

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: BAR Mixtures with NO	Trade Name: BAR Mixtures with NO
Product Use: Many.	
Chemical Name: BAR Mixtures with NO	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	0.03-0.32	10102-43-9	Not available.	58 ppm	25 ppm
Carbon monoxide	0.001-8	630-08-0	Not available.	1880 ppm	25 ppm
Carbon dioxide	0.001-14	124-38-9	Not available.	Not available.	5000 ppm
Propane	0.001-0.32	74-98-6	Not available.	Not available.	1000 ppm
Nitrogen dioxide (Dinitrogen tetroxide)	0.001-0.003	10102-44-0	Not available.	58 ppm	3 ppm
Nitrogen	77.4-99.999	7727-37-9	Not available.	Not available.	Simple asphyxiant.

3. Hazards Identification

Emergency Overview

WARNING! High-pressure gas. Can cause rapid suffocation. May cause dizziness and drowsiness. Self-contained breathing apparatus may be required by rescue workers.

ROUTES OF EXPOSURE: Inhalation.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION:

This mixture is an asphyxiant with effects due to lack of oxygen. Lack of oxygen can kill. Depending on the concentrations and the duration of exposure, the nitric oxide (NO) component, which readily converts to nitrogen dioxide in air, may irritate mucous membranes, sinuses, pharynx, and bronchia, causing pain, headache, cyanosis, irregular respiration, choking, dizziness, and possibly pulmonary edema (fluid in the lungs). Often there are no pulmonary symptoms at the time of exposure, but symptoms appear within 5 to 72 hours. Also depending on the concentration and duration of exposure, carbon monoxide (CO) component may cause pallor, cyanosis, nausea, hallucinations, confusion, angina, and convulsions. With well-established CO poisoning, the mucosal surface will be bright red (cherry red). The carbon dioxide (CO₂) component is physiologically active, affecting circulation and breathing. Moderate concentrations may cause headache, drowsiness, dizziness, stinging of the nose and throat, excitation, rapid breathing and heart rate, excess salivation, vomiting, and unconsciousness.

SKIN CONTACT: The Nitric Oxide component is a severe irritant that can cause burns.

SKIN ABSORPTION: No evidence of adverse effects from available information.

SWALLOWING: A highly unlikely route of exposure. This product is a gas at normal temperature and pressure.

EYE CONTACT: The Nitric Oxide component may cause severe conjunctivitis, producing marked redness and swelling of the conjunctiva. May cause corneal injury with opacification.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:

Repeated hypoxia from CO exposure will cause gradually increasing central nervous system (CNS) damage, with loss of sensation in the fingers, poor memory, and mental deterioration. Chronic exposure may facilitate development of atherosclerosis. Repeated inflammation due to the NO component may cause bronchitis or emphysema. Repeated skin contact may produce cumulative dermatitis.

OTHER EFFECTS OF OVEREXPOSURE:

Other effects of exposure to CO include embryo toxicity, impaired cardiovascular function, pulmonary edema, pneumatic, gross neuropsychiatric damage, memory impairment, permanent CNS damage and cerebral edema with irreversible brain damage. Late, fatal demyelination is a rare, but possible, complication. With inhalation, the CO component may aggravate asthma and inflammatory or fibrotic pulmonary disease. The skin irritating properties of NO may aggravate dermatitis.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:

Hypoxia from carboxyhemoglobin formation due to the CO component may aggravate established coronary and cerebral circulatory insufficiency.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:

Not available - mixture not tested.

CARCINOGENICITY:

Not listed as carcinogen by OSHA, NTP or IARC.

4. First Aid Measures

INHALATION:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

SKIN CONTACT:

Wash with soap and water. Get medical attention if discomfort persists.

SWALLOWING:

A highly unlikely route of exposure. This product is a gas at room temperature and pressure.

EYE CONTACT:

Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. The eyelids must be held open and away from the eyeball 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 medial observation for at least 72 hours to observe for pulmonary reaction 2-6 weeks after the first one. The hazards of the nitric oxide (NO) component are mainly due to its severe irritant and corrosive properties on the skin and mucosal surfaces. Angina and depression of the ST segment of the electrocardiogram indicates myocardial hypoxia due to the carbon monoxide (CO) component. Exposure to high concentrations of CO can result in cerebral edema. With severe CO doses, the use of hyperbaric oxygen may be beneficial. Individuals repeatedly overexposed to CO may present positive Romberg's sign. 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:

WARNING Evacuate all personnel from danger area. Immediately deluge cylinders with water from maximum distance until cool; then move them away from fire area if without risk. Self-contained breathing apparatus may be required by rescue workers. If containers are leaking, reduce vapours with water spray or fog. Shut off leak if without risk. Move containers away from fire area if without risk.

UNUSUAL FIRE AND EXPLOSION HAZARD:

Heat of fire can build pressure in cylinder and cause it to rupture. No part of cylinder should be subjected to a temperature higher than 52 C. Cylinders containing this mixture are equipped with a pressure relief device. (Exceptions may exist where authorized by TDG Regulations.).

HAZARDOUS COMBUSTION PRODUCTS:

None.

SENSITIVITY TO IMPACT:

Avoid impact against container.

SENSITIVITY TO STATIC DISCHARGE:

None.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

WARNING! Immediately evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. Contact with flammables may cause fire or explosion. Reverse flow into cylinder may cause rupture. Reduce vapors with fog or fine water spray. Shut off flow if without risk. Ventilate area or move cylinder to a well-ventilated area. Toxic, corrosive vapors may spread from spill. Before entering area, especially a confined area, check atmosphere with an 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. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. 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 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:

High pressure gas. Use piping and equipment adequately designed to withstand pressures to be encountered. **Gas can cause rapid suffocation due to oxygen deficiency.** Store and use with adequate ventilation. Close valve after each use; keep closed even when empty. **Prevent reverse flow.** Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. **Never work on a pressurized system.** If there is a leak, close the cylinder valve. Blow the system down in an environmentally safe 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. See SPECIAL.

OTHER: None.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION: Use respirable fume respirator or air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select in accordance with the provincial regulations or guidelines. Selection should also be based on the current CSA standards Z94.4, "Selection, care and use of respirators". Respirators should be approved by NIOSH and MSHA.

SKIN PROTECTION: Wear work gloves when handling cylinders.

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.	pH: Not available.
BOILING POINT: Not available.	VAPOUR PRESSURE: Not available.	MOLECULAR WEIGHT: Not applicable.
SPECIFIC GRAVITY: Not available. LIQUID (Water = 1)	SOLUBILITY IN WATER: Slight.	
SPECIFIC GRAVITY: 0.967 to 1.047 VAPOUR (air = 1)	EVAPORATION RATE (Butyl Acetate=1): Not available.	COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable.
VAPOUR DENSITY: Not available.	% VOLATILES BY VOLUME: 100%	ODOUR THRESHOLD: Not available.

APPEARANCE & ODOUR: Colourless gas at normal temperature and pressure.

10. Stability and Reactivity

STABILITY:	The product is stable.
CONDITIONS OF CHEMICAL INSTABILITY:	Not available.
INCOMPATIBILITY (materials to avoid):	Contains nitric oxide which reacts with air, oxygen, ozone, oxidizing agents, flammable materials, combustible materials, powdered aluminum, boron, chlorine monoxide, chromium, fluorine, nitrogen trichloride, halogens, iron, sodium monoxide, magnesium, manganese, phosphorus, tungsten carbide, and uranium. Additional reactions from other components are possible with alkali metals, alkaline earthy metals, aluminum, ammonia, chromium, halogens, metal acetylides; nitric acid, potassium, magnesium above 775 C, and titanium above 550 C.
HAZARDOUS DECOMPOSITION PRODUCTS:	Arsenic, arsenic oxide, hydrogen (CO component).
HAZARDOUS POLYMERIZATION:	Will not occur.
CONDITIONS OF REACTIVITY:	Exposure to light or heat in the presence of moisture. Decomposes at temperatures in excess of 230 - 240 C.

11. Toxicological Information

See section 3.

Carbon dioxide is an asphyxiant. It initially stimulates respiration and then causes respiratory depression. High concentrations result in narcosis. Symptoms in humans are as follows:

EFFECTS:

Breathing rate increases slightly.

CO₂

CONCENTRATION:

1%

Breathing rate increases to 50% above normal level. Prolonged exposure can cause headache, tiredness.

2%

Breathing increases to twice normal rate and become labored. Weak narcotic effect. Impaired hearing, headache, increased blood pressure and pulse rate.

3%

Breathing increases to approximately four times normal rate, symptoms of intoxication become evident, and slight choking may be felt.

4 - 5%

Characteristic sharp odor noticeable. Very labored breathing, headache, visual impairment, and ringing in the ears. Judgment may be impaired, followed within minutes by loss of consciousness.

5 - 10%

50 - 100%

Unconsciousness occurs more rapidly above 10% level. Prolonged exposure to high concentrations may eventually result in death from asphyxiation.

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. (Nitrogen, Carbon dioxide)

HAZARD CLASS:

CLASS 2.2:
Non-flammable,
non-toxic gas.

IDENTIFICATION #:

UN1956

PRODUCT REPORTABLE QUANTITY (PRQ):

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-toxic gas

PLACARD (when required):

Non-flammable, non-toxic gas

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.

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 0
FLAMMABILITY 0
PHYSICAL HAZARD 2

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: 0-3000 psig CGA-660
PIN-INDEXED YOKE: Not applicable.
ULTRA-HIGH-INTEGRITY CONNECTION: Not applicable.

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-14 Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmospheres
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, Fourth 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

Product Name: BAR Mixtures with NO

MSDS# E-4570-F

Date: Oct. 15, 2013

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 information, (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.

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Page 8 of 8