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 of the Following Components in a Nitrogen or Air Balance Gas: Dichlorodifluoromethane, 0.0005-2.0%; Trichlorofluoromethane, 0.0005-2.0%; 1, 1, 2-Trichloro-1, 1, 2- trifluoroethane, 0.0005-2.0%; Tetrafluoroethane, 0.0005-2.0%**
SYNONYMS:	Not Applicable
CHEMICAL FAMILY NAME:	Not Applicable
FORMULA:	Not Applicable
PRODUCT USE:	Calibration of Monitoring and Research Equipment
DOCUMENT NUMBER:	MSDS 1088 (99-0263, 99-0281)
U.N. NUMBER:	UN 1956
U.N. DANGEROUS GOODS CLASS:	2.2 (Non-Flammable Gas)
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:	Oct 2012
DATE OF LAST REVISION:	Oct 2012

SECTION 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This gas mixture is a colorless, odorless gas. Releases of this gas mixture for which Nitrogen is the balance gas may produce oxygen-deficient atmospheres (especially in confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated. Components of this gas mixture (1,1,2-Trichloro-1,1,2-trifluoroethane, Tetrafluoromethane, Trichlorofluoromethane, and Dichlorodifluoromethane) may cause drowsiness and other central nervous system effects in high concentrations; however, due to their low concentration in this gas mixture, this is unlikely to occur. If components of this gas mixture (1,1,2-Trichloro-1,1,2-trifluoroethane, Tetrafluoromethane, Trichlorofluoromethane, and Dichlorodifluoromethane) are exposed to fire, they may decompose yielding toxic products (i.e. hydrogen fluoride, phosgene, hydrogen chloride, carbonyl fluoride).

US DOT SYMBOLS

CANADA (WHMIS) SYMBOLS

EUROPEAN and (GHS) HAZARD SYMBOLS

Signal Word: **Danger**

EU LABELING AND CLASSIFICATION:

Classification of the substance or mixture according to Regulation (EC) No1272/2008 Annex 1

EC# 200-893-9 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 200-892-3 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 200-936-1 This substance is not classified in the Annex I of Directive 67/548/EEC
EC# 212-377-0 This substance is not classified in the Annex I of Directive 67/548/EEC
Pressurized Gas
Oxidizing gas

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

Precautionary Statement(s):
P210: Keep away from heat/sparks/open flames/hot surfaces
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.

Hazard Symbol(s):
[O] Oxidizer

Risk Phrases:
R8: Contact with combustible material may cause fire.
R67: May cause drowsiness or dizziness.

Safety Phrases:
S9: Keep container in a well ventilated area.
S23: Do not breathe gas.
S45: In case of an accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S53: Avoid exposure — obtain special instructions before use.

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. The most significant hazard associated with this gas mixture when it contains less than 19.5% oxygen is the potential for exposure to oxygen-deficient atmospheres. 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: Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.

TARGET ORGANS: ACUTE: Respiratory system, eyes. CHRONIC: Heart, cardiovascular system, central nervous system, reproductive system.

SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS:	CAS #	EINECS #	ICSC #	% Vol	HAZARD CLASSIFICATION; RISK PHRASES
Dichlorodifluoromethane	75-71-8	200-893-9	0048	0 - 2.0%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Trichlorofluoromethane	75-69-4	200-892-3	0047	0 - 2.0%	HAZARD CLASSIFICATION: None RISK PHRASES: None
1,1,2-trichloro-1,1,2-trifluoroethane	76-13-1	200-936-1	0050	0 - 2.0%	HAZARD CLASSIFICATION: None RISK PHRASES: None
1,1,1,2-tetrafluoroethane	811-97-2	212-377-0	1281	0 - 2.0%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Nitrogen or Air	7727-37-9 132259-10-0	Not Listed	Not Listed	Balance	HAZARD CLASSIFICATION: [O] Oxidizer RISK PHRASES: R8
Air is a mixture of gases as listed below:					
Oxygen	7782-44-7	231-956-9	0138	21%	HAZARD CLASSIFICATION: [O] Oxidizer RISK PHRASES: R8
Nitrogen	7727-37-9	231-783-9	1198	79%	HAZARD CLASSIFICATION: None RISK PHRASES: None

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 GAS MIXTURE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. If necessary, Self-Contained Breathing Apparatus must be worn. 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. 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).

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by over-exposure to the components of this gas mixture.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and reduce over-exposure.

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT: Non-Flammable

AUTOIGNITION TEMPERATURE: Not Applicable

FLAMMABLE LIMITS (in air by volume, %): Lower (LEL): Not Applicable Upper (UEL): Not Applicable

FIRE EXTINGUISHING MATERIALS: Non-flammable gas. Use extinguishing media appropriate for surrounding fire. In the event of fire, cool containers of this product with water to prevent failure. Use a water spray or fog to reduce or direct vapors.

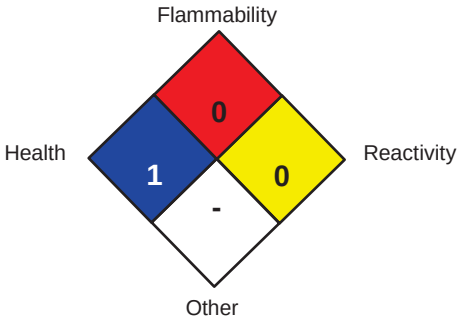
UNUSUAL FIRE AND EXPLOSION HAZARDS: This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire. Additionally, mixtures of this gas for which Air is the balance gas, can support combustion.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.

Explosion Sensitivity to Static Discharge: Not Sensitive

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

NFPA RATING SYSTEM



HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM	
HEALTH HAZARD (BLUE)	1
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 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. Allow the gas mixture to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for oxygen. Oxygen levels must be above 19.5% before non-emergency personnel are allowed to re-enter area. If leaking incidentally from the cylinder, contact your supplier.

SECTION 7 - HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: 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 oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify cylinders containing this gas mixture. 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! Before Use: Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap (where provided) in-place until cylinder is ready for use.

During Use: Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Do not use oils or grease on gas-handling fittings or equipment. Leak-check system with leak detection solution, never with flame. Immediately contact the supplier if there are any difficulties associated with operating cylinder valve. Never insert an object (e.g. wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Use an adjustable strap wrench to remove over-tight or rusted caps. Never strike an arc, on a compressed gas cylinder or make a cylinder part of an electric circuit. **After Use:** Close main cylinder valve. Replace valve protection cap. Mark empty cylinders "EMPTY". **NOTE:** Use only DOT or ASME code containers. Earth-ground and bond all lines and equipment associated with this product. Close valve after each use and when empty.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Purge gas handling equipment with inert gas (i.e. nitrogen) before attempting repairs. 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
Dichlorodifluoromethane	75-71-8	1000 ppm	1000 ppm	1000 ppm
Trichlorofluoromethane	75-69-4	Not Listed	1000 ppm	1000 ppm
1,1,2-trichloro-1,1,2-trifluoroethane	76-13-1	1000 ppm	1000 ppm	1000 ppm
1,1,1,2-tetrafluoroethane	811-97-2	Not Listed	Not Listed	1000 ppm
Nitrogen or Air	7727-37-9, 132259-10-0	Simple Asphyxiant	Simple Asphyxiant	Simple Asphyxiant

Currently, International exposure limits are not established for the components of this product. Please check with competent authority in each country for the most recent limits in place.

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 Phosphine and Oxygen.

RESPIRATORY PROTECTION: : No special respiratory protection is required under normal circumstances of use. Maintain Phosphine levels below 50% of the TLV (TLV = 0.3 ppm) and oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection when Phosphine levels exceed 50% of the TLV (TLV = 0.3 ppm), oxygen levels are below 19.5%, or during emergency response to a release of this gas mixture. During an emergency situation, before entering the area, check the concentration of Phosphine and Oxygen. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, or the applicable regulations of Canada and its Provinces.

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

HAND PROTECTION: Wear gloves when handling cylinders of this gas mixture. Otherwise, wear glove protection appropriate to the specific operation for which this gas mixture is used. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate for task. Safety shoes are recommended when handling cylinders.

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

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

GAS DENSITY@32°F (0°C) and 1 atm:	0.072 lb/ ft^3 (1.153 kg/m^3)
BOILING POINT:	-195.8°C (-320.4°F)
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 at 32°F (0°C) and 1 atm:	0.023
MOLECULAR WEIGHT:	28.01
EVAPORATION RATE (nBuAc = 1):	Not applicable.
EXPANSION RATIO:	Not applicable.
ODOR THRESHOLD:	Not applicable. Odorless.
SPECIFIC VOLUME (ft^3/lb):	13.8
VAPOR PRESSURE @ 70°F (21.1°C) (psig):	Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION:	Not applicable.
APPEARANCE, ODOR AND COLOR:	Colorless, odorless gas mixture.
HOW TO DETECT THIS SUBSTANCE (warning properties):	There are no unusual warning properties associated with a release of this product.

SECTION 10 - STABILITY and REACTIVITY

STABILITY: Normally stable

DECOMPOSITION PRODUCTS: Due to components of this gas mixture (1, 1, 2-Trichloro-1, 1, 2-trifluoroethane, Tetrafluoromethane, Trichlorofluoromethane, and Dichlorodifluoromethane), if exposed to fire, this gas mixture may decompose yielding toxic products (i.e. hydrogen fluoride, phosgene, hydrogen chloride, carbonyl fluoride). 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 (a main component of this gas mixture). Lithium reacts slowly with Nitrogen at ambient temperatures. Components of this gas mixture (1, 1, 2-Trichloro-1, 1, 2-trifluoroethane, Tetrafluoromethane, Trichlorofluoromethane, and Dichlorodifluoromethane) are incompatible with sodium, potassium, calcium, zinc, and magnesium, powdered aluminum, and alloys of these metals.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: 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:

DICHLORODIFLUOROMETHANE: LC (Inhalation-rat) > 80 pph/4 hours LC50 (Inhalation-mouse) 3348 gm/m3/3 hours: Behavioral: sleep, tremor, excitement LC50 (Inhalation-rabbit) 80 pph/30 minutes LC50 (Inhalation-guinea pig) 80 pph/30 minutes TCLo (Inhalation-Human) 200000 ppm/30 minutes: conjunctive, fibrosing alveolitis, liver changes TCLo (Inhalation-rat) 4136 mg/m3/8 hours/6 weeks-intermittent: chronic pulmonary edema; Related to Chronic Data: death TCLo (Inhalation-rat) 3997 mg/m3/90 days-continuous: Lungs, Thorax, or Respiration: chronic pulmonary edema; death TCLo (Inhalation-monkey) 3997 mg/m3/90 days-continuous:

1,1,1,2-TETRAFLUOROETHANE: LC50 (Inhalation-Rat) 1500 gm/m3/4 hours LC50 (Inhalation-Mouse) 1700 gm/m3/2 hours LC (Inhalation-Dog) > 32 pph/1 hour TCLo (Inhalation-Rat) 50,000 ppm/6 hours/2 years-intermittent: Tumorigenic: neoplastic by RTECS criteria; Endocrine: tumors TCLo (Inhalation-Rat) 30 pph/6 hours: female 6-15 day(s) after conception:

TRICHLOROFLUOROMETHANE: TCLo (Inhalation-Human) 50,000 ppm/30 minutes: Sense Organs and Special Senses (Eye):conjunctive irritation; Lungs, Thorax, or Respiration: fibrosing aleveolitis; Liver: other changes LD (Oral-Rat) > 352 mg/kg LD50 (Intraperitoneal-Mouse) 1743 mg/kg: Behavioral: convulsions or effect on seizure threshold LC50 (Inhalation-Rat) 13 pph/15 minutes: Behavioral: tremor, convulsions or effect on seizure threshold; Lungs, Thorax, or Respiration: respiratory depression LC50 (Inhalation-Mouse) 10 pph/30 minutes LC50 (Inhalation-Rabbit) 25 pph/30 LC50 (Inhalation-Guinea Pig) 25 pph/30 minutes TCLo (Inhalation-Rat) 12,000 ppm/4 hours/days-intermittent:

1,1,2-TRICHLORO-1,1,2-TRIFLUOROETHANE: TCLo (Inhalation-Human) 4300 mg/m3/5 Days-intermittent: Brain and Coverings: recordings from specific areas of CNS TCLo (Inhalation-Human) 178 mg/m3/10 years-intermittent: Behavioral: headache Open Irritation Test (Skin-Rabbit) 500 mg: Mild Standard Draize Test (Skin-Rabbit) 500 mg/24 hours: Mild LD50 (Oral-Rat) 43 gm/kg: Behavioral: somnolence (general depressed activity); Gastrointestinal: other changes; Skin and Appendages: hair LD50 (Intravenous-Mouse) 9 gm/kg: Autonomic Nervous System: other (direct) para-sympathomimetic; Behavioral: altered sleep time (including change in righting reflex); Skin and Appendages: dermatitis, other (after systemic exposure) LD50 (Unreported-Mouse) 40 gm/kg LDLo (Oral-Rabbit) 17 gm/kg LC50 (Inhalation-Rat) 38,500 ppm/4 hours: Behavioral: general anesthetic, excitement, ataxia LC50 (Inhalation-Mouse) 260 gm/m3/2 hours: Behavioral: somnolence (general depressed activity), ataxia; Lungs, Thorax, or Respiration: cyanosis LC50 (Inhalation-Rabbit) 59,500 ppm/2 hours: Sense Organs and Special Senses (Eye): effect, not otherwise specified; Behavioral: excitement; Lungs, Thorax, or Respiration: respiratory stimulation LC50 (Inhalation-Guinea Pig) >12 pph/2 hours LD (Skin-Rabbit) > 11 gm/kg LDLo (Oral-Guinea Pig) > 10 gm/kg TCLo (Inhalation-Rat) 20 pph/6 hours/2 years-intermittent:

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

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

DICHLORODIFLUOROMETHANE: ACGIH TLV-A4 (Not Classifiable as to Carcinogenicity in Humans)

TRICHLOROFLUOROMETHANE: ACGIH TLV-A4 (Not Classifiable as to Carcinogenicity in Humans)

1,1,2-TRICHLORO-1,1,2-TRIFLUOROETHANE: ACGIH TLV-A4 (Not Classifiable 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, they are not considered to be, nor suspected to be, cancer-causing agents by these agencies. Nitrous Oxide is listed as ACGIH-A4 (Not Classifiable as a Human Carcinogen).

IRRITANCY OF PRODUCT: Contact with rapidly expanding gases can cause frostbite and damage to exposed skin and eyes.

SENSITIZATION OF PRODUCT: The components of this gas mixture are not known to cause sensitization in humans.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this gas mixture and its components on the human reproductive system. Mutagenicity: No mutagenicity effects have been described for the components of this gas mixture. Embryotoxcity: No embryotoxic effects have been described for the components this gas mixture. Teratogenicity: No teratogenicity effects have been described for the components of this gas mixture. Reproductive Toxicity: No reproductive toxicity effects have been described for the components of gas mixture.

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for the components of this gas mixture.

CHEMICAL DETERMINANT	SAMPLING TIME	BEI

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. 1,1,2-Trichloro-1,1,2-trifluoroethane, Trichlorofluoromethane, and Dichlorodifluoromethane are chlorofluorocarbon (CFC) compounds. Chlorofluorocarbon compounds have been implicated in the possible depletion of the stratospheric ozone, via a series of complex chemical reactions which occur in the upper atmosphere. Atmospheric ozone is essential in protecting plants and animals from potentially harmful ultraviolet-light exposures. All work practice must be directed at eliminating environmental contamination. The following environmental data are applicable to the components of this gas mixture.

DICHLORODIFLUOROMETHANE: Log Kow = 2.16; Water Solubility = 0.28 g/L 27 25°C.

OXYGEN: Water Solubility = 1 volume Oxygen/32 volumes water at 20°C. Log Kow = -0.65

NITROGEN: Water Solubility = 2.4 volumes Nitrogen/100 volumes water at 0°C. 1.6 volumes Nitrogen/100 volumes water at 20°C.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No adverse effect is anticipated to occur to animals or plant-life, except for frost produced in the presence of rapidly expanding gases.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence of an adverse effect of this gas mixture on aquatic life is currently available.

1,1,1,2-TETRAFLUOROETHANE: EC50 (Dapnia magna) 48 hours = 980 mg/L LC50 (Dapnia magna) 48 hours = 450 mg/L

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 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

PACKING GROUP: Not applicable.

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

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2004): 126

MARINE POLLUTANT: The components of this gas mixture are not classified by the DOT as a Marine Pollutant (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 present serious safety hazards and should be discouraged.

NOTE: Shipment of compressed gas cylinders which have not been filled with the owner's consent is a violation of Federal law (49 CFR, Part 173.301 (b)

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: This gas is subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows: Dichlorodifluoromethane , Trichlorofluoromethane, 1,1,2-trichloro-1,1,2-trifluoroethane SARA 313

TSCA: 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): Dichlorodifluoromethane = 5000 lbs (2270 kg);. Trichlorofluoromethane = 5000 lb (2270 kg). The 1,1,2-Trichloro-1,1,2-Trifluoromethane component is a CERCLA Hazardous Substance which has no specific RQ assigned.

OTHER U.S. FEDERAL REGULATIONS: 1,1,2-Trichloro-1,1,2-trifluoroethane, Trichlorofluoromethane, and Dichlorodifluoromethane are subject to the requirements of CFR 29 1910.1000. These gases are listed on Table Z.1. • No component of this gas mixture is subject to the reporting requirements of Section 112(r) of the Clean Air Act. • 1,1,2-Trichloro-1,1,2-trifluoroethane, Trichlorofluoromethane, and Dichlorodifluoromethane are listed as Class I ozone-depleting chemicals. This gas mixture is required to bear the following label: Warning: Contains Name of Chlorofluorocarbon, a substance which harms public health and environment by destroying ozone in the upper atmosphere. • Chlorodifluoromethane is subject to the reporting requirements under Title VI of the Clean Air Act Amendments of 1990: “Stratospheric Ozone Protection”. • The components of this gas mixture are not listed in Appendix A as a highly hazardous chemical, per 29 CFR 1910.119: Process Safety Management of Highly Hazardous Chemicals. • Nitrogen, Oxygen, Tetrafluoromethane, 1,1,2-Trichloro-1,1,2-trifluoroethane, Trichlorofluoromethane, and Dichlorodifluoromethane are not listed as Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases..

U.S. STATE REGULATORY INFORMATION: The components of this gas mixture are covered under the following specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances:	Trichlorofluoromethane, Dichlorodifluoro-methane, 1,1,2-Trichloro-1,1,2-trifluoroethane.
California - Permissible Exposure Limits for Chemical Contaminants:	Trichlorofluoromethane, Dichlorodifluoro-methane, Nitrogen, 1,1,2-Trichloro-1,1,2-trifluoroethane.
Florida - Substance List:	Oxygen, Trichlorofluoromethane, Dichlorodi-fluoromethane, 1,1,2-Trichloro-1,1,2-trifluoro-ethane.
Illinois - Toxic Substance List:	Trichlorofluoromethane, Dichlorodi-fluoromethane, 1,1,2-Trichloro-1,1,2-trifluoro-ethane.
Kansas - Section 302/313 List:	No
Massachusetts - Substance List:	Trichlorofluoromethane, Dichlorodi-fluoromethane, Oxygen, 1,1,2-Trichloro-1,1,2-trifluoroethane.
Michigan - Critical Materials Register:	No
Minnesota - List of Hazardous Substances:	Trichlorofluoromethane, Dichlorodi-fluoromethane, Oxygen, 1,1,2-Trichloro-1,1,2-trifluoroethane.
Missouri - Employer Information/Toxic Substance List:	Trichlorofluoromethane, Dichlorodi-fluoromethane, Oxygen, 1,1,2-Trichloro-1,1,2-trifluoroethane.
New Jersey - Right to Know Hazardous Substance List:	Trichlorofluoromethane, Dichlorodifluoromethane, Oxygen, Nitrogen, 1,1,2-Trichloro-1,1,2-trifluoroethane.
North Dakota - List of Hazardous Chemicals, Reportable Quantities:	Trichlorofluoromethane, Dichlorodifluoro-methane.

Pennsylvania - Hazardous Substance List:	Trichlorofluoromethane, Dichlorodi-fluoromethane, Oxygen, Nitrogen, 1,1,2-Trichloro-1,1,2-trifluoro-ethane.
Rhode Island - Hazardous Substance List:	Trichlorofluoromethane, Dichlorodifluoromethane, Oxygen
Texas - Hazardous Substance List:	Trichlorofluoromethane, Dichlorodi-fluoromethane, 1,1,2-Trichloro-1,1,2-trifluoroethane
West Virginia - Hazardous Substance List:	Trichlorofluoromethane, Dichlorodi-fluoromethane, 1,1,2-Trichloro-1,1,2-trifluoroethane
Wisconsin - Toxic and Hazardous Substances:	Trichlorofluoromethane, Dichlorodi-fluoromethane, 1,1,2-Trichloro-1,1,2-trifluoroethane

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): The components of this gas mixture are not on the California Proposition 65 lists.

CANADIAN REGULATIONS:

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

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: No component of this product is on the CEPA First Priorities Substance Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: This gas mixture is categorized as a Controlled Product, Hazard Classes A, 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.

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:

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 if Chemicals and Chemical Substances (PICCS):	Listed
Swiss Giftliste List 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.

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