1910.106)

- : Non-flammable.

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Hazardous combustion products

- : Oxides of materials which are burning.

Special protective equipment and precautions for firefighters

Protective equipment for fire-fighters

- : Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Do not enter without wearing specialized protective equipment suitable for the situation. Firefighter's normal protective clothing (Bunker Gear) will not provide adequate protection. A full-body encapsulating chemical protective suit with positive pressure self-contained breathing apparatus (NIOSH approved or equivalent) may be necessary.

Special fire-fighting procedures

- : Evacuate personnel to safe areas. Firefighters should wear an approved full-face, self-contained breathing apparatus (SCBA) and impervious clothing. Remove all sources of ignition. Stop spill or leak at source if safely possible. Move containers from fire area if safe to do so. Keep containers cool until after the fire is out.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

- : Individuals involved in the cleanup must wear appropriate personal protective equipment. Deny entry to all unprotected individuals. Ensure adequate ventilation.

Environmental precautions : Ensure spilled product does not enter confined areas.

Methods and material for containment and cleaning up

- : Stop leak if you can do so without risk. Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area).

Special spill response procedures

- : Follow prescribed procedures for reporting and responding to larger releases.

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling

- : Use with adequate ventilation. Use explosion-proof equipment. Do not smoke. Avoid inhaling gas. Protect cylinders from damage. Do not cut, weld, braze, solder, drill, grind or expose containers to heat, flame, spark or other sources of ignition. Do not puncture, incinerate or expose to heat even when empty.

Conditions for safe storage : Protect cylinders from damage. Store in a cool, dry, well-ventilated area. Store away from areas of excessive heat, open flames, sparks, and other possible sources of ignition. 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 from being stored for excessive periods of time. Outside or detached storage is preferred.

Incompatible materials : Reducing agents ;Combustible materials. ;Grease ;Oils ;Organic materials

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SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

<u>Exposure Limits:</u>				
<u>Chemical Name</u>	<u>ACGIH TLV</u>		<u>OSHA PEL</u>	
	<u>TWA</u>	<u>STEL</u>	<u>PEL</u>	<u>STEL</u>
Oxygen, refrigerated liquid	N/Av	N/Av	N/Av	N/Av

Exposure controls

Ventilation and engineering measures

: General mechanical ventilation and explosion-proof local exhaust is required for use with this product. Small quantities can be handled in forced ventilation hoods.

Respiratory protection

: In case of insufficient ventilation wear suitable respiratory equipment.

Skin protection

: Wear cold insulating gloves/face shield/eye protection.

Eye / face protection

: Wear cold insulating gloves/face shield/eye protection.

Other protective equipment

: Safety boots per regulations. Cotton clothing is recommended to prevent static build-up. Emergency showers and eyewash facilities should be nearby.

General hygiene considerations

: Handle in accordance with good industrial hygiene and safety practice for diagnostics.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Colourless gas.
Odour : Odourless.
Odour threshold : Not available.
pH : Not applicable.
Melting Point/Freezing point : - 218°C (-361.8 °F)

Initial boiling point and boiling range

: - 182.9°C

Flash point : Not applicable.

Flashpoint (Method) : Not applicable.

Evaporation rate (BuAe = 1) : Not available.

Flammability (solid, gas) : Not flammable.

Lower flammable limit (% by vol.)

: Not available.

Upper flammable limit (% by vol.)

: Not available.

Oxidizing properties : Strong oxidizer which will promote combustion.

Explosive properties : Not explosive

Vapour pressure : Not applicable.

Vapour density : 1.11

Relative density / Specific gravity

: 1.43

Solubility in water : 39 g/L

Other solubility(ies) : Not available.

Partition coefficient: n-octanol/water or Coefficient of water/oil distribution

: 0.65

Auto-ignition temperature : Not available.

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Decomposition temperature : Not available.

Viscosity : Not applicable.

Volatiles (% by weight) : Not available.

Volatile organic Compounds (VOC's)

: Not applicable.

Absolute pressure of container

: Not available.

Flame projection length : Not applicable.

Other physical/chemical comments

: Molecular Weight: 32 g/mol

Molecular formula: O₂

Critical temperature: -118.6°C

SECTION 10. STABILITY AND REACTIVITY

Reactivity : Not expected to be reactive.

Chemical stability : Stable under normal conditions.

Possibility of hazardous reactions

: May cause or intensify fire; oxidizer.

Conditions to avoid : Open flames, sparks, high heat and close proximity to incompatible substances.

Incompatible materials : See Section 7 (Handling and Storage) for further details.

Hazardous decomposition products

: See Section 5 (Fire Fighting Measures).

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure:

Routes of entry inhalation : YES

Routes of entry skin & eye : NO

Routes of entry Ingestion : NO

Routes of exposure skin absorption

: NO

Potential Health Effects:

Signs and symptoms of short-term (acute) exposure

Sign and symptoms Inhalation

: Oxygen may be toxic when inhaled at elevated pressures. Depending upon pressure and duration of exposure, pure oxygen at elevated pressures may cause cramps, dizziness, difficulty breathing, convulsions, edema, and death.

Sign and symptoms ingestion

: None known, since product is a gas at room temperature.

Sign and symptoms skin

: Contact with liquid or refrigerated gas can cause cold burns and frostbite. Symptoms of more severe frostbite include a burning sensation, stiffness of the affected area, blistering, tissue death and gangrene.

Sign and symptoms eyes

: Contact with liquid may cause frostbite. Spraying directly into the eyes may cause frostbite, damage to the cornea resulting in permanent eye injury.

Potential Chronic Health Effects

: None reported by the manufacturer.

Mutagenicity

: Not expected to be mutagenic in humans.

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Carcinogenicity : No components are listed as carcinogens by ACGIH, IARC, OSHA or NTP.

Reproductive effects & Teratogenicity

: Not expected to have other reproductive effects.

Sensitization to material : Not expected to be a sensitizer.

Specific target organ effects : Respiratory system, Central nervous system.

Medical conditions aggravated by overexposure

: None reported by the manufacturer.

Synergistic materials : None known.

Toxicological data : There is no available data for the product itself, only for the ingredients. See below for individual ingredient acute toxicity data.

<u>Chemical name</u>	<u>LC₅₀(4hr)</u>	<u>LD₅₀</u>	
	<u>inh, rat</u>	<u>(Oral, rat)</u>	<u>(Rabbit, dermal)</u>
Oxygen, refrigerated liquid	N/Av	N/Av	N/Av

Other important toxicological hazards

: None known or reported by the manufacturer.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity : Not expected to be harmful to aquatic organisms.

Ecotoxicity data:

<u>Ingredients</u>	<u>CAS #</u>	<u>Toxicity to Fish</u>		
		<u>LC50 / 96h</u>	<u>NOEC / 21 day</u>	<u>M Factor</u>
Oxygen, refrigerated liquid	7782-44-7	N/Ap	N/Ap	N/Ap

<u>Ingredients</u>	<u>CAS #</u>	<u>Toxicity to Daphnia</u>		
		<u>EC50 / 48h</u>	<u>NOEC / 21 day</u>	<u>M Factor</u>
Oxygen, refrigerated liquid	7782-44-7	N/Ap	N/Ap	N/Ap

<u>Ingredients</u>	<u>CAS #</u>	<u>Toxicity to Algae</u>		
		<u>EC50 / 96h or 72h</u>	<u>NOEC / 96h or 72h</u>	<u>M Factor</u>
Oxygen, refrigerated liquid	7782-44-7	N/Ap	N/Ap	N/Ap

Persistence and degradability

: The manufacturer has not reported detailed studies on the environmental fate of the material. However, prudent practice would dictate that the material not be allowed to enter the environment.

Bioaccumulation potential : Not expected to bioaccumulate.

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<u>Components</u>	<u>Partition coefficient n-octanol/water (log Kow)</u>	<u>Bioconcentration factor (BCF)</u>
Mobility in soil	: None known or reported by the manufacturer.	
Other Adverse Environmental effects	: This product has no known eco-toxicological effects.	

SECTION 13. DISPOSAL CONSIDERATIONS

Handling for Disposal	: See Section 8 for additional personal protection advice when handling this product.
Methods of Disposal	: Do not attempt to dispose of residual waste or unused quantities. Return to vendor with cylinder valve tightly closed and valve cap in place.
RCRA	: Under the RCRA, it is the responsibility of the waste generator to determine the proper waste identification and disposal method.

SECTION 14. TRANSPORT INFORMATION

Regulatory Information	UN Number	UN proper shipping name	Transport hazard class(es)	Packing Group	Label
TDG	UN1073	OXYGEN, REFRIGERATED LIQUID	2.2	none	 
TDG Additional information					
49CFR/DOT	UN1073	Oxygen, refrigerated liquid	2.2	none	 
49CFR/DOT Additional information					

Special precautions for user	: None known or reported by the manufacturer.
Environmental hazards	: See ECOLOGICAL INFORMATION, Section 12.
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	: Not available.

SECTION 15 - REGULATORY INFORMATION

US Federal Information:

Components listed below are present on the following U.S. Federal chemical lists:

<u>Ingredients</u>	CAS #	TSCA Inventory	CERCLA Reportable Quantity(RQ) (40 CFR 117.302):	SARA TITLE III: Sec. 302, Extremely Hazardous Substance, 40 CFR 355:	SARA TITLE III: Sec. 313, 40 CFR 372, Specific Toxic Chemical	de minimus Concentration
					Toxic Chemical	
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SARA TITLE III: Sec. 311 and 312, SDS Requirements, 40 CFR 370 Hazard Classes: Physical hazards (Oxidising gas ;Refrigerated liquefied gas).Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

US State Right to Know Laws:

The following chemicals are specifically listed by individual States:

<u>Ingredients</u>	CAS #	California Proposition 65		State "Right to Know" Lists					
		Listed	Type of Toxicity	CA	MA	MN	NJ	PA	RI
Oxygen, refrigerated liquid	7782-44-7	No	N/Ap	No	Yes	No	Yes	Yes	Yes

Canadian Information:

Canadian WHMIS Classification: See Section 2. Canadian Environmental Protection Act (CEPA) information: All ingredients listed appear on the Domestic Substances List (DSL).

International Information:

Components listed below are present on the following International Inventory list:

<u>Ingredients</u>	CAS #	European EINECS	Australia AICS	Philippines PICCS	Japan ENCS	Korea KECI/KECL	China IECSC	NewZealand IOC
Oxygen, refrigerated liquid	7782-44-7	231-956-9	Present	Present	Not listed	KE-27737	Present	HSR001029

SECTION 16. OTHER INFORMATION

Legend

- : ACGIH: American Conference of Governmental Industrial Hygienists
- AICS: Australian Inventory of Chemical Substances
- CA: California
- CAS: Chemical Abstract Services
- CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980
- CFR: Code of Federal Regulations
- CSA: Canadian Standards Association
- DOT: Department of Transportation
- EC50: Effective Concentration 50%
- EINECS: European Inventory of Existing Commercial chemical Substances
- ENCS: Existing and New Chemical Substances
- EPA: Environmental Protection Agency
- HSDB: Hazardous Substances Data Bank
- IARC: International Agency for Research on Cancer
- IECSC: Inventory of Existing Chemical Substances
- IOC: Inventory of Chemicals
- KECI: Korean Existing Chemicals Inventory
- KECL: Korean Existing Chemicals List
- LC: Lethal Concentration
- LD: Lethal Dose
- MA: Massachusetts
- mppcf: million particles per cubic foot
- MN: Minnesota
- N/Ap: Not Applicable
- N/Av: Not Available

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NIOSH: National Institute of Occupational Safety and Health
 NJ: New Jersey
 NL: Not listed
 NOEC: No observable effect concentration
 NTP: National Toxicology Program
 OECD: Organisation for Economic Co-operation and Development
 OSHA: Occupational Safety and Health Administration
 PA: Pennsylvania
 PEL: Permissible exposure limit
 PICCS: Philippine Inventory of Chemicals and Chemical Substances
 RCRA: Resource Conservation and Recovery Act
 RI: Rhode Island
 RTECS: Registry of Toxic Effects of Chemical Substances
 SARA: Superfund Amendments and Reauthorization Act
 SDS: Safety Data Sheet
 STEL: Short Term Exposure Limit
 TDG: Canadian Transportation of Dangerous Goods Act & Regulations
 TLV: Threshold Limit Values
 TSCA: Toxic Substance Control Act
 TWA: Time Weighted Average
 WHMIS: Workplace Hazardous Materials Identification System

- References** :
1. ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices
 2. ECHA - European Chemical Agency
 3. Canadian Centre for Occupational Health and Safety, CCHInfoWeb databases
 4. Safety Data Sheets from manufacturer.
 5. US EPA Title III List of Lists
 6. California Proposition 65 List
 7. OECD - The Global Portal to Information on Chemical Substances - eChemPortal

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Other special considerations for handling : Provide adequate information, instruction and training for operators.

<p><u>Prepared for:</u> Innovair Industrial Limited 150 McPhillips Street Winnipeg, MB R3E 2J9 Telephone: 800-667-3344</p>	
<p><u>Prepared by:</u> ICC The Compliance Center Inc. Telephone: (888) 442-9628 (U.S.); (888) 977-4834 (Canada) http://www.thecompliancecenter.com</p>	

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