



MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Union REACH Regulations

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: NON-FLAMMABLE GAS MIXTURE Containing One or More of the Following Components in a Nitrogen Balance Gas: Oxygen, 0-23.5%; Methane, 0-2.5%; Propane, 0-1.1%; Carbon Monoxide, 0.0005-1.0%; Sulfur Dioxide, 0.0001-10.00%

SYNONYMS: Not Applicable

CHEMICAL FAMILY NAME: Not Applicable

FORMULA: Not Applicable

PRODUCT USE: Calibration of Monitoring and Research Equipment

DOCUMENT NUMBER: MSDS 1019 (99-0155)

U.N. NUMBER: UN1956

U.N. DANGEROUS GOODS CLASS: Compressed gases, n.o.s. (*Oxygen, Nitrogen) *or the gas component with the next highest concentration next to Nitrogen.

SUPPLIER/MANUFACTURER'S NAME: **PortaGAS, Inc.**

ADDRESS: 1202 E. Sam Houston Pkwy S., Pasadena, TX 77503

EMERGENCY PHONE: **TOLL-FREE in USA/Canada:** (800)255-3924
International calls: +1 813 248 0585
Australian Poison Control: 13 11 26
Australian Fire Brigade: 000

BUSINESS PHONE: (713) 928-6477 General MSDS Info

DATE OF PREPARATION: October 2012

DATE OF LAST REVISION: October 2012

SECTION 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This gas mixture is colorless and has a slight sulfur-like odor (due to the presence of Sulfur Dioxide). The Carbon Monoxide component of this gas mixture is a chemical asphyxiant and can produce significant, adverse health effects at relatively low concentrations. Depending on the duration and concentration of Carbon Monoxide, over-exposure to this gas mixture may cause nausea, dizziness, headaches, and collapse. Sulfur Dioxide can also produce adverse health effects in extremely low concentrations (i.e. skin and eye irritation, dry throat, lung damage). Additionally, releases of this gas mixture may produce oxygen-deficient atmospheres (especially in small, confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated.

US DOT SYMBOLS



CANADA (WHMIS) SYMBOLS



EUROPEAN and
(GHS) HAZARD SYMBOLS



Signal Word: **Danger**

Classification of the substance or mixture according to Regulation (EC) No 1272/2008

Aspiration Hazard Category 1
Pressurized Gas
Skin Corrosive Category 1B
Acute Toxicity Inhalation Category 3

According to European Directive 67/548/EEC as amended.

Harmful by inhalation, pressurized gas

Hazard Statement(s):

H270: May cause or intensify fire, oxidizer
H280: Contains gas under pressure, may explode if heated
H304: May be fatal if swallowed and enters airways
H314: Causes severe skin burns and eye damage
H331: Toxic if inhaled

Hazard Symbol(s):

[T] Toxic; [Xn] Harmful; [O] Oxidizer

Precautionary Statement(s):

P261: Avoid breathing gas.
P271: Use only in well ventilated area.
P281: Use personal protective equipment as required.
P314: Get medical advice/attention if you feel unwell
P403: Store in a well ventilated place.

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Risk Phrases: Simple Asphyxiant

R8: Contact with combustible material may cause fire.
R23: Toxic by inhalation; R34: Causes burns.
R48/20: Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R65: Harmful may cause lung damage if swallowed.
R67: Vapors may cause drowsiness and dizziness.

Safety Phrases:

S9: Keep container in a well ventilated area
S23: Do not breathe gas.
S36/37: Wear suitable protective clothing and gloves.

HEALTH HAZARDS OR RISKS FROM EXPOSURE:

ACUTE: Due to the small size of the individual cylinder of this gas mixture, no unusual health effects from exposure to the product are anticipated under routine circumstances of use. However, the Carbon Monoxide component of this gas mixture is toxic to humans. Symptoms of Carbon Monoxide poisoning can develop gradually, or can arise suddenly, depending on the concentration and duration of exposure. Lips and fingernails will turn bright red, which is a significant sign of Carbon Monoxide over-exposure. Other symptoms of over-exposure can include respiratory difficulty, headaches, and shortness of breath, wheezing, headache, blurred vision, memory loss, dizziness, indigestion, nausea, unconsciousness, and death. Under certain circumstances, over-exposure to this gas may be fatal. Another potential health hazard associated with this gas mixture is the potential for over-exposure to Sulfur Dioxide, which can cause irritation and damage to the respiratory system, the skin, and eyes. Sulfur Dioxide may react with moisture on the skin to produce sulfurous acid; contact with the acid can produce scratchiness, pain, and redness of contaminated areas. Depending on the duration of over-exposure, contact with eye tissue may result in pain, inflammation, and blindness. Symptoms of oxygen deficiency include respiratory difficulty, ringing in ears, headaches, and shortness of breath, wheezing, headache, dizziness, indigestion, nausea, unconsciousness, and death. The skin of a victim of over-exposure may have a blue color.

CHRONIC: Prolonged or repeated over-exposures to Sulfur Dioxide, a component of this gas mixture, may cause respiratory problems, bronchitis, hacking cough, nasal irritation and discharge, increased fatigue, alteration in the senses of taste and smell. Repeated over exposures to Sulfur Dioxide can also result in dental erosion and gum disorders. Propane (another component of this gas mixture) can cause sensitization of the heart to epinephrine, based on animal tests. Refer to Section 11 (Toxicology Information) for additional data on this gas mixture's components. Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.

TARGET ORGANS:

ACUTE: Respiratory system, blood system, skin and eyes.
CHRONIC: Cardiovascular system, heart, reproductive system, teeth, skin, and eyes.

SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS:	CAS #	EINECS #	ICSC #	% Vol	HAZARD CLASSIFICATION; RISK PHRASES
Sulfur Dioxide	7446-09-5	231-195-2	0074	0.0001 – 10.00	HAZARD CLASSIFICATION:[T] Toxic RISK PHRASES: R23, R34
Carbon Monoxide	630-08-0	211-128-3	0023	0.0005 – 1.0%	HAZARD CLASSIFICATION:[T] Toxic RISK PHRASES: R23, R48/23
Propane	74-98-6	200-827-9	0319	0.0 – 1.1%	HAZARD CLASSIFICATION:[F] FLAMMABLE RISK PHRASES: R12
Methane	74-82-8	200-812-7	0291	0.0 – 2.5%	HAZARD CLASSIFICATION:[F] FLAMMABLE RISK PHRASES: R12
Oxygen	7782-44-7	231-956-9	0138	0.0 – 23.5%	HAZARD CLASSIFICATION:[O] OXIDIZER RISK PHRASES: R8
Nitrogen	7727-37-9	231-783-9	1198.	Balance	HAZARD CLASSIFICATION:[Xi] IRRITANT RISK PHRASES: R36/38

None of the trace impurities in this product contribute significantly to the hazards associated with the product.
All hazard information pertinent to the product has been provided in this Material Safety Data sheet., per the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200) and State equivalent standards

Note: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard JIS Z 7250: 2000.

SECTION 4 - FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS PRODUCT WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. Victim(s) who experience any adverse effect after over-exposure 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). No unusual health effects are anticipated after exposure to this gas mixture, due to the small cylinder size. If any adverse symptom develops after over-exposure to this gas mixture, remove victim(s) to fresh air as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation if necessary.

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SKIN EXPOSURE: If irritation of the skin develops after exposure to this gas mixture, immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention.

EYE EXPOSURE: If irritation of the eye develops after exposure to this gas mixture, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Seek medical assistance immediately, preferably an ophthalmologist.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing respiratory conditions may be aggravated by over-exposure to this gas mixture. Carbon Monoxide, a component of this gas mixture, can aggravate some diseases of the cardiovascular system, such as coronary artery disease and angina pectoris. Additionally, due to the presence of Sulfur Dioxide, skin, eye and dental conditions may be aggravated by over-exposures to this gas mixture.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate over-exposure. If necessary, the use of hyperbaric oxygen is the most efficient antidote to Carbon Monoxide poisoning, the optimum range being 2-2.5 atm. A special mask, or, preferably, a compression chamber to utilize oxygen at these pressures is required. Avoid administering stimulant drugs. Additionally, be observant for the signs of pulmonary edema (due to the presence of Sulfur Dioxide).

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT: Not Applicable

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %): Lower (LEL): Not applicable. Upper (UEL): Not applicable. **FIRE**

EXTINGUISHING MATERIALS: Non-flammable gas mixture. Use extinguishing media appropriate for surrounding fire. **UNUSUAL**

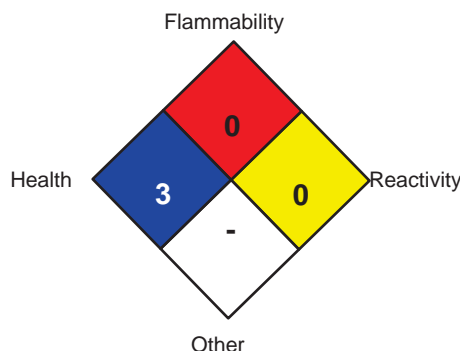
FIRE AND EXPLOSION HAZARDS: Due to the presence of Sulfur Dioxide, this gas mixture is irritating to the respiratory system, skin, and eyes; this mixture may pose a health hazard to firefighters. Sulfur Dioxide can react with water to form a corrosive solution of sulfurous acid. This acidic solution may corrode metal and cause injury to firefighters. This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.

Explosion Sensitivity to Static Discharge: Not Sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment.

NFPA RATING SYSTEM



HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
HEALTH HAZARD (BLUE)			3
FLAMMABILITY HAZARD (RED)			0
PHYSICAL HAZARD (YELLOW)			0
PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	See Sect 8		See Sect 8
For Routine Industrial Use and Handling Applications			

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

SECTION 6 - ACCIDENTAL RELEASE MEASURES

LEAK RESPONSE: Due to the small size and content of the cylinder, an accidental release of this gas mixture presents significantly less risk of over-exposures to Carbon Monoxide and Sulfur Dioxide and exposure to an oxygen deficient environment and other safety hazards than a similar release from a larger cylinder. However, as with any chemical release, extreme caution must be used during emergency response procedures. In the event of a release in which the atmosphere is unknown, and in which other chemicals are potentially involved, evacuate immediate area. Such releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a leak, clear the affected area, protect people, and respond with trained personnel. For emergency disposal, secure the cylinder and slowly discharge the gas to the atmosphere in a well-ventilated area or outdoors. Allow the gas mixture to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for oxygen, Carbon Monoxide, and Sulfur Dioxide. Carbon Monoxide and Sulfur Dioxide levels must be below exposure level listed in Section 2 (Composition and Information on Ingredients) before non-emergency personnel are allowed to re-enter area. If leaking incidentally from the cylinder or its valve, contact your supplier.

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SECTION 7 - HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this product could occur without any significant warning symptoms, due to oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify cylinders containing Carbon Monoxide. If there is a malfunction or another type of operational problem, contact nearest distributor immediately.

STORAGE AND HANDLING PRACTICES: Cylinders should be firmly secured to prevent falling or being knocked-over. Cylinders must be protected from the environment, and preferably kept at room temperature (approximately 21°C [70°F]). Cylinders should be stored in dry, well-ventilated areas, away from sources of heat, ignition, and direct sunlight. Protect cylinders against physical damage. Full and empty cylinders should be segregated. Use a first-in, first-out inventory system to prevent full containers from being stored for long periods of time. These cylinders are not refillable.

WARNING! Do not refill DOT 39 cylinders. To do so may cause personal injury or property damage.

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS:

WARNING! Compressed gases can present significant safety hazards. During cylinder use, use equipment designed for these specific cylinders. Ensure all lines and equipment are rated for proper service pressure.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

Chemical Name	CAS#	ACGIH TWA	OSHA TWA	SWA
Sulfur Dioxide	7446-09-5	2 ppm	5 ppm	2 ppm
Carbon Monoxide	630-08-0	25 ppm	50 ppm	30 ppm
Propane	74-98-6	2500 ppm	1000 ppm	Not Listed
Methane	74-82-8	Not Listed	Not Listed	Not Listed
Oxygen	7782-44-7	Not Listed	Not Listed	Not Listed
Nitrogen	7727-37-9	Not Listed	Not Listed	Not Listed

There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%

VENTILATION AND ENGINEERING CONTROLS: No special ventilation systems or engineering controls are needed under normal circumstances of use. As with all chemicals, use this gas mixture in well-ventilated areas. If this gas mixture is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of oxygen.

RESPIRATORY PROTECTION: No special respiratory protection is required under normal circumstances of use. Use supplied air respiratory protection if Carbon Monoxide and Sulfur Dioxide levels exceed limits given in Section 2 (Composition Information on Ingredients) and oxygen levels are below 19.5% or unknown during emergency response to a release of this gas mixture. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998). If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: No special protection is needed under normal circumstances of use. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: No special protection is needed under normal circumstances of use. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

The following information is for Nitrogen, a main component of this gas mixture.

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.072 lbs/ ft³ (1.153 kg/m³)

BOILING POINT: -320.4°F (-195.8°C)

FREEZING/MELTING POINT @ 10 psig: -210°C (-345.8°F)

SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 0.906

pH: Not applicable.

SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm: 0.023

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MOLECULAR WEIGHT: 28.01

EVAPORATION RATE (nBuAc = 1): Not applicable.

EXPANSION RATIO: Not applicable.

ODOR THRESHOLD: Not applicable.

SPECIFIC VOLUME (ft³/lb): 13.8

VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for **Oxygen, a main component of this gas mixture.**

GAS DENSITY @ 32°F (0°C) and 1 atm: 0.083 lb/cu ft (1.326 kg/m³)

FREEZING/MELTING POINT @ 10 psig: -218.8°C (-361.8°F)

BOILING POINT: -183.0°C (-297.4°F)

SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C): 1.105

pH: Not applicable.

SOLUBILITY IN WATER vol/vol at 32°F (0°C) and 1 atm: 0.04.91

MOLECULAR WEIGHT: 32.00

EVAPORATION RATE (nBuAc = 1): Not applicable.

EXPANSION RATIO: Not applicable.

ODOR THRESHOLD: Not applicable. **VOLUME (ft³/lb):** 12.1

VAPOR PRESSURE @ 70°F (21.1°C) psig: Not applicable.

COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for the gas mixture.

APPEARANCE AND COLOR: This gas mixture is colorless and has a slight sulfur-like or acrid odor.

HOW TO DETECT THIS SUBSTANCE (warning properties): The odor is a distinctive characteristic of this gas mixture. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

SECTION 10 - STABILITY and REACTIVITY

STABILITY: Normally stable in gaseous state.

DECOMPOSITION PRODUCTS: Sulfur Dioxide (a component of this gas mixture) will react with water or moist air to form sulfurous acid. The thermal decomposition products of Methane and Propane (Components of this gas mixture) include carbon oxides. The other components of this gas mixture do not decompose, per se, but can react with other compounds in the heat of a fire.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Titanium will burn in Nitrogen (the main component of this gas mixture). Lithium reacts slowly with Nitrogen at ambient temperatures. The Propane, Carbon Monoxide, Methane components are also incompatible with strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen, oxygen difluoride, and nitrogen trifluoride). The Sulfur Dioxide component 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. Carbon Monoxide is mildly corrosive to nickel and iron (especially at high temperatures and pressures).

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

SECTION 11 - TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following toxicology data are available for the components of this gas mixture in 1% concentration or greater:

CARBON MONOXIDE: LC₅₀ (Inhalation-Rat) 1807 ppm/4 hours LC₅₀ (Inhalation-Mouse) 2444 ppm/4 hours LC₅₀ (Inhalation-Guinea Pig) 5718 ppm/4 hours LC₅₀ (Inhalation-wild bird species) 1334 ppm LCLo (Inhalation-Human) 4 mg/m³/12 hours: Behavioral: coma.

PROPANE: Skin Contact (Rabbit): Several formulations containing an isobutane-propane mixture have been tested for skin irritation effects. All formulations contained less than 13% propane. All of the formulations containing propane caused only mild irritation.

SULFUR DIOXIDE: Eye, rabbit = 6 ppm/4 hours/32 days; mild effects Mutation in Microorganisms System Test = 10 mmol/L DNA damage System Test (human, lymphocyte) = 5700 ppb TCLo (inhalation, mouse) = 32 ppm/ 24 hours (female 7-28 day post).

METHANE: There are no specific toxicology data for Methane. Methane is a simple asphyxiant, which acts to displace oxygen in the environment.

NITROGEN: There are no specific toxicology data for Nitrogen. Nitrogen is a simple asphyxiant, which acts to displace oxygen in the environment.

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OXYGEN: The toxicity data for Oxygen are related to exposures in a hyperbaric environment and are not likely to occur in industrial exposure situations.

SUSPECTED CANCER AGENT: The components of this gas mixture are listed by agencies tracking the carcinogenic potential of chemical compounds, as follows:

SULFUR DIOXIDE: ACGIH TLV-A4 (Not Classifiable as a Human Carcinogen); IARC-3 (Unclassifiable as to Carcinogenicity in Humans) The remaining components of this gas mixture are not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, and IARC; therefore are not considered to be, nor suspected to be, cancer-causing agents by these agencies.

IRRITANCY OF PRODUCT: Due to the presence of Sulfur Dioxide, this gas mixture can be very irritating and potentially damaging to the skin, eyes, and respiratory system, especially in the presence of moisture.

SENSITIZATION OF PRODUCT: The components of this gas mixture are not known to be skin or respiratory sensitizers. Based on animal tests, the Propane component of this gas mixture may cause cardiac sensitization to epinephrine.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this gas mixture on the human reproductive system. Mutagenicity: The components of this gas mixture are not reported to cause mutagenic effects in humans. The Sulfur Dioxide component of this gas mixture has produced mutagenic effects on specific animal tissues exposed to relatively large doses. Embryotoxicity: The components of this gas mixture are not reported to cause embryotoxic effects in humans. Sulfur Dioxide has produced embryotoxic effects during clinical studies on test animals exposed to relatively large doses. Teratogenicity: The components of this gas mixture are not reported to cause teratogenic effects in humans due to the small cylinder size and small total amount of all components. Carbon Monoxide, a component of this gas mixture which exists up to 1%, can cause teratogenic effects in humans. Severe exposure to Carbon Monoxide during pregnancy has caused adverse effects and the death of the fetus. In general, maternal symptoms are an indicator of the potential risk to the fetus since Carbon Monoxide is toxic to the mother before it is toxic to the fetus. Sulfur Dioxide has produced teratogenic effects during clinical studies on test animals exposed to relatively large doses. Reproductive Toxicity: The components of this gas mixture are not reported to cause adverse reproductive effects in humans.

BIOLOGICAL EXPOSURE INDICES (BEIs): Biological Exposure Indices (BEIs) have been determined for the components of this gas mixture, as follows:

CHEMICAL DETERMINANT	SAMPLING TIME	BEI
CARBON MONOXIDE		
<ul style="list-style-type: none">Carboxyhemoglobin in BloodCarbon Monoxide in End-Exhaled Air	<ul style="list-style-type: none">End of ShiftEnd of Shift	<ul style="list-style-type: none">3.5% of Hemoglobin20 ppm

SECTION 12 - ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are applicable to the components of this gas mixture.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on the effects of this gas mixture on plant and animal life. Carbon Monoxide, a component of this gas mixture, can be deadly to exposed animal life, producing symptoms similar to those experienced by humans. Carbon Monoxide may also be harmful to plant life. : Due to the presence of Sulfur Dioxide in this gas mixture, over-exposed animals could develop respiratory system damage, as well as skin and eye disorders. Because Sulfur Dioxide produces corrosive solutions upon contact with moisture; plants may be damaged or destroyed.

EFFECT OF CHEMICAL ON AQUATIC LIFE: If a release this gas mixture occurs near a body water, the release may be harmful or fatal to fish and other aquatic life. Sulfur Dioxide, a component of this gas mixture, hydrolyzes to sulfurous acid solution when in contact with water. Sulfurous acid is very soluble in water, and even low concentrations of Sulfur Dioxide or sulfurous acid in water are detrimental to aquatic life. The presence of more than a trace of Carbon Monoxide (another component of this gas mixture) is also a hazard to fish.

SECTION 13 - DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan. Cylinders with undesired residual product may be safely vented outdoors with the proper regulator. For further information, refer to Section 16 (Other Information).

SECTION 14 - TRANSPORTATION INFORMATION

US DOT: IATA: IMO: ADR:

THIS GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Compressed gases, n.o.s. (*Oxygen, Nitrogen)*or the gas component with the next highest concentration next to Nitrogen.

HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)

UN IDENTIFICATION NUMBER: UN 1956

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PACKING GROUP: Not applicable.

DOT LABEL(S) REQUIRED: Class 2.2 (Non-Flammable Gas)

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126

MARINE POLLUTANT: The components of this gas mixture are not classified by the DOT as Marine Pollutants (as defined by 49 CFR 172.101, Appendix B).

SPECIAL SHIPPING INFORMATION: 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

Note: DOT 39 Cylinders ship in a strong outer carton (over pack). Pertinent shipping information goes on the outside of the over pack. DOT 39 Cylinders do not have transportation information on the cylinder itself.

U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS:

This product is classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:

This product is classified as Dangerous Goods, per regulations of Transport Canada.

PROPER SHIPPING NAME: Compressed gases, n.o.s. (*Oxygen, Nitrogen)* or the gas component with the next highest concentration next to Nitrogen.

HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)

UN IDENTIFICATION NUMBER: UN 1956

PACKING GROUP: Not Applicable

HAZARD LABEL: Class 2.2 (Non-Flammable Gas)

SPECIAL PROVISIONS: None

EXPLOSIVE LIMIT AND LIMITED QUANTITY INDEX: 0.12

ERAP INDEX: None

PASSENGER CARRYING SHIP INDEX: None

PASSENGER CARRYING ROAD VEHICLE OR PASSENGER CARRYING RAILWAY VEHICLE INDEX: 75

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2004): 126

Note: Shipment of compressed gas cylinders via Public Passenger Road Vehicle is a violation of Canadian law (Transport Canada Transportation of Dangerous Goods Act, 1992).

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):

This product is classified as Dangerous Goods, by rules of IATA:

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:

This product is classified as Dangerous Goods by the International Maritime Organization.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):

This product is classified by the United Nations Economic Commission for Europe to be dangerous goods.

SECTION 15 - REGULATORY INFORMATION

UNITED STATES REGULATIONS

SARA REPORTING REQUIREMENTS: The components of this gas mixture are subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

Chemical Name	SARA 302 (40 CFR 355, App A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Sulfur Dioxide	YES	YES	YES

TSCA: U.S. SARA SECTION 302 EXTREMELY HAZARDOUS THRESHOLD PLANNING QUANTITY (TPQ: Sulfur Dioxide = 500 lb (227 kg) U.S. SARA SECTION 304 EXTREMELY HAZARDOUS REPORTABLE QUANTITY (TPQ: Sulfur Dioxide = 500 lb (227 kg).

All components in this product are listed on the US Toxic Substances Control Act (TSCA) inventory of chemicals.

SARA 311/312:

Acute Health: Yes

Chronic Health: No

Fire: No

Reactivity: No

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this gas. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): None

OTHER U.S. FEDERAL REGULATIONS: Carbon Monoxide, Propane, and Sulfur Dioxide are subject to the reporting requirements of CFR 29 1910.1000; these compounds are listed on Table Z.1. Methane, Propane and Sulfur Dioxide are subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for Sulfur Dioxide (anhydrous form only) 5,000 lb (2270 kg). The Threshold Quantity for each of other gases is 10,000 lb (454 kg) and so this

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mixture will not be affected by the regulation. Sulfur Dioxide is listed in Appendix A as a highly hazardous chemical, per 29 CFR 1910.119: Process Safety Management of Highly Hazardous Chemicals.

The threshold quantity for Sulfur Dioxide under this regulation is 1000 lb (454 kg). This gas mixture does not contain any Class I or Class II ozone depleting chemicals (40 CFR part 82). Nitrogen and Oxygen are not listed as Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. Sulfur Dioxide is listed under this regulation in Table 1, as a Regulated Substance (Toxic Substance), in quantities of 5,000 pounds (4,553 kg) or greater. Carbon Monoxide, Methane, and Propane are listed under this regulation in Table 3, as Regulated Substances (Flammable Substances), in quantities of 10,000 lbs (4,554 kg) or greater, and so this mixture will not be affected by the regulation.

U.S. STATE REGULATORY INFORMATION:

Alaska - Designated Toxic and Hazardous Substances:

California - Permissible Exposure Limits for Chemical Contaminants:

Florida - Substance List:

Illinois - Toxic Substance List:

Kansas - Section 302/313 List:

Massachusetts - Substance List:

Michigan - Critical Materials Register:

Minnesota - List of Hazardous Substances:

Missouri - Employer Information/Toxic Substance List:

New Jersey - Right to Know Hazardous Substance List:

North Dakota - List of Hazardous Chemicals, Reportable Quantities:

Pennsylvania - Hazardous Substance List:

Rhode Island - Hazardous Substance List:

Texas - Hazardous Substance List:

West Virginia - Hazardous Substance List:

Wisconsin - Toxic and Hazardous Substances:

Carbon Monoxide, Methane, Propane, Sulfur Dioxide.

Carbon Monoxide, Nitrogen, Methane, Propane, Sulfur Dioxide.

Oxygen, Carbon Monoxide, Sulfur Dioxide.

Carbon Monoxide, Propane, Sulfur Dioxide.

Sulfur Dioxide.

Oxygen, Carbon Monoxide, Methane, Propane, Sulfur Dioxide.

No

Carbon Monoxide, Methane, Propane, Sulfur Dioxide.

Methane, Propane.

Oxygen, Carbon Monoxide, Nitrogen, Methane, Propane, Sulfur Dioxide.

No.

Oxygen, Carbon Monoxide, Nitrogen, Methane, Propane, Sulfur Dioxide.

Oxygen, Carbon Monoxide, Nitrogen, Methane, Propane, Sulfur Dioxide.

Propane, Sulfur Dioxide.

Propane, Sulfur Dioxide.

Propane, Sulfur Dioxide

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The Carbon Monoxide component of this gas mixture is on the California Proposition 65 lists as a chemical known to the State of California to cause birth defects or other reproductive harm.

CANADIAN REGULATIONS:

CANADIAN DSL/NDL INVENTORY STATUS: All of the components of this product are on the DSL Inventory

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this gas mixture are not on the CEPA Priorities Substances Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: This gas mixture is categorized as a Controlled Product, Hazard Classes A – Compressed Gases, D2A and D2B– Toxic Material, as per the Controlled Product Regulations.



EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU LABELING AND CLASSIFICATION: Classification of the substance or mixture according to Regulation (EC) No1272/2008. See section 2 for details.

Classification:

[T] Toxic; [Xn] Harmful; [O] Oxidizer

Risk Phrases: Simple Asphyxiant

R8: Contact with combustible material may cause fire.

R23: Toxic by inhalation.

R34: Causes burns.

R48/20: Harmful: danger of serious damage to health by prolonged exposure through inhalation.

R65: Harmful may cause lung damage if swallowed.

R67: Vapors may cause drowsiness and dizziness.

Safety Phrases:

S9: Keep container in a well ventilated area.

S23: Do not breathe gas.

S36/37: Wear suitable protective clothing and gloves.

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: All components of this product are listed on the AICS.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.

JAPANESE INFORMATION FOR PRODUCT:

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JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

Asia-Pac:	Listed
Australian Inventory of Chemical Substances (AICS):	Listed
Korean Existing Chemicals List (ECL):	Listed
Japanese Existing National Inventory of Chemical Substances (ENCS):	Listed
Philippines Inventory of Chemicals and Chemical Substances (PICCS):	Listed
Swiss Giftlist of Toxic Substances:	Listed
U.S. TSCA:	Listed

SECTION 16 - OTHER INFORMATION

INFORMATION ABOUT DOT-39 NRC (Non-Refillable Cylinder) PRODUCTS DOT 39 cylinders ship as hazardous materials when full. Once the cylinders are relieved of pressure (empty) they are not considered hazardous material or waste. Residual gas in this type of cylinder is not an issue because toxic gas mixtures are prohibited. Calibration gas mixtures typically packaged in these cylinders are Nonflammable n.o.s., UN 1956. A small percentage of calibration gases packaged in DOT 39 cylinders are flammable or oxidizing gas mixtures. For disposal of used DOT-39 cylinders, it is acceptable to place them in a landfill if local laws permit. Their disposal is no different than that employed with other DOT containers such as spray paint cans, household aerosols, or disposable cylinders of propane (for camping, torch etc.). When feasible, we recommended recycling for scrap metal content.

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.

PREPARED BY: Paul Eigbrett

Global Safety Management, 10006 Cross Creek Blvd. Suite 440, Tampa, FL 33647

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