

Safety Data Sheet



Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

Product Name	• Oxygen (Compressed)
Synonyms	• Aviator's Breathing Oxygen (ABO); Oxygen USP
CAS Number	• 7782-44-7
Product Code	• MSDS No: 50007
EC Number	• 231-956-9
Molecular Formula	• :O 2:

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

Relevant identified use(s)	• Calibration of Monitoring or Research Equipment
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1.3 Details of the supplier of the safety data sheet

Manufacturer	• Air Liquide 2700 Post Oak Blvd. Houston, TX 77056 United States www.us.airliquide.com sds@airliquide.com
Telephone (Technical)	• 713-896-2896
Telephone (Technical)	• 800-819-1704

1.4 Emergency telephone number

Manufacturer	• 800-424-9300 - CHEMTREC
Manufacturer	• +1 703-527-3887 - Outside United States

Section 2: Hazards Identification

EU/EEC

According to EU Directive 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010]
According to EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

CLP	• Oxidizing Gases 1 - H270 Compressed Gas - H280
DSD/DPD	• Oxidizing (O) R8

2.2 Label Elements

CLP

DANGER



- Hazard statements**
- H270 - May cause or intensify fire; oxidizer
 - H280 - Contains gas under pressure; may explode if heated

Precautionary statements

- Prevention**
- P220 - Keep/Store away from clothing and other combustible materials.
 - P244 - Keep reduction valves free from grease and oil.
- Response**
- P370+P376 - In case of fire: Stop leak if safe to do so.
- Storage/Disposal**
- P403 - Store in a well-ventilated place.

DSD/DPD



- Risk phrases**
- R8 - Contact with combustible material may cause fire.

2.3 Other Hazards

- CLP**
- According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.

- DSD/DPD**
- This product is considered dangerous according to the European Directive 67/548/EEC.
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United States (US)

According to OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

- OSHA HCS 2012**
- Oxidizing Gases 1 - H270
 - Compressed Gas - H280

2.2 Label elements

OSHA HCS 2012

DANGER



- Hazard statements**
- May cause or intensify fire; oxidizer - H270
 - Contains gas under pressure; may explode if heated - H280

Precautionary statements

- Prevention**
- Keep/Store away from clothing and other combustible materials. - P220
 - Keep reduction valves free from grease and oil. - P244
- Response**
- In case of fire: Stop leak if safe to do so. - P370+P376
- Storage/Disposal**
- Store in a well-ventilated place. - P403

2.3 Other hazards

- OSHA HCS 2012**
- Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.
-

Canada

According to WHMIS

2.1 Classification of the substance or mixture

WHMIS

- Compressed Gas - A
Oxidizing - C

2.2 Label elements**WHMIS**

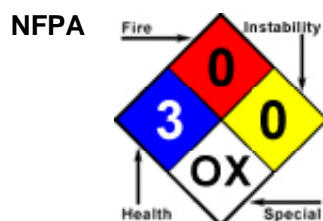
- Compressed Gas - A
Oxidizing - C

2.3 Other hazards**WHMIS**

- In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

2.4 Other information

- None of the trace impurities in this product contribute significantly to the hazards associated with the product. All hazard information pertinent to this product has been provided in the Safety Data Sheet, per the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200) and state equivalent standards.

**Section 3 - Composition/Information on Ingredients****3.1 Substances**

Composition					
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive	Comments
Oxygen	CAS:7782-44-7 EC Number:231-956-9	> 99.5%	NDA	EU DSD/DPD: Annex I - O; R8 EU CLP: Annex VI - Ox. Gas 1 H270; Press. Gas - Comp., H280 OSHA HCS 2012: Ox. Gas 1; Press Gas. - Comp.	NDA
Maximum Impurities		< 0.5%		WHMIS: EU DSD/DPD: EU CLP: OSHA HCS 2012:	NDA

3.2 Mixtures

- Material does not meet the criteria of a mixture in accordance with Regulation (EC) No 1272/2008.

See Section 16 for full text of H-statements and R-phrases.

Section 4 - First Aid Measures

4.1 Description of first aid measures

Inhalation

- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.

Skin

- Although exposure is unlikely, in case of contact immediately flush skin with running water. If skin irritation develops get medical advice/attention.

Eye

- First aid is not expected to be necessary if material is used under ordinary conditions and as recommended. Hold eye open and rinse slowly and gently with water for 15 -20 minutes. Remove contact lenses, if present, after the first five minutes, then continue rinsing eye. Get medical attention immediately if symptoms occur.

Ingestion

- First aid is not expected to be necessary if material is used under ordinary conditions and as recommended. Never give anything by mouth to an unconscious person. Do NOT induce vomiting.

4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician

- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

4.4 Other information

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO GASES WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn. Victim(s) who experience any adverse effect after over - exposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media

- Use extinguishing agent suitable for type of surrounding fire.
SMALL FIRES: Dry chemical or CO₂.
LARGE FIRES: Water spray or fog.

Unsuitable Extinguishing Media

- No data available

5.2 Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards

- Containers may explode when heated.
Ruptured cylinders may rocket.

Hazardous Combustion Products

- No data available

5.3 Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
Always wear thermal protective clothing when handling refrigerated/cryogenic liquids. Wear positive pressure self-contained breathing apparatus (SCBA).
Move containers from fire area if you can do it without risk.
FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.
FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
FIRE INVOLVING TANKS: Cool containers with flooding quantities of water until well

after fire is out.

FIRE INVOLVING TANKS: Do not direct water at source of leak or safety devices; icing may occur.

FIRE INVOLVING TANKS: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.

FIRE INVOLVING TANKS: ALWAYS stay away from tanks engulfed in fire.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions

- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Do not touch or walk through spilled material. Ventilate the area before entry.

Emergency Procedures

- Stop leak if you can do it without risk. Keep unauthorized personnel away. Keep out of low areas. Stay upwind. Do not direct water at spill or source of leak. **LARGE SPILL:** Consider initial downwind evacuation for at least 500 meters (1/3 mile)

6.2 Environmental precautions

- No data available

6.3 Methods and material for containment and cleaning up

Containment/Clean-up Measures

- Stop leak if you can do it without risk. Do not direct water at spill or source of leak. Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container. If possible, turn leaking containers so that gas escapes rather than liquid. Isolate area until gas has dispersed. Ventilate the area. Allow substance to evaporate.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling

- Use only with adequate ventilation. Ventilate closed spaces before entering. Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Cylinders should be firmly secured to prevent falling or being knocked -over. Do not attempt to repair, adjust, or in any other way modify cylinders. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. Empty containers retain product residue and can be hazardous. Do not cut, weld, puncture or incinerate container.

7.2 Conditions for safe storage, including any incompatibilities

Storage

- Store in a cool, dry, well-ventilated place. Protect cylinders against physical damage. Cylinders should be firmly secured to prevent falling or being knocked -over.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines

- Currently there are no applicable exposure limits established for this material.

8.2 Exposure controls

Engineering Measures/Controls

- Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Use explosion-proof - electrical, ventilating and/or lighting equipment.

Personal Protective Equipment

Respiratory

- No data available

Eye/Face

- Wear safety glasses.

Skin/Body

- Wear leather gloves when handling cylinders.

Environmental Exposure Controls

- Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Section 9 - Physical and Chemical Properties

9.1 Information on Physical and Chemical Properties

Material Description			
Physical Form	Gas	Appearance/Description	Colorless, odorless gas at normal temperature and pressure.
Color	Colorless	Odor	Odorless
Odor Threshold	Data lacking		
General Properties			
Boiling Point	-183 C(-297.4 F)	Melting Point	-218.8 C(-361.84 F)
Decomposition Temperature	Data lacking	pH	Data lacking
Specific Gravity/Relative Density	1.105 Water=1 @ 21.1 C(69.98 F)	Density	1.326 kg/m ³ @ 32 F(0 C)
Water Solubility	0.0491 % @ 0 C(32 F)	Viscosity	Not relevant
Explosive Properties	Data lacking	Oxidizing Properties:	Oxidizing gas.
Volatility			
Vapor Pressure	Data lacking	Vapor Density	1.105 Air=1
Evaporation Rate	Data lacking		
Flammability			
Flash Point	Not relevant	UEL	Not relevant
LEL	Not relevant	Autoignition	Not relevant
Flammability (solid, gas)	Not flammable.		
Environmental			
Octanol/Water Partition coefficient	Not relevant		

9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity

- No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Hazardous polymerization will not occur.

10.4 Conditions to avoid

- No data available

10.5 Incompatible materials

- No data available

10.6 Hazardous decomposition products

- None

Section 11 - Toxicological Information

11.1 Information on toxicological effects

Oxygen (Compressed) 7782-44-7								
Test Type	Dosage	Route	Species	Duration	Results	Test Class	Target Organs	Comments
Reproductive	= 10 pph	Inhalation	Rat	9 Hour(s)	TCLo	NDA	NDA	NDA
GHS Properties				Classification				
Acute toxicity				EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met				
Aspiration Hazard				EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met				
Carcinogenicity				EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met				
Germ Cell Mutagenicity				EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met				
Skin corrosion/Irritation				EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met				
Skin sensitization				EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met				
STOT-RE				EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met				
STOT-SE				EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met				
Toxicity for Reproduction				EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met				
Respiratory sensitization				EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met				
Serious eye damage/Irritation				EU/CLP • Classification criteria not met OSHA HCS 2012 • Classification criteria not met				

Potential Health Effects

Inhalation

Acute (Immediate)

- Under normal conditions of use, no health effects are expected.

Chronic (Delayed)

- No data available

Skin

Acute (Immediate)

- Under normal conditions of use, no health effects are expected.

- Chronic (Delayed)**
- No data available
- Eye**
- Acute (Immediate)**
- Under normal conditions of use, no health effects are expected.
- Chronic (Delayed)**
- No data available
- Ingestion**
- Acute (Immediate)**
- Under normal conditions of use, no health effects are expected.
- Chronic (Delayed)**
- No data available

Key to abbreviations

TC = Toxic Concentration

Section 12 - Ecological Information

12.1 Toxicity

- Oxygen occurs naturally in the atmosphere. The gas will be dissipated rapidly in well ventilated areas.

12.2 Persistence and degradability

- No data available

12.3 Bioaccumulative potential

- No data available

12.4 Mobility in Soil

- No data available

12.5 Results of PBT and vPvB assessment

- PBT and vPvB assessment has not been conducted for this material.

12.6 Other adverse effects

Section 13 - Disposal Considerations

13.1 Waste treatment methods

- Product waste**
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.
- Packaging waste**
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	UN1072	Oxygen, compressed	2.2	NDA	NDA
TDG	UN1072	OXYGEN, COMPRESSED	2.2	NDA	NDA
IMO/IMDG	UN1072	OXYGEN, COMPRESSED	2.2	NDA	NDA
IATA/ICAO	UN1072	Oxygen, compressed	2.2	NDA	NDA

- 14.6 Special precautions for user**
- 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. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well -ventilated during transportation.

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

- Not relevant.

Section 15 - Regulatory Information

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

SARA Hazard Classifications • Pressure(Sudden Release of)

State Right To Know				
Component	CAS	MA	NJ	PA
Oxygen	7782-44-7	Yes	Yes	Yes
Maximum Impurities	NDA	No	No	No

Inventory						
Component	CAS	Canada DSL	Canada NDSL	China	EU EINECS	EU ELNICS
Oxygen	7782-44-7	Yes	No	Yes	Yes	No
Maximum Impurities	NDA	No	No	No	No	No

Inventory (Con't.)			
Component	CAS	Japan ENCS	TSCA
Oxygen	7782-44-7	No	Yes
Maximum Impurities	NDA	No	No

Canada

Labor

Canada - WHMIS - Classifications of Substances

- Oxygen 7782-44-7 A, C

Canada - WHMIS - Ingredient Disclosure List

- Oxygen 7782-44-7 Not Listed

Environment

Canada - CEPA - Priority Substances List

- Oxygen 7782-44-7 Not Listed

China

Environment

China - Ozone Depleting Substances - First Schedule

- Oxygen 7782-44-7 Not Listed

China - Ozone Depleting Substances - Second Schedule

- Oxygen 7782-44-7 Not Listed

China - Ozone Depleting Substances - Third Schedule

- Oxygen 7782-44-7 Not Listed

Other

China - Annex I & II - Controlled Chemicals Lists

- Oxygen 7782-44-7 Not Listed

China - Dangerous Goods List

- Oxygen 7782-44-7 UN1072; UN1073

China - Export Control List - Part I Chemicals

- Oxygen 7782-44-7 Not Listed

Europe

Other

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Classification

- Oxygen 7782-44-7 O; R8

EU - CLP (1272/2008) - Annex VI - Table 3.2 - Concentration Limits

- Oxygen 7782-44-7 Not Listed

Germany

Environment

Germany - TA Luft - Types and Classes

- Oxygen 7782-44-7 Not Listed

Germany - Water Classification (VwVwS) - Annex 1

- Oxygen 7782-44-7 ID Number 743, not considered hazardous to water

Germany - Water Classification (VwVwS) - Annex 2 - Water Hazard Classes

- Oxygen 7782-44-7 Not Listed

Germany - Water Classification (VwVwS) - Annex 3

- Oxygen 7782-44-7 Not Listed

Other

Germany - Specifically Regulated Chemicals in TRGS

- Oxygen 7782-44-7 Not Listed

Portugal

Other

Portugal - Prohibited Substances

- Oxygen 7782-44-7 Not Listed

United Kingdom

Environment

United Kingdom - Pollution Inventory - Schedule 1 - Thresholds for Releases to Air

- Oxygen 7782-44-7 Not Listed

United Kingdom - Substances Contained in Dangerous Substances or Preparations

- Oxygen 7782-44-7 Not Listed

Other

United Kingdom - Workplace Exposure Limits (WELs) - Substances in Review

- Oxygen 7782-44-7 Not Listed

United Kingdom - The Red List - Dangerous Substances in Water

- Oxygen 7782-44-7 Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

- Oxygen 7782-44-7 Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

- Oxygen 7782-44-7 Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

- Oxygen 7782-44-7 Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

- Oxygen 7782-44-7 Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

- Oxygen 7782-44-7 Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

- Oxygen 7782-44-7 Not Listed

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

- Oxygen 7782-44-7 Not Listed

U.S. - RCRA (Resource Conservation & Recovery Act) - Basis for Listing - Appendix VII

- Oxygen 7782-44-7 Not Listed

U.S. - RCRA (Resource Conservation & Recovery Act) - List for Hazardous Constituents

- Oxygen 7782-44-7 Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

- Oxygen 7782-44-7 Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

- Oxygen 7782-44-7 Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

- Oxygen 7782-44-7 Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

- Oxygen 7782-44-7 Not Listed

United States - Pennsylvania

Labor

U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List

- Oxygen 7782-44-7 Not Listed

U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances

- Oxygen 7782-44-7 Not Listed

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

Section 16 - Other Information

Last Revision Date

- 10/September/2013

Preparation Date

- 10/September/2013

Disclaimer/Statement of Liability

- To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.