Safety Data Sheet

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

Nitrous oxide

Reference number: AWO131

Date of issue: 10/30/2020 Revision date: 10/30/2020 Version: 1.1

Danger

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

1.1. Product identifier

SDS no : AWO131

Chemical description : Nitrous oxide

CAS No : 10024-97-2

EC no : 233-032-0

EC index no : ---

Registration-No. : Registration deadline not expired.

Chemical formula : N2O

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.
Chemical reaction / Synthesis.
Aerosol propellant.
Use for manufacture of electronic/photovoltaic components.
Contact supplier for more information on uses.

Uses advised against : Do not inhale product on purpose.

1.3. Details of the supplier of the safety data sheet

Company identification : Oy Woikoski Ab
Virransalmentie 2023
52920 Voikoski Finland
Tel. +358 15 7700 700
info@woikoski.fi
www.woikoski.fi

1.4. Emergency telephone number

Country	Organisation/Company	Address	Emergency number	Comment
	Myrkytystietokeskus Giftinformationscentralen, Poison Information Centre	P.O.B 790 (Tukholmankatu 17) HUS SF - 00029 Helsinki	+358 9 471 977	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Physical hazards Oxidising Gases, Category 1 H270

Gases under pressure : Liquefied gas	H280

2.2. Label elements

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

Hazard pictograms (CLP) :

GHS03 GHS04

Signal word (CLP) : Danger

Hazard statements (CLP) : H270 - _H_270_EU.
H280 - _H_280_EU.

Precautionary statements (CLP)

- Response : P370+P376 - _P_370-376_EU.
- Storage : P403 - _P_403_EU.

2.3. Other hazards

Asphyxiant in high concentrations.
Contact with liquid may cause cold burns/frostbite.

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Nitrous oxide	CAS No: 10024-97-2 EC no: 233-032-0 EC index no: --- Registration-No.: *2	100	Ox. Gas 1, H270 Liquefied gas, H280

Contains no other components or impurities which will influence the classification of the product.
**1: Listed in Annex IV / V REACH, exempted from registration.*
**3: Registration not required: Substance manufactured or imported < 1t/y.*

3.2. Mixture Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation : 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

In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation.
In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination.

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 : If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Nitric oxide/nitrogen dioxide.

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.
If possible, stop flow of product.
Use water spray or fog to knock down fire fumes if possible.

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.

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.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Eliminate ignition sources.
Ensure adequate air ventilation.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.2. Environmental precautions

Try to stop release.

6.3. Methods and material for containment and cleaning up

Ventilate area.

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 regularily) 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.
Avoid suck back of water, acid and alkalis.

Safe handling of the gas receptacle : 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.
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 toppling.
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

Nitrous oxide (10024-97-2)	
Finland - Occupational Exposure Limits	
HTP-value (8h) (mg/m3)	180 mg/m³

Nitrous oxide (10024-97-2)	
HTP-value (8h) (ppm)	100 ppm

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).
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:
PPE compliant to the recommended EN/ISO standards should be selected.

- Eye/face protection : Wear safety glasses with side shields.
  Wear safety glasses with side shields or goggles 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 : None necessary.

8.2.3. Environmental exposure controls

Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

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	:	Colourless.
Odour	:	Poor warning properties at high concentrations. Sweetish.
Odour threshold	:	Odour threshold is subjective and inadequate to warn for overexposure.
pH	:	Not applicable.
Melting point / Freezing point	:	-90.81 °C
Boiling point	:	-88.5 °C
Flash point	:	Not applicable for gases and gas-mixtures.
Evaporation rate	:	Not applicable for gases and gas-mixtures.
Flammability (solid, gas)	:	
Explosive limits	:	Non flammable.
Vapour pressure [20°C]	:	5080 kPa
Relative density, liquid (water=1)	:	1.2
Relative density, gas (air=1)	:	1.5
Water solubility	:	2.2 mg/l
Partition coefficient n-octanol/water (Log Kow)	:	Not applicable for inorganic gases.
Auto-ignition temperature	:	Not applicable.
Viscosity	:	Not applicable.
Explosive properties	:	Not applicable.

Oxidising properties	:	Oxidiser.

9.2. Other information

Molar mass	:	44 g/mol
Critical temperature [°C]	:	36.4 °C
- Coefficient of oxygen equivalency (Ci)	:	0.6
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

At temperatures over 575°C and at atmospheric pressure, nitrous oxide decomposes into nitrogen and oxygen.
Pressurized nitrous oxide can also decompose at temperatures equal or greater than 300°C.
In the presence of catalysts (e.g. halogen products, mercury, nickel, platinum) the rate of decomposition increases and decomposition can occur at even lower temperatures.
Nitrous oxide dissociation is irreversible and exothermic, leading to a considerable rise in pressure.
Stable under normal conditions.

10.3. Possibility of hazardous reactions

Violently oxidises organic material.

10.4. Conditions to avoid

Heat.

10.5. Incompatible materials

May react violently with combustible materials.
May react violently with reducing agents.
Keep equipment free from oil and grease.
For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

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 data available.
EC50 48h - Daphnia magna : No data available.
EC50 72h Algae : No data available.
LC50-96 h - fish : No data available.

12.2. Persistence and degradability

Assessment : Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Assessment : No data available.

12.4. Mobility in soil

Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution.

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 : None.
Global warming potential [CO2=1] : 298
Effect on the global warming : When discharged in large quantities may contribute to the greenhouse effect.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

May be vented to atmosphere in a well ventilated place.
Discharge to atmosphere in large quantities should be avoided.
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.

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

In accordance with ADR / RID / IMDG / IATA / ADN
UN-No. : 1070

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : NITROUS OXIDE

Transport by air (ICAO-TI / IATA-DGR) : NITROUS OXIDE

Transport by sea (IMDG) : NITROUS OXIDE

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 : 2O
Hazard identification number : 25
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) : P200
Transport by air (ICAO-TI / IATA-DGR)
Passenger and Cargo Aircraft : 200.
Cargo Aircraft only : 200.
Transport by sea (IMDG) : P200

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.
Other information, restriction and prohibition regulations	:	Ensure all national/local regulations are observed.
Seveso directive 96/82/EC	:	Covered.

National regulations

No additional information available

15.2. Chemical safety assessment

This product is either exempt from REACH, does not meet the minimum volume threshold for a CSR or the CSA has not yet been carried out.

SECTION 16: Other information

Indication of changes	:	Revised safety data sheet in accordance with commisssion regulation (EU) No 453/2010.
Training advice	:	The hazard of asphyxiation is often overlooked and must be stressed during operator training.
Further information	:	This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
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