

Material Safety Data Sheet

1. Product Identification

CHEMICAL NAME; CLASS: NON-FLAMMABLE GAS MIXTURE Containing One or More 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%

Document Number: 161091

PRODUCT USE: For chemical synthesis, manufacture of carbon black, welding, cutting, and for general analytical or synthetic chemical uses.

SUPPLIER/MANUFACTURER'S NAME: Portagas

ADDRESS: 6717-B Polk Street
Houston, TX 77011

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

EMERGENCY PHONE: INFOTRAC : (800) 535-5053

2. 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
Trichlorofluoromethane (Freon 11)	75-69-4	0-2.0%	NE	1000 C, A4	1000	1000 C (Vacated 1989 PEL)	2000	NIOSH REL; 1000 C 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.

3. Hazard Identification

EMERGENCY OVERVIEW: This product is a colorless, odorless gas.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure is by inhalation. **INHALATION:** Due to the small size of an individual cylinder of this product, no unusual health effects from

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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

HAZARDOUS MATERIAL INFORMATION SYSTEM			
HEALTH	(BLUE)	1	
FLAMMABILITY	(RED)	0	
REACTIVITY	(YELLOW)	0	
PROTECTIVE EQUIPMENT			B
EYES	RESPIRATORY	HANDS	BODY
See Section 8			
For routine industrial applications			

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 headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. Under some circumstances of over-exposure, death may occur.

Other effects of exposure can be summarized as follows:

CONCENTRATION OF GAS

12-16% Oxygen

10-14% Oxygen

6-10% Oxygen

Below 6%

OBSERVED EFFECT

Breathing and pulse rate increased, muscular coordination slightly disturbed.

Emotional upset, abnormal fatigue, disturbed respiration.

Nausea and vomiting, collapse or loss of consciousness.

Convulsive movements, possible respiratory collapse, and death.

NOTE: At high altitudes, individuals may be more susceptible to Carbon Monoxide over-exposures. Development of symptoms may also occur more rapidly if individuals are doing physically demanding tasks. Individuals who have heart conditions may experience a more rapid onset of symptoms. During recovery, victims can experience headaches, vision problems, and memory loss.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. Over-exposure to this product may cause the following health effects:

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ACUTE: The most significant hazard associated with this product is inhalation of oxygen-deficient atmospheres. Symptoms of oxygen deficiency include respiratory difficulty, ringing in ears, headaches, shortness of breath, wheezing, headache, dizziness, indigestion, nausea, and, at high concentrations, unconsciousness or death may occur. The skin of a victim of over-exposure may have a blue color.

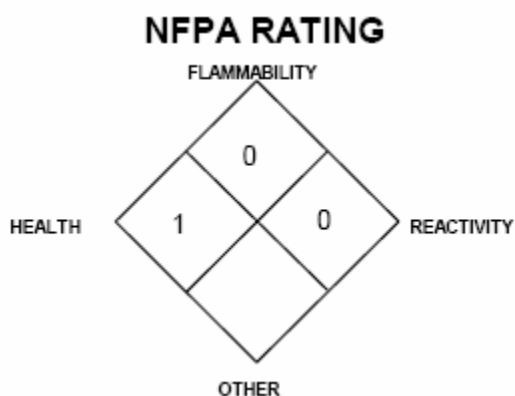
CHRONIC: There are currently no known adverse health effects associated with chronic exposure to this gas.

TARGET ORGANS: Respiratory system, circulatory system, cardiovascular system, and reproductive system.

4. First Aid Measures

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).

5. Fire-Fighting Measures



FLASH POINT, (method): 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: 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.

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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.

6. Accidental Release Measures

CLEAN UP PROCEDURES: Evacuate and ventilate area. Remove leaking cylinder to exhaust hood or safe outdoor area. Shut off source if possible and remove source of heat.

Minimum Personal Protective Equipment should be **Level B: fire-retardant protective clothing, gloves and Self-Contained Breathing Apparatus.**

Locate and seal the source of the leaking gas. Protect personnel attempting the shut off with water-spray. Allow the gas to dissipate.

7. Handling And Use

WORK PRACTICES AND HYGIENE PRACTICES: If there is a malfunction or another type of operational problem, contact nearest distributor immediately.

STORAGE AND HANDLING PRACTICES: Secure cylinder when using to protect from falling. Use suitable hand truck to move cylinders. Store in well ventilated areas. Keep valve protection caps on cylinders when not in use. Store away from heat, flame, and sparks. Do not allow area where cylinders are stored to exceed 52° C (125° F). Cylinders should be separated from oxygen cylinders or other oxidizers by a minimum distance of 20 ft. or by a barrier of non-combustible material at least 5 ft. high, having a fire-resistance rating of at least 0.5 hours.

8. Exposure Controls – Personal Protection

ENGINEERING CONTROLS: Provide adequate general and local exhaust ventilation to avoid asphyxiation.

EYE / FACE PROTECTION: Safety glasses

RESPIRATORY PROTECTION: In case of leakage, use self-contained breathing apparatus.

OTHER PROTECTIVE EQUIPMENT: Safety shoes when handling cylinders.

9. Physical and Chemical Properties

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

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BOILING POINT: -320.4 °F (-195.8°C)
FREEZING/MELTING POINT @ 10 psig -345.8°F (-210°C)
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
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.
GAS DENSITY @ 70°F (21.1°C) and 1 atm: 0.07493 lb/cu ft (1.2 kg/cu m³)

10. Stability and Reactivity

STABILITY: Stable under normal storage conditions.
CONDITIONS TO AVOID: Storage in poorly ventilated areas. Storing near a heat source.
MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Titanium will burn in Nitrogen (a main component of this product). Lithium reacts slowly with Nitrogen at ambient temperatures. Components of this product (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: Can occur when heated or under pressure.
HAZARDOUS DECOMPOSITION: None

11. Toxicological Information

SUSPECTED CANCER AGENT: The 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. Dichlorodifluoromethane and Trichlorofluoromethane are listed as ACGIH TLV - A4 (Not Classifiable as a Human Carcinogen).
BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) are not applicable for the components of this gas mixture.

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12. Ecological Information

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 product.

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.

13. Disposal Considerations

PREPARING WASTES FOR DISPOSAL 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).

14. Transportation Information

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

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

PACKING GROUP: Not applicable.

DOT LABEL(S) REQUIRED: Non-Flammable Gas

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): 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).

15. Regulatory Information

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SARA REPORTING REQUIREMENTS: This product is subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows:

COMPONENT	SARA 302	SARA 304	SARA 313
Dichlorodifluoromethane	NO	YES	YES
Trichlorofluoromethane	NO	YES	YES
1,1,2-Trichloro-1,1,2-trifluoroethane	NO	NO	YES

SARA THRESHOLD PLANNING QUANTITY: Not applicable.

CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

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 product 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.

STATE REGULATORY INFORMATION: The components of this gas mixture are covered under the following specific State regulations:

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,
Dichlorodifluoromethane,
Nitrogen, 1,1,2-Trichloro-1,1,2-trifluoroethane.

Florida - Substance List: Oxygen,

Trichlorofluoromethane,
Dichlorodifluoromethane,
1,1,2-Trichloro-1,1,2-trifluoroethane.

Illinois - Toxic Substance List:

Trichlorofluoromethane,
Dichlorodifluoromethane,
1,1,2-Trichloro-1,1,2-trifluoroethane.

Kansas - Section 302/313 List: No.

Massachusetts - Substance List:

Trichlorofluoromethane,
Dichlorodifluoromethane, Oxygen, 1,1,2-Trichloro-1,1,2-trifluoroethane.

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Minnesota - List of Hazardous Substances:

Trichlorofluoromethane,
Dichlorodifluoromethane, 1,1,2-Trichloro-1,1,2-trifluoroethane.

Missouri - Employer Information/Toxic Substance List: Trichlorofluoromethane, Dichlorodifluoromethane, 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,
Dichlorodifluoromethane.

Pennsylvania - Hazardous Substance List:

Trichlorofluoromethane,
Dichlorodifluoromethane,

CALIFORNIA PROPOSITION 65: No component of this product is on the California Proposition 65 lists.

Oxygen, Nitrogen, 1,1,2-Trichloro-1,1,2-trifluoro-ethane.

Rhode Island - Hazardous Substance List:

Trichlorofluoromethane,
Dichlorodifluoromethane, Oxygen.

Texas - Hazardous Substance List:

Trichlorofluoromethane,
dichlorodifluoromethane,
1,1,2-Trichloro-1,1,2-trifluoroethane.

West Virginia - Hazardous Substance List:

Trichlorofluoromethane,
Dichlorodifluoromethane,
1,1,2-Trichloro-1,1,2-trifluoroethane.

Wisconsin - Toxic and Hazardous Substances:

Trichlorofluoromethane,
Dichlorodifluoromethane, 1,1,2-Trichloro-1,1,2-trifluoroethane.

16. Other Information

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.

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