

Sulfur Dioxide 0.0001% - 0.0999% in Nitrogen

SDS Number: 2200

Revision Date: 5/28/2015

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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: Sulfur Dioxide 0.0001% - 0.0999% in Nitrogen
Revision Date: 5/28/2015
Version: 1
SDS Number: 2200
Common Name: None
CAS Number: MIXTURE
Chemical Family: Gas Mixture
Chemical Formula: SO₂ in Nitrogen
Synonyms: None

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

2 HAZARDS IDENTIFICATION

Inhalation: Sulfur dioxide is very irritating and generally causes severe nose, throat and respiratory irritation before toxic concentrations are present. Exposure to low concentrations of sulfur dioxide may cause sneezing, coughing, bronchospasm, and systemic acidosis. Relative high concentrations of product would have to be inhaled for pulmonary edema or respiratory arrest to occur, however, individual susceptibility to the effects of sulfur dioxide varies.

Prolonged or repeated low level exposures may impair lung function and cause corrosion of the teeth.

Reproductive toxicity and developmental changes in newborn have been observed in experimental animals exposed to sulfur dioxide. Sulfur dioxide is mutagenic in experimental cell assay systems.

Nitrogen acts as a simple asphyxiate. Accumulation of high concentrations can displace oxygen content in the air necessary to support life.

Skin Contact: May irritate the skin upon contact. 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: May cause irritation with associated redness, swelling, and tears. Contact with rapidly expanding gas near the point of release may cause frostbite.

Ingestion: Ingestion is unlikely. Product is a gas at room temperature.

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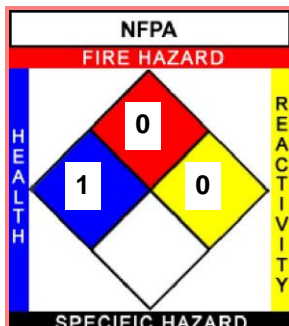
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NFPA:
HMIS III:

Health = 1, Fire = 0, Reactivity = 0
H1/F0/PH3



HMIS III	
HEALTH	1
FLAMMABILITY	0
PHYSICAL HAZARDS	3
PERSONAL PROTECTION B I Safety Glasses, Gloves	

PERSONAL PROTECTION INDEX			
A		G	
B		H	
C		I	
D		J	
E		K	
F		X	Consult your supervisor or S.O.P. for "SPECIAL" handling directions
A		n	
O		P	
Q		R	
S		Additional Information	
t		U	
W		Y	
Z			

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.
P304+312 - IN INHALED: Call a POISON CENTER or doctor/physician if you feel unwell.
P304+340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
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.

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Additional Hazard Statements (USA):

Simple Asphyxiant - May displace oxygen and cause rapid suffocation.

Colorless non-flammable gas with characteristic odor. May cause skin, eye and upper respiratory irritation. High concentrations of sulfur dioxide may cause pulmonary edema and chemical pneumonitis. Nitrogen acts as a simple asphyxiant by displacing oxygen necessary to support life. Sulfur dioxide reacts with water to produce sulfuric acid. Contents under pressure. Use and store below 125 °F (52 °C).

IDHI: 100 ppm (SO₂)

3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

CAS # I Percentage I Chemical Name

7727-37-9 I 99.9-99.9999% I Nitrogen
7446-09-5 I 0.0001-0.0999% I Sulfur dioxide

4 FIRST AID MEASURES

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.

Skin Contact: Remove contaminated clothing and flush affected area with large quantities of water. For frostbite, seek medical attention immediately; do NOT rub the affected areas or flush them with water. In order to prevent further tissue damage, do NOT attempt to remove frozen clothing from frostbitten areas.

Eye Contact: PERSONS WITH POTENTIAL EXPOSURE TO SULFUR DIOXIDE SHOULD NOT WEAR CONTACT LENSES. Flush eyes with large amounts of water for at least 15 minutes, holding eyelids open to ensure adequate rinsing. If irritation persists or frostbite is suspected, seek immediate medical attention.

Ingestion: None anticipated; product is a gas.

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.

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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:

Nitrogen gas
Nitrogen oxides (NOx)
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 heat or flame exposed containers until well after the flames are extinguished. Firefighters should wear a full-facepiece, 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.
Sulfur dioxide forms sulfuric acid solutions with water.
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. Personnel entering area should wear appropriate protective equipment, including respiratory protection suitable for unknown concentrations. Personnel should not re-enter an area until sulfur dioxide has sufficiently dispersed and adequate oxygen re-established. 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 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:

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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 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.

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 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.

Do not rely on the olfactory sense to detect the presence of hydrogen sulfide. Analytical devices and instrumentation are readily available for this purpose. Perform frequent analytical tests to be certain that the TWA is not exceeded. Many metals corrode rapidly with wet hydrogen sulfide. Anhydrous hydrogen sulfide can be handled in carbon steel, aluminum, Inconel®, Stellite®, 304 and 316 stainless steels. Avoid hard steels, which are highly stressed since they may be susceptible to hydrogen embrittlement from hydrogen sulfide. Multipoint air samplers with alarms for plant production units should be provided to constantly monitor the air in and around the units.

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 19.5%

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:

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Handle with protective gloves made from Saranex™, Barricade™ and Responder™ for greater than 8 hour exposures to pure sulfur dioxide). 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:

Use of a vapor respirator is highly recommended. A NIOSH/MSHA-approved full-facepiece SCBA operated in positive mode and/or any supplied air respirator with a full-facepiece 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; Sulfur Dioxide

CAS No(s): 7727-37-9; 7446-09-5

USA NIOSH (TWA/TLV): 2 ppm, 5 mg/m³

USA NIOSH (STEL/TLV): 5 ppm, 13 mg/m³

USA ACGIH (STEL/TLV): 0.25 ppm, 0.65 mg/m³

USA ACGIH (TWA/TLV): Simple asphyxiant (Nitrogen)

USA OSHA Occupational Exposure limits Table Z-1 limits for Air Contaminant (TWA): 2 ppm, 5 mg/m³

USA OSHA Occupational Exposure limits Table Z-1 limits for Air Contaminant (STEL): 5 ppm, 10 mg/m³

USA OSHA Table Z-1 limits for Air Contaminant 1910.1000 (TWA/PEL): 5 ppm, 13 mg/m³

Biological occupational exposure limits:

Contains no substances with biological occupational exposure limit values.

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PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, colorless gas	Odor:	Pungent, irritating
Physical State:	Gas	Molecular Formula:	MIXTURE
Odor Threshold:	Not determined	Solubility:	< 1%
Particle Size:	Not determined	Softening Point:	Not determined
Spec Grav./Density:	Not determined	Percent Volatile:	100%
Viscosity:	Not determined	Heat Value:	Not determined
Sat. Vap. Conc.:	Not determined	Freezing/Melting Pt.:	-209.9 °C (-345.9 °F)
Boiling Point:	-195.8 °C (-320.4 °F)	Flash Point:	NA
Flammability:	(solid, gas): Not flammable	Octanol:	Not determined
Partition Coefficient:	Not determined	Vapor Density:	(air = 1): 0.97
Vapor Pressure:	Not determined	VOC:	NA
pH:	Not determined	Bulk Density:	NA
Evap. Rate:	Not determined	Auto-Ignition Temp:	Not determined
Molecular weight:	MIXTURE	UFL/LFL:	NA
Decomp Temp:	Not determined		

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10 STABILITY AND REACTIVITY

Stability: Product is stable under normal conditions.
Conditions to Avoid: Incompatibilities, flames, ignition sources.
Materials to Avoid: Mixture contains only 0-0.1% sulfur dioxide. The following data is for pure sulfur dioxide. Reacts violently with peroxides, chromates, permanganates and oxygen difluoride. It also reacts with chlorates to form chlorine, which may become explosive at elevated temperatures. Forms sulfuric acid solutions with water.
Hazardous Decomposition: Nitrogen Oxides (NOx) and Sulfur Oxides.
Hazardous Polymerization: Will not occur.

11 TOXICOLOGICAL INFORMATION

Component(s): Nitrogen; Sulfur Dioxide
CAS No(s): 7727-37-9; 7446-09-5

Acute Toxicity:
LC50 Inhalation - Rat: 2,520 ppm (1 h)

Skin Corrosion/Irritation: Causes skin irritation. Sulfur dioxide is an irritant at 8 to 12 ppm with conjunctival irritation and lacrimation. Irritation becomes severe at 50 ppm.

Serious Eye Damage/Eye Irritation: Causes severe eye irritation. Sulfur dioxide is an irritant at 8 to 12 ppm with conjunctival irritation and lacrimation. Irritation becomes severe at 50 ppm.

Respiratory or Skin Sensitation: No data available.

Germ Cell Mutagenicity: Genetic changes observed in mammalian, insect bacterial and yeast cell assay systems. Sulfur dioxide has failed consistently to induce gene toxicity in intact rodents.

Carcinogenicity: This product is or contains a component that is not classifiable as to its carcinogenicity to humans based on its IARC, ACGIH, NTP or OSHA classification (Sulfur dioxide).

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Sulfur dioxide).
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: Experimental inhalation exposures of rats and mice at 1.5 to 32 ppm resulted in toxicity to both the male and female reproductive systems. Effects included menstrual cycle changes and toxic effects to testes. Developmental abnormalities were observed in newborn of exposed pregnant animals.

Specific Target Organ Toxicity - Single Exposure: Respiratory System - Dryness of the nose and throat and bronchoconstriction occurs following inhalation of 5 ppm or more sulfur dioxide. From 6 to 8 ppm a decrease in tidal respiratory volume occurs. Exposure to 20 ppm sulfur dioxide caused bronchospasm and 50 ppm causes extreme discomfort.

Specific Target Organ Toxicity - Repeated Exposure: Repeated exposure to sulfur dioxide has caused thickening of the mucous layer in the trachea and increases in goblet cells and mucous glands in test animals. No evidence of decreased

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pulmonary function was seen in guinea pigs exposed to 5 ppm sulfur dioxide for 1 year and monkeys exposed to 1.3 ppm for 78 weeks. Decreased lung compliance and decreased pulmonary flow-resistance was seen in dogs exposed continuously to 5 ppm for 225 days. Although there is no evidence that sulfur dioxide acts directly as a carcinogen, it may act as a promoter. Rats which inhaled 4 - 10 ppm sulfur dioxide (1-6 H/day, 5 days/week) and were intermittently exposed to benzo[a]pyrene (B[a]P) had a substantial increase in respiratory tract squamous cell carcinomas when compared to exposures to B[a]P) or SO₂ alone.

Aspiration Hazard: No data available.

Additional Information:

Component: Nitrogen; RTECS: QW9700000

Component: Sulfur dioxide; RTECS: WS4550000

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ECOLOGICAL INFORMATION

Component(s): Nitrogen; Sulfur Dioxide

CAS No(s): 7727-37-9; 7446-09-5

Toxicity:

Toxicity to fish:

No data available.

Toxicity to daphnia and other aquatic invertebrates:

No data available.

Persistence and Degradability:

The average residence time of pollution sulfur is generally between one and five days depending on the climate of a region. Spring melts of accumulated winter snow packs may result in rapid short-term inputs of high sulfate, low pH water to freshwater systems with disastrous effects on fish.

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

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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.

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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. (Sulfur Dioxide, Nitrogen)

DOT (US)

UN Number: 1956
Class: 2.2
ERG #: 126
Proper Shipping Name: Compressed gas, n.o.s. (Sulfur Dioxide, Nitrogen)

IMDG

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

IATA

UN Number: 1956
Class: 2
Proper Shipping Name: Compressed gas, n.o.s. (Sulfur Dioxide, Nitrogen)

Canada TDG

UN Number: 1956
Class: 2.2
Proper Shipping Name: Compressed gas, n.o.s. (Sulfur Dioxide, Nitrogen)



15 REGULATORY INFORMATION

COMPONENT / (CAS/PERC) / CODES

*Nitrogen (7727379 99.9-99.9999%) MASS, NJHS, PA, TSCA

*Sulfur dioxide (7446095 0.0001-0.0999%) EHS302, MASS, NJEHS, NJHS, OSHAPSM, OSHAWAC, PA, PROP65, SARA311/312, TSCA, TXAIR

Sulfur dioxide is listed under the accident prevention provisions of section 112 (r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 5,000 pounds.

REGULATORY KEY DESCRIPTIONS

EHS302 = Extremely Hazardous Substance
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

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SARA311/312 = SARA 311/312 Toxic Chemicals

TSCA = Toxic Substances Control Act

TXAIR = TX Air Contaminants with Health Effects Screening Level

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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.