Program:	No [x]	Monographs:	No [x]	No [x]

SECTION 6 - EMERGENCY AND FIRST AID PROCEDURES

Eye Contact:	Immediately flush eyes with plenty of water for at least 15 minutes while holding lids open. If redness, itching or a burning sensation develops, get Medical attention.
Skin Contact:	Wash the material off the skin with copious amounts of soap and water for at least 15 minutes. If redness, itching or a burning sensation develops, get Medical attention.
Inhalation:	Remove victim to fresh air. If cough or other respiratory symptoms occur, consult Medical personnel. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Consult Medical personnel.
Ingestion:	If patient is conscious, give 1 or 2 glasses of warm water to drink and get Medical attention. DO NOT INDUCE VOMITING. Have victim lie down and keep warm.
NOTE TO PHYSICIAN:	Product is an asphxiant and can induce cardiac muscle sensitization to circulating epinephrine-like compounds. Do NOT give adrenalin or similar sympathomimetic drugs. Do NOT allow victim to exercise until 24 hours following specific exposures. Freeze burns of mucosal tissue can develop following specific exposures.

SECTION 7 - SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type):	Not normally necessary if controls are adequate. For high concentrations exceeding 4%, or if exposure is prolonged, use positive pressure air-supplied respirator.		
Ventilation:	Local Exhaust: Recommended to control exposures. See mechanical.	Mechanical (General): Recommended in low areas or indoors where vapors may collect.	
Protective Gloves:	Plastic if working with liquid.	Eye Protection:	Chemical goggles recommended. Full faceshield in addition if splashing of liquid form is possible.
Other Protective Clothing or Equipment:	Eye wash and safety showers are good safety practice in work areas when working with liquefied product.		

SECTION 8 - SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage:	Store as a liquefied compressed gas in DOT approved pressure vessels away from high temperatures. If cylinder is not connected to a system, it must be safety capped to protect against actuation of valve and release of agent.
Other Precautions:	Note incompatibility information in Section 4.
Steps to be Taken in Case Material is Released or Spilled:	Evacuate area; ventilate to outside atmosphere. Cool or remove hot, metal surfaces or source of non-extinguished flames.
Waste Disposal Methods:	Dispose of in compliance with local, state, and federal regulations.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM RATINGS

HAZARD INDEX:

4	Severe Hazard	2	HEALTH
3	Serious Hazard	0	FLAMMABILITY
2	Moderate Hazard	0	REACTIVITY
1	Slight Hazard		
0	Minimal Hazard		

N/A = Not Applicable NDA = No Data Available

Form No. F-85320-7

HELIUM NON-FLAMMABLE GAS MIXTURE - HELIUM/OXYGEN/CARBON DIOXIDE/NITROGEN

M S D S

Canadian Centre for Occupational Health and Safety

Issue : 2001-1 (February, 2001)

*** IDENTIFICATION ***

MSDS RECORD NUMBER : 2041059
PRODUCT NAME(S) : NON-FLAMMABLE GAS MIXTURE
Containing One or More of the Following Components in a Nitrogen or Helium Balance Gas: Oxygen, 0 - 23.5%; Carbon Dioxide, 0.005 - 50.0%; Methane: 0 - 2.5%
PRODUCT IDENTIFICATION : Document Number: 50015
DATE OF MSDS : 1997-03-24

*** SUPPLIER/DISTRIBUTOR INFORMATION ***

SUPPLIER/DISTRIBUTOR : BACHARACH, INC
ADDRESS : 625 ALPHA DRIVE
PITTSBURGH PENNSYLVANIA
U.S.A. 15238
Telephone: 412-963-2223 (INFORMATION)
Fax: 412-963-2091
EMERGENCY TELEPHONE NO. : 800-424-9300 (CHEMTREC)

MATERIAL SAFETY
DATA SHEET
Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: **Non-Flammable Gas Mixture**

Containing One or More of the Following Components in a Nitrogen or Helium Balance Gas: Oxygen, 0-23.5%; Carbon Dioxide, 0.005-50.0%; Methane; 0-2.5%

SYNONYMS: Not Applicable
CHEMICAL FAMILY NAME: Not Applicable
FORMULA: Not Applicable
Document Number: 50015 (Replaces Bacharach MSDS No. 99-0196)

Note: The Material Safety Data Sheet is for this gas mixture supplied in cylinders with 33 cubic feet (935 liters) or less gas capacity (DOT - 39 cylinders). This MSDS has been developed for various gas mixtures with the composition of components within the ranges listed in Section 2 (Composition and Information on Ingredients). Refer to the product label for information on the actual composition of the product.

HELIUM NON-FLAMMABLE GAS MIXTURE - HELIUM/OXYGEN/CARBON DIOXIDE/NITROGEN

PRODUCT USE:	Calibration of Monitoring and Research Equipment
SUPPLIER:	BACHARACH, INC.
MSDS RESPONSIBILITY:	AIR LIQUIDE AMERICA CORPORATION
ADDRESS:	821 Chesapeake Drive Cambridge, MD 21613
EMERGENCY PHONE:	CHEMTREC: 1-800-424-9300
BUSINESS PHONE:	1-410-228-6400
General MSDS Information	1-713/868-0440
Fax on Demand:	1-800/231-1366

2. COMPOSITION and INFORMATION ON INGREDIENTS

		EXPOSURE LIMITS IN AIR					
		ACGIH		OSHA			
		TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	OTHER
CHEMICAL NAME:	Carbon Dioxide	5000	30,000	5000 10,000 (Vacated 1989 PEL)	30,000 (Vacated 1989 PEL)	40,000	DFG-MAK: 5000 NIOSH REL TWA: 5000 C: 30000 ppm
CAS #:	124-38-9						
mole %:	0.005-50.0%						
CHEMICAL NAME:	**Oxygen**	There are no specific exposure limits for Oxygen. Oxygen levels should be maintained above 19.5%.					
CAS #:	7782-44-7						
mole%:	0 - 23.5%						
CHEMICAL NAME:	**Methane**	There are no specific exposure limits for Methane. Methane is a simple asphyxiant (SA). Oxygen levels should be maintained abouve 19.5%.					
CAS #:	74-82-8						
mole %:	0-2.5%						
CHEMICAL NAME:	**Nitrogen/ Helium**	There are no specific exposure limits for Nitrogen or Helium. These gases are simple asphyxiants (SA). Oxygen levels should be maintained above 19.5%.					
CAS #:	7727-37-9/ 7440-59-7						
mole %:	Balance						

NE = Not Established. C = Ceiling Limit.
See Section 16 for Definitions of Terms Used.

NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a colorless, odorless gas. A significant hazard associated with releases of this product is the potential for over-exposure to Carbon Dioxide, a component of this gas mixture. Inhalation of Carbon Dioxide can increase respiration and heart rate, possibly resulting in circulatory insufficiency (which may lead to coma and death). At concentrations between 2-10%, Carbon Dioxide can cause nausea, dizziness, headache, mental confusion, increased blood pressure and respiratory rate. If the concentration of Carbon Dioxide reaches 10% or more, suffocation can occur within minutes. Additionally, releases of this product may produce oxygen-deficient atmospheres (especially in confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated.

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

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure for this product is by inhalation.

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. A significant hazard associated with releases of this product is the potential for over-exposure to Carbon Dioxide, a component of this gas mixture. If this product is released in a small, poorly ventilated area (i.e. an enclosed or confined space), and if the concentration of Carbon Dioxide reaches 10% or more, suffocation can occur within minutes. At concentrations between 2-10%, Carbon Dioxide can cause nausea, dizziness, headache, mental confusion, increased blood pressure and respiratory rate. Carbon Dioxide initially stimulates respiration and then causes respiratory depression. High concentrations result in narcosis. Symptoms in humans are as follows:

CONCENTRATION OF CARBON DIOXIDE	OBSERVED EFFECT
1%	Slight increase in breathing rate.
2%	Breathing rate increases to 50% above normal level. Prolonged exposure can cause headache, tiredness.
3%	Breathing increases to twice normal rate and becomes labored. Weak narcotic effect. Impaired hearing, headache, increase in blood pressure and pulse rate.
4-5%	Breathing increases to approximately four times normal rate, symptoms of intoxication become evident and slight choking

	may be felt.
5-10%	Characteristic sharp odor noticeable. Very labored breathing, headache, visual impairment and ringing in the ears. Judgment may be impaired, followed within minutes by loss of consciousness.
50-100%	Unconsciousness occurs more rapidly above 10% level. Prolonged exposure to high concentrations may eventually result in death from asphyxiation.

Additionally, if mixtures of this product contain less than 19.5% Oxygen and are released in a small, poorly-ventilated area (i.e. an enclosed or confined space), an oxygen-deficient environment may occur. 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. The effects associated with various levels of oxygen are as follows:

CONCENTRATION OF OXYGEN	OBSERVED EFFECT
12-16% Oxygen:	Breathing and pulse rate increased, muscular coordination slightly disturbed.
10-14% Oxygen:	Emotional upset, abnormal fatigue, disturbed respiration.
6-10% Oxygen:	Nausea, vomiting, collapse, or loss of consciousness.
Below 6%:	Convulsive movements, possible respiratory collapse, and death.

CONTACT WITH SKIN or EYES: Exposure to high concentrations of Carbon Dioxide (a component of this gas mixture) may cause eye irritation with symptoms such as pain, redness, and tearing. Prolonged contact of high concentrations of Carbon Dioxide with the eyes can cause damage to the retinal ganglion cells.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in Lay Terms. 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. Inhalation of high concentrations of Carbon Dioxide (a component of this gas mixture) can cause nausea, dizziness, headache, mental confusion, increased blood pressure and respiratory rate. High concentrations of Carbon Dioxide may cause eye irritation, and potential eye damage. Another 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, 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: There are currently no known adverse health effects associated with chronic exposure to this gas.

TARGET ORGANS: Respiratory system, central nervous system, and eyes.

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS PRODUCT WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, 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).

5. FIRE-FIGHTING MEASURES

NFPA RATING

FLAMMABILITY [0]

HEALTH [1] [0] REACTIVITY

[ ]

OTHER

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. Pressure in a container can build-up due to heat and it may rupture if pressure relief devices should fail to function.

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

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 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 Carbon Dioxide and oxygen. Carbon Dioxide should not be above background levels and 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.

7. HANDLING and USE

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 product could occur without any significant warning symptoms, due to carbon dioxide over-exposure and oxygen deficiency. Do not attempt to repair, adjust, or in any other way modify the 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 deg C, 70 deg 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! Compressed gases can present significant safety hazards. During cylinder use, use equipment designed for these specific cylinders. Ensure all lines and equipment are rated for proper service pressure.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain that application equipment is locked and tagged-out safely. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: No special 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 equipment to detect the levels of Carbon Dioxide and Oxygen.

RESPIRATORY PROTECTION: No special respiratory protection is required under normal circumstances of use. Use supplied air respiratory protection if the level of Carbon Dioxide exceeds exposure limits presented in Section 2 (Composition and Information of Ingredients) and 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. Respiratory selection guidelines from NIOSH for Carbon Dioxide are provided below for information.

NIOSH/OSHA RECOMMENDATIONS FOR CARBON DIOXIDE CONCENTRATIONS IN AIR:

UP TO 40,000 ppm:	Supplied Air Respirator (SAR); or full-facepiece Self-Contained Breathing Apparatus (SCBA).
EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS:	Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.
ESCAPE:	Escape-type SCBA.
NOTE:	The IDLH concentration for Carbon Dioxide is 40,000 ppm.

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.

9. PHYSICAL and CHEMICAL PROPERTIES

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

GAS DENSITY @ 32 deg F (0 deg C) and 1 atm: 0.072 lbs/ ft3 (1.153 kg/m3)
BOILING POINT: -320.4 deg F (-195.8 deg C)
FREEZING/MELTING POINT @ 10 psig -210 deg C (-345.8 deg F)
SPECIFIC GRAVITY (air = 1) @ 70 deg F (21.1 deg C): 0.906
pH: Not applicable.
SOLUBILITY IN WATER vol/vol @ 32 deg F (0 deg 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 deg F (21.1 deg C) psig: Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for Helium, a main component of this gas mixture.
GAS DENSITY @ 32 deg F (0 deg C) and 1 atm: 0.0103 lbs/cu ft (1.165 kg/m3)
BOILING POINT: -452.1 deg F (-268.9 deg C)
FREEZING/MELTING POINT (@ 10 psig): Not applicable.
SPECIFIC GRAVITY (air = 1) @ 70 deg F (21.1 deg C): 0.1381
pH: Not applicable.
SOLUBILITY IN WATER vol/vol at 32 deg F (0 deg C)and 1 atm: 0.0094
MOLECULAR WEIGHT: 4.00
EVAPORATION RATE (nBuAc = 1): Not applicable.
EXPANSION RATIO: Not applicable.
ODOR THRESHOLD: Not applicable. Odorless.
SPECIFIC VOLUME (ft3/lb): 96.7
VAPOR PRESSURE @ 70 deg F (21.1 deg C) (psig): Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION: Not applicable.

The following information is for the gas mixture.
APPEARANCE AND COLOR: This product is a colorless, odorless gas.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no unusual warning properties associated with a release of this product. 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.

10. STABILITY and REACTIVITY

STABILITY: Normally stable in gaseous state. Moisture in the air could lead to the formation of carbonic acid from Carbon Dioxide.

DECOMPOSITION PRODUCTS: Methane, a component of this gas mixture, will thermally decompose in air to generate carbon monoxide and carbon dioxide. The other components of this gas mixture do not decompose, per se, but may react with other compounds in the heat of a fire.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Titanium will burn in Nitrogen (a component of this product). Lithium reacts slowly with Nitrogen at ambient temperatures. A component of this product (Methane) is also incompatible with strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen difluoride, and nitrogen trifluoride). Carbon Dioxide, another component of this gas mixture, will ignite and explode when heated with powdered aluminum, beryllium, cerium alloys, chromium, magnesium-aluminum alloys, manganese, thorium, titanium, and zirconium. In the presence of moisture, Carbon Dioxide will ignite with cesium oxide. Metal acetylides will also ignite and explode on contact with Carbon Dioxide.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following toxicology data are available for the components of this product:

METHANE: There are no specific toxicology data for Methane. Methane is a simple asphyxiant, which acts to displace oxygen in the environment.
Carbon Dioxide: This gas is a simple asphyxiant with physiological effects at high concentration.

TCLo(inhalation, rat) = 6 pph/24 hours; reproductive and teratogenic effects
LCLo(inhalation, human) = 9 pph/ 5 minutes
LCLo(inhalation, mammal) = 90,000 ppm/5 minutes

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

HELIUM: There are no specific toxicology data for Helium. Helium is a simple asphyxiant (SA), which acts to displace oxygen in the environment

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.

IRRITANCY OF PRODUCT: Not applicable.

SENSITIZATION TO THE PRODUCT: The components of this gas mixture are not known to be sensitizers.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: This product is not expected to cause mutagenic effects in humans.
Embryotoxcity: This product has not been reported to cause embryotoxic effects.
Teratogenicity: This product is not expected to cause teratogenic effects in humans. Clinical studies involving test animals exposed to high concentrations of Carbon Dioxide indicate teratogenic effects.
Reproductive Toxicity: This product is not expected to cause adverse reproductive effects in humans. Clinical studies involving test animals exposed to high concentrations of Carbon Dioxide indicate reproductive effects.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions may be aggravated by over-exposure to the components of this product. Additionally, over-exposure to Carbon Dioxide (a component of this gas mixture) may aggravate eye disorders and central nervous system conditions.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen, if necessary; treat symptoms and eliminate exposure.

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

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: The components of this gas mixture occur naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas. The following environmental data are applicable to the components of this product.

Oxygen: Water Solubility = 1 volume Oxygen/32 volumes water at 20 deg C. Log Kow = -0.65
Nitrogen: Water Solubility = 2.4 volumes Nitrogen/100 volumes water at 0 deg C. 1.6 volumes Nitrogen/100 volumes water at 20 deg C.

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.

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, Carbon Dioxide) or (Helium, Carbon Dioxide)
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).

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 can present serious safety hazards. If transporting these cylinders in vehicles, ensure these cylinders are not exposed to extremely high temperatures (as may occur in an enclosed vehicle on a hot day). Additionally, the vehicle should be well-ventilated during transportation.

Note: DOT 39 Cylinders ship in a strong outer carton (overpack). Pertinent shipping information goes on the outside of the overpack. DOT 39 Cylinders do not have transportation information on the cylinder itself.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

15. REGULATORY INFORMATION

SARA REPORTING REQUIREMENTS: The components of the gas mixture are 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
Oxygen	NO	NO	NO
Methane	NO	NO	NO
Carbon Dioxide	NO	NO	NO
Helium	NO	NO	NO
Nitrogen	NO	NO	NO

SARA Threshold Planning Quantity: Not applicable.

TSCA INVENTORY STATUS: The components of this gas mixture are listed on the TSCA Inventory.

CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

OTHER U.S. FEDERAL REGULATIONS:

Methane is subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for this gas is 10,000 pounds.

This gas mixture does not contain any Class I or Class II ozone depleting chemicals (40 CFR part 82).

Nitrogen, Helium, Carbon Dioxide and Oxygen are not listed as Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. Methane is are listed under this regulation in Table 3 as a

Regulated Substance (Flammable Substance), in quantities of 10,000 lbs (4,553 kg) or greater.

OTHER CANADIAN REGULATIONS: This gas mixture is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

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

Alaska - Designated Toxic and Hazardous Substances: Methane, Carbon Dioxide, Helium.
California - Permissible Exposure Limits for Chemical Contaminants: Nitrogen, Methane, Carbon Dioxide, Helium.
Florida - Substance List: Oxygen, Carbon Dioxide, Helium.
Illinois - Toxic Substance List: Carbon Dioxide, Helium.
Kansas - Section 302/313 List: No.
Massachusetts - Substance List: Oxygen, Methane, Carbon Dioxide, Helium.
Minnesota - List of Hazardous Substances: Methane, , Carbon Dioxide, Helium.
Missouri - Employer Information/Toxic Substance List: Methane, Carbon Dioxide, Helium.
New Jersey - Right to Know Hazardous Substance List: Oxygen, Nitrogen, Methane, Carbon Dioxide, Helium.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: No.
Pennsylvania - Hazardous Substance List: Oxygen, Nitrogen, Methane, Carbon Dioxide, Helium.
Rhode Island - Hazardous Substance List: Oxygen, Nitrogen, Methane, Carbon Dioxide, Helium.
Texas - Hazardous Substance List: Carbon Dioxide.
West Virginia - Hazardous Substance List: Carbon Dioxide.
Wisconsin - Toxic and Hazardous Substances: Carbon Dioxide.

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

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. Air Liquide America 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 involves some preparation before the metal dealer may accept

them. We perform this operation as a service 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 serious injury or death.

Further information about the handling of compressed gases can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102. Telephone: (703) 412-0900.

P-1	"Safe Handling of Compressed Gases in Containers"
AV-1	"Safe Handling and Storage of Compressed Gases"
	"Handbook of Compressed Gases"

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
619/565-0302
Fax on Demand: 1-800/231-1366

This Material Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide America Corporation'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 product 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.

HYDRAULIC OIL

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* M S D S *
* *
* Canadian Centre for Occupational Health and Safety *
* * * * * * * * * * * * * Issue : 2001-1 (February, 2001) *

*** IDENTIFICATION ***

MSDS RECORD NUMBER : 2313097
PRODUCT NAME(S) : BP AW HYDRAULIC OIL 32
LUBRICATING OIL; HYDRAULIC OIL
PRODUCT IDENTIFICATION : MSDS No. 0494105 US/ENGLISH
CAS NUMBER: 64741-88-4
DATE OF MSDS : 2000-01-24
CURRENCY NOTE : This MSDS was provided to CCOHS in electronic form on 2000-05-31

*** MANUFACTURER INFORMATION ***

MANUFACTURER : BP Lubricants
ADDRESS : 28100 Torch Parkway
Warrenville Illinois
U.S.A. 60555-4015
Telephone: 630-434-6377 (OTHER PRODUCT SAFETY INFORMATION)
EMERGENCY TELEPHONE NO. : 312-856-2200 (HEALTH INFORMATION, USA)
703-527-3887 (SPILL INFORMATION, CHEMTREC, USA)

*** MATERIAL SAFETY DATA ***

MSDS No. 0494105 US/ENGLISH

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER/SUPPLIER:
BP Lubricants
28100 Torch Parkway
Warrenville, Illinois 60555-4015
U.S.A.

EMERGENCY HEALTH INFORMATION:
1 (800) 447-8735

EMERGENCY SPILL INFORMATION:

1 (800) 424-9300 CHEMTREC (USA)

OTHER PRODUCT SAFETY INFORMATION:
1 (630) 434-6377 (USA)

SUBSTANCE: BP AW HYDRAULIC OIL 32

TRADE NAMES/SYNONYMS:
LUBRICATING OIL; HYDRAULIC OIL

CREATION DATE: Jan 24 2000

REVISION DATE: Feb 01 2000

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: SOLVENT-REFINED HEAVY PARAFFINIC DISTILLATE
CAS NUMBER: 64741-88-4
EC NUMBER (EINECS): 265-090-8
EC INDEX NUMBER: 649-454-00-7
PERCENTAGE: 98.0-100.0

(See Section 8, "Exposure Controls, Personal Protection", for exposure guidelines)

SECTION 3 HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=0 FIRE=1 REACTIVITY=0

EMERGENCY OVERVIEW:
COLOR: yellow
PHYSICAL FORM: oil
ODOR: hydrocarbon odor
MAJOR HEALTH HAZARDS: Prolonged or repeated contact can defat the skin and lead to irritation and/or dermatitis.

POTENTIAL HEALTH EFFECTS:
INHALATION:
No significant health hazards identified.
SKIN CONTACT:
Prolonged or repeated contact can defat the skin and lead to irritation and/or dermatitis. High pressure skin injections are serious medical emergencies. Injury will not appear serious at first; within a few hours, tissue will become swollen, discolored and extremely painful.
EYE CONTACT:
No significant health hazards identified.
INGESTION:
Ingestion causes gastrointestinal irritation and diarrhea.

SECTION 4 FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Get medical attention.

SKIN CONTACT: Wash exposed skin with soap and water. Remove contaminated clothing and thoroughly clean and dry before reuse. Accidental high pressure injection through the skin requires immediate medical attention. Get medical attention if irritation develops.

EYE CONTACT: Flush eyes with plenty of water.

INGESTION: If swallowed, drink plenty of water. Get immediate medical attention. Induce vomiting only at the instructions of a physician. Do not

give anything by mouth to unconscious or convulsive person.

SECTION 5 FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Slight fire hazard.

EXTINGUISHING MEDIA: carbon dioxide, regular dry chemical, regular foam, water

FIRE FIGHTING: Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Water or foam may cause frothing.

FIRE FIGHTING PROTECTIVE EQUIPMENT: Firefighters should wear full bunker gear, including a positive pressure self contained breathing apparatus.

FLASH POINT: 468 F (242 C)
LOWER FLAMMABLE LIMIT: 1 % by volume
UPPER FLAMMABLE LIMIT: 7 % by volume

FLAMMABILITY CLASSIFICATION: Not Flammable.

HAZARDOUS COMBUSTION PRODUCTS:
Thermal decomposition products or combustion: hydrocarbons, oxides of carbon, oxides of nitrogen, oxides of phosphorus, oxides of sulfur, oxides of zinc

SECTION 6 ACCIDENTAL RELEASE MEASURES

Stop leak if possible without personal risk. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Keep unnecessary people away, isolate hazard area and deny entry. Large spills: Dike for later disposal. Cover with plastic sheet or tarp to minimize spreading and protect from contact with water. Prevent spreading by diking, ditching, or absorbing on inert materials.

SECTION 7 HANDLING AND STORAGE

STORAGE: Avoid extremes in storage temperatures. Store in a cool, dry, well-ventilated area. Store away from heat, ignition sources, and open flame in accordance with applicable regulations. Keep container tightly closed. Do not store in unlabeled containers.

HANDLING: Keep away from all ignition sources. Use only with adequate ventilation. Do not eat, drink or smoke in areas of use or storage. Use good personal hygiene practices. Wash hands before eating, drinking, smoking or using toilet facilities. Wash thoroughly after work using soap and water. Remove contaminated clothing and thoroughly clean and dry before reuse. SPECIAL PRECAUTIONS: Empty containers may contain toxic,

flammable/combustible or explosive residue or vapors. Do not cut, grind, drill, weld, reuse or dispose of containers unless adequate precautions are taken against these hazards.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
SOLVENT-REFINED HEAVY PARAFFINIC DISTILLATE:
MINERAL OIL MIST:
5 mg/m3 OSHA TWA
5 mg/m3 ACGIH TWA (Notice of Intended Changes 1993-1994)
10 mg/m3 ACGIH STEL (Notice of Intended Changes 1993-1994)
5 mg/m3 MEXICO TWA
10 mg/m3 MEXICO STEL

VENTILATION: Use with adequate ventilation. Control airborne concentrations below the exposure guidelines.

EYE PROTECTION: None required; however, use of eye protection is good industrial practice.

CLOTHING: Avoid repeated or prolonged contact. Wear protective clothing if prolonged or repeated contact is likely.

GLOVES: Wear protective gloves if prolonged or repeated contact is likely.

PROTECTIVE MATERIAL TYPES: neoprene

RESPIRATOR: Use with adequate ventilation.
Avoid breathing vapor or mist.
If ventilation is inadequate, use a NIOSH certified respirator with an organic vapor cartridge and P95 particulate filter.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid
COLOR: yellow
PHYSICAL FORM: oil
ODOR: hydrocarbon odor
BOILING POINT: Not available
FREEZING POINT: Not available
POUR POINT: -26 F (-32 C)
VAPOR PRESSURE: <1 mmHg @ 20 C
VAPOR DENSITY (air=1): >1
SPECIFIC GRAVITY (water=1): 0.87
BULK DENSITY: 0.880 g/cm3
WATER SOLUBILITY: insoluble in cold water
PH: Not available

VOLATILITY: negligible
ODOR THRESHOLD: Not available
EVAPORATION RATE: slower than ether

VISCOSITY: 27.3 cP @ 40 C
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Avoid contact with incompatible materials.

INCOMPATIBILITIES: strong oxidizing materials

HAZARDOUS DECOMPOSITION:
Thermal decomposition products or combustion: hydrocarbons, oxides of carbon, oxides of nitrogen, oxides of phosphorus, oxides of sulfur, oxides of zinc

POLYMERIZATION: Will not polymerize.

SECTION 11 TOXICOLOGICAL INFORMATION

EYE IRRITATION: Testing not conducted. See Other Toxicity Data.

SKIN IRRITATION: Testing not conducted. See Other Toxicity Data.

DERMAL LD50: Testing not conducted. See Other Toxicity Data.

ORAL LD50: Testing not conducted. See Other Toxicity Data.

INHALATION LC50: Testing not conducted. See Other Toxicity Data.

OTHER TOXICITY DATA:
Specific toxicity tests have not been conducted on this product. Our hazard evaluation is based on information from similar products, the ingredients, technical literature, and/or professional experience.

No component of this product present at levels greater than 0.1% is identified as a carcinogen by the U.S. National Toxicology Program, the U.S. Occupational Safety and Health Act, or the International Agency on Research on Cancer (IARC).

SECTION 12 ECOLOGICAL INFORMATION

Ecological testing has not been conducted on this product by BP Amoco.