

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Oxygen (refrigerated)

Date of issue: 15/08/2014

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Version: 2.1

SDS reference: RS-O2-097B

Danger



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

1.1. Product identifier

Trade name : Oxygen (refrigerated)-liquid
 SDS no : RS-O2-097B
 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
 Laboratory use
 Contact supplier for more information on uses
 Uses advised against : Consumer use

1.3. Details of the supplier of the safety data sheet

Company identification : Messer Tehnogas AD
 Banjicki put 62
 11090 Beograd Serbia
 +38 111 353 7210

1.4. Emergency telephone number

Emergency telephone number : +381(0) 11 360 8440 (24h)
 Emergency telephone number

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

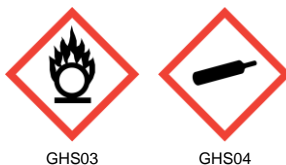
Physical hazards Ox. Gas 1 H270
 Press. Gas (Ref. Liq.) H281

Full text of H-statements see section 16.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



- Signal word (CLP) : Danger
- Hazard statements (CLP) : H270 - May cause or intensify fire; oxidizer
H281 - Contains refrigerated gas; may cause cryogenic burns or injury.
- Precautionary statements (CLP)
- Prevention : P220 - Keep away from combustible materials
P282 - Wear cold insulating gloves, face shield, eye protection
P244 - Keep valves and fittings free from oil and grease
 - 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

2.3. Other hazards

- : Contact with liquid may cause cold burns/frostbite
None

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
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 H-statements see section 16.

3.2. Mixtures : Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area
Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped
- 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
Refer to section 11

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

- : None

SECTION 5: Fire-fighting 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 : Supports combustion
Exposure to fire may cause containers to rupture/explode
- Hazardous combustion products : None

5.3. Advice for firefighters

- 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
If leaking do not spray water onto container. Water surrounding area (from protected position) to contain fire
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
Standard 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

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 product 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
 - Protect eyes, face and skin from liquid splashes
 - Keep equipment free from oil and grease
 - 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
- : Suck back of water into the container must be prevented
 - Open valve slowly to avoid pressure shock
 - Refer to supplier's container handling instructions
 - Do not allow backfeed into the container
 - Protect cylinders from physical damage; do not drag, roll, slide or drop
 - When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders
 - 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
 - If user experiences any difficulty operating cylinder valve discontinue use and contact supplier
 - 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 attempt to transfer gases from one cylinder/container to another
 - 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
 - Containers should be stored in the vertical position and properly secured to prevent them from falling over.

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
- Ensure exposure is below occupational exposure limits (where available)
- Avoid oxygen rich (>23,5%) atmospheres
- Gas detectors should be used when oxidising gases may be released
- Consider the use of a 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 - specifications

• 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
- Wear cold insulating gloves
- 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 : Liquid.
- 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
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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

: 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
May react violently with combustible materials
May react violently with reducing agents
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. No data available.

12.3. Bioaccumulative potential

Assessment : No ecological damage caused by this product.

12.4. Mobility in soil

Assessment : No data available.

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

Effect on the ozone layer : Can cause frost damage to vegetation.

Effect on global warming : None

Effect on 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
Ensure that the emission levels from local regulations or operating permits are not exceeded
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 (ADR/RID) : 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 (ADR/RID)

Class : 2
Classification code : 30
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)) :

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.

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

: Not applicable.

SECTION 15: Regulatory information

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

EU-Regulations

Restrictions on use : None
 Seveso Directive : 2012/18/EU (Seveso III) : Listed
 Covered

National regulations

National legislation : Ensure all national/local regulations are observed.
 Water hazard class (WGK) : nwg - Non-hazardous to water
 Kenn-Nr. : 743

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 2015/830.
 Training advice : Ensure operators understand the hazard of oxygen enrichment. Receptacle under pressure.
 Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation. Classification in accordance with the calculation methods of Regulation (EC) 1272/2008 CLP.

Full text of H- and EUH-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

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

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