

# Material Safety Data Sheet



Nitrous Oxide

## Section 1. Chemical product and company identification

**Product Name** : Nitrous Oxide  
**Supplier** : AIRGAS INC., on behalf of its subsidiaries  
259 North Radnor-Chester Road  
Suite 100  
Radnor, PA 19087-5283  
1-610-687-5253  
**Product use** : Synthetic/Analytical chemistry.  
**MSDS#** : 001042  
**Date of Preparation/Revision** : **4/24/2007.**  
**In case of emergency** : 1-866-734-3438

## Section 2. Hazards identification

**Physical state** : Gas. (COLORLESS LIQUEFIED COMPRESSED GAS. ODORLESS OR WITH A MILD SWEET ODOR. [INHALATION ANESTHETIC] [NOTE: SHIPPED AS A LIQUIFIED COMPRESSED GAS])

**Emergency overview** : Warning!  
OXIDIZER.  
CONTENTS UNDER PRESSURE.  
CAUSES DAMAGE TO THE FOLLOWING ORGANS: REPRODUCTIVE SYSTEM, RESPIRATORY TRACT, CENTRAL NERVOUS SYSTEM.  
POSSIBLE CANCER HAZARD.  
MAY CAUSE CANCER BASED ON ANIMAL DATA.  
Contact with combustible material may cause fire.  
Do not puncture or incinerate container. Store in tightly closed container. Avoid contact with combustible materials. Risk of cancer depends on duration and level of exposure.  
Contact with rapidly expanding gases or liquids can cause frostbite.

**Routes of entry** : Inhalation

**Potential acute health effects**

**Eyes** : No known significant effects or critical hazards.  
**Skin** : No known significant effects or critical hazards.  
**Inhalation** : Acts as a simple asphyxiant.  
**Ingestion** : Ingestion is not a normal route of exposure for gases

**Potential chronic health effects** : **CARCINOGENIC EFFECTS** A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.  
**MUTAGENIC EFFECTS** Not available.  
**TERATOGENIC EFFECTS**: Not available.

**Medical conditions aggravated by overexposure** : Acute or chronic respiratory conditions may be aggravated by overexposure to this gas.  
See toxicological information (section 11)

## Section 3. Composition, Information on Ingredients

<u>Name</u>	<u>CAS number</u>	<u>% Volume</u>	<u>Exposure limits</u>
Nitrous Oxide	10024-97-2	100	<b>ACGIH TLV (United States, 1/2004). Notes: 1996 Adoption Refers to Appendix A -- Carcinogens.</b> TWA: 90 mg/m <sup>3</sup> 8 hour(s). Form: All forms TWA: 50 ppm 8 hour(s). Form: All forms <b>NIOSH REL (United States, 12/2001). Notes: TWA over the time exposed Note: REL for exposure to waste anesthetic gas.</b>

## Section 4. First aid measures

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

- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.
- Skin contact** : In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Inhalation** : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
- Ingestion** : Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if symptoms appear.

## Section 5. Fire fighting measures

**Flammability of the product** : Non-flammable.

**Fire fighting media and instructions** : Use an extinguishing agent suitable for surrounding fires.

If involved in fire, shut off flow immediately if it can be done without risk. Apply water from a safe distance to cool container and protect surrounding area.

This material increases the risk of fire and may aid combustion. Contact with combustible material may cause fire.

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

## Section 6. Accidental release measures

**Personal precautions** : Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Do not touch or walk through spilled material.

**Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

## Section 7. Handling and storage

**Handling** : Store in tightly closed container. Avoid contact with combustible materials. Do not puncture or incinerate container. High pressure gas. 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.

Never allow any unprotected part of the body to touch uninsulated pipes or vessels that contain cryogenic liquids. Prevent entrapment of liquid in closed systems or piping without pressure relief devices. Some materials may become brittle at low temperatures and will easily fracture.

**Storage** : Keep container tightly closed. Keep container in a cool, well-ventilated area. 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).

## Section 8. Exposure Controls, Personal Protection

- Engineering controls** : Use only with adequate ventilation. If user operations generate dust, fumes, vapor or mist, use process enclosures, local exhaust ventilation, or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Personal protection**
- Eyes** : 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 or dusts.  
When working with cryogenic liquids, wear a full face shield.
- Skin** : 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.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. 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.  
The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93
- Hands** : Chemical-resistant, impervious gloves or gauntlets complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.  
Insulated gloves suitable for low temperatures
- Personal protection in case of a large spill** : A self-contained breathing apparatus should be used to avoid inhalation of the product.
- Consult local authorities for acceptable exposure limits.**

## Section 9. Physical and chemical properties

- Molecular weight** : 44.02 g/mole
- Molecular formula** : N<sub>2</sub>O
- Boiling/condensation point** : -87.99°C (-126.4°F)
- Melting/freezing point** : -90.99°C (-131.8°F)
- Critical temperature** : 36.6°C (97.9°F)
- Vapor pressure** : 745 psig
- Vapor density** : 1.53 (Air = 1)
- Specific Volume (ft<sup>3</sup>/lb)** : 8.69565
- Gas Density (lb/ft<sup>3</sup>)** : 0.115

## Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.
- Incompatibility with various substances** : Extremely reactive or incompatible with reducing agents, combustible materials.

## Section 11. Toxicological information

- Chronic effects on humans** : **CARCINOGENIC EFFECTS** A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.  
Causes damage to the following organs: the reproductive system, upper respiratory tract, central nervous system (CNS).
- Other toxic effects on humans** : No specific information is available in our database regarding the other toxic effects of this material for humans.
- Specific effects**
- Carcinogenic effects** : May cause cancer based on animal data. Risk of cancer depends on duration and level of exposure.

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**Mutagenic effects** : No known significant effects or critical hazards.

**Reproduction toxicity** : No known significant effects or critical hazards.

## Section 12. Ecological information

**Products of degradation** : These products are nitrogen oxides (NO, NO<sub>2</sub>...).

**Toxicity of the products of biodegradation** : The product itself and its products of degradation are not toxic.

**Environmental fate** : Not available.





**Environmental hazards** : No known significant effects or critical hazards.



**Toxicity to the environment** : Not available.

## Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

## Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
<b>DOT Classification</b>	UN1070 UN2201	NITROUS OXIDE  Nitrous oxide, refrigerated liquid	2.2	Not applicable (gas).	 	<b>Limited quantity</b> Yes.  <b>Packaging instruction</b> <b>Passenger Aircraft</b> Quantity limitation: 75 kg  <b>Cargo Aircraft</b> Quantity limitation: 150 kg
<b>TDG Classification</b>	UN1070 UN2201	NITROUS OXIDE  Nitrous oxide, refrigerated liquid	2.2	Not applicable (gas).	 	<b>Explosive Limit and Limited Quantity Index</b> 0  <b>ERAP Index</b> 3000  <b>Passenger Carrying Ship Index</b> 450  <b>Passenger Carrying Road or Rail Index</b> 75

Nitrous Oxide						
<b>Mexico Classification</b>	UN1070	NITROUS OXIDE	2.2	Not applicable (gas).		-
	UN2201	Nitrous oxide, refrigerated liquid				

## Section 15. Regulatory information

### United States

- U.S. Federal regulations** : TSCA 8(b) inventory: nitrous oxide  
 SARA 302/304/311/312 extremely hazardous substances: No products were found.  
 SARA 302/304 emergency planning and notification: No products were found.  
 SARA 302/304/311/312 hazardous chemicals: nitrous oxide  
 SARA 311/312 MSDS distribution - chemical inventory - hazard identification: nitrous oxide: Fire hazard, Sudden Release of Pressure, Delayed (Chronic) Health Hazard  
 Clean Water Act (CWA) 307: No products were found.  
 Clean Water Act (CWA) 311: No products were found.  
 Clean air act (CAA) 112 accidental release prevention: No products were found.  
 Clean air act (CAA) 112 regulated flammable substances: No products were found.  
 Clean air act (CAA) 112 regulated toxic substances: No products were found.

- State regulations** : Pennsylvania RTK: nitrous oxide: (generic environmental hazard)  
 Massachusetts RTK: nitrous oxide  
 New Jersey: nitrous oxide

### Canada

- WHMIS (Canada)** : Class A: Compressed gas.  
 Class C: Oxidizing material.  
 Class D-2A: Material causing other toxic effects (VERY TOXIC).  
 CEPA DSL: nitrous oxide

## Section 16. Other information

### United States

- Label Requirements** : OXIDIZER.  
 CONTENTS UNDER PRESSURE.  
 CAUSES DAMAGE TO THE FOLLOWING ORGANS: REPRODUCTIVE SYSTEM, RESPIRATORY TRACT, CENTRAL NERVOUS SYSTEM.  
 POSSIBLE CANCER HAZARD.  
 MAY CAUSE CANCER BASED ON ANIMAL DATA.  
 CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE.

### Canada

- Label Requirements** : Class A: Compressed gas.  
 Class C: Oxidizing material.  
 Class D-2A: Material causing other toxic effects (VERY TOXIC).

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

Health	*	1
Fire hazard		0
Reactivity		0
Personal protection		C

#### liquid:

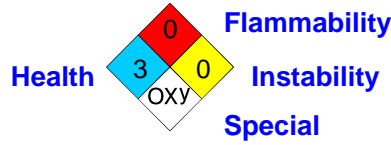
Health		3
Fire hazard		0
Reactivity		0
Personal protection		

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



liquid:



**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.