## 1 PRODUCT AND COMPANY IDENTIFICATION

### Manufacturer

Norlab - A Division of Norco, Inc.
898 W. Gowen Rd.
Boise, ID 83705

**Contact:** Quality Department
**Phone:** (208) 336-1643
**Web:** www.norlab-gas.com

**Product Name:** 5-100 PPM Hydrogen Sulfide, 1-300 PPM CO, 0.0001-2.5% Methane, 2-23.5% Oxygen in N2
**Revision Date:** 5/28/2015
**Version:** 1
**SDS Number:** 2310
**CAS Number:** MIXTURE
**Product Family:** Gas Mixture
**Chemical Formula:** H2S, CH4, CO, O2 in N2
**Synonyms:** Gas, Bump Gas, Calibration Gas Mixture, Four Part Mix

**Emergency Telephone Number:** (800) 424-9300 (CHEMTREC)

## 2 HAZARDS IDENTIFICATION

**Inhalation:** Nitrogen acts as a simple asphyxiate displacing the Oxygen content in the air necessary for life. The following effects of asphyxiation are representative and it is possible that none of these symptoms may occur: loss of balance or dizziness; tightness in the frontal area of the forehead; tingling of the tongue, fingertips or toes; weakened speech leading to the inability to utter sounds; rapid reduction in the ability to perform movements; reduced consciousness of surroundings; loss of tactile sensations; and heightened mental activity. Exposure to non-fatal levels of hydrogen sulfide may result in coughing, lacrimation, mucous nasal discharge, depression, fluid sounds in the lungs, headache, sweating, vertigo, irritability, weakness confusion, delirium, convulsions and cyanosis. At higher exposures hydrogen sulfide may cause sudden collapse, anoxic convulsions, pulmonary edema,
hemorrhages in various organs, degenerative changes in the liver and kidney, edema of the intestines and brain and/or rapid death. Inhaled carbon monoxide binds with blood hemoglobin to form carboxyhemoglobin. Carboxyhemoglobin cannot take part in normal Oxygen transport, greatly reducing the blood's ability to transport Oxygen. Depending on levels and duration of exposure, symptoms may include headache, dizziness, heart palpitations, weakness, confusion, nausea, and even convulsions, eventual unconsciousness and death.

**Skin Contact:** Contact with hydrogen sulfide in this product may cause severe pain itching and erythema. Contact with rapidly expanding gas near the point of release may cause frostbite with redness, skin color change to gray or white, and blistering.

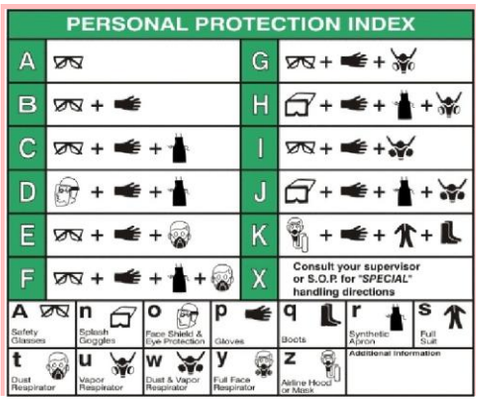
**Eye Contact:** Exposure to 20-50 PPM hydrogen sulfide will cause eye irritation. Low to moderately high concentrations may cause painful conjunctivitis, photophobia, lacrimation and corneal opacity. Exposure to 50-100 PPM hydrogen sulfide has resulted in temporary damage to the corneal epithelium in dogs, cats, rabbits, and

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

**Ingestion:** Ingestion of this product is unlikely but can cause irritation of the mucous membranes and gastrointestinal tract.

NFPA: Health = 1, Fire = 0, Reactivity = 0
HMIS III: H1/F0/PH3






GHS Signal Word:
WARNING

GHS Hazard Pictograms:

GHS Classifications:
Physical, Gases Under Pressure, Compressed Gas
Health, Acute toxicity, 5 Inhalation

GHS Phrases:
H280 - Contains gas under pressure; may explode if heated
H333 - May be harmful if inhaled

GHS Precautionary Statements:
P260 - Do not breathe dust/fume/gas/mist/vapors/spray.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P304+340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P308+313 - IF exposed or concerned: Get medical advice/attention.
P403+233 - Store in a well ventilated place. Keep container tightly closed.
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52 °C (125 °F).
CGA-PG05 – Use a back flow preventive device in the piping
CGA-PG06 – Close Valve after each use and when empty.
CGA-PG10 – Use only with equipment rated for cylinder pressure.
CGA-PG20 – Use only equipment of compatible materials of constructions.

Additional Hazard Statements (USA):
Simple Asphyxiate - May displace oxygen and cause rapid suffocation.

Product is a colorless non-flammable gas with a distinctive rotten egg like odor. Do not rely on smell to detect hydrogen

sulfide because of olfactory fatigue. Exposure to low levels of hydrogen sulfide causes irritation of mucous membranes. Inhaled carbon monoxide binds to the blood hemoglobin, greatly reducing the red cell's ability to transport Oxygen to body tissues. Effects may include headaches, dizziness, convulsions, loss of consciousness, and death. Mix may or may not have sufficient Oxygen content to support life therefore mix should be treated as a simple asphyxiate. Contents under pressure. Use and store below 125 °F (52 °C).

## 3 COMPOSITION/INFORMATION ON INGREDIENTS

**Ingredients:**

| CAS # | Percentage | Chemical Name |
|---|---|---|
| 7727-37-9 | 73.9625-97.9993% | Nitrogen |
| 7782-44-7 | 2.0-23.5% | Oxygen |
| 74-82-8 | 0.0001-2.5% | Methane |
| 630-08-0 | 0.0001-0.0300% | Carbon monoxide |
| 7783-06-4 | 0.0005-0.0075% | Hydrogen sulfide |

## 4 FIRST AID MEASURES

**Inhalation:** PROMPT REMOVAL FROM THE CONTAMINATED AREA AND IMMEDIATE MEDICAI ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOUID BE EQUIPPED WITH SEIF-CONTAINED BREATHING APPARATUS.

Conscious persons should be assisted to an uncontaminated area and treated with supplemental Oxygen. Quick removal from the contaminated area is most important. Unconscious persons should be moved to and uncontaminated area and be given artificial respiration and oxygen at the same time. Seek immediate medical attention. The physician should be informed that the patient has inhaled quantities of hydrogen sulfide and carbon monoxide.

**Skin Contact:** Flush affected area with copious quantities of water. Remove contaminated clothing as rapidly as possible. If irritation persists, seek medical attention.

**Eye Contact:** PERSONS WITH POTENTIAL EXPOSURE TO HYDROGEN SUIFIDE SHOUID NOT WEAR CONTACT LENSES. In case of eye contact, immediately flush with low pressure, cool water for at least 1S minutes, opening eyelids to ensure flushing. Get immediate medical attention.

**Ingestion:** Ingestion unlikely. Gas at room temperature.

**Most important symptoms and effects, both acute and delayed:**
The most important known symptoms and effects are described in the labeling (see Section 2) and/or Section 11.

**Indication of any immediate medical attention and special treatment needed:**
No data available.

## 5 FIRE FIGHTING MEASURES

| | |
|---|---|
| **Flammability:** | Not flammable |
| **Flash Point:** | NA |
| **Flash Point Method:** | NA |
| **Burning Rate:** | Not determined |
| **Autoignition Temp:** | Not determined |
| **LEL:** | NA |
| **UEL:** | NA |

**Extinguishing Media:**
Use as appropriate for surrounding material.

**Special Hazards Arising From the Substance or Mixture:**
Carbon Oxides
Hydrogen gas (trace)
Hydrogen Sulfide
Nitrogen gas
Nitrogen Oxides (NOx)
Oxygen gas
Sulfur Oxides

**Advice for Firefighters:**
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.

**Further Information:**
If incinerated, may release toxic fumes.
Use water spray to cool unopened containers.
The majority of this product constitutes a nonflammable inert gas. Methane and hydrogen sulfide are present in concentrations below their Lower Explosion Limits (LEL).
Cylinders may rupture violently from pressure when involved in a fire situation.
See Section 7 for more information on safe handling.
See Section 8 for more information on personal protection equipment.
See Section 13 for disposal information.

## 6 ACCIDENTAL RELEASE MEASURES

**Personal Precautions, Protective Equipment and Emergency Procedures:**
Isolate hazard area, evacuate personnel and deny entry to unauthorized/unprotected individuals. Extinguish all ignition sources and ventilate closed spaces and low areas. Use personal protective equipment including respiratory protection for high or unknown concentrations. Keep from contacting skin or eyes. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Personnel should not re-enter hazard area until hydrogen sulfide and carbon monoxide has dispersed and adequate atmospheric oxygen is re-established. Evacuate personnel to safe 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.

**Environmental Precautions:**
Prevent further release (leakage/spillage) if safe to do so.

**Methods and Materials for Containments and Cleaning Up:**

Contact the appropriate emergency telephone number listed in Section 1 or call your closest Norco/Norlab location. Ensure adequate ventilation.

**Reference to Other Sections:**

See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for information on proper disposal.

## 7 HANDLING AND STORAGE

**Handling Precautions:**

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 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.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid from 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.

**Storage Requirements:**

Ensure adequate ventilation.

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 128 °F (82 °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.

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

## 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

**Engineering Controls:**

All ventilation should be designed in accordance with OSHA standard (29 CFR 1910.94). Use local exhaust at filling zones and where leakage and dust formation is probable. Use mechanical (general) ventilation for storage areas. Use appropriate ventilation as required to keep Exposure limits in Air below TLV & PEL Limits. Maintain atmospheric Oxygen content at or above 19.8%

**Personal Protective Equip:**

Eye/face protection:
When using material use safety goggles, gloves and vapor respirator according to HMIS PP, G. Use of a face shield according to HMIS PP, O is also highly recommended. All safety equipment should be tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin protection:
Handle with protective gloves made from Neoprene, butyl rubber, PVC or polyethylene. Gloves must be inspected prior to use. Dispose of contaminated gloves according to applicable laws and workplace practices.

Body Protection:
Chemically resistant gloves, safety goggles and face shield are recommended. Type of protective equipment should be selected based on concentration amount and conditions of use of this material. Use safety shoes.

Respiratory protection:
A vapor respirator may be required as backup to engineering controls when proper engineering controls are not in place to keep TIV and PEI limits below defined thresholds. A NIOSH/MSHA-approved full-face piece SCBA operated in positive mode and/or any supplied air respirator with a full-face piece and operated in a positive pressure mode in combination with an auxiliary self contained breathing apparatus operated in positive pressure mode should be used for high or unknown concentrations. Respirators should be stored in an area not likely to be contaminated.

Control of environmental exposure:
Prevent leakage or spillage if safe to do so.

**Components with workplace control parameters:**

Component(s): Nitrogen; Methane, Carbon Monoxide, Hydrogen Sulfide
CAS No(s): 7727-37-9; 74-82-8; 630-08-0; 7783-06-4
USA NIOSH (TWA/REL): 0.1 mg/m$^3$
USA NIOSH (C/REL): 10.0 ppm
USA ACGIH (TWA/TLV): 1.0 ppm
USA ACGIH (STEL/TLV): 5.0 ppm
USA ACGIH (TWA/TLV): Simple asphyxiate (Nitrogen)
USA OSHA Occupational Exposure Limits Table Z-1 Limits for Air Contaminant (C): 50.0 ppm, 50.0 mg/m$^3$
USA OSHA Occupational Exposure Limits Table Z-2 (CEII): 20.0 ppm
USA OSHA Occupational Exposure Limits Table Z-2 (Peak): 50.0 ppm

**Biological occupational exposure limits:**

Component: Carbon Monoxide
CAS-No: 74-82-8
Parameters: Carboxyhemoglobin; Carbon monoxide
Biological Specimen: In blood; In end-exhaled air
USA ACGIH Biological Exposure Indices: 3.5%; 20.0 ppm

## 9 PHYSICAL AND CHEMICAL PROPERTIES

| | | | |
|---|---|---|---|
| **Appearance:** | Clear, colorless gas | | |
| **Physical State:** | Gas | **Odor:** | Characteristic, rotten egg-like |
| **Odor Threshold:** | Not determined | **Molecular Formula:** | MIXTURE |
| **Particle Size:** | Not determined | **Solubility:** | Very slight |
| **Spec Grav./Density:** | Not determined | **Softening Point:** | Not determined |
| **Viscosity:** | Not determined | **Percent Volatile:** | 100% |
| **Sat. Vap. Conc.:** | Not determined | **Heat Value:** | Not determined |
| **Boiling Point:** | Not determined | **Freezing/Melting Pt.:** | Not determined |
| **Flammability:** | (solid, gas): Not flammable | **Flash Point:** | NA |
| **Partition Coefficient:** | Not determined | **Octanol:** | Not determined |
| **Vapor Pressure:** | (mm Hg @ 20 °C): Not determined | **Vapor Density:** | (air = 1): Not determined |
| **pH:** | Not determined | **VOC:** | Not determined |
| **Evap. Rate:** | Not determined | **Bulk Density:** | NA |

| | | | |
|---|---|---|---|
| **Molecular weight:** | MIXTURE | **Auto·Ignition Temp:** | Not determined |
| **Decomp Temp:** | Not determined | **UFL/LFL:** | NA |

## 10 STABILITY AND REACTIVITY

| | |
|---|---|
| **Stability:** | Product is stable under normal conditions. |
| **Conditions to Avoid:** | Incompatibilities, flames, ignition sources. |
| **Materials to Avoid:** | The majority of this product is inert gas, however, hydrogen sulfide will react with brass materials and form copper sulfide as a reaction product. |
| **Hazardous Decomposition:** | Carbon Oxides, Nitrogen Oxides (NOx) and Sulfur Oxides. |
| **Hazardous Polymerization:** | Will not occur. |

## 11 TOXICOLOGICAL INFORMATION

**Component(s):** Nitrogen; Oxygen; Methane; Carbon Monoxide; Hydrogen Sulfide
**CAS No(s):** 7727-37-9; 7782-44-7; 74-82-8; 630-08-0; 7783-06-4

**Acute Toxicity:**
LC50 Inhalation - Rat: 444 ppm (4 h)
LC50 Inhalation - Mouse: 634 ppm (1 h)

**Skin Corrosion/Irritation:** May irritate skin.

**Serious Eye Damage/Eye Irritation:** May cause eye irritation.

**Respiratory or Skin Sensitation:** No data available.

**Germ Cell Mutagenicity:** No data available.

**Carcinogenicity:**

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by IARC.
ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

**Reproductive Toxicity:** Known human reproductive toxicant.
Reproductive Toxicity Inhlation - Rat: Effects on newborn (physical).

**Specific Target Organ Toxicity · Single Exposure:** Continuous exposure to low (15 to 50 PPM) concentrations of hydrogen sulfide will generally cause irritation to mucous membranes, and may also cause headache, dizziness or nausea. Olfactory fatigue or paralysis of smell is also possible; thus detection of hydrogen sulfide by its odor is not considered adequate. Higher concentrations (2000 to 3000 PPM) may result in respiratory arrest leading to coma or unconsciousness. Exposures for more than 30 minutes at concentrations greater than 700 PPM have been fatal.

Hydrogen sulfide should be regarded as highly toxic. Toxicologically, it reacts with enzymes in the bloodstream and inhibits cellular respiration resulting in pulmonary paralysis, sudden collapse and death. This effect overshadows the irritant

properties.

**Specific Target Organ Toxicity · Repeated Exposure:** Inhalation - Causes damage to organs through prolonged or repeated exposure.

**Aspiration Hazard:** No data available.

**Additional Information:**
Component: Nitrogen; RTECS: QW9700000
Component: Oxygen; RTECS: RS2060000
Component: Methane; RTECS: PA1490000
Component: Carbon monoxide; RTECS: FG3800000
Component: Hydrogen sulfide; RTECS: MX1228000

## 12 ECOLOGICAL INFORMATION

**Component(s):** Nitrogen; Oxygen; Methane; Carbon Monoxide; Hydrogen Sulfide
**CAS No(s):** 7727-37-9; 7782-44-7; 74-82-8; 630-08-0; 7783-06-4

**Toxicity:**

*Toxicity to fish:*
LC50 - Pimephales promelas (Fathead Minnow): 0.016 mg/l (96 h)

*Toxicity to daphnia and other aquatic invertebrates:*
No data available.

**Persistence and Degradability:**
Hydrogen sulfide does not absorb solar radiation and therefore does not undergo photolysis or photochemical reaction with Oxygen. Primary chemical transformation of hydrogen sulfide in the atmosphere is oxidation via Oxygen containing radicals. The persistence of hydrogen sulfide in the atmosphere is dependent on season, latitude, and atmospheric conditions, ranging from 1 to 40 days with decreased temperatures and decreased levels of hydroxide in northern regions increasing residence time. In soil and water hydrogen sulfide is oxidized to elemental Sulfur by microorganisms via oxidation-reduction reactions which form part of the global Sulfur cycle.

**Bioaccumulative potential:**
No data available.

**Mobility in Soil:**
No data available.

**Results of PBT and vPvB assessment:**
Not required/conducted.

**Other Adverse Effects:**
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life. Product does not contain Class I or Class II ozone depleting substances.

## 13 DISPOSAL CONSIDERATIONS

Product and Contaminated Packaging: Do not attempt to dispose of residual waste or unused quantities in returnable containers. 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.

## 14 TRANSPORT INFORMATION

DOT Class: Non-Flammable Gas (2.2) #2.2
UN #: UN 1956, Class: 2, Proper Shipping Name: Compressed gas, n.o.s. (Hydrogen Sulfide, Nitrogen)

**DOT (US)**
UN Number: 1956
Class: 2.2
ERG #: 126
Proper Shipping Name: Compressed gas, n.o.s. (Hydrogen Sulfide, Nitrogen)

**IMDG**
UN Number: 1956
Class: 2
EMS-No: F-C, S-V
Proper Shipping Name: Compressed gas, n.o.s. (Hydrogen Sulfide, Nitrogen)

**IATA**
UN Number: 1956
Class: 2
Proper Shipping Name: Compressed gas, n.o.s. (Hydrogen Sulfide, Nitrogen)

**Canada TDG**
UN Number: 1956
Class: 2.2
Proper Shipping Name: Compressed gas, n.o.s. (Hydrogen Sulfide, Nitrogen)


## 15 REGULATORY INFORMATION

COMPONENT / (CAS/PERC) / CODES
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*Nitrogen (7727379 73.96-97.9993%) MASS, NJHS, PA, TSCA

*Oxygen (7782447 2.0-23.5%) MASS, NJHS, PA, SARA311/312, TSCA

*Methane (74828 0.0001-2.5%) MASS, NJHS, PA, TSCA, TXAIR

*Carbon monoxide (630080 0.0001-0.0300%) MASS, NJEHS, OSHAWAC, PA, PROP68, SARA311/312, TSCA, TXAIR

*Hydrogen sulfide (7783064 0.0008-0.0100%) CERCLA, CSWHS, EHS302, HAP, MASS, NJEHS, NJHS, OSHAPSM,

OSHAWAC, PA, SARA311/312, SARA313, TOXICRCRA, TSCA, TXAIR, TXHWL

This product contains hydrogen sulfide (CAS No.: 7783-06-4) which is listed under SARA 313 with a de minimus concentration of 1%; under SARA 304, CERCLA with a reportable quantity of 100 pounds, and is a SARA 302, Extremely Hazardous Substance with a Threshold Planning Quantity of 800 pounds.

REGULATORY KEY DESCRIPTIONS

CERCLA = Superfund clean up substance
CSwHS = Clean water Act Hazardous substances
EHS302 = Extremely Hazardous Substance
HAP = Hazardous Air Pollutants
MASS = MA Massachusetts Hazardous Substances List
NJEHS = NJ Extraordinarily Hazardous Substances
NJHS = NJ Right-to-Know Hazardous Substances
OSHAPSM = OSHA Chemicals Requiring process safety management
OSHAwAC = OSHA workplace Air Contaminants
PA = PA Right-To-Know List of Hazardous Substances
PROP65 = CA Prop 65
SARA311/312 = SARA 311/312 Toxic Chemicals
SARA313 = SARA 313 Title III Toxic Chemicals
TOXICRCRA = RCRA Toxic Hazardous wastes (U-List)
TSCA = Toxic Substances Control Act
TXAIR = TX Air Contaminants with Health Effects Screening Level
TXHwL = TX Hazardous waste List

## 16 OTHER INFORMATION

**Disclaimer:**

The data in this Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material in any process. The information set forth herein is furnished free of charge and is based on technical data that Norlab believes to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside of Norlab's control, Norlab makes no warranties, expressed or implied, and assumes no liability in connection with any use of this information. Nothing herein is to be taken as a license to operate under, or a recommendation to infringe upon, any patents.