# Precision Gas Products Inc.

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## Containing the Following in Nitrogen or Air Balance Gas: Dichlorodifluoromethane, 0.0005-2.0%; Pentanefluoroethane, 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%

# MATERIAL SAFETY DATA SHEET

## Identification

Revision Date 01-01-15

Formula: Not Applicable
Document Number: MSDS 200-5

## 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 | |
| Dichlorodifluoromethane (Freon 12) | 75-71-8 | 0-2.0% | 1000, A4 | NE | 1000 | NE | 15,000 | NIOSH REL;1000 DFG MAK;1000 |
| Pentanefluoroethane (Freon 125) | | 0-2.0% | | | | | | |
| Trichlorofluoromethane (Freon 11) | 75-69-4 | 0-2.0% | NE | 1000 C, A4 | 1000 | 1000C(vacated 1989 PEL) | 2000 | NIOSH REL;1000C DFG MAK;1000 |
| 1,1,2-Trichloro-1,1,2,-trifluoroethane (Freon 113) | 76-13-1 | 0-2.0% | 1000, A4 | 1250 | 1000 | 1250(vacated 1989 PEL) | 2000 | NIOSH REL;1000 TWA;1250 STEL DFG MAK;500 |
| Tetrafluoroethane (HFC-134a) | 811-97-2 | 0-2.0% | NE | NE | NE | NE | NE | NE |
| Nitrogen or Air | 7727-37-9 132259-10-0 | 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. These components and their concentrations have been incorporated into this MSDS. There are no specific exposure limits for 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. Components of this product (1,1,2-Trichloro-1,1,2-trichluoroethane, Tetrafluoromethane, Trichlorofluoromethane, Pentanefuoroethane, 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 are exposed to fire, they may decompose yielding toxic products (i.e. hydrogen fluoride, phosgene, hydrogen chloride, carbonyl fluoride).

**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. The chief health hazard associated with this gas mixture for which Nitrogen is the balance gas and is released in a small, poorly-ventilated area (i.e. an enclosed or confined space) is the development of an oxygen-deficient environment. Individuals breathing such an atmosphere may experience symptoms which 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. The effect associated with various levels of oxygen are as follows.

Health Effects or Risks From Exposure: Over-exposure to this gas mixture may cause the following health effects:

- **Acute:** Due to the small size of the individual cylinder of this product, 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 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

Rescuers should not attempt to retrieve victims of exposure to this product without adequate personal protective equipment. 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.
**Auto ignition 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. Such release 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 comes from the cylinder, contact your supplier.

## Handling and Storage

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. Do not attempt to repair, adjust, or in any other way modify cylinders contained with this gas mixture. If there is a malfunction or another type of operational problem, contact nearest distributor immediately. 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. Compressed gases can present significant safety hazards. During cylinder use, use equipment designed for these specific cylinders. Ensure all lines and equipment is rated for proper service pressure.

## 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 & Chemical Properties

The following information is for Nitrogen 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.
ODOR THRESHOLD: Not applicable.
VAPOR PRESSURE @ 70ºF (21.1ºC) psig: Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.
GAS DENSITY @ 70ºF (21.1ºC) and 1 atm: 0.07493 lb/cu ft (1.2 kg/cu m³)
pH: Not applicable.
MOLECULAR WEIGHT: 28.01
EXPANSION RATIO: Not applicable
SPECIFIC VOLUME (ft³/lb): 13.8

The following information is for Air 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.
ODOR THRESHOLD: Not applicable.
VAPOR PRESSURE @ 70ºF (21.1ºC)psig: Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.
pH: Not applicable.
MOLECULAR WEIGHT: 28.975
EXPANSION RATIO: Not applicable

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 components of this product (1,1,2-Trichloro-1,1,2-trifluoroethane,Tetrafluoromethane, Trichlorofluoromethane, Pentanefluoroethane, and Dichlorodifluoromethane) are exposed to fire, they may decompose yielding toxic products (i.e. hydrogen fluoride, phosgene, hydrogen chloride, carbon fluoride).

Material with which Substance is Compatible: Titanium will burn in Nitrogen. Lithium reacts slowly with Nitrogen at ambient temperatures. 1,1,2-Trichloro-1,1, 2-rifluoroethane. Tetrafluoromethane , Trichlorofluoromethane, Pentanefluoroethane, and Dichlorodifluoromethane, are incompatible with sodium, potassium, calcium, zinc, and magnesium.

Conditions to Avoid: Cylinders exposed to high temperature or direct flame can rapture or burst.

## Toxicological Information

Dichlorodifluoromethane (Freon12)

LC50(inhalation, guinea pig) = 80ppm/30minutes

LC50(inhalation, mouse) = 76ppm/30minutes.

LC50(inhalation, rabbit) = 80ppm/30minutes.

LC50(inhalation, rat) = 80ppm/30minutes.

TCLo (inhalation, human) = 200,000 ppm/30minutes;eye, pulmonary, liver effects.

Trichlorofluoromethane (Freon 11)

TDLo(inhalation, human) =50000ppm/30minutes; eye, pulmonary, liver effects.

LCLo(inhalation, rat) =10ppm/20minutes.

LC50(inhalation, mouse) =10ppm/30minutes.

LD50(intraperitoneal, mouse) =1743mg/kg.

LC50(inhalation, rabbit) =25ppm/30minutes.

LC50(inhalation, guinea pig) = 25ppm/20minutes

1, 1, 2-Trichloro – 1, 1, 2-Trifluoroethane (Freon 113)

Skin-Rabbit, adult 500mg open Mild irritation effects.

Oral-Rat LD50= 43g/kg.

Inhalation-Rabbit, adult LC50= 80ppm/30minutes.
Inhalation-Mouse LCLo= 25ppm/90seconds.

Tetrafluoroethane (HFC-134a)

TC(inhalation, rat) = 567,000 hours.

- 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.

## Ecological Information

Environmental Stability: The gas will be dissipated rapidly in well-ventilated areas. 1,1,2-Trichloro-1,1,2-trifluoroethane,Tetrafluoromethane, Trichlorofluoromethane, pentanefluoroethane, and Dichlorodifluoromethane are 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.

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

Effect of Chemical on Aquatic Life: No evidence is currently available on this product's effects on aquatic life. The following aquatic toxicity data are available for the components of this product.

Tetrafluoromethane
48 hours EC50 – Dapper magna: 980 mg/l
48 hours LC50 – LC50: 450 mg/l.



## Disposal Considerations

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 Chlorofluorocarbon) or (Air, Name of Chlorofluorocarbon). |
| 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

| COMPONENT | SARA 302 | SARA 304 | SARA 313 |
|---|---|---|---|
| Dichlorodifluoromethane | NO | YES | YES |
| Pentanefluoroethane | NO | | YES |
| Trichlorofluoromethane | NO | YES | YES |
| 1,1,2-Trichloro-1,1,2-trfluoroethane | NO | NO | YES |

Warning: Contains Name of Chlorofluorocarbon, a substance which harms public health and environment by destroying ozone in the upper atmosphere.
Other Canadian Regulations: This gas mixture is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

## 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.