

Danger**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Trade name : Oxygen (refrigerated)
SDS no : AL610
Chemical description : Oxygen (refrigerated)
CAS No : 7782-44-7
EC no : 231-956-9
EC index no : 008-001-00-8
Registration-No. : Listed in Annex IV / V REACH, exempted from registration.
Chemical formula : O₂

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
Test gas/Calibration gas.
Welding, cutting, heating and brazing.
Laboratory use.
Shield gas for welding processes.
Water treatment.
Use for manufacture of electronic/photovoltaic components.
Contact supplier for more information on uses.

1.3. Details of the supplier of the safety data sheet

Company identification : Air Liquide Australia Limited
Level 9 / 380 St. Kilda Road
3004 Melbourne VIC Australia
+61 3 9697 9888
ALAEquiries@AirLiquide.com

1.4. Emergency telephone number

Emergency telephone number : 1800 812 588

SECTION 2: Hazards identification**2.1. Classification of the substance or mixture****Classification according to WHS Regulation**

Physical hazards	Oxidising Gases, Category 1	H270
	Gases under pressure : Refrigerated liquefied gas	H281

2.2. Label elements**Classification according to WHS Regulation**

Hazard pictograms :



GHS03

GHS04

Signal word :

Danger

Hazard statements :

H270 - May cause or intensify fire; oxidizer.

H281 - Contains refrigerated gas; may cause cryogenic burns or injury.

Precautionary statements :

- Prevention : P282 - Wear cold insulating gloves, eye protection, face protection.

P220 - Keep away from combustible materials.

P244 - Keep valves and fittings free from oil and grease.

- Response : P370+P376 - In case of fire: stop leak if safe to do so.

P336+P315 - Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice / attention.

- Storage : P403 - Store in a well-ventilated place.

2.3. Other hazards

: None.

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%	Classification according to WHS Regulation
Oxygen (refrigerated)	(CAS No) 7782-44-7 (EC no) 231-956-9 (EC index no) 008-001-00-8 (Registration-No.) *1	100	Ox. Gas 1, H270 Press. Gas (Ref. Liq.), H281

Contains no other components or impurities which will influence the classification of the product.

*1: Listed in Annex IV / V REACH, exempted from registration.

*2: Registration deadline not expired.

*3: Registration not required: Substance manufactured or imported < 1t/y.

Full text of R-phrases see section 16. Full text of H-statements see section 16.

3.2. Mixture : Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area.
- Skin contact : In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

: Continuous inhalation of concentrations higher than 75% may cause nausea, dizziness, respiratory difficulty and convulsion.

4.3. Indication of any immediate medical attention and special treatment needed

: None.

SECTION 5: Firefighting measures**5.1. Extinguishing media**

- Suitable extinguishing media : Water spray or fog.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

Specific hazards : Exposure to fire may cause containers to rupture/explode.
Supports combustion.

Hazardous combustion products : None.

5.3. Advice for fire-fighters

Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
Exposure to fire may cause containers to rupture/explode.
If possible, stop flow of product.
Use water spray or fog to knock down fire fumes if possible.
Move containers away from the fire area if this can be done without risk.

Special protective equipment for fire fighters : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

Hazchemcode : 2P

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

- : Try to stop release.
- Evacuate area.
- Monitor concentration of released product.
- Eliminate ignition sources.
- Use protective clothing.
- Ensure adequate air ventilation.
- Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
- Act in accordance with local emergency plan.
- Stay upwind.

6.2. Environmental precautions

- : Try to stop release.

6.3. Methods and material for containment and cleaning up

- : Ventilate area.
- Liquid spillages can cause embrittlement of structural materials.
- Keep area evacuated and free from ignition sources until any spilled liquid has evaporated (ground free from frost).

6.4. Reference to other sections

- : See also sections 8 and 13.

**SECTION 7: Handling and storage****7.1. Precautions for safe handling**

- Safe use of the product : The substance must be handled in accordance with good industrial hygiene and safety procedures.
Only experienced and properly instructed persons should handle gases under pressure.
Consult supplier for specific recommendations.
Consider pressure relief device(s) in gas installations.
Ensure the complete gas system was (or is regularly) checked for leaks before use.
Do not smoke while handling product.
Use no oil or grease.
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
Use only oxygen approved lubricants and oxygen approved sealings.
Use only with equipment cleaned for oxygen service and rated for cylinder pressure.
Do not breathe gas.
Avoid release of product into atmosphere.
- Safe handling of the gas receptacle : Refer to supplier's container handling instructions.
Do not allow backfeed into the container.
Never attempt to repair or modify container valves or safety relief devices.
Damaged valves should be reported immediately to the supplier.
Keep container valve outlets clean and free from contaminants particularly oil and water.
Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
Close container valve after each use and when empty, even if still connected to equipment.
Never use direct flame or electrical heating devices to raise the pressure of a container.
Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.
Suck back of water into the container must be prevented.
Open valve slowly to avoid pressure shock.

7.2. Conditions for safe storage, including any incompatibilities

- : Observe all regulations and local requirements regarding storage of containers.
Containers should not be stored in conditions likely to encourage corrosion.
Container valve guards or caps should be in place.
Containers should be stored in the vertical position and properly secured to prevent them from falling over.
Stored containers should be periodically checked for general condition and leakage.
Keep container below 50°C in a well ventilated place.
Segregate from flammable gases and other flammable materials in store.
Store containers in location free from fire risk and away from sources of heat and ignition.
Keep away from combustible materials.

7.3. Specific end use(s)

- : None.

SECTION 8: Exposure controls/personal protection**8.1. Control parameters**

- OEL (Occupational Exposure Limits) : No data available.
DNEL (Derived-No Effect Level) : No data available.
PNEC (Predicted No-Effect Concentration) : No data available.

8.2. Exposure controls

8.2.1. Appropriate engineering controls

- : Provide adequate general and local exhaust ventilation.
- Systems under pressure should be regularly checked for leakages.
- Avoid oxygen rich (>23,5%) atmospheres.
- Gas detectors should be used when oxidising gases may be released.
- Consider work permit system e.g. for maintenance activities.

8.2.2. Individual protection measures, e.g. personal protective equipment

- : A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered:
 - Protect eyes, face and skin from liquid splashes.
 - PPE compliant to the recommended EN/ISO standards should be selected.

• Eye/face protection

- : Wear safety glasses with side shields.
- Wear goggles and a face shield when transfilling or breaking transfer connections.
- Standard EN 166 - Personal eye-protection.

• Skin protection

- Hand protection

- : Wear working gloves when handling gas containers.
- Standard EN 388 - Protective gloves against mechanical risk.

- Other

- : Consider the use of flame resistant safety clothing.
- Standard EN ISO 14116 - Limited flame spread materials.
- Wear safety shoes while handling containers.
- Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

• Respiratory protection

- : None necessary.

• Thermal hazards

- : Wear cold insulating gloves when transfilling or breaking transfer connections.
- Standard EN 511 - Cold insulating gloves.

8.2.3. Environmental exposure controls

- : None necessary.

SECTION 9: Physical and chemical properties**9.1. Information on basic physical and chemical properties**

Appearance

- Physical state at 20°C / 101.3kPa : Gas.
- Colour : Bluish liquid.

Odour : No odour warning properties.

Odour threshold : Odour threshold is subjective and inadequate to warn of overexposure.

pH value : Not applicable.

Molar mass : 32 g/mol

Melting point : -219 °C

Boiling point : -183 °C

Flash point : Not applicable for gases and gas mixtures.

Critical temperature [°C] : -118 °C

Evaporation rate (ether=1) : Not applicable for gases and gas mixtures.

Flammability range : Non flammable.

Vapour pressure [20°C] : Not applicable.

Vapour pressure [50°C] : Not applicable.

Relative density, gas (air=1) : 1.1

Relative density, liquid (water=1) : 1.1

Solubility in water	: 39 mg/l
Partition coefficient n-octanol/water [log Kow]	: Not applicable for inorganic gases.
Auto-ignition temperature	: Not applicable.
Viscosity [20°C]	: Not applicable.
Explosive Properties	: Not applicable.
Oxidising Properties	: Oxidiser.
- Coefficient of oxygen equivalency (Ci)	: 1

9.2. Other information

Other data	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.
------------	--

SECTION 10: Stability and reactivity**10.1. Reactivity**

: No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

: Stable under normal conditions.

10.3. Possibility of hazardous reactions

: Risk of explosion if spilt on organic structural materials (e.g. wood or asphalt).
Violently oxidises organic material.

10.4. Conditions to avoid

: None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

: May react violently with combustible materials.
May react violently with reducing agents.
Consider the potential toxicity hazard due to the presence of chlorinated or fluorinated polymers in high pressure (> 30 bar) oxygen lines in case of combustion.
Keep equipment free from oil and grease.
For additional information on compatibility refer to ISO 11114.
Consult supplier for specific recommendations.

10.6. Hazardous decomposition products

: None.

SECTION 11: Toxicological information**11.1. Information on toxicological effects**

Acute toxicity	: No known toxicological effects from this product.
Skin corrosion/irritation	: No known effects from this product.
Serious eye damage/irritation	: No known effects from this product.
Respiratory or skin sensitisation	: No known effects from this product.
Germ cell mutagenicity	: No known effects from this product.
Carcinogenicity	: No known effects from this product.
Toxic for reproduction : Fertility	: No known effects from this product.
Toxic for reproduction : unborn child	: No known effects from this product.
STOT-single exposure	: No known effects from this product.
STOT-repeated exposure	: No known effects from this product.
Aspiration hazard	: Not applicable for gases and gas mixtures.

SECTION 12: Ecological information**12.1. Toxicity**

Assessment : No ecological damage caused by this product.

12.2. Persistence and degradability

Assessment : No ecological damage caused by this product.

12.3. Bioaccumulative potential

Assessment : No ecological damage caused by this product.

12.4. Mobility in soil

Assessment : No ecological damage caused by this product.

12.5. Results of PBT and vPvB assessment

Assessment : Not classified as PBT or vPvB.

12.6. Other adverse effects

: Can cause frost damage to vegetation.

Effect on ozone layer : None.

Effect on the global warming : None.

SECTION 13: Disposal considerations**13.1. Waste treatment methods**

Consult supplier for specific recommendations.
May be vented to atmosphere in a well ventilated place.
Do not discharge into any place where its accumulation could be dangerous.
Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at
<http://www.eiga.org> for more guidance on suitable disposal methods.

List of hazardous waste codes (from Commission Decision 2001/118/EC) : 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

13.2. Additional information

: None.

SECTION 14: Transport information**14.1. UN number**

UN-No. : 1073

14.2. UN proper shipping name

Transport by road/rail (ADG) : OXYGEN, REFRIGERATED LIQUID

Transport by air (ICAO-TI / IATA-DGR) : OXYGEN, REFRIGERATED LIQUID

Transport by sea (IMDG) : OXYGEN, REFRIGERATED LIQUID

14.3. Transport hazard class(es)

Labelling


2.2 : Non-flammable, non-toxic gases
5.1 : Oxidizing substances

Transport by road/rail (ADG)

Class : 2
 Hazchemcode : 2P
 Hazard identification number : 225
 Tunnel Restriction : C/E - Tank carriage : Passage forbidden through tunnels of category C, D and E. Other carriage : Passage forbidden through tunnels of category E

Transport by air (ICAO-TI / IATA-DGR)

Class / Div. (Sub. risk(s)) : 2.2 (5.1)

Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.2 (5.1)
 Emergency Schedule (EmS) - Fire : F-C
 Emergency Schedule (EmS) - Spillage : S-W

14.4. Packing group

Transport by road/rail (ADR/RID) : Not applicable
 Transport by air (ICAO-TI / IATA-DGR) : Not applicable
 Transport by sea (IMDG) : Not applicable

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None.
 Transport by air (ICAO-TI / IATA-DGR) : None.
 Transport by sea (IMDG) : None.

14.6. Special precautions for user
Packing Instruction(s)

Transport by road/rail (ADR/RID) : P203
 Transport by air (ICAO-TI / IATA-DGR)
 Passenger and Cargo Aircraft : Forbidden
 Cargo Aircraft only : Forbidden
 Transport by sea (IMDG) : P203

Special transport precautions : 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 there is adequate ventilation.
 - 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.



OXYGEN, Refrigerated Liquid (O₂)

SDS Ref.: AL610

HAZCHEMCODE : 2P

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

: Not applicable.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations

Ensure all national/local regulations are observed.

15.2. Chemical safety assessment

: A CSA does not need to be carried out for this product.

SECTION 16: Other information

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010.

Training advice : Ensure operators understand the hazard of oxygen enrichment.

Full text of H-statements

Ox. Gas 1	Oxidising Gases, Category 1
Press. Gas (Ref. Liq.)	Gases under pressure : Refrigerated liquefied gas
H270	May cause or intensify fire; oxidizer
H281	Contains refrigerated gas; may cause cryogenic burns or injury
R8	Contact with combustible material may cause fire
O	Oxidising

DISCLAIMER OF LIABILITY : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press.
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 document