SAFETY DATA SHEETS

This SDS packet was issued with item:

078948416

N/A

SAFETY DATA SHEET

Nitrous Oxide

Section 1. Identification

GHS product identifier : Nitrous Oxide

Chemical name : Nitrous Oxide

Other means of identification : Nitrogen oxide; Nitrous oxide; Laughing gas; Hyponitrous acid anhydride; Dinitrogen monoxide; nitrous oxide, E 942; R744A; NITROGEN OXIDE (N2O); FACTITIOUS AIR; Nitrogen monoxide; Hyponitrous oxide

Product type : Gas.

Product use : Synthetic/Analytical chemistry.

Synonym : Nitrogen oxide; Nitrous oxide; Laughing gas; Hyponitrous acid anhydride; Dinitrogen monoxide; nitrous oxide, E 942; R744A; NITROGEN OXIDE (N2O); FACTITIOUS AIR; Nitrogen monoxide; Hyponitrous oxide

SDS # : 001042

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : OXIDIZING GASES - Category 1
GASES UNDER PRESSURE - Liquefied gas
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : May cause or intensify fire; oxidizer.
Contains gas under pressure; may explode if heated.
May cause drowsiness or dizziness.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Open valve slowly. Use only with equipment cleaned for Oxygen service. Always keep container in upright position.

Prevention : Keep away from clothing and other combustible materials. Keep reduction valves, valves and fittings free from oil and grease. Use only outdoors or in a well-ventilated area. Avoid breathing gas.

Response : In case of fire: Stop leak if safe to do so. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor if you feel unwell.

Storage : Store locked up. Protect from sunlight. Store in a well-ventilated place. Keep container tightly closed.

Section 2. Hazards identification

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : Nitrous Oxide

Other means of identification : Nitrogen oxide; Nitrous oxide; Laughing gas; Hyponitrous acid anhydride; Dinitrogen monoxide; nitrous oxide, E 942; R744A; NITROGEN OXIDE (N2O); FACTITIOUS AIR; Nitrogen monoxide; Hyponitrous oxide

Product code : 001042

CAS number/other identifiers

CAS number : 10024-97-2

Ingredient name	%	CAS number
nitrous oxide	100	10024-97-2

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness.

Skin contact : No known significant effects or critical hazards.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : Can cause central nervous system (CNS) depression. As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Section 4. First aid measures

Eye contact : No specific data.

Inhalation : Adverse symptoms may include the following:, nausea or vomiting, headache, drowsiness/fatigue, dizziness/vertigo, unconsciousness

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. Oxidizing material. This material increases the risk of fire and may aid combustion. Contact with combustible material may cause fire. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
nitrogen oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Section 6. Accidental release measures

Small spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous. Keep away from clothing, incompatible materials and combustible materials. Keep reduction valves free from grease and oil.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Store locked up. Separate from reducing agents and combustible materials. Store away from grease and oil. Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
nitrous oxide	**ACGIH TLV (United States, 1/2021).** TWA: 90 mg/m³ 8 hours. TWA: 50 ppm 8 hours. **NIOSH REL (United States, 10/2020).** TWA: 46 mg/m³ 10 hours. TWA: 25 ppm 10 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Section 8. Exposure controls/personal protection

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Compressed gas.]

Color : Colorless.

Odor : Characteristic.

Odor threshold : Not available.

pH : Not applicable.

Melting point : -90.8°C (-131.4°F)

Boiling point : -88.5°C (-127.3°F)

Critical temperature : 36.55°C (97.8°F)

Flash point : [Product does not sustain combustion.]

Evaporation rate : Not available.

Flammability (solid, gas) : Extremely flammable in the presence of the following materials or conditions: reducing materials and combustible materials.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : 745 (psig)

Vapor density : 1.53 (Air = 1) Liquid Density@BP: 76.8 lb/ft3 (1230 kg/m3)

Specific Volume (ft^3/lb) : 8.6957

Gas Density (lb/ft^3) : 0.115

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : 1.2 g/l

Partition coefficient: n-octanol/water : 0.36

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Flow time (ISO 2431) : Not available.

Molecular weight : 44.01 g/mole

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Hazardous reactions or instability may occur under certain conditions of storage or use.
Conditions may include the following:
contact with combustible materials
Reactions may include the following:
risk of causing fire

Conditions to avoid : No specific data.

Incompatible materials : Highly reactive or incompatible with the following materials:
combustible materials
reducing materials
grease
oil

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

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
nitrous oxide	-	3	-

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
nitrous oxide	Category 3	-	Narcotic effects

Section 11. Toxicological information

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness.

Skin contact : No known significant effects or critical hazards.

Ingestion : Can cause central nervous system (CNS) depression. As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : Adverse symptoms may include the following:, nausea or vomiting, headache, drowsiness/fatigue, dizziness/vertigo, unconsciousness

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
nitrous oxide	0.36	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty pressure vessels should be returned to the supplier. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1070	UN1070	UN1070	UN1070	UN1070
UN proper shipping name	NITROUS OXIDE	NITROUS OXIDE	NITROUS OXIDE	NITROUS OXIDE	NITROUS OXIDE
Transport hazard class(es)	2.2 (5.1) 	2.2 (5.1) 	2.2 (5.1) 	2.2 (5.1) 	2.2 (5.1) 
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Additional information

DOT Classification : **Limited quantity** Yes.
Quantity limitation Passenger aircraft/rail: 75 kg. Cargo aircraft: 150 kg.

Section 14. Transport information

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2), 2.23-2.25 (Class 5).
Explosive Limit and Limited Quantity Index 0
ERAP Index 3000
Passenger Carrying Vessel Index 450
Passenger Carrying Road or Rail Index 75

IATA : **Quantity limitation** Passenger and Cargo Aircraft: 75 kg. Cargo Aircraft Only: 150 kg.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

California Prop. 65

⚠ **WARNING**: This product can expose you to Nitrous oxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Ingredient name	No significant risk level	Maximum acceptable dosage level
Nitrous oxide	-	-

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Section 15. Regulatory information

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

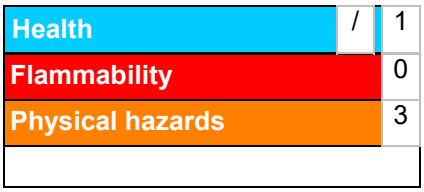
Not listed.

Inventory list

Australia	:	This material is listed or exempted.
Canada	:	This material is listed or exempted.
China	:	This material is listed or exempted.
Europe	:	This material is listed or exempted.
Japan	:	**Japan inventory (CSCL)**: This material is listed or exempted. **Japan inventory (ISHL)**: Not determined.
New Zealand	:	This material is listed or exempted.
Philippines	:	This material is listed or exempted.
Republic of Korea	:	This material is listed or exempted.
Taiwan	:	This material is listed or exempted.
Thailand	:	This material is listed or exempted.
Turkey	:	Not determined.
United States	:	This material is active or exempted.
Viet Nam	:	This material is listed or exempted.

Section 16. Other information

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

National Fire Protection Association (U.S.A.)

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Section 16. Other information

Procedure used to derive the classification

Classification	Justification
OXIDIZING GASES - Category 1 GASES UNDER PRESSURE - Liquefied gas SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3	Expert judgment Expert judgment Expert judgment

History

Date of printing : 3/3/2022

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Version : 1.03

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Trade name: Precision Calibration Gas Mixture

1 Identification

Product Identifier

Trade name: Precision Calibration Gas Mixture

Product Number: 000-2730

Relevant identified uses of the substance or mixture and uses advised against:
Used for calibration of gas measuring devices. Not suitable for human consumption.

Product Description: Calibration gas mixture consisting of Nitrous Oxide.

Details of the Supplier of the Safety Data Sheet:

Manufacturer/Supplier:
CryoConcepts LP
205 Webster St.
Bethlehem, PA 18015

TELEPHONE NUMBER: (855)-355-2796 (CRYO)
Emergency telephone number:
Inside the US: 1-855-355-2796
Outside the US: 1-352-323-3500

2 Hazard(s) Identification

Classification of the substance or mixture:

GHS03 Flame over circle

Oxid. Gas 1 H270 May cause or intensify fire; Oxidizer.

GHS04 Gas Cylinder

Press. Gas H280 Contains gas under pressure; may explode if heated.

GHS07

STOT SE 3 H336 May cause drowsiness or dizziness.

Simple Asphyxiant May displace oxygen and cause rapid suffocation.

Label elements

GHS label elements:
The substance is classified and labeled according to the Globally Harmonized System (GHS).

CryoConcepts
THE CRYO EXPERTS

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Trade name: Precision Calibration Gas Mixture

Hazard pictograms:

Signal word: Danger

Hazard-determining components of labeling:
Nitrous Oxide

Hazard statements:
May cause or intensify fire; oxidizer.
Contains gas under pressure; may explode if heated.
May cause drowsiness or dizziness.
May displace oxygen and cause rapid suffocation.

Precautionary statements:
Keep/Store away from clothing/combustible materials.
Avoid breathing dust/fume/gas/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Keep valves and fittings free from oil and grease.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER/doctor if you feel unwell.
In case of fire: Stop leak if safe to do so.
Store locked up.
Protect from sunlight. Store in a well-ventilated place.
Store in a well-ventilated place. Keep container tightly closed.
Dispose of contents/container in accordance with local/regional/national/international regulations.

Classification system:

NFPA ratings (scale 0-4)

Health = 2
Fire = 0
Reactivity = 0

The substance possesses oxidizing properties.

Health = 1
Fire = 0
Reactivity = 3

Hazard(s) not otherwise classified (HNOC):

3 Composition/ Information on Ingredients

Chemical characterization: Mixtures

Description: Mixture of substances listed below with non-hazardous additions.

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Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Trade name: Precision Calibration Gas Mixture

Dangerous Components:		
CAS: 10024-97-2 RTECS: QX 1350000	Nitrous Oxide  Oxid. Gas 2, H270;  Press. Gas, H280;  STOT SE 3, H336; Simple Asphyxiant	99.5-99.999%

4 First-Aid Measures

Description of first aid measures:

After inhalation:
Generally, the product does not irritate with inhalation.
Supply fresh air. If required, provide artificial respiration. Consult doctor if symptoms persist.
In case of unconsciousness, place patient stably in side position for transportation.

After skin contact:
In cases of contact with liquefied material, frostbite may occur. Immerse frostbite in cool-warm water and seek medical attention.
Wash with soap and water.
If skin irritation occurs, consult a doctor.

After eye contact:
Not anticipated under normal use.
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

After swallowing:
Not a normal route of entry.
If swallowed and symptoms occur, consult a doctor.

Information for doctor:
Most important symptoms and effects, both acute and delayed: No further relevant information available.
Indication of any immediate medical attention and special treatment needed:
No further relevant information available.

5 Fire-Fighting Measures

Extinguishing media:

Suitable extinguishing agents:
Use fire-fighting measures that suit the environment.
Use water spray to cool fire-exposed containers.

Special hazards arising from the substance or mixture:
Closed containers may explode when exposed to extreme heat.
If incinerated, product will release the following toxic product will release the following toxic fumes: Oxides of Nitrogen (NOx)

CryoConcepts
THE CRYO EXPERTS

Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Trade name: Precision Calibration Gas Mixture

Advice for firefighters
This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.
This gas mixture acts as an oxidizer and may intensify any fires. Use caution.

Protective equipment:
As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent) and full protective gear to prevent contact with skin and eyes.

6 Accidental Release Measures

Personal precautions, protective equipment and emergency procedures:
Treat any fumes as toxic.
Keep away from ignition sources
Ensure adequate ventilation.
Keep people at a distance and stay upwind.
In a confined area, NIOSH approved respiratory protection may be required.

Environmental Precautions: Inform authorities in case of gas release.

Methods and material for containment and cleaning up:
Dispose of the collected material according to regulations.
Ensure adequate ventilation.
Dispose contaminated material as waste according to section 13.

Reference to other sections:
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and Storage

Handling

Precautions for safe handling:
Ensure good ventilation/exhaustion at the workplace.
Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms due to the potential for oxygen deficiency (simple asphyxiation). Do not attempt to adjust, repair or in any other way modify the cylinders containing this gas mixture. If there is a malfunction or another type of operational problem, contact nearest distributor immediately.

Information about protection against explosions and fires:
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C, i.e. electric lights. Do not pierce or burn, even after use.
Do not cur, grind or weld on container that contains or contained product.
Do not spray on a naked flame or any incandescent material.

Conditions for safe storage, including any incompatibilities:
Store away from strong oxidizing agents and strong reducing agents.

Storage

Requirements to be met by storerooms and receptacles.
Store in a cool location.

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Cylinders should be firmly secured to prevent falling or being knocked over. Cylinders must be protected from the environment, and preferably kept at room temperature. Cylinders should be stored in a dry, well-ventilated areas, away from sources of heat, ignition, and direct sunlight. Protect cylinders against physical damage. Full and empty cylinders should be segregated. Use a “first-on, first-out” inventory system to prevent full containers from being stored for long periods of time.

Information about storage in one common storage facility: Not required.

Further information about storage conditions: Store in cool, dry conditions in well-sealed receptacles.

Specific end use(s): No further relevant information available.

8 Exposure Controls/Personal Protection

Additional information about design of technical systems: No further data, see section 7.

Control parameters:
All ventilation should be designed in accordance with OSHA standard (29 CFR 1910.94). Use mechanical (general) ventilation for storage areas. Use appropriate ventilation as required to keep Exposure Limits in Air below TLV & PEL limits.

Components with occupational exposure limits	
10024-97-2 Nitrous Oxide	
REV	Long-term value: 46 mg/m^3, 25ppm over the time exposed;exp. to waste anesthetic gas
TLV	Long-term value: 90mg/m^3, 50ppm

Additional information: The lists were valid during the creation of this SDS were used as basis.

Exposure controls:

Personal protective equipment:

General protective and hygienic measures:
Wash hands before breaks and at the end of work.
Keep away from foodstuffs, beverages and feed.
Avoid contact with the eyes and skin.

Breathing equipment:
Not required.
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure, use respiratory protective device that is independent of circulating air.

Protection of hands:


Protective gloves

Due to missing tests, no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Select glove material based on penetration times, rates of diffusion and degradation.

Material of gloves:
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several

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substances, the resistance of the glove material cannot be calculated in advance and has therefore to be checked prior to the application.

Penetration time of glove material:

The exact break-through time has to be determined and observed by the manufacturer of the protective gloves.

Eye protection:

Tightly sealed goggles

Body protection:

Protective work clothing

9 Physical and Chemical Properties

Information on basic physical and chemical properties

General Information

Appearance:

Form:	Gaseous
Color:	Clear, colorless
Odor:	Odorless
Odor threshold:	Not determined.
pH value:	Acidic Not determined.
Change in condition	
Melting point/Melting range:	Not determined.
Boiling point/Boiling range:	Not determined.
Flash point:	None
Flammability (solid, gaseous):	Contact with combustible material may cause fire.
Ignition temperature:	Not determined.
Decomposition temperature:	Not determined.
Auto igniting:	Product is not self-igniting.
Danger of explosion:	Not determined.
Explosion limits:	
Lower:	Not determined.
Upper:	Not determined.
Vapor pressure:	Not determined.
Density:	
Relative density:	Not determined.
Vapor density:	Not determined.
Evaporation rate:	Not applicable.

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Solubility in / Miscibility with:
Water: Not miscible or difficult to mix.

Partition coefficient (n-octanol/water): Not determined.

Viscosity:
Dynamic: Not determined.
Kinematic: Not determined.

Other information: No further relevant information available.

10 Stability and Reactivity

Reactivity: No further relevant information available.

Chemical stability: Stable under normal conditions.

Thermal decomposition / conditions to be avoided: No decomposition is used according to specifications.

Possibility of hazardous reactions: No dangerous reactions known.

Conditions to avoid: No further relevant information available.

Incompatible materials: Strong oxidizing agents and strong reducing agents.

Hazardous decomposition products: Nitrogen Oxides (NO_x).

11 Toxicological Information

Information on toxicological effects: The toxicity of this product is unknown.

Acute toxicity:

LD/LC50 values that are relevant for classification:		
10024-97-2 Nitrous Oxide		
Inhalative	LC50/4 h	1.06 mg/l (rat)

Primary irritant effect:
On the skin: No irritating effect.
On the eye: No irritating effect.
Additional toxicological information:

Carcinogenic categories:

IARC (International Agency for Research on Cancer):
Group 1 – Carcinogenic to humans
Group 2A – Probably carcinogenic to humans
Group 2B – Possibly carcinogenic to humans
Group 3 – Not classifiable as to its carcinogenicity to humans
Group 4 – Probably not carcinogenic to humans
None of the ingredients are listed.

NTP (National Toxicology Program):
None of the ingredients are listed.

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OSHA-Ca (Occupational Safety & Health Administration):
None of the ingredients are listed.

12 Ecological Information

Toxicity: The hazards for the aquatic environment are unknown.

Aquatic toxicity: No further relevant information available.

Persistence and degradability: No further relevant information available.

Behavior in environmental system:

Bioaccumulative potential: No further relevant information available.

Mobility in soil: No further relevant information available.

Additional ecological information:

General notes:
Do not allow undiluted product or product that has not been neutralized to reach ground water, water course or sewage system.

Results of PBT and vPvB assessment:
PBT: Not applicable.
vPvB: Not applicable.

Other adverse effects: No further relevant information available.

13 Disposal Considerations

Waste treatment methods:

Recommendation:
Observe all federal, state and local environmental regulations when disposing of this material.
Release all residual gas pressure in a well-ventilated area. Verify the cylinder is completely empty (0 PSIG).
Remove or cover any hazard labels. Return empty cylinder for recycling.
NOTE: Check with the local waste authority before placing any gas cylinder into waste container for pickup.
CryoConcepts encourages the consumer to return all cylinders.

Waste disposal key:
The U.S. EPA has not published waste disposal numbers for this product's components.

Uncleaned packagings:
Recommendation: Return cylinder and unused product to supplier.

14 Transport Information

UN-Number:	UN1070
DOT, ADR, IMDG, IATA	
UN proper shipping name:	
DOT, IATA:	Nitrous oxide
ADR	UN1070 Nitrous oxide
IMDG	NITROUS OXIDE

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Transport hazard class(es):

DOT

Class:	2 Gases
Label:	2.2/5.1

ADR:

Class:	2 2O Gases
Label:	2.2+5.1

IMDG:

Class:	2 Gases
Label:	2.2/5.1

IATA:

Class:	2 Gases
Label:	2.2 (5.1)
Packing group:	
DOT, ADR, IMDG, IATA	Non-Regulated Material
Environmental hazards:	Not applicable.
Special precautions for user:	Warning: Gases
Danger code (Kemler):	25
EMS Number:	F-C, S-W
Stowage Category	A
Stowage Code	SW2 Clear of living quarters
Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:	Not applicable.

Transport/Additional Information:

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DOT
Quantity limitations: On passenger aircraft/rail: 75 kg
On cargo aircraft only: 150 kg

ADR
Excepted quantities (EQ): Code: E10
Not permitted as Excepted Quantity

IMDG
Limited quantities (LQ): 0
Excepted quantities (EQ): Code: E0
Not permitted as Excepted Quantity

UN "Model Regulation": UN 1070 NITROUS OXIDE, 2.2 (5.1)

15 Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture:
SARA (Superfund Amendments and Reauthorization)

Section 355 (extremely hazardous substances):
None of the ingredients are listed.

Section 313 (Specific toxic chemical listings):
None of the ingredients are listed.

TSCA (Toxic Substances Control Act):
All ingredients are listed.

California Proposition 65:
Chemicals known to cause cancer:
None of the ingredients are listed.
Chemicals known to cause reproductive toxicity for females:
All ingredients are listed.
Chemicals known to cause reproductive toxicity for males:
None of the ingredients are listed.
Chemicals known to cause developmental toxicity:
All ingredients are listed.

Carcinogenic categories:
EPA (Environmental Protection Agency):
None of the ingredients are listed.

TLV (Threshold Limit Value established by ACGIH):		
10024-97-2	Nitrous Oxide	A4

NIOSH-Ca (National Institute for Occupational Safety and Health):
None of the ingredients are listed.

GHS label elements
The substance is classified and labeled according to the Globally Harmonized System (GHS).

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Hazard pictograms:

Signal Word: Danger

Hazard-determining components of labeling:
Nitrous Oxide

Hazard statements:
May cause or intensify fire; oxidizer.
Contains gas under pressure; may explode if heated.
May cause drowsiness or dizziness.
May displace oxygen and cause rapid suffocation.

Precautionary statements:
Keep/Store away from clothing/combustible materials.
Avoid breathing dust/fume/gas/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Keep valves and fittings free from oil and grease.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER/doctor if you feel unwell.
In case of fire: Stop leak if safe to do so.
Store locked up.
Protect from sunlight. Store in a well-ventilated place.
Store in a well-ventilated place. Keep container tightly closed.
Dispose of contents/container in accordance with local/regional/national/international regulations.

National regulations:
This product is subject to be classified according with the latest version of the regulations on hazardous substances.

State Right to Know:		
CAS: 10024-97-2 RTECS: QX 1350000	Nitrous Oxide Oxid. Gas 2, H270; Press. Gas, H280; STOT SE 3, H336; Simple Asphyxiant	99.5-99.999%
All ingredients are listed.		

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other Information

Relevant phrases:
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Abbreviations and acronyms:
ADR: The European Agreement concerning the International Carriage of Dangerous Goods by Road
ADN: The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health Administration
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Oxid. Gas 1: Oxidising Gases, Hazard Category 1
Press. Gas: Gases under pressure: Liquefied gas
STOT SE 3: Specific target organ toxicity – Single exposure, Hazard Category 3