Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name:	Nitric Oxide/Inert Gas Mixture	**Trade Name:**	Nitric Oxide/Inert Gas Mixture
Product Use:	Not available.		
Chemical Name:	Not applicable.	**Synonym:**	Not applicable.
Chemical Formula:	Not applicable.	**Chemical Family:**	Not applicable.
Telephone:	**Emergencies:** * 1-800-363-0042	**Supplier /Manufacture:**	Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2
		Phone:	905-803-1600
		Fax:	905-803-1682

**Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Praxair sales representative.*

2. Composition and Information on Ingredients

INGREDIENTS	% (VOL)	CAS NUMBER	LD_{50} (Species & Routes)	LC_{50} (Rat, 4 hrs.)	TLV-TWA (ACGIH)
Nitric Oxide AND ONE OR MORE OF THE FOLLOWING GASES:	1.0-21.0	10102-43-9	Not applic.	57 ppm	25 ppm
Argon	Balance	7440-37-1	Not applic.	Not available.	Simple asphyxiant.
Helium	Balance	7440-59-7	Not applic.	Not available.	Simple asphyxiant.
Krypton	Balance	7439-90-9	Not applic.	Not available.	Simple asphyxiant.
Neon	Balance	7440-01-9	Not applic.	Not available.	Simple asphyxiant.
Nitrogen	Balance	7727-37-9	Not applic.	Not available.	Simple asphyxiant.
Xenon	Balance	7740-63-3	Not applic.	Not available.	Simple asphyxiant.

3. Hazards Identification

Emergency Overview

DANGER! **Toxic, corrosive, high-pressure gas. May be fatal if inhaled. May cause lung damage. Symptoms may be delayed. Self-contained breathing apparatus must be worn by rescue workers.**

ROUTES OF EXPOSURE: Inhalation.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION:	Overexposure may cause irritation of mucous membranes, sinuses, pharynx, and bronchia, with pain, headache, cyanosis, irregular respiration, choking, dizziness, and possibly pulmonary edema. Of no pulmonary symptoms at time of exposure; may have latency of 5-72 hours. High vapour concentrations may cause pain, choking, bronchoconstriction, reflex slowing of the heart, and possibly asphyxiation. Lack of oxygen can kill.
SKIN CONTACT:	Severe irritant; may cause burns.
SKIN ABSORPTION:	Prolonged or widespread skin contact with the liquid may result in the absorption of harmful amounts of material.
SWALLOWING:	Unlikely route of exposure. This product is a gas at normal temperature and pressure. May cause burns of the mough, esophagus and stomach.
EYE CONTACT:	May cause severe conjunctivitis seen as marked redness and swelling of the conjunctiva, and corneal injury with opacification.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:
Repeated inhalation may result in bronchitis or emphysema. Repeated skin contact may result in cumulative dermatitis.

OTHER EFFECTS OF OVEREXPOSURE:
None known. This product is an asphyxiant. Lack of oxygen can cause death.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:
Inhalation may aggravate asthma and inflammatory or fibrotic pulmonary disease. Because of its irritating properties, this material may aggravate an existing dermatitis.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:
Nitrogen dioxide has been shown to cause mutations, sister-chromatid exchanges, and chromosomal aberations in mammalian cells.

CARCINOGENICITY:
Not listed as carcinogen by OSHA, NTP or IARC.

4. First Aid Measures

INHALATION:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. Keep person warm and at rest.

SKIN CONTACT:
Immediately flush affected areas with water for at least 15 minutes while removing contaminated clothing and shoes. Discard clothing and shoes. Call a physician.

SWALLOWING:
This product is a gas at normal temperature and pressure.

EYE CONTACT:
Flush with water. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN:
In case of overexposure, keep patient under medical observation for at least 72 hours to observe for pulmonary edema. Patient may have second acute pulmonary reaction 2-6 weeks after the first one. The hazards of this material are mainly due to its severe irritant and corrosive properties on the skin and mucosal surfaces. There is no specific antidote. Treatment of over-exposure should be directed at the control of symptoms and the clinical condition.

5. Fire Fighting Measures

FLAMMABLE :	No.	**IF YES, UNDER WHAT CONDITIONS?**	Not applicable.
FLASH POINT (test method)	Not applicable.	**AUTOIGNITION TEMPERATURE**	Not applicable.
FLAMMABLE LIMITS IN AIR, % by volume:	**LOWER:** Not applicable.	**UPPER:**	Not applicable.

EXTINGUISHING MEDIA:

This mixture cannot catch fire. Use media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES:

DANGER! Highly toxic gas. Evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. Immediately cool containers with water spray from maximum distance until cool, then move containers away from fire area if without risk. If containers are leaking, reduce vapours with water spray or fog. Shut off leak if without risk while continuing cooling water spray. Remove containers away from fire area of fire if without risk.

UNUSUAL FIRE AND EXPLOSION HAZARD:

Nonflammable material. This material cannot catch fire. Container may rupture due to heat of fire. No part of a container should be subjected to temperature higher than 52 C. Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature. Toxic fumes may be produced when heated.

HAZARDOUS COMBUSTION PRODUCTS:

None.

SENSITIVITY TO IMPACT:

Avoid impact against container.

SENSITIVITY TO STATIC DISCHARGE:

Not applicable.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

DANGER! Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Reduce vapours with fog or fine water spray. Reverse flow into cylinder may cause rupture. Shut off leak if without risk. Ventilate area of leak or move leaking container to well ventilated area. Prevent runoff from contaminating surrounding environment. Corrosive vapours may spread from spill. Before entering area, especially confined areas, check atmosphere with appropriate device.

WASTE DISPOSAL METHOD:

Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, provincial, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN STORAGE:

Store and use with adequate ventilation. Separate flammable cylinders from oxygen, chlorine, and other oxidizers by at least 6 m or use a barricade of non-combustible material. This barricade should be at least 1.5 m high and have a fire resistance rating of at least ½ hour. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Store only where temperature will not exceed 52 C. Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

PRECAUTIONS TO BE TAKEN IN HANDLING:

Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. For other precautions, see section 16.

For additional information on storage and handling, refer to Compressed Gas Association (CGA) pamphlet P-1, *Safe Handling of Compressed Gases in Containers,* available from the CGA. Refer to section 16 for the address and phone number along with a list of other available publications.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:

Toxic high-pressure gas. May be fatal if inhaled. Do not breathe gas. Do not get vapour in eyes, on skin, or on clothing. Have safety showers and eyewash fountains immediately available. Use piping and equipment adequately designed to withstand pressures to be encountered. Use only in a closed system. ***Store and use with adequate ventilation at all times.*** Close valve after each use; keep closed even when empty. ***When returning cylinder to supplier,*** be sure valve is closed, then install valve outlet plug tightly. ***Never work on a pressurized system.*** If there is a leak, close the cylinder valve. Vent the system down in a safe and environmentally sound manner in compliance with all federal, provincial, and local laws; then repair the leak. ***Never place a compressed gas cylinder where it may become part of an electrical circuit.***

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST:	A corrosion-resistant system is acceptable. See SPECIAL.
MECHANICAL (general):	Inadequate. See SPECIAL.
SPECIAL:	Use only in a closed system. Corrosion-resistant, forced-draft fume hood is preferred.
OTHER:	Not applicable. See SPECIAL.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION:	For concentrations up to 10 times the applicable exposure limit any NIOSH/MSHA approved supplied air respirator is recommended. Up to 50 times the TLV, a NIOSH/MSHA approved respirator with a full-face piece or self-contained breathing apparatus is recommended. For higher concentration us only self-contained breathing apparatus operated in the pressure demand mode.. Selection should also be based on the current CSA standard Z94.4, "Selection, Care and Use of Respirators". Respirators should also be approved by NIOSH and MSHA.

SKIN PROTECTION:	Neoprene gloves.
EYE PROTECTION:	Wear safety glasses when handling cylinders. Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.
OTHER PROTECTIVE EQUIPMENT:	Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines.

9. Physical and Chemical Properties

PHYSICAL STATE:	Gas.	**FREEZING POINT:**	Not available - mixture not tested.	**pH:**	Not applicable.
BOILING POINT	Not available - mixture not tested.	**VAPOUR PRESSURE**	Gas.	**MOLECULAR WEIGHT:**	Not applicable.
SPECIFIC GRAVITY: LIQUID (Water = 1)	Not available.	**SOLUBILITY IN WATER,**	Not available - mixture not tested.		
SPECIFIC GRAVITY: VAPOUR (air = 1)	Not available - mixture not tested.	**EVAPORATION RATE** (Butyl Acetate=1):	Not available.	**COEFFICIENT OF WATER/OIL DISTRIBUTION:**	Not applicable.
VAPOUR DENSITY:	Not available - mixture not tested.	**% VOLATILES BY VOLUME:**	Not available.	**ODOUR THRESHOLD:**	Not available.
APPEARANCE & ODOUR:	Colourless.	Odourless gas			

10. Stability and Reactivity

STABILITY:	The product is stable.
CONDITIONS OF CHEMICAL INSTABILITY:	Temperatures in excess of 160 C.
INCOMPATIBILITY (materials to avoid):	Water, bases, flammable and combustible materials, copper, aluminum. Very corrosive to metals when wet. Explosions may occur on contact with ammonia, boron trichloride, carbon disulfide, cyclohexane, fluorine, formaldehyde, nitrobenzene, toluene, incompletely halogenated hydrocarbons, propylene, alcohols, and ozone.
HAZARDOUS DECOMPOSITION PRODUCTS:	Above 160 C nitrogen dioxide decomposes to form nitric oxide and oxygen. Reacts with water to form nitric acid and nitric oxide.
HAZARDOUS POLYMERIZATION:	None.
CONDITIONS OF REACTIVITY:	None currently known.

11. Toxicological Information

See section 3.

12. Ecological Information

No adverse ecological effects expected. This product does not contain any Class I or Class II ozone-depleting chemicals. The components of this mixture are not listed as marine pollutants by TDG Regulations.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information

TDG/IMO SHIPPING NAME: Compressed gas, n.o.s. (name of the most important inert gas) if the mixture has less than 2.3% nitic oxide or Compressed gas, toxic, n.o.s. (nitric oxide) if the mixture has 2.3% nitric oxide or more.

HAZARD CLASS:	IDENTIFICATION #:	PRODUCT REPORTABLE QUANTITY (PRQ):
Class 2.2 if the mixture has less than 2.3% Class 2.3 if the mixture has 2.3% nitric oxide or more.	UN1956 if the mixture has less than 2.3% nitric oxide or UN1955 if the mixture has 2.3% nitric oxide or more.	Any accidental release in a quantity that could pose a danger to public safety or any sustained release of 10 minutes or more.

SHIPPING LABEL(s) Non-flammable, non-corrosive and non-toxic if the mixture has less than 2.3% nitric oxide or Toxic gas if the mixture has 2.3% nitric oxide or more.

PLACARD (when required): Non-flammable, non-corrosive and non-toxic if the mixture has less than 2.3% nitric oxide or Toxic gas if if the mixture has 2.3% nitric oxide or more.

SPECIAL SHIPPING INFORMATION:

Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, non-ventilated compartment of a vehicle can present serious safety hazards.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, provincial, and local regulations.

DSL (Canada) This product is on the DSL list

WHMIS (Canada) CLASS A: Compressed gas.
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
CLASS E: Corrosive Material

International Regulations

EINECS Not available.

DSCL (EEC) R20- Harmful by inhalation.

International Lists No products were found.

16. Other Information

MIXTURES:

When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

HAZARD RATING SYSTEM:

HMIS RATINGS:

HEALTH	**3**
FLAMMABILITY	**0**
PHYSICAL HAZARD	**2**

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED:	CGA-660
PIN-INDEXED YOKE:	Not available.
ULTRA-HIGH-INTEGRITY CONNECTION:	Not available.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlets V-1 and V-7 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, Fax (703) 961-1831, website: www.cganet.com.

AV-1	Safe Handling and Storage of Compressed Gas
P-1	Safe Handling of Compressed Gases in Containers
P-9	Inert Gases - Argon, Nitrogen, and Helium
P-14	Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmosphere
SB-2	Oxygen-Deficient Atmospheres
V-1	Compressed Gas Cylinder Valve Inlet and Outlet Connections
V-7	Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures
---	Handbook of Compressed Gases, Fifth Edition

For more indepth information for each component, refer to the pure product MSDS.

The information contained in this MSDS is generated from technical sources using the Chemmate Mixture MSDS system and the pure-product MSDS for each component. These mixtures are not tested as a whole for chemical, physical, or health effects.

PREPARATION INFORMATION:

DATE:	**October 15, 2013**
DEPARTMENT:	**Safety and Environmental Services**
TELEPHONE:	**905-803-1600**

The opinions expressed herein are those of qualified experts within Praxair Canada Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair Canada Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair Canada Inc. requests the users of this product to study this Material Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety nformation, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

Praxair Canada Inc.
1 City Centre Drive
Suite 1200
Mississauga, ON L5B 1M2