



SAFETY DATA SHEET

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

Nitrous oxide

Issue Date:	16.01.2013	Version: 1.2	SDS No.: 000010021720
Revision Date:	23.11.2023		1/66
Last revised date :	11.04.2022		

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

1.1 Product identifier

Product name: Nitrous oxide

Trade name: Ilokaasu, Nitrous oxide Technical, Nitrous oxide 2.0 Chemical, Nitrous oxide 4.8 Scientific, HIQ Nitrous oxide 5.0, NIONTIX® 100%, lääkkeellinen kaasu, nesteytetty

Additional identification

Chemical name: Dinitrogen oxide
Chemical formula: N₂O
INDEX No. -
CAS-No. 10024-97-2
EC No. 233-032-0
REACH Registration No. 01-2119970538-25

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. Aerosol propellant. Calibration gas for analytical equipment Electronic industry Formulation of mixtures with gas in pressure receptacles. Refrigerant. Use as pressure gas in airbags Using gas as feedstock in chemical processes. Exempt from registration requirements. Use of gas to manufacture pharmaceutical products. Food Industry It is the responsibility of the end user to ensure that the product as supplied is suitable for its intended use. Medical applications.

Uses advised against Consumer use. Industrial or technical grade unsuitable for medical and/or food applications or inhalation.

1.3 Details of the supplier of the safety data sheet

Supplier

Oy Linde Gas Ab
 Itsehallintokuja 6
 FIN-02600 ESPOO

Telephone: +358 10 2421

E-mail: sds.ren@linde.com



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1.4 Emergency telephone number: Poison Information Center: open 24 hours a day, tel. 09 471 977

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

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

Physical Hazards

Oxidizing gases	Category 1	H270: May cause or intensify fire; oxidizer.
Gases under pressure	Liquefied gas	H280: Contains gas under pressure; may explode if heated.

Health Hazards

Specific Target Organ Toxicity - Single Exposure	Category 3	H336: May cause drowsiness or dizziness.
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2.2 Label Elements

Contains: Dinitrogen oxide



Signal Word: Danger

Hazard Statement(s): H270: May cause or intensify fire; oxidizer.
 H280: Contains gas under pressure; may explode if heated.
 H336: May cause drowsiness or dizziness.

Precautionary Statements
 General

None.

Prevention:

P220: Keep away from clothing and other combustible materials.
 P244: Keep valves and fittings free from oil and grease.
 P260: Do not breathe gas/vapors.



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Response: P304+P340+P315: IF INHALED: Remove person to fresh air and keep comfortable for breathing. 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.

Unknown toxicity - Health

Acute toxicity, inhalation, gas 0 %

Unknown toxicity - Environment

Acute hazards to the aquatic environment 100 %

Chronic hazards to the aquatic environment 100 %

2.3 Other hazards

Contact with evaporating liquid may cause frostbite or freezing of skin.

Endocrine disrupting properties-Toxicity

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Endocrine disrupting properties-Ecotoxicity

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.



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SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Dinitrogen oxide
INDEX No.:	-
CAS-No.:	10024-97-2
EC No.:	233-032-0
REACH Registration No.:	01-2119970538-25
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:	Ilokaasu, Nitrous oxide Technical, Nitrous oxide 2.0 Chemical, Nitrous oxide 4.8 Scientific, HIQ Nitrous oxide 5.0, NIONTIX® 100%, lääkkeellinen kaasu, nesteytetty

Chemical name	Chemical formula	Concentration	CAS-No.	EC No.	REACH Registration No.	M-Factor:	Notes
Dinitrogen oxide	N ₂ O	100%	10024-97-2	233-032-0	01-2119970538-25	-	#

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.

This substance has workplace exposure limit(s).

This substance is listed as SVHC.PBT: persistent, bioaccumulative and toxic substance.

vPvB: very persistent and very bioaccumulative substance.

SECTION 4: First aid measures

General: Move the exposed person to fresh air at once. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

4.1 Description of first aid measures

Inhalation: Move the exposed person to fresh air at once. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.



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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.

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

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: If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Nitrogen monoxide ; Nitrogen dioxide



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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.

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.

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 eg. 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.



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7.3 Specific end use(s): None.

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters

Occupational Exposure Limits

Chemical name	Type	Form of exposure	Exposure Limit Values	Source
Dinitrogen oxide	HTP 8H		100 ppm 180 mg/m ³	Finland. Workplace Exposure Limits, as amended (08 2007)

Please refer to the latest edition of the appropriate source text and consult an industrial hygienist or similar professional, or local agencies, for further information.

Biological Limit Values

No biological exposure limits noted for the ingredient(s).

DNEL-Values

Critical component	Type	Value	Remarks
Dinitrogen oxide	Workers - Inhalation, Systemic, long-term	183 mg/m ³	-

8.2 Exposure controls

Appropriate engineering controls:

Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Gas detectors should be used when quantities of oxidizing gases may be released. 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. Heat and impact sensitive - impact or heating can cause decomposition.



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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 388 Protective gloves against mechanical risks. Additional Information: Wear working gloves while handling containers

Body protection: No special precautions.

Other: Wear safety shoes while handling containers
Guideline: ISO 20345 Personal protective equipment - Safety footwear.

Respiratory Protection: Reference should be made to European Standard EN 689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances. When allowed by a risk assessment Respiratory Protective Equipment (RPE) may be used. The selection of the Respiratory Protective Device (RPD) must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected RPD. Self-contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres. Guideline: EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

Thermal hazards: No precautionary measures are necessary.

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.



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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:	Liquefied gas
Color:	Colorless
Odor:	Slightly sweetish odor
Odor Threshold:	Odor threshold is subjective and is inadequate to warn of over exposure.
Melting Point:	-131,46 °F/-90,81 °C Other, Key study
Boiling Point:	-127,3 °F/-88,5 °C (1.013 hPa) Experimental result, Key study
Flammability:	This product is not flammable.
Upper/lower limit on flammability or explosive limits	
Explosive limit - upper:	Not applicable
Explosive limit - lower:	Not applicable
Flash Point:	Not applicable to gases and gas mixtures.
Autoignition Temperature:	Not applicable.
Decomposition Temperature:	1067 °F/575 °C
pH:	Not applicable

Viscosity

Dynamic viscosity:	0,014 mPa.s (77 °F/25 °C)
Kinematic viscosity:	No data available.

Solubility(ies)

Solubility in Water:	1,5 g/l (59 °F/15 °C)
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	0,36
Dispersion Stability:	No data available.
Vapor pressure:	5.719,51 kPa (77 °F/25 °C)



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Relative density:	1,226 (-128 °F/-89 °C)
Density:	0,785 g/cm ³ (68,0 °F/20,0 °C) 0,7895 g/cm ³ (122,0 °F/50,0 °C)
Relative vapor density:	1,53 AIR=1
Particle characteristics:	Not applicable

9.2 Other information

Oxidizing properties:	Ci: 0,6 Oxidizing
Molecular weight:	44,01 g/mol (N ₂ O)
Critical Temp. (°C):	36,4 °C

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. At temperatures above 575°C and at atmospheric pressure, nitrous oxide decomposes into nitrogen and oxygen. Pressurised nitrous oxide can also decompose at temperatures equal to or greater than 300°C.
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:	Heat.
10.5 Incompatible Materials:	May react violently with combustible materials. May react violently with reducing agents. Combustible materials Catalyst. Reducing agents. Organic material. For material compatibility see latest version of ISO-11114.
10.6 Hazardous Decomposition Products:	Thermal decomposition yields toxic products which can be corrosive in the presence of moisture. Under normal conditions of storage and use, hazardous decomposition products should not be produced. If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Nitrogen Oxides



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SECTION 11: Toxicological information

General information: None.

Information on likely routes of exposure

Inhalation: Reduced fertility in healthcare personnel has been reported where they have been repeatedly exposed to levels of nitrous oxide above the specified occupational exposure limits in inadequately ventilated rooms. There is no documented evidence to confirm or exclude the existence of any causal connection between these cases and exposure to nitrous oxide. The substance may have effects on the bone marrow and peripheral nervous system.

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

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.

Acute toxicity - Inhalation Product Based on available data, the classification criteria are not met.

Dinitrogen oxide LC 50 (Mouse, 4 h): > 500000 ppm Remarks: Gas Experimental result, Key study

Repeated dose toxicity
Dinitrogen oxide NOAEL (Mouse(Female, Male), Inhalation, 14 Weeks): 50.000 ppm(m) Inhalation Experimental result, Key study

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.



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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 May cause drowsiness or dizziness.

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..

11.2 Information on other hazards

Endocrine disrupting properties

Product: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.;

Components:

Dinitrogen oxide The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.;

Other information

Product: No data available.



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SECTION 12: Ecological information

General information: Not applicable

12.1 Toxicity

Acute toxicity
Product

No ecological damage caused by this product.

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.

Global Warming Potential

Global warming potential: 298
Contains greenhouse gas(es). When discharged in large quantities may contribute to the greenhouse effect.

Dinitrogen oxide

[EU. Non-Fluorinated Substance GWPs \(Annex IV\), Regulation 517/2014/EU on fluorinated greenhouse gases](#)
- Global warming potential: 298

12.6 Endocrine disrupting properties:



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Product: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Components:
Dinitrogen oxide The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects:

Other hazards
Product: No data available.

Other effects:

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 hazardous substances.



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SECTION 14: Transport information

ADR

- 14.1 UN number or ID number: UN 1070
- 14.2 UN Proper Shipping Name: NITROUS OXIDE
- 14.3 Transport Hazard Class(es)
 - Class: 2
 - Label(s): 2.2, 5.1
 - Hazard No. (ADR): 25
 - Tunnel restriction code: (C/E)
- 14.4 Packing Group: -
 - Limited quantity: None.
 - Excepted quantity: None.
- 14.5 Environmental hazards: Not applicable
- 14.6 Special precautions for user: -

RID

- 14.1 UN number or ID number: UN 1070
- 14.2 UN Proper Shipping Name: NITROUS OXIDE
- 14.3 Transport Hazard Class(es)
 - Class: 2
 - Label(s): 2.2, 5.1
- 14.4 Packing Group: -
 - Limited quantity: None.
 - Excepted quantity: None.
- 14.5 Environmental hazards: Not applicable
- 14.6 Special precautions for user: -



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IMDG

- 14.1 UN number or ID number: UN 1070
- 14.2 UN Proper Shipping Name: NITROUS OXIDE
- 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: -
 - Limited quantity: None.
 - Excepted quantity: None.
- 14.5 Environmental hazards: Not applicable
- 14.6 Special precautions for user: -

IATA

- 14.1 UN number or ID number: UN 1070
- 14.2 Proper Shipping Name: Nitrous oxide
- 14.3 Transport Hazard Class(es):
 - Class: 2.2
 - Label(s): 2.2, 5.1
- 14.4 Packing Group: -
 - Limited quantity: None.
 - Excepted quantity: None.
- 14.5 Environmental hazards: Not applicable
- 14.6 Special precautions for user: -
 - Other information
 - Passenger and cargo aircraft: Allowed.
 - Cargo aircraft only: Allowed.

14.7 Maritime transport in bulk according to IMO instruments

Not applicable for product as supplied.



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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. REACH Annex XIV, Substances Subject to Authorization as amended: None present or none present in regulated quantities.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended: None present or none present in regulated quantities.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended: None present or none present in regulated quantities.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended: None present or none present in regulated quantities.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended: None present or none present in regulated quantities.

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

Classification	Lower-tier Requirements	Upper-tier Requirements
P4. Oxidizing gases	50 t	200 t

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



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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) 2020/878.

15.2 Chemical safety assessment: Chemical Safety Assessment has been carried out.

SECTION 16: Other information

Revision Information: Relevant changes are indicated using two vertical bold lines and red text, the text is also highlighted in grey.

Abbreviations and acronyms:

FN_OEL: Finland. Workplace Exposure Limits, as amended
 FN_OEL / HTP 8H: Time Weighted Average (TWA):

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC - Number - European Community number; ECx - Concentration associated with x% response; EIGA - European Industrial Gases Association; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - substance of very high concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United



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

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States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

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 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.
H336	May cause drowsiness or dizziness.

Training information:

Users of breathing apparatus must be trained. Ensure operators understand the hazards.



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

Ox. Gas 1, H270
 Press. Gas Liq. Gas, H280
 STOT SE 3, H336

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:

23.11.2023

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.



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Annex to the extended Safety Data Sheet (eSDS)

Content

Exposure Scenario 1.	Industrial use, Formulation & (re)packing of substances and mixtures
Exposure Scenario 2.	Industrial use, Laboratory activities
Exposure Scenario 3.	Industrial use, Manufacture of computer, electronic and optical products, electrical equipment
Exposure Scenario 4.	Industrial use, Manufacture of fine chemicals
Exposure Scenario 5.	Industrial use, Refrigerant.
Exposure Scenario 6.	Industrial use, Use as pressure gas in airbags
Exposure Scenario 7.	Professional use, Aerosol propellant.

Exposure Scenario 1.

Exposure scenario worker

1. Industrial use, Formulation & (re)packing of substances and mixtures

List of use descriptors	
Sector(s) of use	
Product categories [PC]:	

Name of contributing environmental scenario and corresponding ERC	Formulation of mixtures with gas in pressure receptacles, Transfilling gas or liquid.: ERC2: Formulation into mixture
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Contributing Scenarios	Formulation of mixtures with gas in pressure receptacles, Transfilling gas or liquid.: PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC8b: Transfer of substance or mixture (charging and discharging)
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	at dedicated facilities
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2.1. Contributing exposure scenario controlling environmental exposure for: Formulation of mixtures with gas in pressure receptacles, Transfilling gas or liquid.

Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product	See section 9 of the SDS.
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Viscosity:	
Kinematic viscosity:	No data available.
Dynamic viscosity:	0,014 mPa.s (77 °F/25 °C)

Amounts used

Regional use tonnage:	500 tonnes/yr
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Frequency and duration of use

Batch process:	220 Emission days
Continuous process:	not relevant

Environment factors not influenced by risk management

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Intermittent release	220	0,5 %	-	-	The exposure of aquatic, terrestrial, sediment and sewage treatment



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					microorganisms is considered to be negligible because the substance partitions primarily to air when released to the environment.
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Other relevant operational conditions	Release to air from process: 11,4 kg/day
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Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 8 of the safety data sheet (Environmental exposure controls).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Technical and organisational measures	Handle substance within a closed system.
Air	Air - minimum efficiency of 99,5 %
Soil	not relevant
Water	not relevant
Remarks:	Wastewater emission controls are not applicable as there is no direct release to wastewater. Soil emission controls are not applicable as there is no direct release to soil.

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

type:	Sewage treatment plant
Discharge rate:	not relevant
Treatment effectiveness:	not relevant
Sludge treatment technique:	not relevant
Measures to limit air emissions:	not relevant



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Remarks:	Not applicable as there is no release to wastewater.
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Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment:

Suitable waste treatment	Treatment effectiveness	Remarks
See section 13 of the SDS		External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment:

Suitable recovery operations:	Treatment effectiveness	Remarks
See section 13 of the SDS		External recovery and recycling of waste should comply with applicable local and/or national regulations.

Additional good practice advice beyond the REACH CSA

Use appropriate abatement systems to ensure that the emission levels defined by local regulations are not exceeded.
Ensure operatives are trained to minimise releases

2.2. Contributing exposure scenario controlling worker exposure for: Formulation of mixtures with gas in pressure receptacles, Transfilling gas or liquid.

Process Categories:	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities
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Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product:	See section 9 of the SDS.
Vapour pressure:	5719,51 kPa
Process temperature:	25 °C
Remarks	not relevant

Amounts used

Daily amount per site	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Hours per shift	< 8 h	220 days per year	PROC1, PROC8b
Occasional exposure, e.g. during maintenance and sampling, connecting/ disconnecting containers .			

Human factors not influenced by risk management

This information is not available.

Other given operational conditions affecting workers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use			5	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Transfer of substance or mixture (charging and discharging) at dedicated facilities



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Outdoor use				Transfer of substance or mixture (charging and discharging) at dedicated facilities
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Other relevant operational conditions:	. See section 8 of the SDS.
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Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 7 of the safety data sheet

Technical conditions and measures to control dispersion from source towards the worker

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).				Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).				Transfer of substance or mixture (charging and discharging) at dedicated facilities
Local exhaust ventilation				Transfer of substance or mixture (charging and discharging) at dedicated facilities

Organisational measures to prevent/limit releases, dispersion and exposure

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks



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				See section 7 of the SDS.
				Ensure operatives are trained to minimise exposures.
				Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed

Conditions and measures related to personal protection, hygiene and health evaluation

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See chapter 8 of the safety data sheet (Personal protection equipment)

Additional good practice advice beyond the REACH CSA

See section 7 of the SDS. Handle product within a closed system. Drain down and flush system prior to equipment break-in or maintenance. Apply a good standard of general or controlled ventilation when maintenance activities are carried out.

3. Exposure estimation

Environment:

Formulation of mixtures with gas in pressure receptacles, Transfilling gas or liquid.:

none

Health:

Formulation of mixtures with gas in pressure receptacles, Transfilling gas or liquid.:

none

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Check that RMMs and OCs are as described above or of equivalent efficiency Guidance is based on assumed operating



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conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see <http://www.ecetoc.org/tra>

Exposure Scenario 2.

Exposure scenario worker

1. Industrial use, Laboratory activities

List of use descriptors	
Sector(s) of use	SU24: Scientific research and development
Product categories [PC]:	PC21: Laboratory chemicals

Name of contributing environmental scenario and corresponding ERC	<u>Using gas alone or in mixtures for the calibration of analysis equipment:</u> ERC8a: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
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Contributing Scenarios	<u>Using gas alone or in mixtures for the calibration of analysis equipment:</u> PROC15: Use as laboratory reagent
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2.1. Contributing exposure scenario controlling environmental exposure for: Using gas alone or in mixtures for the calibration of analysis equipment.

Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product	See section 9 of the SDS.
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Viscosity:	
Kinematic viscosity:	No data available.



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Dynamic viscosity:	0,014 mPa.s (77 °F/25 °C)
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Amounts used

Regional use tonnage:	20 tonnes/yr
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Frequency and duration of use

Batch process:	220 Emission days
Continuous process:	not relevant

Environment factors not influenced by risk management

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Intermittent release	220	20 %	-	-	The exposure of aquatic, terrestrial, sediment and sewage treatment microorganisms is considered to be negligible because the substance partitions primarily to air when released to the environment.

Other relevant operational conditions	Release to air from process: 18,2 kg/day
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Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 8 of the safety data sheet (Environmental exposure controls).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil



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Technical and organisational measures	Handle substance within a closed system.
Air	Air - minimum efficiency of 80 %
Soil	not relevant
Water	not relevant
Remarks:	Wastewater emission controls are not applicable as there is no direct release to wastewater. Soil emission controls are not applicable as there is no direct release to soil.

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

type:	Sewage treatment plant
Discharge rate:	not relevant
Treatment effectiveness:	not relevant
Sludge treatment technique:	not relevant
Measures to limit air emissions:	not relevant
Remarks:	Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment:

Suitable waste treatment	Treatment effectiveness	Remarks
See section 13 of the SDS		External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment:

Suitable recovery operations:	Treatment effectiveness	Remarks



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See section 13 of the SDS	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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Additional good practice advice beyond the REACH CSA

Use appropriate abatement systems to ensure that the emission levels defined by local regulations are not exceeded. Ensure operatives are trained to minimise releases

2.2. Contributing exposure scenario controlling worker exposure for: Using gas alone or in mixtures for the calibration of analysis equipment.

Process Categories:	PROC15: Use as laboratory reagent
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Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product:	See section 9 of the SDS.
Vapour pressure:	5719,51 kPa
Process temperature:	25 °C
Remarks	not relevant

Amounts used

Daily amount per site	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Hours per shift	< 8 h	220 days per year	PROC15
Occasional exposure, e.g.	1 h	h/day	PROC15



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during maintenance and sampling, connecting/disconnecting containers .			
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Human factors not influenced by risk management

This information is not available.

Other given operational conditions affecting workers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use			5	Use as laboratory reagent
Outdoor use				Use as laboratory reagent

Other relevant operational conditions: . See section 8 of the SDS.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 7 of the safety data sheet

Technical conditions and measures to control dispersion from source towards the worker

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).				Use as laboratory reagent
Local exhaust ventilation				Use as laboratory reagent

Organisational measures to prevent/limit releases, dispersion and exposure



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inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See section 7 of the SDS.
				Ensure operatives are trained to minimise exposures.
				Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed

Conditions and measures related to personal protection, hygiene and health evaluation

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See chapter 8 of the safety data sheet (Personal protection equipment)

Additional good practice advice beyond the REACH CSA

See section 7 of the SDS. Handle product within a closed system. Drain down and flush system prior to equipment break-in or maintenance. Apply a good standard of general or controlled ventilation when maintenance activities are carried out.

3. Exposure estimation

Environment:

Using gas alone or in mixtures for the calibration of analysis equipment.:

none

Health:

Using gas alone or in mixtures for the calibration of analysis equipment.:

none



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4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Check that RMMs and OCs are as described above or of equivalent efficiency Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see <http://www.ecetoc.org/tra>

Exposure Scenario 3.

Exposure scenario worker

1. Industrial use, Manufacture of computer, electronic and optical products, electrical equipment

List of use descriptors	
Sector(s) of use	SU16: Manufacture of computer, electronic and optical products, electrical equipment
Product categories [PC]:	PC33: Semiconductors

Name of contributing environmental scenario and corresponding ERC	<u>Use for electronic component manufacture.:</u> ERC6a: Use of intermediate
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Contributing Scenarios	<u>Use for electronic component manufacture.:</u> PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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2.1. Contributing exposure scenario controlling environmental exposure for: Use for electronic component manufacture.

Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product	See section 9 of the SDS.
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Viscosity:	
Kinematic viscosity:	No data available.
Dynamic viscosity:	0,014 mPa.s (77 °F/25 °C)

Amounts used

Regional use tonnage:	250 tonnes/yr
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Frequency and duration of use

Batch process:	365 Emission days
Continuous process:	not relevant

Environment factors not influenced by risk management

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Intermittent release	365	0,5 %	-	-	The exposure of aquatic, terrestrial, sediment and sewage treatment microorganisms is considered to be negligible because the substance partitions primarily to air when released to the environment.

Other relevant operational conditions	Release to air from process: 3,42 kg/day
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Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 8 of the safety data sheet (Environmental exposure controls).



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Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Technical and organisational measures	Handle substance within a closed system.
Air	Air - minimum efficiency of 99,50 %
Soil	not relevant
Water	not relevant
Remarks:	Wastewater emission controls are not applicable as there is no direct release to wastewater. Soil emission controls are not applicable as there is no direct release to soil.

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

type:	Sewage treatment plant
Discharge rate:	not relevant
Treatment effectiveness:	not relevant
Sludge treatment technique:	not relevant
Measures to limit air emissions:	not relevant
Remarks:	Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment:

Suitable waste treatment	Treatment effectiveness	Remarks
See section 13 of the SDS		External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment:

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Suitable recovery operations:	Treatment effectiveness	Remarks
See section 13 of the SDS		External recovery and recycling of waste should comply with applicable local and/or national regulations.

Additional good practice advice beyond the REACH CSA

Use appropriate abatement systems to ensure that the emission levels defined by local regulations are not exceeded. Ensure operatives are trained to minimise releases

2.2. Contributing exposure scenario controlling worker exposure for: Use for electronic component manufacture.

Process Categories:	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
Physical form of the product:	See section 9 of the SDS.
Vapour pressure:	5719,51 kPa
Process temperature:	25 °C
Remarks	not relevant

Amounts used

Daily amount per site	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.
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Frequency and duration of use



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	Use duration:	Frequency of use:	Remarks
Hours per shift	< 8 h	220 days per year	PROC1
Occasional exposure, e.g. during maintenance and sampling, connecting/disconnecting containers .			

Human factors not influenced by risk management

This information is not available.

Other given operational conditions affecting workers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use			5	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Outdoor use				Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Other relevant operational conditions: . See section 8 of the SDS.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 7 of the safety data sheet

Technical conditions and measures to control dispersion from source towards the worker

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks



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

Nitrous oxide

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Revision Date:	23.11.2023		40/66
Last revised date :	11.04.2022		

Provide a good standard of controlled ventilation (5 to 10 air changes per hour).				Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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Organisational measures to prevent/limit releases, dispersion and exposure

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See section 7 of the SDS.
				Ensure operatives are trained to minimise exposures.
				Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed

Conditions and measures related to personal protection, hygiene and health evaluation

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See chapter 8 of the safety data sheet (Personal protection equipment)

Additional good practice advice beyond the REACH CSA

See section 7 of the SDS. Handle product within a closed system. Drain down and flush system prior to equipment break-in or maintenance. Apply a good standard of general or controlled ventilation when maintenance activities are carried out.

3. Exposure estimation



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

Nitrous oxide

Issue Date:	16.01.2013	Version: 1.2	SDS No.: 000010021720
Revision Date:	23.11.2023		41/66
Last revised date :	11.04.2022		

Environment:

Use for electronic component manufacture.:

none

Health:

Use for electronic component manufacture.:

none

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Check that RMMs and OCs are as described above or of equivalent efficiency Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see <http://www.ecetoc.org/tra>

Exposure Scenario 4.

Exposure scenario worker

1. Industrial use, Manufacture of fine chemicals

List of use descriptors	
Sector(s) of use	SU9: Manufacture of fine chemicals
Product categories [PC]:	PC21: Laboratory chemicals

Name of contributing environmental scenario and corresponding ERC	<u>Using gas as feedstock in chemical processes.:</u> ERC6a: Use of intermediate
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Contributing Scenarios	<u>Using gas as feedstock in chemical processes.:</u> PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities
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According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended

Nitrous oxide

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Revision Date:	23.11.2023		42/66
Last revised date :	11.04.2022		

2.1. Contributing exposure scenario controlling environmental exposure for: Using gas as feedstock in chemical processes.

Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product	See section 9 of the SDS.
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Viscosity:	
Kinematic viscosity:	No data available.
Dynamic viscosity:	0,014 mPa.s (77 °F/25 °C)

Amounts used

Regional use tonnage:	250 tonnes/yr
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Frequency and duration of use

Batch process:	365 Emission days
Continuous process:	not relevant

Environment factors not influenced by risk management

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Intermittent release	365	0,5 %	-	-	The exposure of aquatic, terrestrial, sediment and sewage treatment microorganisms is considered to be negligible because the substance partitions primarily to air when released to the



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Revision Date:	23.11.2023		43/66
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					environment.
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Other relevant operational conditions	Release to air from process: 3,42 kg/day
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Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 8 of the safety data sheet (Environmental exposure controls).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Technical and organisational measures	Handle substance within a closed system.
Air	Air - minimum efficiency of 99,50 %
Soil	not relevant
Water	not relevant
Remarks:	Soil emission controls are not applicable as there is no direct release to soil. Prevent discharge of undissolved substance to or recover from onsite wastewater.

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

type:	Sewage treatment plant
Discharge rate:	not relevant
Treatment effectiveness:	not relevant
Sludge treatment technique:	not relevant
Measures to limit air emissions:	not relevant
Remarks:	Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal



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Fraction of used amount transferred to external waste treatment:

Suitable waste treatment	Treatment effectiveness	Remarks
See section 13 of the SDS		External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment:

Suitable recovery operations:	Treatment effectiveness	Remarks
See section 13 of the SDS		External recovery and recycling of waste should comply with applicable local and/or national regulations.

Additional good practice advice beyond the REACH CSA

Use appropriate abatement systems to ensure that the emission levels defined by local regulations are not exceeded.
Ensure operatives are trained to minimise releases

2.2. Contributing exposure scenario controlling worker exposure for: Using gas as feedstock in chemical processes.

Process Categories:	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities
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Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
Physical form of the product:	See section 9 of the SDS.
Vapour pressure:	5719,51 kPa
Process temperature:	25 °C



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

Nitrous oxide

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Revision Date:	23.11.2023		45/66
Last revised date :	11.04.2022		

Remarks	not relevant
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Amounts used

Daily amount per site	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Hours per shift	< 8 h	220 days per year	PROC1, PROC8b
Occasional exposure, e.g. during maintenance and sampling, connecting/disconnecting containers .			

Human factors not influenced by risk management

This information is not available.

Other given operational conditions affecting workers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use			5	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Transfer of substance or mixture (charging and discharging) at dedicated facilities
Outdoor use				Transfer of substance or mixture (charging and discharging) at dedicated facilities

Other relevant operational conditions:	. See section 8 of the SDS.
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Nitrous oxide

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Last revised date :	11.04.2022		

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 7 of the safety data sheet

Technical conditions and measures to control dispersion from source towards the worker

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).				Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).				Transfer of substance or mixture (charging and discharging) at dedicated facilities
Local exhaust ventilation				Transfer of substance or mixture (charging and discharging) at dedicated facilities

Organisational measures to prevent/limit releases, dispersion and exposure

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See section 7 of the SDS.
				Ensure operatives are trained to minimise exposures.
				Ensure supervision is in place



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				to check that the RMMs are in place and are being used correctly and that the OCs are being followed
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Conditions and measures related to personal protection, hygiene and health evaluation

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See chapter 8 of the safety data sheet (Personal protection equipment)

Additional good practice advice beyond the REACH CSA

See section 7 of the SDS. Handle product within a closed system. Drain down and flush system prior to equipment break-in or maintenance. Apply a good standard of general or controlled ventilation when maintenance activities are carried out.

3. Exposure estimation

Environment:

Using gas as feedstock in chemical processes.:

none

Health:

Using gas as feedstock in chemical processes.:

none

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Check that RMMs and OCs are as described above or of equivalent efficiency Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see <http://www.ecetoc.org/tra>

Exposure Scenario 5.

Exposure scenario worker
SDS_FI - 000010021720



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

Nitrous oxide

Issue Date:	16.01.2013	Version: 1.2	SDS No.: 000010021720
Revision Date:	23.11.2023		48/66
Last revised date :	11.04.2022		

1. Industrial use, Refrigerant.

List of use descriptors	
Sector(s) of use	
Product categories [PC]:	PC16: Heat transfer fluids

Name of contributing environmental scenario and corresponding ERC	<u>Refilling of refrigeration equipment:</u> ERC9a: Widespread use of functional fluid (indoor) ERC9b: Widespread use of functional fluid (outdoor)
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Contributing Scenarios	<u>Refilling of refrigeration equipment:</u> PROC8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities
------------------------	---

2.1. Contributing exposure scenario controlling environmental exposure for: Refilling of refrigeration equipment

Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product	See section 9 of the SDS.
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Viscosity:	
Kinematic viscosity:	No data available.
Dynamic viscosity:	0,014 mPa.s (77 °F/25 °C)

Amounts used

Regional use tonnage:	20 tonnes/yr
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According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended

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Revision Date:	23.11.2023		49/66
Last revised date :	11.04.2022		

Frequency and duration of use

Batch process:	365 Emission days
Continuous process:	not relevant

Environment factors not influenced by risk management

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Intermittent release	365	10 %	-	-	The exposure of aquatic, terrestrial, sediment and sewage treatment microorganisms is considered to be negligible because the substance partitions primarily to air when released to the environment.

Other relevant operational conditions	Release to air from process: 100 kg/day
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Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 8 of the safety data sheet (Environmental exposure controls).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

Technical and organisational measures	Handle substance within a closed system.
Air	Air - minimum efficiency of 90 %
Soil	not relevant
Water	not relevant
Remarks:	Wastewater emission controls are not applicable as there is no direct



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	release to wastewater. Soil emission controls are not applicable as there is no direct release to soil.
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Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

type:	Sewage treatment plant
Discharge rate:	not relevant
Treatment effectiveness:	not relevant
Sludge treatment technique:	not relevant
Measures to limit air emissions:	not relevant
Remarks:	Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment:

Suitable waste treatment	Treatment effectiveness	Remarks
See section 13 of the SDS		External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment:

Suitable recovery operations:	Treatment effectiveness	Remarks
See section 13 of the SDS		External recovery and recycling of waste should comply with applicable local and/or national regulations.

Additional good practice advice beyond the REACH CSA



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Use appropriate abatement systems to ensure that the emission levels defined by local regulations are not exceeded.
Ensure operatives are trained to minimise releases

2.2. Contributing exposure scenario controlling worker exposure for: Refilling of refrigeration equipment

Process Categories:	PROC8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities
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Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product:	See section 9 of the SDS.
Vapour pressure:	5719,51 kPa
Process temperature:	25 °C
Remarks	not relevant

Amounts used

Daily amount per site	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Hours per shift	< 8 h	220 days per year	PROC8b
Occasional exposure, e.g. during maintenance and sampling, connecting/ disconnecting containers .			

Human factors not influenced by risk management



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Revision Date:	23.11.2023		52/66
Last revised date :	11.04.2022		

This information is not available.

Other given operational conditions affecting workers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use			5	Transfer of substance or mixture (charging and discharging) at dedicated facilities
Outdoor use				Transfer of substance or mixture (charging and discharging) at dedicated facilities

Other relevant operational conditions: . See section 8 of the SDS.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 7 of the safety data sheet

Technical conditions and measures to control dispersion from source towards the worker

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).				Transfer of substance or mixture (charging and discharging) at dedicated facilities
Local exhaust ventilation				Transfer of substance or mixture (charging and discharging) at dedicated facilities

Organisational measures to prevent/limit releases, dispersion and exposure



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

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inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See section 7 of the SDS.
				Ensure operatives are trained to minimise exposures.
				Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed

Conditions and measures related to personal protection, hygiene and health evaluation

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See chapter 8 of the safety data sheet (Personal protection equipment)

Additional good practice advice beyond the REACH CSA

See section 7 of the SDS. Handle product within a closed system. Drain down and flush system prior to equipment break-in or maintenance. Apply a good standard of general or controlled ventilation when maintenance activities are carried out.

3. Exposure estimation

Environment:

Refilling of refrigeration equipment:

none

Health:

Refilling of refrigeration equipment:

none

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES



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

Nitrous oxide

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Last revised date :	11.04.2022		

Check that RMMs and OCs are as described above or of equivalent efficiency Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see <http://www.ecetoc.org/tra>

Exposure Scenario 6.

Exposure scenario worker

1. Industrial use, Use as pressure gas in airbags

List of use descriptors	
Sector(s) of use	SU0: Other
Product categories [PC]:	PC0: Other

Name of contributing environmental scenario and corresponding ERC	<u>Use as pressure gas in airbags:</u> ERC6b: Use of reactive processing aid at industrial site (no inclusion into or onto article)
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Contributing Scenarios	<u>Use as pressure gas in airbags:</u> PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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2.1. Contributing exposure scenario controlling environmental exposure for: Use as pressure gas in airbags

Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product	See section 9 of the SDS.
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Viscosity:	
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According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended

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Revision Date:	23.11.2023		55/66
Last revised date :	11.04.2022		

Kinematic viscosity:	No data available.
Dynamic viscosity:	0,014 mPa.s (77 °F/25 °C)

Amounts used

Regional use tonnage:	180 tonnes/yr
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Frequency and duration of use

Batch process:	365 Emission days
Continuous process:	not relevant

Environment factors not influenced by risk management

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Intermittent release	365	15 %	-	-	The exposure of aquatic, terrestrial, sediment and sewage treatment microorganisms is considered to be negligible because the substance partitions primarily to air when released to the environment.

Other relevant operational conditions	Release to air from process: 74 kg/day
---------------------------------------	--

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 8 of the safety data sheet (Environmental exposure controls).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil



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Nitrous oxide

Issue Date:	16.01.2013	Version: 1.2	SDS No.: 000010021720
Revision Date:	23.11.2023		56/66
Last revised date :	11.04.2022		

Technical and organisational measures	Handle substance within a closed system.
Air	Air - minimum efficiency of 85 %
Soil	not relevant
Water	not relevant
Remarks:	Wastewater emission controls are not applicable as there is no direct release to wastewater. Soil emission controls are not applicable as there is no direct release to soil.

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

type:	Sewage treatment plant
Discharge rate:	not relevant
Treatment effectiveness:	not relevant
Sludge treatment technique:	not relevant
Measures to limit air emissions:	not relevant
Remarks:	Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment:

Suitable waste treatment	Treatment effectiveness	Remarks
See section 13 of the SDS		External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment:

Suitable recovery operations:	Treatment effectiveness	Remarks



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Revision Date:	23.11.2023		57/66
Last revised date :	11.04.2022		

See section 13 of the SDS	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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Additional good practice advice beyond the REACH CSA

Use appropriate abatement systems to ensure that the emission levels defined by local regulations are not exceeded. Ensure operatives are trained to minimise releases

2.2. Contributing exposure scenario controlling worker exposure for: Use as pressure gas in airbags

Process Categories:	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product:	See section 9 of the SDS.
Vapour pressure:	5719,51 kPa
Process temperature:	25 °C
Remarks	not relevant

Amounts used

Daily amount per site	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Hours per shift	< 8 h	220 days per year	PROC1



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Last revised date :	11.04.2022		

Occasional exposure, e.g. during maintenance and sampling, connecting/disconnecting containers .			
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Human factors not influenced by risk management

This information is not available.

Other given operational conditions affecting workers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use			5	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Other relevant operational conditions: . See section 8 of the SDS.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 7 of the safety data sheet

Technical conditions and measures to control dispersion from source towards the worker

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).				Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions

Organisational measures to prevent/limit releases, dispersion and exposure



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Nitrous oxide

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Revision Date:	23.11.2023		59/66
Last revised date :	11.04.2022		

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See section 7 of the SDS.
				Ensure operatives are trained to minimise exposures.
				Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed

Conditions and measures related to personal protection, hygiene and health evaluation

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See chapter 8 of the safety data sheet (Personal protection equipment)

Additional good practice advice beyond the REACH CSA

See section 7 of the SDS. Handle product within a closed system. Drain down and flush system prior to equipment break-in or maintenance. Apply a good standard of general or controlled ventilation when maintenance activities are carried out.

3. Exposure estimation

Environment:

Use as pressure gas in airbags:

none

Health:

Use as pressure gas in airbags:

none



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Nitrous oxide

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Last revised date :	11.04.2022		

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

Check that RMMs and OCs are as described above or of equivalent efficiency Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see <http://www.ecetoc.org/tra>

Exposure Scenario 7.

Exposure scenario worker

1. Professional use, Aerosol propellant.

List of use descriptors	
Sector(s) of use	SU0: Other
Product categories [PC]:	PC0: Other

Name of contributing environmental scenario and corresponding ERC	<u>Use as a propellant in household consumer aerosol products:</u> ERC2: Formulation into mixture
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Contributing Scenarios	<u>Use as a propellant in household consumer aerosol products:</u> PC0: Other
------------------------	--

2.1. Contributing exposure scenario controlling environmental exposure for: Use as a propellant in household consumer aerosol products

Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
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Physical form of the product	See section 9 of the SDS.
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Viscosity:	
Kinematic viscosity:	No data available.



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

Nitrous oxide

Issue Date:	16.01.2013	Version: 1.2	SDS No.: 000010021720
Revision Date:	23.11.2023		61/66
Last revised date :	11.04.2022		

Dynamic viscosity:	0,014 mPa.s (77 °F/25 °C)
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Amounts used

Regional use tonnage:	20 tonnes/yr
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Frequency and duration of use

Batch process:	365 Emission days
Continuous process:	not relevant

Environment factors not influenced by risk management

Other given operational conditions affecting environmental exposure

type	Emission days	Emission factors			Remarks
		Air	Soil	Water	
Intermittent release	365	100 %	-	-	The exposure of aquatic, terrestrial, sediment and sewage treatment microorganisms is considered to be negligible because the substance partitions primarily to air when released to the environment.

Other relevant operational conditions	Release to air from process: 54,8 kg/day
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Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 8 of the safety data sheet (Environmental exposure controls).

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil



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Technical and organisational measures	not relevant
Air	not relevant
Soil	not relevant
Water	not relevant
Remarks:	Wastewater emission controls are not applicable as there is no direct release to wastewater. Soil emission controls are not applicable as there is no direct release to soil.

Organisational measures to prevent/limit release from site:

none

Conditions and measures related to sewage treatment plant

type:	Sewage treatment plant
Discharge rate:	not relevant
Treatment effectiveness:	not relevant
Sludge treatment technique:	not relevant
Measures to limit air emissions:	not relevant
Remarks:	Not applicable as there is no release to wastewater.

Conditions and measures related to external treatment of waste for disposal

Fraction of used amount transferred to external waste treatment:

Suitable waste treatment	Treatment effectiveness	Remarks
See section 13 of the SDS		External treatment and disposal of waste should comply with applicable local and/or national regulations.

Conditions and measures related to external recovery of waste

Fraction of used amount transferred to external waste treatment:

Suitable recovery operations:	Treatment effectiveness	Remarks



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See section 13 of the SDS	External recovery and recycling of waste should comply with applicable local and/or national regulations.
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Additional good practice advice beyond the REACH CSA

Use appropriate abatement systems to ensure that the emission levels defined by local regulations are not exceeded. Ensure operatives are trained to minimise releases

2.2. Contributing exposure scenario controlling worker exposure for: Use as a propellant in household consumer aerosol products

Process Categories:	PC0: Other
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Product characteristics

Concentration of the substance in a mixture:	Covers percentage substance in the product up to 100 %.
Physical form of the product:	See section 9 of the SDS.
Vapour pressure:	5719,51 kPa
Process temperature:	25 °C
Remarks	not relevant

Amounts used

Daily amount per site	The actual tonnage handled per shift is not considered to influence the exposure as such for this scenario. Instead, the combination of the scale of operation (industrial vs. professional) and level of containment/automation (as reflected in the PROCs and technical conditions) is the main determinant of the process-intrinsic emission potential.
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Frequency and duration of use

	Use duration:	Frequency of use:	Remarks
Hours per shift	< 8 h	220 days per year	PROC15
Occasional exposure, e.g.	1 h	h/day	PROC15



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during maintenance and sampling, connecting/ disconnecting containers .			
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Human factors not influenced by risk management

This information is not available.

Other given operational conditions affecting workers exposure

Area of use	Room size:	Temperature:	Ventilation rate	Remarks
Indoor use			10	Use as laboratory reagent

Other relevant operational conditions: . See section 8 of the SDS.

Risk management measures (RMM)

Technical conditions and measures at process level (source) to prevent release

See chapter 7 of the safety data sheet

Technical conditions and measures to control dispersion from source towards the worker

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
Provide a good standard of controlled ventilation (5 to 10 air changes per hour).				Use as laboratory reagent
Local exhaust ventilation				Use as laboratory reagent

Organisational measures to prevent/limit releases, dispersion and exposure



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inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See section 7 of the SDS.
				Ensure operatives are trained to minimise exposures.
				Ensure supervision is in place to check that the RMMs are in place and are being used correctly and that the OCs are being followed

Conditions and measures related to personal protection, hygiene and health evaluation

inhalation exposure	dermal exposure	eye exposure	oral exposure	Remarks
				See chapter 8 of the safety data sheet (Personal protection equipment)

Additional good practice advice beyond the REACH CSA

See section 7 of the SDS. Handle product within a closed system. Drain down and flush system prior to equipment break-in or maintenance. Apply a good standard of general or controlled ventilation when maintenance activities are carried out.

3. Exposure estimation

Environment:

Use as a propellant in household consumer aerosol products:

none

Health:

Use as a propellant in household consumer aerosol products:

none

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES



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Check that RMMs and OCs are as described above or of equivalent efficiency Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. For scaling see <http://www.ecetoc.org/tra>