

Material Safety Data Sheet



Nonflammable Gas Mixture: Carbon Dioxide / Nitric Oxide / Nitrogen / Sulfur Dioxide

Section 1. Chemical product and company identification

Product Name : Nonflammable Gas Mixture: Carbon Dioxide / Nitric Oxide / Nitrogen / Sulfur Dioxide
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# : 002163
Date of Preparation/Revision : **4/11/2006.**
In case of emergency : 1-866-734-3438

Section 2. Hazards identification

Physical state : Gas.
Emergency overview : Danger!
MAY BE FATAL IF INHALED.
CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS.
CONTENTS UNDER PRESSURE.
CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS:
BLOOD, LUNGS, MUCOUS MEMBRANES, CARDIOVASCULAR SYSTEM,
RESPIRATORY TRACT, SKIN, CENTRAL NERVOUS SYSTEM, EYE, LENS OR
CORNEA, NOSE, SINUSES, THROAT.
POSSIBLE CANCER HAZARD
CONTAINS MATERIAL WHICH MAY CAUSE CANCER BASED ON ANIMAL DATA.
Do not get in eyes, on skin or clothing. Do not breathe gas. Do not puncture or
incinerate container. Keep container closed. Use only with adequate ventilation. Wash
thoroughly after handling. Risk of cancer depends on duration and level of exposure.
Contact with rapidly expanding gases can cause frostbite.
Routes of entry : Inhalation,Dermal,Eyes
Potential acute health effects
Eyes : Severely corrosive to the eyes.
Skin : Severely corrosive to the skin.
Inhalation : Very toxic by inhalation. Severely corrosive to the respiratory system.
Ingestion : Ingestion is not a normal route of exposure for gases
Potential chronic health effects : **CARCINOGENIC EFFECTS** Classified A4 (Not classifiable for human or animal.) by
ACGIH, 3 (Not classifiable for human.) by IARC [sulphur dioxide].
MUTAGENIC EFFECTS Not available.
TERATOGENIC EFFECTS: Not available.
Medical conditions aggravated by overexposure : Repeated exposure to a highly toxic material may produce general deterioration of health
by an accumulation in one or many human organs.
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>
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Nitrogen	7727-37-9	48 - 99	<p>ACGIH TLV (United States, 9/2004). STEL: 54000 mg/m³ 15 minute(s). Form: All forms STEL: 30000 ppm 15 minute(s). Form: All forms TWA: 9000 mg/m³ 8 hour(s). Form: All forms TWA: 5000 ppm 8 hour(s). Form: All forms NIOSH REL (United States, 6/2001). STEL: 54000 mg/m³ 15 minute(s). Form: All forms STEL: 30000 ppm 15 minute(s). Form: All forms TWA: 9000 mg/m³ 10 hour(s). Form: All forms TWA: 5000 ppm 10 hour(s). Form: All forms OSHA PEL (United States, 6/1993). TWA: 9000 mg/m³ 8 hour(s). Form: All forms TWA: 5000 ppm 8 hour(s). Form: All forms</p>
Carbon Dioxide	124-38-9	0.5 - 50	
Nitric Oxide	10102-43-9	0.0025 - 1	<p>ACGIH TLV (United States, 9/2004). Notes: Identifies substances identified in the BEI documentation for Methemoglobin inducers (for which methemoglobin is the principle toxicity) and organophosphorous cholinesterase inhibitors are part of this notation. TWA: 31 mg/m³ 8 hour(s). Form: All forms TWA: 25 ppm 8 hour(s). Form: All forms NIOSH REL (United States, 6/2001). TWA: 30 mg/m³ 10 hour(s). Form: All forms TWA: 25 ppm 10 hour(s). Form: All forms OSHA PEL (United States, 6/1993). TWA: 30 mg/m³ 8 hour(s). Form: All forms TWA: 25 ppm 8 hour(s). Form: All forms</p>
Sulfur Dioxide	7446-09-5	0.0002 - 1	

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 immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.

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- Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
- 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 immediately.

Section 5. Fire fighting measures

- Flammability of the product** : Non-flammable.
- Products of combustion** : These products are carbon oxides (CO, CO₂), nitrogen oxides (NO, NO₂...), sulfur oxides (SO₂, SO₃...).
- 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.
- No specific hazard.
- 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. Keep unnecessary personnel away. Use suitable protective equipment (Section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 7. Handling and storage

- Handling** : Do not get in eyes, on skin or on clothing. Keep container closed. Use only with adequate ventilation. Do not puncture or incinerate container. Wash thoroughly after handling. 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.
- 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.
- 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.

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Personal protection in case of a large spill : Full chemical resistant suit and self-contained breathing apparatus only by trained and authorized persons.

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

- Molecular weight** : Not applicable.
- Molecular formula** : Not applicable.
- Boiling/condensation point** : Not available.
- Melting/freezing point** : -75.55°C (-104°F) based on data for: sulphur dioxide. Weighted average: -208.2°C (-342.8°F)
- Critical temperature** : The lowest known value is -146.9°C (-232.4°F) (Nitrogen).
- Vapor density** : The highest known value is 2.2 (Air = 1) (sulphur dioxide). Weighted average: 1.16 (Air = 1)
- Specific Volume (ft³/lb)** : Not applicable.
- Gas Density (lb/ft³)** : Weighted average: 0.08

Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.
- Incompatibility with various substances** : Reactive with, alkalis, moisture.

Section 11. Toxicological information

<u>Ingredient name</u>	<u>Test</u>	<u>Result</u>	<u>Route</u>	<u>Species</u>
Nitric Oxide	LC50	115 ppm (1 hour (s))	Inhalation	Rat
	LC50	1068 mg/m³ (4 hour(s))	Inhalation	Rat
Sulfur Dioxide	LC50	2520 ppm (1 hour(s))	Inhalation	Rat
	LC50	3000 ppm (0.5 hour(s))	Inhalation	Mouse

Chronic effects on humans : **CARCINOGENIC EFFECTS** Classified A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC [sulphur dioxide]. Contains material which causes damage to the following organs: blood, lungs, mucous membranes, cardiovascular system, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea, nose/sinuses, throat.

Other toxic effects on humans : Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation (lung irritant).

Specific effects

Carcinogenic effects : Contains material which may cause cancer based on animal data. Risk of cancer depends on duration and level of exposure.

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 carbon oxides (CO, CO₂), nitrogen oxides (NO, NO₂...), sulfur oxides (SO₂, SO₃...).

Toxicity of the products of biodegradation : The products of degradation are less toxic than the product itself.

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
DOT Classification	UN1956	COMPRESSED GAS, N.O.S.	2.2	Not applicable (gas).		-
TDG Classification	UN1956	COMPRESSED GAS, N.O.S.	2.2	Not applicable (gas).		Explosive Limit and Limited Quantity Index 0.125 Passenger Carrying Road or Rail Index 75
Mexico Classification	UN1956	COMPRESSED GAS, N.O.S.	2.2	Not applicable (gas).		-

Section 15. Regulatory information

United States

- U.S. Federal regulations** : TSCA 8(b) inventory: Nitrogen; Carbon Dioxide; nitric oxide; sulphur dioxide
 SARA 302/304/311/312 extremely hazardous substances: nitric oxide; sulphur dioxide
 SARA 302/304 emergency planning and notification: nitric oxide; sulphur dioxide
 SARA 302/304/311/312 hazardous chemicals: Nitrogen; Carbon Dioxide; nitric oxide; sulphur dioxide
 SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Nitrogen: Sudden Release of Pressure; Carbon Dioxide: Sudden Release of Pressure, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard; nitric oxide: Sudden Release of Pressure, Immediate (Acute) Health Hazard; sulphur dioxide: Sudden Release of Pressure, Immediate (Acute) Health Hazard, 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: nitric oxide; sulphur dioxide
 Clean air act (CAA) 112 regulated flammable substances: No products were found.
 Clean air act (CAA) 112 regulated toxic substances: nitric oxide; sulphur dioxide

State regulations

- : Pennsylvania RTK: Nitrogen: (generic environmental hazard); Carbon Dioxide: (generic environmental hazard); nitric oxide: (environmental hazard, generic environmental hazard); sulphur dioxide: (environmental hazard, generic environmental hazard)
 Massachusetts RTK: Nitrogen; Carbon Dioxide; nitric oxide; sulphur dioxide
 New Jersey: Nitrogen; Carbon Dioxide; nitric oxide; sulphur dioxide

Canada

WHMIS (Canada)

- : Class A: Compressed gas.
 Class D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
 Class D-2A: Material causing other toxic effects (VERY TOXIC).
 Class E: Corrosive gas.

CEPA DSL: Nitrogen; Carbon Dioxide; nitric oxide; sulphur dioxide

Section 16. Other information

United States

Label Requirements

- : MAY BE FATAL IF INHALED.
CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS.
CONTENTS UNDER PRESSURE.
CONTAINS MATERIAL WHICH CAUSES DAMAGE TO THE FOLLOWING ORGANS:
BLOOD, LUNGS, MUCOUS MEMBRANES, CARDIOVASCULAR SYSTEM,
RESPIRATORY TRACT, SKIN, CENTRAL NERVOUS SYSTEM, EYE, LENS OR
CORNEA, NOSE, SINUSES, THROAT.
POSSIBLE CANCER HAZARD
CONTAINS MATERIAL WHICH MAY CAUSE CANCER BASED ON ANIMAL DATA.

Canada

Label Requirements

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

Health	*	2
Fire hazard		0
Reactivity		0
Personal protection		C

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



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.