

SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended

Oxygen, refrigerated liquid

Issue Date: 16.01.2013 Version: 1.4 SDS No.: 000010021821

Last revised date: 24.01.2023 1/15

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name: Oxygen, refrigerated liquid

Trade name: Gasart 201 Sauerstoff Flüssig, Gasart 205 Sauerstoff 3.5 Flüssig, Gasart 202

Sauerstoff med. Flüssig, Gasart 214 Biogon® O, E948 Flüssig

Additional identification

Chemical name: Oxygen Chemical formula: 02

INDEX No.008-001-00-8CAS-No.7782-44-7EC No.231-956-9

REACH Registration No. Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH),

exempted from registration.

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

Identified uses: Industrial and professional. Perform risk assessment prior to use. Balance gas

for mixtures. Calibration gas. Carrier gas. Chemical synthesis. Combustion, melting and cutting processes. Food packaging gas. Laboratory use. Laser gas. Oxidizing agent. Process gas. Shielding gas in gas welding. Test gas. Use of

gas to manufacture pharmaceutical products.

Uses advised againstConsumer use Industrial or technical grade is unsuitable for medical and/or

food applications or inhalation.

1.3 Details of the supplier of the safety data sheet

Supplier

Linde Gas GmbH Telephone: +43 50 4273

Carl-von-Linde-Platz 1 A-4651 Stadl-Paura

E-mail: office@at.linde-gas.com

1.4 Emergency telephone number: Emergency number UMCO: +49 89 220 61012 (German), +44 1865 407333 (English)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 as amended.

Physical Hazards

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Oxidizing gases Category 1 H270: May cause or intensify fire; oxidizer.

Gases under pressure Refrigerated H281: Contains refrigerated gas; may cause cryogenic

liquefied gas burns or injury.

2.2 Label Elements



Signal Word: Danger

Hazard Statement(s): H270: May cause or intensify fire; oxidizer.

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

Precautionary Statements

General None.

Prevention: P220: Keep away from clothing and other combustible materials.

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

P282: Wear cold insulating gloves and either face shield or eye protection.

Response: P336+P315: Thaw frosted parts with lukewarm water. Do not rub affected

area. Get immediate medical advice/attention. P370+P376: In case of fire: Stop leak if safe to do so.

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

Disposal None.

2.3 Other hazards None.



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SECTION 3: Composition/information on ingredients

3.1 Substances

 Chemical name
 Oxygen

 INDEX No.:
 008-001-00-8

 CAS-No.:
 7782-44-7

 EC No.:
 231-956-9

REACH Registration No.: Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from

registration.

Purity: 100%

The purity of the substance in this section is used for classification only, and does not represent the actual purity of the substance as supplied, for which other

documentation should be consulted.

Trade name: Gasart 201 Sauerstoff Flüssig, Gasart 205 Sauerstoff 3.5 Flüssig, Gasart 202

Sauerstoff med. Flüssig, Gasart 214 Biogon® O, E948 Flüssig

Chemical name	Chemical formula	Concentration	CAS-No.	REACH Registration No.	M-Factor:	Notes
Oxygen	02	100%	7782-44-7	Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration.	-	

The concentrations of the components in the SDS header, product name on page one and in section 3.2 are in mol due to regulatory requirements. All concentrations are nominal.

SECTION 4: First aid measures

General: Move the exposed person to fresh air at once.

4.1 Description of first aid measures

Inhalation: Move the exposed person to fresh air at once.

Eye contact: Rinse the eye with water immediately. Remove contact lenses, if present and easy

to do. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available,

flush an additional 15 minutes.

[#] This substance has workplace exposure limit(s).

PBT: persistent, bioaccumulative and toxic substance

vPvB: very persistent and very bioaccumulative substance.



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Skin Contact: Contact with evaporating liquid may cause frostbite or freezing of skin. If clothing

is saturated with the liquid and adhering to the skin then the area should be

thawed with lukewarm water prior to removing the clothing.

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. Contact with liquefied gas can

cause damage (frostbite) due to rapid evaporative cooling.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: Continuous inhalation of concentrations higher than 75% may cause nausea,

dizziness, respiratory difficulty and convulsion. Contact with liquefied gas can

cause damage (frostbite) due to rapid evaporative cooling.

Treatment: Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate

medical advice/attention.

SECTION 5: Firefighting measures

General Fire Hazards: Heat may cause the containers to explode.

5.1 Extinguishing media

Suitable extinguishing media: Water Spray or Fog. Dry powder. Foam. Carbon Dioxide.

Unsuitable extinguishing

media:

None.

5.2 Special hazards arising from the

substance or mixture:

Supports combustion.

Hazardous Combustion Products: None.

5.3 Advice for firefighters

Special fire fighting

procedures:

In case of fire: Stop leak if safe to do so. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate

the source of the fire or let it burn out.



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Special 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. Guideline: EN 469 Protective clothing for firefighters. Performance requirements for protective clothing for firefighting. EN 15090 Footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in buildings and other structures. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

Evacuate area. In case of leakage, eliminate all ignition sources. Provide adequate ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Monitor the concentration of the

released product.

6.2 Environmental Precautions:

Prevent further leakage or spillage if safe to do so.

6.3 Methods and material for containment and cleaning up:

Provide adequate ventilation. Liquid spillages can cause embrittlement of

structural materials.

6.4 Reference to other sections:

Refer to sections 8 and 13.



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SECTION 7: Handling and storage:

7.1 Precautions for safe handling:

Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Keep equipment free from oil and grease. Open valve slowly to avoid pressure shock. Use only oxygen approved lubricants and sealants. Use only with equipment cleaned for oxygen service and rated for the pressure. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eq. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/regional/national/international regulations. Never use direct flame or electrical heating devices to raise the pressure of a container. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Damaged valves should be reported immediately to the supplier Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminates particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place.

7.2 Conditions for safe storage, including any incompatibilities:

Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material. Avoid asphalted locations for storage, transfer and use (ignition risk if spilt). Segregate from flammable gases and other flammable materials being stored.

7.3 Specific end use(s):

None.



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SECTION 8: Exposure controls/personal protection

8.1 Control Parameters

Occupational Exposure Limits

None of the components have assigned exposure limits.

8.2 Exposure controls

Appropriate engineering

controls:

Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Avoid oxygen rich (>23,5%) atmospheres. Gas detectors should be used when quantities of oxidizing gases may be released. Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Systems under pressure should be regularly checked for leakages. Preferably use permanent leak tight connections (eg. welded pipes). Do not eat, drink or smoke when using the product.

Individual protection measures, such as personal protective equipment

General information: 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. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task

being performed and the risks involved.

Eye/face protection: Safety eyewear, goggles or face-shield to EN166 should be used to avoid

exposure to liquid splashes. Wear eye protection to EN 166 when using gases.

Guideline: EN 166 Personal Eye Protection.

Skin protection

Hand Protection: Guideline: EN 511 Protective gloves against cold.

Additional Information: Wear cold insulating gloves.

Body protection: Wear appropriate clothing to prevent skin contamination or freezing.

Other: Wear safety shoes while handling containers

Guideline: ISO 20345 Personal protective equipment - Safety footwear.

Respiratory Protection: Not required.

Thermal hazards: If there is a risk of contact with the liquid, all protective equipment should be

suitable for extremely low temperatures.



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Hygiene measures: Specific risk management measures are not required beyond good industrial

hygiene and safety procedures. Do not eat, drink or smoke when using the

product.

Environmental exposure

controls:

For waste disposal, see section 13 of the SDS.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state: Gas

Form: Refrigerated liquefied gas

Coloriess Odoriess Odoriess

Odor Threshold: Odor threshold is subjective and is inadequate to warn of over

exposure.

pH:Not applicable.Melting Point:-218,4 °CBoiling Point:-183 °C

Sublimation Point:Not applicable.Critical Temp. (°C):-118,0 °C

Flash Point: Not applicable to gases and gas mixtures. **Evaporation Rate:** Not applicable to gases and gas mixtures.

Flammability (solid, gas):

This product is not flammable.

Flammability Limit - Upper (%): Not applicable. Flammability Limit - Lower (%): Not applicable.

Vapor pressure:No reliable data available.

Vapor density (air=1): 1,1 (0 °C) AIR=1

Relative density: 1,1 (0 °C ,Reference material: Water)

Solubility(ies)

Solubility in Water: 39 mg/l
Partition coefficient (n-octanol/water): Not known.
Autoignition Temperature: Not applicable.
Decomposition Temperature: Not known.

Viscosity

Kinematic viscosity:No data available.Dynamic viscosity:No data available.Explosive properties:Not applicable.

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Oxidizing properties: Oxidizing

9.2 Other information: Gas/vapour heavier than air. May accumulate in confined

spaces, particularly at or below ground level.

Molecular weight: 32 g/mol (02)

SECTION 10: Stability and reactivity

10.1 Reactivity: No reactivity hazard other than the effects described in sub-section below.

10.2 Chemical Stability: Stable under normal conditions.

10.3 Possibility of hazardous

reactions:

Violently oxidises organic material. May react violently with combustible

materials. May react violently with reducing agents.

10.4 Conditions to avoid: None.

10.5 Incompatible Materials: Cryogenic liquids can cause embrittlement of some metals and alter the physical

properties of other materials. Combustible materials Reducing agents. Keep equipment free from oil and grease. For material compatibility see latest version of ISO-11114. Consider the potential toxicity hazard due to the presence of chlorinated or fluorinated polymers in high pressure (>30 bar) oxygen lines and

equipment in case of combustion.

10.6 Hazardous Decomposition

Products:

Under normal conditions of storage and use, hazardous decomposition products

should not be produced.

SECTION 11: Toxicological information

General information: None.

11.1 Information on toxicological effects

Acute toxicity - Oral

Product Based on available data, the classification criteria are not met.

Acute toxicity - Dermal

Product Based on available data, the classification criteria are not met.



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Acute toxicity - Inhalation

Product Based on available data, the classification criteria are not met.

Skin Corrosion/Irritation

Product Based on available data, the classification criteria are not met.

Serious Eye Damage/Eye Irritation

Product Based on available data, the classification criteria are not met.

Respiratory or Skin Sensitization

Product Based on available data, the classification criteria are not met.

Germ Cell Mutagenicity

Product Based on available data, the classification criteria are not met.

Carcinogenicity

Product Based on available data, the classification criteria are not met.

Reproductive toxicity

Product Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Single Exposure

Product Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Repeated Exposure

Product Based on available data, the classification criteria are not met.

Aspiration Hazard

Product Not applicable to gases and gas mixtures..

SECTION 12: Ecological information

General information: Not applicable

12.1 Toxicity

Acute toxicity

Product No ecological damage caused by this product.



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12.2 Persistence and Degradability

Product Not applicable to gases and gas mixtures..

12.3 Bioaccumulative potential

Product The subject product is expected to biodegrade and is not expected to persist for

long periods in an aquatic environment.

12.4 Mobility in soil

Product Because of its high volatility, the product is unlikely to cause ground or water

pollution.

12.5 Results of PBT and vPvB

assessment

Product Not classified as PBT or vPvB.

12.6 Other adverse effects: No ecological damage caused by this product.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information: Do not discharge into any place where its accumulation could be dangerous. Vent

to atmosphere in a well ventilated place.

Disposal methods: 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. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to

national, state, or local laws.

European Waste Codes

Container: 16 05 04*: Gases in pressure containers (including halons) containing

dangerous substances.

SECTION 14: Transport information

ADR

14.1 UN Number: UN 1073

14.2 UN Proper Shipping Name: OXYGEN, REFRIGERATED LIQUID

14.3 Transport Hazard Class(es)

Class: 2
Label(s): 2.2, 5.1
Hazard No. (ADR): 225
Tunnel restriction code: (C/E)

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14.4 Packing Group:

14.5 Environmental hazards: Not applicable

14.6 Special precautions for user: –

RID

14.1 UN Number: UN 1073

14.2 UN Proper Shipping Name OXYGEN, REFRIGERATED LIQUID

14.3 Transport Hazard Class(es)

Class: 2 Label(s): 2.2, 5.1

14.4 Packing Group:

14.5 Environmental hazards: Not applicable

14.6 Special precautions for user:

IMDG

14.1 UN Number: UN 1073

14.2 UN Proper Shipping Name: OXYGEN, REFRIGERATED LIQUID

14.3 Transport Hazard Class(es)

 Class:
 2.2

 Label(s):
 2.2, 5.1

 EmS No.:
 F-C, S-W

14.4 Packing Group:

14.5 Environmental hazards: Not applicable

14.6 Special precautions for user: –

IATA

14.1 UN Number: UN 1073

14.2 Proper Shipping Name: Oxygen, refrigerated liquid

14.3 Transport Hazard Class(es):

Class: 2.2 Label(s): –

14.4 Packing Group: –

14.5 Environmental hazards: Not applicable

14.6 Special precautions for user:

Other information

Passenger and cargo aircraft: Forbidden. Cargo aircraft only: Forbidden.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code: Not applicable



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Additional identification:

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 that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation.

SECTION 15: Regulatory information

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

EU Regulations

EU. Directive 2012/18/EU (SEVESO III) on major accident hazards involving dangerous substances, Annex 1, as amended.:

Chemical	CAS-No.	Lower-tier	Upper-tier	
		Requirements	Requirements	
Oxygen	7782-44-7	200 t	2.000 t	

Directive 98/24/EC on the protection of workers from the risks related to chemical agents at work as amended:

Chemical name	CAS-No.	Concentration	
Oxygen	7782-44-7	100%	

National Regulations

Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work Directive 2016/425/EEC on personal protective equipment Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.

This Safety Data Sheet has been produced to comply with Regulation (EU) 2015/830.

15.2 Chemical safety assessment: Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from

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



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SECTION 16: Other information

Revision Information: Not relevant.

Key literature references and sources for data:

Various sources of data have been used in the compilation of this SDS, they include

but are not exclusive to:

Agency for Toxic Substances and Diseases Registry (ATSDR)

(http://www.atsdr.cdc.gov/).

European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.

European Chemical Agency: Information on Registered Substances http://apps.echa.europa.eu/registered/registered-sub.aspx#search

European Industrial Gases Association (EIGA) Doc. 169 "Classification and Labelling

guide", as amended.

International Programme on Chemical Safety (http://www.inchem.org/) ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and

oxidizing ability for the selection of cylinder valve outlets.

Matheson Gas Data Book, 7th Edition.

National Institute for Standards and Technology (NIST) Standard Reference Database

Number 69.

The ESIS (European chemical Substances 5 Information System) platform of the former European Chemicals Bureau (ECB) ESIS (http://ecb.jrc.ec.europa.eu/esis/).

The European Chemical Industry Council (CEFIC) ERICards.

United States of America's National Library of Medicine's toxicology data network

TOXNET (http://toxnet.nlm.nih.gov/index.html)

Threshold Limit Values (TLV) from the American Conference of Governmental

Industrial Hygienists (ACGIH).

Substance specific information from suppliers.

Details given in this document are believed to be correct at the time of publication.

Wording of the H-statements in section 2 and 3

H270	May cause or intensify fire; oxidizer.
H280	Contains gas under pressure; may explode if heated.
H281	Contains refrigerated gas; may cause cryogenic burns or injury.

Training information: Users of breathing apparatus must be trained. Ensure operators understand the

hazard of oxygen enrichment. Ensure operators understand the hazards.

Classification according to Regulation (EC) No 1272/2008 as amended.

Ox. Gas 1, H270

Press. Gas Refrig. Liq. Gas, H281



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Other information: Before using this product in any new process or experiment, a thorough material

compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. 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.

Last revised date: 24.01.2023

Disclaimer: This information is provided without warranty. The information is believed to be

correct. This information should be used to make an independent determination of

the methods to safeguard workers and the environment.