



Emergency Contact: Chemtrec (800) 424-9300  
Or Norco (208) 336-1643

1125 West Amity Road  
Boise, ID 83705  
(208) 336-1643

## Methane 0.0001% to 2.5%, Oxygen 2.0% to 23% in Nitrogen

### MATERIAL SAFETY DATA SHEET

#### Identification

Product Name: 0.0001% to 2.5% Methane, 2.0% to 23% Oxygen in Nitrogen  
Chemical Name: Not Applicable  
Chemical Family: Gas Mixture  
CAS Number: N/A  
Common Names/Synonyms: Calibration Gas, Bump Gas, Cal Gas Mixture, Two Part Mix.  
MSDS Identification Code/Number: 2290

Revision Date: 12/22/08  
Last Review Date: 12/22/08

#### Composition, Information on Ingredients

##### Exposure Limits<sup>1</sup>:

Ingredient	% Volume	PEL-OSHA <sup>2</sup>	TLV-ACGIH <sup>3</sup>	LD <sub>50</sub> or LC <sub>50</sub> Route/Species
Methane Formula: CH <sub>4</sub> CAS Number: 0074-82-8 RTECS#: TX2275000	0.0001% to 2.5%	None Established	1000 ppm	Not Available
Oxygen Formula: O <sub>2</sub> CAS: 7782-44-7 RTECS#: RS206000	2.0% to 23%	None Established	None Established	Not Available
Nitrogen Formula: N <sub>2</sub> CAS: 7727-37-9 RTECS#: QW9700000	74.4% to 97.9998%	None Established	Simple Asphyxiant	Not Available

<sup>1</sup> Refer to individual state or provincial regulations, as applicable, for limits that may be more stringent than those listed here.

<sup>2</sup> As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993)

<sup>3</sup> As stated in the ACGIH 2007 Threshold Limit Values for Chemical Substances and Physical Agents

OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations.

#### Hazard Identification

##### Emergency Overview:

Colorless, odorless non-flammable gas. Mix may or may not have sufficient oxygen content to support life; therefore mix should be treated as a simple asphyxiant. Maintain oxygen levels above 19.5%. Inhalation of high methane concentrations may cause central nervous system (CNS) depression and cardiac sensitization. Contents under pressure. Use and store below 125°F (52°C).

##### Route of Entry:

Skin Contact No	Skin Absorption No	Eye Contact Yes	Inhalation Yes	Ingestion No
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<b>Hazard Identification Continued</b>
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**Health Effects:**

Exposure Limits Yes	Irritant No	Sensitization No
Teratogen No	Reproductive Hazard No	Mutagen No
Synergistic Effects None reported		

Carcinogenicity: NTP: No            IARC: No            OSHA: No

**Eye Effects:**

Contact with rapidly expanding gas near the point of release may cause frostbite.

**Skin Effects:**

Contact with rapidly expanding gas near the point of release may cause frostbite with redness, skin color change to gray or white, and blistering.

**Ingestion Effects:**

None known. Ingestion is unlikely as product is a gas.

**Inhalation Effects:**

Inhalation of high methane concentrations may cause central nervous system depression with dizziness, disorientation, in-coordination, nausea, and narcosis. High concentrations may also cause cardiac sensitization resulting in irregular heartbeat and may make the individual more susceptible to cardiac effects of substances such as epinephrine and adrenaline.

**Medical conditions Aggravated By Exposure:**

None known.

**NFPA Hazard Codes**

Health:            0  
Flammability:    0  
Instability:       0

**HMIS Hazard Codes**

Health:            0  
Flammability:    0  
Physical Hazard: 3

**Ratings System**

0 = No Hazard  
1 = Slight Hazard  
2 = Moderate Hazard  
3 = Serious Hazard  
4 = Severe Hazard

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2004, *CGA Recommended Hazard Ratings for Compressed Gases, 2<sup>nd</sup> Edition*.

<b>First Aid Measures</b>
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**Eyes:**

If frostbite is suspected, flush eyes with cool water for 15 minutes and obtain immediate medical attention.

**Skin:**

For frostbite, immerse skin in lukewarm water. DO NOT USE HOT WATER. Obtain medical attention.

**Ingestion:**

None required, product is a gas.

**Inhalation:**

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO THIS PRODUCT. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area and be given artificial respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.

### First Aid Measures Continued

**Note to physician:** Monitor cardiac rhythm and treat arrhythmias as necessary. Do Not administer stimulants such as epinephrine or adrenaline.

### Fire Fighting Measures

Conditions of Flammability: Nonflammable		
Flash point: None	Method: Not Applicable	Autoignition Temperature: Not Available
LEL (%): None	UEL None	
Hazardous combustion products: None		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

**Fire and Explosion Hazards:**

Nonflammable. Product contains methane well below its flammable limits or 5% in air. Cylinders may vent rapidly or rupture violently from pressure when involved in a fire situation.

**Extinguishing Media:**

None required. Use media appropriate for surrounding materials.

**Fire Fighting Instructions:**

If possible, stop the flow of gas supply. Use water spray to cool fire exposed cylinders until well after flames have been extinguished. Firefighters should wear a NIOSH/MSHA approved self-contained breathing apparatus operated in positive pressure mode and full turnout or bunker gear.

### Accidental Release Measures

Evacuate all personnel from affected area. Use appropriate protective equipment. Stop the flow of gas or remove cylinder to an outdoor area if this can be done without risk. Ventilate enclosed areas. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest Norco/NorLab location.

### Handling and Storage

**Electrical Classification:**

Non-hazardous.

Gas mixture is non-corrosive and may be used with any common structural material.

Use only in well-ventilated areas. Valve protection caps must remain in place unless the cylinder is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure (< 3000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

Protect cylinders from physical damage. Store in a cool, dry, well-ventilated area of non-combustible construction away from heavy traffic areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Post "NO SMOKING OR OPEN FLAMES" signs in the storage or use area.

For additional recommendations, consult Compressed Gas Association's Pamphlet P-1.

## Exposure Controls, Personal Protection

**Engineering Controls:**

General ventilation used in combination with local exhaust ventilation as necessary to control air contaminants to at or below acceptable exposure guidelines.

**Eye/Face Protection:**

Safety goggles or glasses.

**Skin Protection:**

Protective gloves made of any suitable material.

**Respiratory Protection:**

For emergency release use a NIOSH approved positive pressure air line with mask and escape bottle or self-contained breathing apparatus using at a minimum grade D air.

**Other/General Protection:**

Safety shoes, safety shower, eyewash "fountain".

## Physical and Chemical Properties

Parameter	Value	Units
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure	: Not Available	
Vapor density (Air = 1)	: Not Available	
Evaporation Point	: Not Available	
Boiling point	: Not Available	
Freezing point	: Not Available	
pH	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H <sub>2</sub> O)	: Very slight	
Odor threshold	: Not Applicable	
Odor and appearance	: Odorless, colorless gas	

## Stability and Reactivity

**Stability:**

Stable.

**Incompatible Materials:**

None known.

**Hazardous Polymerization:**

Does not occur.

## Toxicological Information

**Inhalation:**

High concentrations of aliphatic hydrocarbon gases may cause CNS depression. Recent information suggests that C1 – C4 aliphatic (alkane) hydrocarbon gases can cause potentially fatal cardiac arrhythmias. Cardiac sensitization to adrenalin in dogs has been noted following inhalation. In dogs, the heart was more sensitive to epinephrine induced ventricular fibrillations following exposure to 15-90% propane for 10 minutes. Ventricular fibrillations have been reported in a 15 year old girl and a 14 year old boy following inhalation of n-butane (concentration not reported).

<b>Toxicological Information Continued</b>
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**Sin & Eye:**

Contact with gas is not expected to cause irritation

<b>Ecological Information</b>
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Product does not contain Class I or Class II ozone depleting substances. Not toxic. Not expected to be toxic to fish and wildlife. Will not bioconcentrate.

<b>Disposal Considerations</b>
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Do not attempt to dispose of waste or unused quantities in returnable cylinders. Return in the shipping container, *properly labeled, with any valve outlet plugs or caps secure and valve protection cap in place* to NorLab for proper disposal. Non-refillable containers should be vented in a well-ventilated area then disposed of in compliance with local regulations, or returned to NorLab.

<b>Transport Information</b>
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Parameter	United States DOT	Canada TDG
<b>Proper Shipping name:</b>	Compressed gases, n.o.s., (Methane, Nitrogen)	Compressed gases, n.o.s.,
<b>Hazard Class:</b>	2.2	2.2
<b>Identification Number:</b>	UN 1956	UN 1956
<b>Shipping Label:</b>	Non-flammable Gas	Non-flammable Gas

<b>Regulatory Information</b>
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**SARA Title III Notification and Information:****SARA Title III – Hazard Classes:**

Acute Health hazard

Sudden Release of Pressure Hazard

**SARA Title III – Section 313 Supplier Notification:**

This product does not contain toxic chemicals subject to reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of CFR 40 Part 372.

This product contains methane which is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds.

**California Proposition 65:**

This product does not contain ingredient(s) known to the State of California to cause cancer or reproductive toxicity.

<b>Other Information</b>
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Compressed gas cylinders shall not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

**Disclaimer of Expressed and Implied Warranties:**

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).



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## Carbon Dioxide 0.0001% to 30% in Nitrogen

### MATERIAL SAFETY DATA SHEET

#### Identification

Product Name: Carbon Dioxide 0.0001% to 30% in Nitrogen  
CAS Number: N/A  
Chemical Family: Gas Mixture  
Chemical Formula: CO<sub>2</sub> in N<sub>2</sub>  
Synonyms: N/A  
MSDS Identification Code/Number: 2040  
Prepared By: Quality Dept.

Revision Date: 03/14/01  
Last Review Date: 04/10/13

#### Composition, Information on Ingredients

##### Exposure Limits<sup>1</sup>:

INGREDIENT	% VOLUME	PEL-OSHA <sup>2</sup>	TLV-ACGIH <sup>3</sup>	LD <sub>50</sub> or LC <sub>50</sub> Route/Species
Carbon Dioxide Formula: CO <sub>2</sub> CAS: 124-38-9 RTECS#: FF6400000	0.0001 to 30	5,000 ppm TWA	5,000 ppm TWA 30,000 ppm STEL	LC <sub>50</sub> 470,000 PPM Inhalation Rat 30 Min.
Nitrogen Formula: N <sub>2</sub> CAS: 7727-37-9 RTECS#: QW9700000	70.0 to 99.9999	None Established	Simple Asphyxiant	Not Applicable

<sup>1</sup> Refer to individual state or provincial regulations, as applicable, for limits that may be more stringent than those listed here.

<sup>2</sup> As stated in 29 CFR 1910, Subpart Z (revised July 1, 1993).

<sup>3</sup> As stated in the ACGIH 2007 Threshold Limit Values for Chemical Substances and Physical Agents.

OSHA Regulatory Status: This material is classified as hazardous under OSHA regulations.  
IDLH: 40,000 ppm (CO<sub>2</sub>)

#### Hazards Identification

##### Emergency Overview:

Colorless, odorless, nonflammable gas. Simple Asphyxiant - This product does not contain oxygen and may cause asphyxia if released in a confined area. Maintain oxygen levels above 19.5%. Carbon dioxide exposure can cause nausea and respiratory problems. High concentrations may cause vasodilatation leading to circulatory collapse. Contents under pressure. Use and store below 125° F (52° C).

##### Route of Entry:

Skin Contact No	Skin Absorption No	Eye Contact No	Inhalation Yes	Ingestion No
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<b>Hazards Identification Continued</b>
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**Health Effects:**

Exposure Limits Yes	Irritant No	Sensitization No
Teratogen No	Reproductive Hazard No	Mutagen No
Synergistic Effects None reported.		

**Carcinogenicity:** NTP: No IARC: No OSHA: No

**Eye Effects:**

Contact with rapidly expanding gas near the point of release may cause frostbite.

**Skin Effects:**

Contact with rapidly expanding gas near the point of release may cause frostbite with redness, skin color change to gray or white, and blistering.

**Ingestion Effects:**

Ingestion is unlikely. Gas at room temperature.

**Inhalation Effects:**

Carbon dioxide is a cerebral vasodilator. Inhaling large concentrations causes rapid circulatory insufficiency leading to coma and death. Chronic, harmful effects are not known from repeated inhalation of low concentrations. Low concentrations of carbon dioxide cause increased respiration and headache.

Depending upon the concentration of carbon dioxide present, product may act as a simple asphyxiant. Effects of oxygen deficiency resulting from simple asphyxiants may include: rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgment, depression of all sensations, emotional instability and fatigue. As asphyxiation progresses, nausea, vomiting, prostration and loss of consciousness may result, eventually leading to convulsions, coma and death.

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

**Medical Conditions Aggravated by Exposure:**

None known.

**NFPA Hazard Codes**

Health: 0  
Flammability: 0  
Instability: 0

**HMIS Hazard Codes**

Health: 0  
Flammability: 0  
Physical Hazard: 3

**Ratings System**

0 = No Hazard  
1 = Slight hazard  
2 = Moderate Hazard  
3 = Serious Hazard  
4 = Severe Hazard

Hazard ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, *CGA Recommended Hazard Ratings for Compressed Gases, 3<sup>rd</sup> Edition*.

<b>First Aid Measures</b>
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**Eye:**

None required for gas. If frostbite is suspected, flush with cool water for 15 minutes and obtain immediate medical attention.

**Skin:**

None required for gas. For frostbite, immerse skin in lukewarm water. DO NOT USE HOT WATER. Obtain medical attention.

**Ingestion:**

Not anticipated; product is a gas.

<b>First Aid Measures Continued</b>
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**Inhalation:**

PROMPT REMOVAL FROM THE CONTAMINATED AREA AND IMMEDIATE MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

Victims should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep victim warm and calm. Further treatment should be symptomatic and supportive. Seek immediate medical attention.

<b>Fire Fighting Measures</b>
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Conditions of Flammability: Not flammable		
Flash point: None	Method: Not Applicable	Autoignition Temperature: None
LEL (%): None	UEL (%): None	
Hazardous combustion products: None		
Sensitivity to mechanical shock: None		
Sensitivity to static discharge: None		

**Fire and Explosion Hazards:**

Nonflammable. Cylinders may rupture violently from pressure when involved in a fire situation.

**Extinguishing Media:**

Use media suitable for surrounding combustible or flammable materials.

**Fire Fighting Instructions:**

Stop the flow of gas if it can be done without risk. Use water spray to cool surrounding containers. Continue to cool surrounding containers until well after flames are extinguished. Firefighters should wear a full-face piece, NIOSH/MSHA-approved self-contained breathing apparatus (SCBA) operated in positive pressure mode and full turnout gear.

<b>Accidental Release Measures</b>
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Evacuate all personnel from affected area. Use appropriate protective equipment. If a leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest Norco/NorLab location.

<b>Handling and Storage</b>
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**Electrical classification:**

Non-hazardous

Use only in well-ventilated areas. Carbon dioxide vapor is heavier than air and will accumulate in low areas. Valve protection caps must remain in place on refillable cylinders unless cylinder is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

Protect cylinders from physical damage. Store in a cool, dry, well-ventilated area of non-combustible construction away from heavy traffic areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125° F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

For additional recommendations, consult Compressed Gas Association Pamphlets P-1 and Safety Bulletin SB-2.



## Handling and Storage Continued

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

## Exposure Controls, Personal Protection

**Engineering Controls:**

Use local exhaust to prevent accumulation of high concentrations and control air contaminants to at or below acceptable exposure limits. Maintain atmospheric oxygen at or above 19.5%.

**Eye/Face Protection:**

Safety goggles or glasses.

**Skin Protection:**

Protective gloves of any material.

**Respiratory Protection:**

A positive pressure air line with full-face mask and escape bottle or self-contained breathing apparatus should be available for emergency use.

**Other/General Protection:**

Safety shoes.

## Physical and Chemical Properties

PARAMETER	VALUE	UNITS
Physical state (gas, liquid, solid)	: Gas	
Vapor pressure	: Not Available	
Vapor density (Air = 1)	: ~ 1	
Evaporation point	: Not Available	
Boiling point	: Not Available	°F
	: Not Available	°C
Freezing point	: Not Available	°F
	: Not Available	°C
pH	: Not Available	
Specific gravity	: Not Available	
Oil/water partition coefficient	: Not Available	
Solubility (H <sub>2</sub> O)	: Slightly Soluble	
Odor threshold	: Not Applicable	
Odor and appearance	: Colorless, odorless gas.	

## Stability and Reactivity

**Stability:**

Stable under normal conditions.

**Incompatible Materials:**

None.

**Hazardous Decomposition Products:**

Carbonic acid in the presence of water or moisture.

**Hazardous Polymerization:**

Will not occur.

### Toxicological Information

**Inhalation:**

Inhaling high concentrations of carbon dioxide may cause circulatory insufficiency leading to coma and death. Chronic, harmful effects are not known from repeated inhalation of low (3 to 5 molar %) concentrations.

**Reproductive:**

Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

Exposure of female rats to 60,000 ppm carbon dioxide for 24 hours has produced toxic effects to the embryo and fetus in pregnant rats. Toxic effects to the reproductive system have been observed in other mammalian species at similar concentrations.

### Ecological Information

Product does not contain Class I or Class II ozone depleting substances. Not toxic.

### Disposal Considerations

Do not attempt to dispose of waste or unused quantities in returnable cylinders. Return in the shipping container, *properly labeled, with any valve outlet plugs or caps secure and valve protection cap in place* to NorLab for proper disposal. Non-refillable containers should be vented in a well-ventilated area then disposed of in compliance with local regulations, or returned to NorLab.

### Transportation Information

Parameter	United States DOT	Canada TDG
<b>Proper Shipping Name:</b>	Compressed gas, N. O. S., (Carbon Dioxide, Nitrogen)	Compressed gas, N. O. S.
<b>Hazard Class:</b>	2.2	2.2
<b>Identification Number:</b>	UN 1956	UN 1956
<b>Shipping Label:</b>	Non Flammable Gas	Non Flammable Gas

### Regulatory Information

**SARA Title III Notifications and Information:****SARA Title III – Hazard Classes:**

Acute Health Hazard  
Sudden Release of Pressure Hazard

**SARA Title III- Section 313 Supplier Notification:**

This product does not contain toxic chemicals subject to reporting requirements of section 313 or the Emergency Planning and Community Right-To-Know Act (EPCRA) or 1986 and of 40 CFR 372.

**California Proposition 65:** This product does not contain ingredient(s) known to the State of California to cause cancer or reproductive toxicity.

### Other Information

Compressed gas cylinders must not be refilled without the express written permission of the owner. Shipment of a compressed gas cylinder which has not been filled by the owner or with his/her (written) consent is a violation of transportation regulations.

**Disclaimer of expressed and implied warranties:**

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).