Safety Data Sheet



Section 1: Identification

Product identifier

Product Name • Sulfur Dioxide (0.0010 - 0.0999%), Nitrogen (Balance)

Product Code MSDS No.: 30079

Relevant identified uses of the substance or mixture and uses advised against

Recommended use • Calibration Gas

Details of the supplier of the safety data sheet

Manufacturer • Air Liquide

2700 Post Oak Blvd. Houston, TX 77056 United States

www.us.airliquide.com sds@airliquide.com

Telephone (Technical) • 713-896-2896 Telephone (Technical) • 800-819-1704

Emergency telephone number

Manufacturer • 800-424-9300 - CHEMTREC

Manufacturer • +1 703-527-3887 - Outside United States

Section 2: Hazard Identification

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

OSHA HCS 2012 • Compressed Gas - H280 Simple Asphyxiant

Label elements
OSHA HCS 2012

WARNING



Hazard statements • Contains gas under pressure; may explode if heated - H280 May displace oxygen and cause rapid suffocation.

Precautionary statements

Storage/Disposal • Store in a well-ventilated place. - P403

Other hazards

OSHA HCS 2012

 Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada

According to WHMIS

Classification of the substance or mixture

WHMIS

Compressed Gas - A

Label elements

WHMIS



Compressed Gas - A

Other hazards WHMIS

 This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces.
 In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

Section 3 - Composition/Information on Ingredients

Substances

Material does not meet the criteria of a substance.

Mixtures

Hazardous Components							
Chemical Name	Chemical Name Identifiers %(weight) LD50/LC50 Classifications According to Regulation/Directive Comments						
Nitrogen	CAS :7727-37-9	99.9001% TO 99.999%	NDA	OSHA HCS 2012: Press. Gas - Comp.; Simp. Asphyx.	Balance		
Sulfur dioxide	CAS :7446- 09-5	0.001% TO 0.0999%	Inhalation-Rat LC50 • 2520 ppm 1 Hour(s)	OSHA HCS 2012: Press. Gas - Comp.; Muta. 2; Acute Tox. 3 (inh); Repr. 2	10-999 ppm		

Section 4: First-Aid Measures

Description of first aid measures

Inhalation

 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.

Skin

Although exposure is unlikely, in case of contact immediately flush skin with running

water. If skin irritation develops get medical advice/attention.

First aid is not expected to be necessary if material is used under ordinary conditions and as recommended. If irritation develops and persists, get medical attention.

Ingestion is not considered a potential route of exposure.

Most important symptoms and effects, both acute and delayed

Refer to Section 11 - Toxicological Information.

Indication of any immediate medical attention and special treatment needed

Notes to Physician

Eye

Ingestion

 All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred. A potential health hazard associated with this gas is anoxia.

Other information

Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO GASES WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus must be worn. Victim(s) who experience any adverse effect after overexposure to this gas mixture must be taken for medical attention. Rescuers should be taken for medical attention if necessary. Take a copy of the label and the MSDS to physician or other health professional with victim(s).

Section 5: Fire-Fighting Measures

Extinguishing media

Suitable Extinguishing Media . Use extinguishing agent suitable for type of surrounding fire.

Unsuitable Extinguishing Media

No data available

Special hazards arising from the substance or mixture

Unusual Fire and Explosion

Hazards

Containers may explode when heated. Ruptured cylinders may rocket.

Hazardous Combustion Products

No data available

Advice for firefighters

Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

Wear positive pressure self-contained breathing apparatus (SCBA).

Move containers from fire area if you can do it without risk.

FIRE: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions

FIRE INVOLVING TANKS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.

FIRE INVOLVING TANKS: Cool containers with flooding quantities of water until well after fire is out.

FIRE INVOLVING TANKS: Do not direct water at source of leak or safety devices; icing may occur.

FIRE INVOLVING TANKS: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.

FIRE INVOLVING TANKS: ALWAYS stay away from tanks engulfed in fire.

Section 6 - Accidental Release Measures

Format: GHS Language: English (US) WHMIS, OSHA HCS 2012

Personal precautions, protective equipment and emergency procedures

Personal Precautions

 Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Do not touch or walk through spilled material. Ventilate the area before entry.

Emergency Procedures

 Stop leak if you can do it without risk. Keep unauthorized personnel away. Keep out of low areas. Stay upwind. Do not direct water at spill or source of leak. LARGE SPILL: Consider initial downwind evacuation for at least 500 meters (1/3 mile)

Environmental precautions

No special environmental precautions necessary.

Methods and material for containment and cleaning up

Containment/Clean-up Measures

• Stop leak if you can do it without risk.

Do not direct water at spill or source of leak.

Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container.

If possible, turn leaking containers so that gas escapes rather than liquid.

Isolate area until gas has dispersed.

Ventilate the area.

Section 7 - Handling and Storage

Precautions for safe handling

Handling

• Use only with adequate ventilation. Ventilate closed spaces before entering. Be aware of any signs of dizziness or fatigue, especially if work is done in a poorly ventilated area; exposures to fatal concentrations of this gas mixture could occur without any significant warning symptoms, due to olfactory fatigue or oxygen deficiency. Cylinders should be firmly secured to prevent falling or being knocked-over. Do not attempt to repair, adjust, or in any other way modify cylinders. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. Empty containers retain product residue and can be hazardous. Do not cut, weld, puncture or incinerate container.

Conditions for safe storage, including any incompatibilities

Storage

Store in a cool, dry, well-ventilated place. Protect cylinders against physical damage. Cylinders should be firmly secured to prevent falling or being knocked-over.

Section 8 - Exposure Controls/Personal Protection

Control parameters

Exposure Limits/Guidelines							
	Result	ACGIH	Canada Ontario	Canada Quebec	NIOSH	OSHA	
Sulfur dioxide (7446-09-5)	STELs	0.25 ppm STEI			5 ppm STEL; 13 mg/m3 STEL	Not established	
	TWAs	Not established	• •	2 ppm TWAEV; 5.2 mg/m3 TWAEV	2 ppm TWA; 5 mg/m3 TWA	5 ppm TWA; 13 mg/m3 TWA	

Exposure controls

Engineering Measures/Controls

 Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal Protective Equipment

Respiratory

Follow the OSHA respirator regulations found in 29 CFR 1910.134. Use a

Eye/Face Skin/Body NIOSH/MSHA approved respirator if exposure limits are exceeded or symptoms are experienced.

- . Wear safety glasses.
- Wear leather gloves when handling cylinders.
- Follow best practice for site management and disposal of waste. Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

Environmental Exposure Controls

Key to abbreviations

STEL = Short Term Exposure Limits are based on 15-minute exposures

STEV = Short Term Exposure Value

TWAEV = Time-Weighted Average Exposure Value

Time-Weighted Averages are based on 8h/day, 40h/week

exposures

ACGIH = American Conference of Governmental Industrial Hygiene NIOSH = National Institute of Occupational Safety and Health

OSHA = Occupational Safety and Health Administration

Section 9 - Physical and Chemical Properties

Information on Physical and Chemical Properties

Material Description			
Physical Form	Gas	Appearance/Description	Colorless gas with acrid or pungent odor.
Color	Colorless	Odor	Acrid or pungent odor.
Taste	Data lacking	Particulate Type	Not relevant
Particulate Size	Not relevant	Aerosol Type	Not relevant
Odor Threshold	3 to 5 ppm Sulfur Dioxide	Physical and Chemical Properties	Data lacking
General Properties			
Boiling Point	-195.8 C(-320.44 F) Nitrogen	Melting Point	-210 C(-346 F) Nitrogen
Decomposition Temperature	Data lacking	Heat of Decomposition	Data lacking
рН	Not relevant	Specific Gravity/Relative Density	0.906 Water=1 @ 21.1 C(69.98 F) Nitrogen
Density	1.153 kg/m³ @ 0 C(32 F) Nitrogen	Bulk Density	Data lacking
Water Solubility	Moderately soluble 1 to 10 %	Solvent Solubility	Data lacking
Viscosity	Not relevant	Explosive Properties	Not explosive.
Oxidizing Properties:	Not an oxidizing gas.		
Volatility			
Vapor Pressure	Not relevant	Vapor Density	1.066 Air=1
Evaporation Rate	Not relevant	VOC (Wt.)	Data lacking
VOC (Vol.)	Data lacking	Volatiles (Wt.)	Data lacking
Volatiles (Vol.)	Data lacking		
Flammability			
Flash Point	Not relevant	UEL	Not relevant
LEL	Not relevant	Autoignition	Not relevant
Heat of Combustion (ΔHc)	Not relevant	Burning Time	Not relevant
Flame Height	Not relevant	Flame Extension	Not relevant
Ignition Distance	Not relevant	Flame Duration	Not relevant
Self-Accelerating Decomposition Temperature (SADT)	Not relevant	Flammability (solid, gas)	Not flammable.

Environmental					
Half-Life	Data lacking	Octanol/Water Partition coefficient	Data lacking		
Coefficient of water/oil distribution	Data lacking	Bioaccumulation Factor	Data lacking		
Bioconcentration Factor	Data lacking	Biochemical Oxygen Demand BOD/BOD5	Data lacking		
Chemical Oxygen Demand	Data lacking	Persistence	Data lacking		
Degradation	Data lacking				

Section 10: Stability and Reactivity

Reactivity

No dangerous reaction known under conditions of normal use.

Chemical stability

Stable under normal temperatures and pressures.

Possibility of hazardous reactions

Hazardous polymerization will not occur.

Conditions to avoid

Excess heat.

Incompatible materials

 Will react with water or steam to produce toxic and corrosive fumes. The Sulfur Dioxide component of this gas mixture is not compatible with the following materials: strong bases, strong oxidizers, powdered metals, metal oxides, interhalogens, metal acetylides, sodium hydride, silver azide, cesium azide, fluorine, zinc, zinc compounds.

Hazardous decomposition products

Sulfur dioxide dissolves in water to form corrosive sulfuric acid.

Section 11 - Toxicological Information

Information on toxicological effects

Component Name	CAS	Data
Sulfur dioxide (0.001% TO 0.0999%)		Acute Toxicity: ihl-rat LC50:2520 ppm/1H; Irritation: eye-rbt 6 ppm/32D MLD; Reproductive: ihl-mus TCLo:25 ppm/7H (6-15D preg); ihl-rbt TCLo:70 ppm/7H (6-18D preg); Tumorigen/Carcinogen: ihl-rat TCLo:72 mg/kg/300D-l

GHS Properties	Classification
Acute toxicity	OSHA HCS 2012 • Classification criteria not met
Aspiration Hazard	OSHA HCS 2012 • Classification criteria not met
Carcinogenicity	OSHA HCS 2012 Classification criteria not met
Germ Cell Mutagenicity	OSHA HCS 2012 • Classification criteria not met
Respiratory sensitization	OSHA HCS 2012 • Classification criteria not met
Serious eye damage/Irritation	OSHA HCS 2012 • Classification criteria not met
Skin corrosion/Irritation	OSHA HCS 2012 • Classification criteria not met

Skin sensitization	OSHA HCS 2012 • Classification criteria not met
STOT-RE	OSHA HCS 2012 • Classification criteria not met
STOT-SE	OSHA HCS 2012 Classification criteria not met
Toxicity for Reproduction	OSHA HCS 2012 • Classification criteria not met

Route(s) of entry/exposure Potential Health Effects Inhalation

Inhalation, Skin, Eye

Acute (Immediate)

• This material is a simple asphyxiant. May displace or reduce oxygen available for breathing especially in confined spaces. If this material is released in a small, poorly ventilated area (i.e. an enclosed or confined space), an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur. The following effects associated with decreased levels of oxygen: increase in breathing and pulse rate, emotional upset, abnormal fatigue, nausea, vomiting, collapse, loss of consciousness, convulsive movements, respiratory collapse and death.

Chronic (Delayed)

Skin

Acute (Immediate)
Chronic (Delayed)

Eye

Acute (Immediate) Chronic (Delayed)

Ingestion

Acute (Immediate)
Chronic (Delayed)
Mutagenic Effects

Carcinogenic Effects

Reproductive Effects

Key to abbreviations

TC = Toxic Concentration
MLD = Mild

LC = Lethal Concentration

No data available

- Under normal conditions of use, no health effects are expected.
- Under normal conditions of use, no health effects are expected.
- Under normal conditions of use, no health effects are expected.
- Under normal conditions of use, no health effects are expected.
- Ingestion is not anticipated to be a likely route of exposure to this product.
- Ingestion is not anticipated to be a likely route of exposure to this product.
- Material level data is not available however this gas mixture contains sulfur dioxide
 which based on studies in rats may cause mutagenic effects upon prolonged and
 repeated exposure. The sulfur dioxide component is present in amounts below
 regulatory thresholds that would make this classification relevant to the material.
- The components of this material are not found on the following lists: FEDERAL OSHA Z LIST, NTP and IARC; therefore, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies.
- Material level data is not available however this gas mixture contains sulfur dioxide
 which based on studies in mice and rabbits may cause developmental effects. The
 sulfur dioxide component is present in amounts below regulatory thresholds that would
 make this classification relevant to the material.

Section 12 - Ecological Information

Toxicity

Material data lacking.

Persistence and degradability

Material data lacking.

Bioaccumulative potential

Material data lacking.

Mobility in Soil

Material data lacking.

Other adverse effects

Material data lacking.

Section 13 - Disposal Considerations

Waste treatment methods

Product waste

• Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste

 Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	UN1956	Compressed gas, n.o.s. (Nitrogen, Sulfur Dioxide)	2.2	NDA	NDA
TDG	UN1956	COMPRESSED GAS, N.O.S. (NITROGEN, SULFUR DIOXIDE)	2.2	NDA	NDA
IMO/IMDG	UN1956	COMPRESSED GAS, N.O.S. (NITROGEN, SULFUR DIOXIDE)	2.2	NDA	NDA
IATA/ICAO	UN1956	Compressed gas, n.o.s. (Nitrogen, Sulfur Dioxide)	2.2	NDA	NDA

Special precautions for user

• Sulfur Dioxide has a reportable quantity of 500 lbs (227 kg) as listed in Appendix A to 49 CFR 172.101. Cylinders should be transported in a secure position, in a well-ventilated vehicle. The transportation of compressed gas cylinders in automobiles or in closed-body vehicles can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not relevant.

Section 15 - Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture SARA Hazard Classifications • Acute, Pressure(Sudden Release of)

State Right To Know							
Component CAS MA NJ PA							
Nitrogen	7727-37-9	Yes	Yes	Yes			
Sulfur dioxide	7446-09-5	Yes	Yes	Yes			

Inventory						
Component CAS Canada DSL Canada NDSL TSCA						
Nitrogen	7727-37-9	Yes	No	Yes		
Sulfur dioxide	7446-09-5	Yes	No	Yes		

Canada

Labor

Canada - WHMIS - Classifications of Substances

• Sulfur dioxide 7446-09-5 0.001% TO 0.0999% A, D1A, D2B, E

• Nitrogen 7727-37-9 99.9001% TO 99.999% A

Canada - WHMIS - Ingredient Disclosure List

Sulfur dioxide 7446-09-5 0.001% TO 0.0999% 1 %
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed

Environment

Canada - CEPA - Priority Substances List

Sulfur dioxide 7446-09-5 0.001% TO 0.0999% Not Listed
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

• Sulfur dioxide 7446-09-5 0.001% TO 0.0999% 1000 lb TQ (liquid)

• Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

Sulfur dioxide 7446-09-5 0.001% TO 0.0999% Not Listed
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% Not Listed
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed
- U.S. CERCLA/SARA Hazardous Substances and their Reportable Quantities
- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% Not Listed
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed
- U.S. CERCLA/SARA Radionuclides and Their Reportable Quantities
- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% Not Listed
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed
- U.S. CERCLA/SARA Section 302 Extremely Hazardous Substances EPCRA RQs
- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% 500 lb EPCRA RQ
- Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed
- U.S. CERCLA/SARA Section 302 Extremely Hazardous Substances TPQs
- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% 500 lb TPQ
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed
- U.S. CERCLA/SARA Section 313 Emission Reporting
- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% Not Listed
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed
- U.S. CERCLA/SARA Section 313 PBT Chemical Listing
- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% Not Listed
- Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% Not Listed
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed
- U.S. California Proposition 65 Developmental Toxicity

- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% developmental toxicity, initial date 7/29/11
- Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% Not Listed
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed
- U.S. California Proposition 65 No Significant Risk Levels (NSRL)
- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% Not Listed
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed
- U.S. California Proposition 65 Reproductive Toxicity Female
- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% Not Listed
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed
- U.S. California Proposition 65 Reproductive Toxicity Male
- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% Not Listed
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed

United States - Pennsylvania

Labor

U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List

- Sulfur dioxide 7446-09-5 0.001% TO 0.0999%
- Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed
- U.S. Pennsylvania RTK (Right to Know) Special Hazardous Substances
- Sulfur dioxide 7446-09-5 0.001% TO 0.0999% Not Listed
 Nitrogen 7727-37-9 99.9001% TO 99.999% Not Listed

Section 16 - Other Information

Last Revision Date

06/November/2012

Preparation Date

Disclaimer/Statement of Liability

• 06/November/2012

To the best of Air Liquide's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this gas mixture is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.

Key to abbreviations NDA = No Data Available