Precision Gas Products Inc.

2455 Cawthra Road, Unit 21 Mississauga, Ontario L5A 3P1
Tel: (905)-949-2626/1-888-730-8196 Fax: (905)-949-2688
Emergency Contact: Chemtrec (800) 424-9300

Chlorodifluoromethane in Nitrogen or Air
0.0005-2.0%

MATERIAL SAFETY DATA SHEET

Identification

Revision Date 01-01-15

Formula: Not Applicable
Document Number: MSDS 201

Composition and Information on Ingredients

Chemical Name	CAS #	Mole %	Exposure Limits in Air					Other ppm
			ACGIH		OSHA			
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	
Chlorodifluoromethane (Freon 22)	75-45-6	0.0005 - 2.0%	1000	NE	1000 (Vocated 1989 PEL)	NE	NE	NIOSH REL;1000ppm TWA; 1240 ppm STEL DFG MAK; 500PPM
Nitrogen or Air	7727-37-9 25635-88-5	Balance	There are no specific exposure limits for Nitrogen. Nitrogen is a simple Asphyxiant (SA). The composition of Air is as follows: 79% Nitrogen and 21% Oxygen. Oxygen levels should be maintained above 19.5%.					

NE=Not Established. C=Ceiling Limit. A4=Not Classifiable as a Human Carcinogen. See Section 16 for Definitions of Terms Used.
Note: All WHMIS required information is included.

Hazard Identification

EMERGENCY OVERVIEW*: This product is a colorless, odorless gas. Releases of this product 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. Chlorodifluoromethane, a components of this gas mixture, 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.*

Hazardous Material Information System

- HEALTH (Blue) 1
- FLAMMABILITY (Red) 0
- REACTIVITY (Yellow) 0

Inhalation*:* Due to the small size of an individual cylinder of this product, no unusual health effects from over-exposure to the product are anticipated under routine circumstances of use. If released in a small, poorly - ventilated area (i.e. an enclosed or confined space) development of an oxygen-deficient environment may occur. Individuals breathing such an atmosphere may experience symptoms that include headache, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur.

Over-exposure to this gas mixture may cause the following health effects:

- **Acute:** Symptoms of oxygen deficient include respiratory difficulty, ringing in ears, headache, shortness of breathing, wheezing, headaches, dizziness, indigestion, nausea, unconsciousness, and death. The skin of a victim of over-exposure may have a blue color.
- **Chronic:** There are currently no known adverse health effects associated with chronic exposure to this gas.
- **Target Organs:** Respiratory system

First – Aid Measures

If necessary, Self - Contained Breathing Apparatus must be worn. No unusual health effects are anticipated after exposure to this product, due to the small cylinder size. If any adverse symptom develops after over-exposure to this product, 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 product 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).

Fire – Fighting Measures

Flash Point, (method): Not applicable.
Autoignition Temperature: Not applicable.
Flammable Limits (in air by volume %):
Lower (LEL): Not applicable
Upper (LEL): Not applicable

- Fire Extinguishing Materials: Non – flammable gas mixture. Use extinguishing media appropriate for surrounding fire.
- 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 firefighters must wear Self – Contained Breathing Apparatus and full protective equipment.

Accidental Release Measures

Leak Response: Due to the small size and content of the cylinder, an accidental release of this product presents significantly less risk of an oxygen – deficiency environment and other safety hazards that 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 immediately area 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 comes from the cylinder, contact your supplier.

Handling and Use

Use only in well – ventilated areas. Be aware of any signs of dizziness or fatigue, especially if work is done in poorly – ventilated area; exposures to fatal concentrations of this product could occur without any significant warning symptom, due to oxygen deficiency. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure-reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous backflow into the system**.**

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 21ºC; 70ºF). 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 CT 39(DOT 39) cylinders. To do so may cause personal injury or property damage.*
Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, asphyxiation or toxic exposure.

Exposure Controls – Personal Protection

Ventilation and Engineering Controls: No specific ventilation systems or engineering controls are needed under normal circumstances of use. As with all chemicals, use this product in well – ventilated areas. If this product is used in a poorly – ventilated area, install automatic monitoring to detect the levels of oxygen.
Respiratory Protection**:** No specific respiratory protection is required under normal circumstances of use. Use supplied air respiratory protection if oxygen levels are below 19.5% or unknown during emergency response to a release of this product. If respiratory protection is required for emergency response to this product, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134) or equivalent State standards.

- Eye Protection: Safety glasses
- Hand Protection: No special protection is needed under normal circumstances of use.
- Body Protection: No special protection is needed under normal circumstances of use.

Physical and Chemical Properties

The following information is for Nitrogen, a balance gas:

GAS DENSITY @32ºF (OºC) and 1 atm: 0.072lbs/ft³ (1.153kg/m³)
BIOLING POINT: -320.4ºF (-195.8ºC)
FREEZING/MELTING POINT @ 10psig –345.8ºF (-210ºC)
SPECIFIC GRAVITY (air = 1) @ 70ºF (21.1ºC): 0.906
SOLUBILITY IN WATER vol./vol. @ 32ºF (0ºC) and 1 atm: 0.023
EVAPORATING RATE (nBuAc = 1): Not applicable. pH: Not applicable.
ODOR THRESHOLD: Not applicable. MOLECULAR WEIGHT: 28.01
VAPOR PRESSURE @ 70ºF (21.1ºC) psig: Not applicable. EXPANSION RATIO: Not applicable
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable. SPECIFIC VOLUME (ft³/lb): 13.8
GAS DENSITY @ 70ºF (21.1ºC) and 1 atm: 0.07493 lb/cu ft (1.2 kg/cu m³)

The following information is for Air, a balance gas:

BIOLING POINT: -317.8ºF (-194.3ºC)
FREEZING/MELTING POINT @ 10psig –357.2ºF (-216.2ºC)
SPECIFIC GRAVITY (air = 1) @ 70ºF (21.1ºC): 1
SOLUBILITY IN WATER vol./vol. @ 32ºF (0ºC) and 1 atm: 0.0292
EVAPORATING RATE (nBuAc = 1): Not applicable. pH: Not applicable.
ODOR THRESHOLD: Not applicable. MOLECULAR WEIGHT: 28.975
VAPOR PRESSURE @ 70ºF (21.1ºC)psig: Not applicable. EXPANSION RATIO: Not applicable
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable. SPECIFIC VOLUME (ft³/lb) :Not applicable for Air

Appearance and Color: This product is colorless, odorless gas.
How to Detect this Substance (warning properties): 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.

Stability and Reactivity

Stability: Normally stable in gaseous state.

Decomposition Products: If Chlorodifluoromethane is exposed to fire, it may decompose yielding toxic products (i.e. hydrogen fluoride, phosgene, hydrogen chloride, carbon fluoride). The other components of this gas mixture do not decompose, per se, but can react with other compounds in the heat of fire.

Materials with which Substance is Compatible: Titanium will burn in Nitrogen (a main component of this product). Lithium reacts slowly with Nitrogen at ambient temperatures. Chlorodifluoromethane is incompatible with sodium, potassium, calcium, zinc, and magnesium, powdered aluminum, and alloys of these metals.

Hazardous Polymerization: Will no occur.

Conditions to Avoid: Contact with incompatible materials. Cylinders exposed to high temperature or direct flame can rapture or burst.

Toxicological Information

Chlorodifluoromethane:
Mutation in Microorganism System Test (*Salmonella typhimurium*)=33ppm/24hours
Microsomal Mutagenicity Assay (*Salmonella typhimurium*)=33ppm/24hours
TCLo (inhalation, rat) =50000 ppm/5hours (36 day);reproductive effects.
LC50 (inhalation, rat) =35pph/15 minutes LC50 (inhalation, rat) =28pph/20minutes
LCLo (inhalation, dog) =70pph

Short – Term Inhalation: No effect level has been established at 1% Chlorodifluoromethane for rats and mice.
Long – Term Inhalation: Test animals similarly exposed to 0.2% Chlorodifluoromethane did not show any adverse health effect.

- This gas mixture is not known to cause sensitization in humans.
- Acute or chronic respiratory conditions may be aggravated by over-exposure to the components of this product.
- Administer oxygen, if necessary; treat symptoms; eliminate exposure.
  Note: Epinephrine increases the toxicity of Chlorodifluoromethane on the heart.

Ecological Information

Environmental Stability: The gas will be dissipated rapidly in well-ventilated areas. Chlorodifluoromethane is chlorofluorocarbon (CFC) compounds. Chlorofluoroocarbon compounds have been implicated in the possible depletion of the stratospheric ozone, via a series of complex chemical reactions that occur in the upper atmosphere. Atmospheric ozone is essential in protecting plants and animals from potentially harmful ultraviolet-light exposure. All work practice must be directed at eliminating environmental contamination.

Effects of Material on Plants or Animals: No evidence is currently available on this product's effects on plant and animal life.

Effects of Chemical on Aquatic Life: No evidence is currently available on this product's effects on aquatic life.

Disposal Consideration

Preparing Wastes for Disposal: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. Cylinders with undesired residual product may be safely vented outdoors with the proper regulator. For further information, refer to Section 16 (Other Information).

Transportation Information

Proper Shipping Name:	Compressed gases, n.o.s. (Nitrogen, Name of Chlorodifluoromethane) or (Air, Name of Chlorodifluoromethane).
Hazard Class Number and Description:	2.2 (Non – Flammable Gas)
UN Identification Number:	UN 1956
CT (DOT) Label(s) Required:	Non – Flammable Gas

Regulatory Information

Chlorodifluoromethane:
SARA Section 302 (40CFR355.30): No
SARA Section 304 (40CFR344.40): No
SARA Section 313 (40CFR372.65): Yes

Other Information

Information About CT 39 (DOT-39) NRC (Non-Refillable Cylinders) Products

CT 39 (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 packed in these cylinders are Nonflammable n.o.s., UN 1956. A small percentage of calibration gases packed in CT 39 (DOT 39) cylinders are flammable or oxidizing gas mixtures.

For disposal of used CT 39 (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 CT (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. Precision Gas Products Inc. will do this for any customer that wishes to return cylinders to us prepaid. All that is required is a phone call to make arrangements so we may anticipate arrival. Scrapping cylinders to valued customers who want to participate.

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 injury or death.