Linde Gas LLC (216) 642-6600
P.O. Box 94737
Cleveland, Ohio 44101
www.us.lindegas.com

MATERIAL
SAFETY
DATA SHEET

No. 95

PRODUCT NAME 4-16% Carbon Dioxide and 6-20% Nitrogen in Helium	**CAS #** CO_2 = 124-38-9; N_2 = 7727-37-9; He = 7440-59-71
TRADE NAME AND SYNONYMS Laser Gas Mixtures; Compressed gas, n.o.s. (D.O.T.)	**DOT I.D. No.:** UN 1956
CHEMICAL NAME AND SYNONYMS 4-16 Molar % Carbon Dioxide and 6-20 Molar % Nitrogen in Helium	**DOT Hazard Class:** Division 2.2
ISSUE DATES AND REVISIONS Revised January 1995	**Formula** 4-16 Molar % CO_2 and 6-20 Molar % N_2 in He
	Chemical Family: Gas Mixture

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT

CO_2 = 5,000 Molar PPM; STEL = 30,000 Molar PPM; nitrogen and helium are simple asphyxiants (ACGIH 1994-1995). (Continued on Page 4)

SYMPTOMS OF EXPOSURE

Concentrations of 20-30 percent of these mixtures when inhaled with adequate oxygen in | the air will cause an increase in the respiratory rate. Higher concentrations will cause headache, nausea and eventual unconsciousness.

TOXICOLOGICAL PROPERTIES

Carbon dioxide is the most powerful cerebral vasodilator known. Inhaling large concentrations causes rapid circulatory insufficiency leading to coma and death. Chronic harmful effects are not known from repeated inhalation of low (20-30%) concentrations of these mixtures.

Neither helium, carbon dioxide or nitrogen are listed in the IARC, NTP or by OSHA as a carcinogen or a potential carcinogen. (Continued on Page 4)

RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO THESE MIXTURES. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

Inhalation: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given assisted respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

None

PHYSICAL DATA

BOILING POINT See Page 4	**LIQUID DENSITY AT BOILING POINT** See Page 4
VAPOR PRESSURE See Page 4	**GAS DENSITY AT 70°F. 1 atm** Approximately .03945 lb/ft^3 (.6319 kg/m^3)
SOLUBILITY IN WATER Partly	**FREEZING POINT** See Page 4
EVAPORATION RATE N/A, (Gas)	**SPECIFIC GRAVITY (AIR=1)** @ 70°F (21.1°C) = Approximately 0.53

APPEARANCE AND ODOR Colorless, odorless gas

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) N/A	**AUTO IGNITION TEMPERATURE** N/A	**FLAMMABLE LIMITS % BY VOLUME (See Page 4)** LEL N/A UEL N/A
EXTINGUISHING MEDIA Nonflammable gas mixtures		**ELECTRICAL CLASSIFICATION** Nonhazardous

SPECIAL FIRE FIGHTING PROCEDURES

If cylinders are involved in a fire, safely relocate or keep cool with water spray.

UNUSUAL FIRE AND EXPLOSION HAZARDS

None

REACTIVITY DATA

STABILITY Unstable		**CONDITIONS TO AVOID** None
Stable	X	

INCOMPATIBILITY (Materials to avoid) None

HAZARDOUS DECOMPOSITION PRODUCTS None

HAZARDOUS POLYMERIZATION May Occur		**CONDITIONS TO AVOID** None
Will Not Occur	X	

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Evacuate all personnel from affected area. Use appropriate protective equipment. If - leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.

WASTE DISPOSAL METHOD

Do not attempt to dispose of waste or unused quantities. Return in the shipping container Properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to your supplier. For emergency disposal assistance, contact your closest supplier location or call the emergency telephone number listed herein.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.		
VENTILATION See Local Exhaust	**LOCAL EXHAUST** See Page 4	**SPECIAL** N/A
	MECHANICAL (Gen.) N/A	**OTHER** N/A
PROTECTIVE GLOVES Any materia		
EYE PROTECTION Safety goggles or glasses		
OTHER PROTECTIVE EQUIPMENT Safety shoes		

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION

DOT Shipping Name: Compressed gas, n.o.s. DOT Hazard Class: Division 2.2
DOT Shipping Label: Nonflammable Gas I.D. No.: UN 1956

SPECIAL HANDLING RECOMMENDATIONS

Use only in well-ventilated areas. 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 (<3,000 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 back flow into the cylinder.

For additional handling recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14, and Safety Bulletin SB-2.

SPECIAL STORAGE RECOMMENDATIONS

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125F (52C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in - first out" inventory system to prevent full cylinders being stored for excessive periods of time.

For additional storage recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14, and Safety Bulletin SB-2.

SPECIAL PACKAGING RECOMMENDATIONS

These gas mixtures are noncorrosive and may be used with any common structural material.

OTHER RECOMMENDATIONS OR PRECAUTIONS

Analytical monitoring for carbon dioxide levels in the work atmosphere is recommended if these mixtures are used in confined areas. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR). (Continued on Page)

*Various Government Agencies (i.e. Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

4-16% CARBON DIOXIDE AND 6-20% NITROGEN IN HELIUM

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT: (Continued)

OSHA 1993 PEL (8 Hr. TWA) for CO_2 = 5,000 Molar PPM with no listing for nitrogen or helium.

TOXICOLOGICAL PROPERTIES: (Continued)

Persons in ill health where such illness would be aggravated by exposure to these mixtures should not be allowed to work with or handle these products.

PHYSICAL DATA

BOILING POINT:
He = -452.067°F (-268.926°C)
N_2 = -320.445°F (-195.803°C)
CO_2 Sublimation Point = -109.3°F (-78.5°C)

LIQUID DENSITY AT BOILING POINT:
He = 7.801 lb/ft^3 (124.96 kg/m^3)
N_2 = 50.48 lb/ft^3 (808.607 kg/m^3)
CO_2 Solid Density = 97.5 lb/ft^3 (1561 kg/m^3)

VAPOR PRESSURE: @ 70°F (21.1°C) = Above the critical temperature of
He = -450.31°F (-267.95°C)
N_2 = -232.51°F (146.95°C)
CO_2 = 856 psia (5900 kPa)

FREEZING POINT:
He Point = -456.497°F (-271.387°C) @ 437 psia (3013 kPa)
N_2 = -346.004°F (-210.002°C)
CO_2 = -69.9°F (-56.6°C)

SPECIAL PROTECTION INFORMATION

LOCAL EXHAUST:

To prevent accumulation above the TWA for carbon dioxide.

SPECIAL PRECAUTIONS

OTHER RECOMMENDATIONS OR PRECAUTIONS: (Continued)

Always secure cylinders in an upright position before transporting them. NEVER transport cylinders in trunks of vehicles, enclosed vans, truck cabs or in passenger compartments. Transport cylinders secured in open flatbed or in open pick-up type vehicles.

Reporting under SARA, Title III, Section 313 not required.

NFPA 704 NO. for these mixtures = 2 0 0 None