

# 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 Balance Gas:**  
**n-Hexane, 0-0.48%; n-Pentane, 0-0.75%; Oxygen, 0-23.5%**

**SYNONYMS:** Not Applicable

**CHEMICAL FAMILY NAME:** Not Applicable

**FORMULA:** Not Applicable

**Document Number:** 50011

**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.

<b>PRODUCT USE:</b>	Calibration of Monitoring and Research Equipment
<b>SUPPLIER/MANUFACTURER'S NAME:</b>	AIR LIQUIDE AMERICA L.P.
<b>ADDRESS:</b>	821 Chesapeake Drive Cambridge, MD 21613
<b>EMERGENCY PHONE:</b>	CHEMTREC: 1-800-424-9300
<b>BUSINESS PHONE:</b>	1-410-228-6400
	General MSDS Information 1-713/868-0440
	Fax on Demand: 1-800/231-1366

## 2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH-TLV		OSHA-PEL		NIOSH IDLH ppm	OTHER ppm
			TWA ppm	STEL ppm	TWA ppm	STEL ppm		
n-Hexane	110-54-3	0-0.48%	50 (skin)	NE	500 50 (Vacated 1989 PEL)	NE	1100 (Based on 10% of LEL)	NIOSH REL: TWA = 500 DFG MAKs: TWA = 50 (skin) PEAK = 8•MAK, 15, min., average value DFG MAK Pregnancy Risk Classification: C
n-Pentane	109-66-0	0-0.75%	600	750	1000 600 (Vacated 1989 PEL)	750 (Vacated 1989 PEL)	1500 (based on 10% of LEL)	NIOSH RELs: TWA = 120 STEL = 610 (ceiling) 15 minutes DFG MAKs: TWA = 1000 PEAK = 2•MAK 60 min., momentary value
Oxygen	7782-44-7	0.0- 23.5%	There are no specific exposure limits for Oxygen. Oxygen levels should be maintained above 19.5%.					
Nitrogen	7727-37-9	Balance	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					

NE = Not Established.

NIC = Notice of Intended Change

See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This gas mixture has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

## 3. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** This gas mixture is a colorless gas mixture which is either odorless, or which has a faint, solvent-like odor, if the solvent components (n-Pentane and n-Hexane) are present. Components of this gas mixture (n-Pentane and n-Hexane) can cause anesthetic or peripheral neuropathy effects. Additionally, releases of this gas mixture may produce oxygen-deficient atmospheres (especially in small, confined spaces or other poorly-ventilated environments); individuals in such atmospheres may be asphyxiated.

**SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE:** The most significant route of over-exposure for this gas mixture is by inhalation. **INHALATION:** Due to the small size of an individual cylinder of this gas mixture, no unusual health effects from over-exposure to the product are anticipated under routine circumstances of use. A hazard associated with this gas mixture is the potential for anesthetic and peripheral neuropathy effects after inhalation over-exposures to n-Pentane and n-Hexane (components of this gas mixture). Specific human over-exposure data are available for n-Pentane and n-Hexane, as follows:

### CONCENTRATION OF n-PENTANE

Brief (10 minute) up to 5,000 ppm:

Higher than 5,000 ppm:

Long-Term:

### CONCENTRATION OF n-HEXANE

Brief (10 minute) at 1,500 ppm:

5000 ppm:

Long term at 500 ppm:

Eyes and Vision:

Blood Cells:

### OBSERVED EFFECT

No symptoms.

Exhilaration, dizziness and headache can occur.

Can cause chronic neurological disorder causing damage to the nerves in the hands and feet (peripheral neuropathy).

### OBSERVED EFFECT

Irritation of the respiratory tract, nausea and headache.

Dizziness and drowsiness can occur.

Can affect the nerves in the arms and legs. Effects include numbing or tingling sensations in the fingers and toes, tiredness, muscle weakness, cramps and spasms in the leg, difficulty in holding objects or walking, abdominal pains, loss of appetite, weight loss. More serious exposures can cause damage to the nerves in the hands and feet (peripheral neuropathy).

Abnormal color perception and pigment changes in the eyes have been reported among industrial workers exposed to 423-1280 ppm for 5 years or more.

Mild forms of anemia have also been associated with exposure to hexane. These are of temporary nature.

### 3. HAZARD IDENTIFICATION (Continued)

**INHALATION (continued):** Additionally, if mixtures of this gas mixture contain less than 19.5% Oxygen and are released in a small, poorly ventilated area (i.e. a small, 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 following effects associated with various levels of oxygen are as follows:

**CONCENTRATION OF OXYGEN**

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, vomiting, collapse, or loss of consciousness.

Convulsive movements, possible respiratory collapse, and death.

**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 gas mixture, no unusual health effects from exposure to the product are anticipated under routine circumstances of use.

Inhalation over-exposures to components of this gas mixture (n-Pentane, and n-Hexane) can cause anesthetic effects and motor neuropathy (i.e. pain and tingling in feet and hands).

**CHRONIC:** Chronic exposure of this gas mixture to the skin may cause dermatitis. Abnormal color perception and pigment changes in the eyes have been reported among persons exposed to 420 -1300 ppm of n-Hexane for five years. Additionally, long-term exposure to low levels of n-Hexane or n-Pentane can affect the nerves in the arms and legs. Effects include numbing or tingling sensation, tiredness, cramps, spasms in legs, difficulty holding objects or walking, loss of appetite and weight loss. Pentane isomers, such as n-Pentane, can cause sensitization of the heart to epinephrine. Refer to Section 11 (Toxicology Information) for additional information on the components of this gas mixture. Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may effect the heart and nervous system.

**TARGET ORGANS:** ACUTE: Respiratory system, blood system, central nervous system effects. CHRONIC: Cardiovascular system, reproductive system, skin, central nervous system.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM		
HEALTH HAZARD	(BLUE)	1
FLAMMABILITY HAZARD	(RED)	0
PHYSICAL HAZARD	(YELLOW)	0
PROTECTIVE EQUIPMENT		
EYES	RESPIRATORY	HANDS
BODY		
See Section 8		
For Routine Industrial Use and Handling Applications		

### 4. FIRST-AID MEASURES

**RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS GAS MIXTURE WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT.** At a minimum, **Self-Contained Breathing Apparatus must be worn.** Victim(s) who experience any adverse effect after over-exposure to this gas mixture 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).

No unusual health effects are anticipated after exposure to this gas mixture, due to the small cylinder size. If any adverse symptom develops after over-exposure to this gas mixture, remove victim(s) to fresh air as quickly as possible. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation if necessary.

**SKIN EXPOSURE:** If irritation of the skin develops after exposure to this gas mixture, immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention.

**EYE EXPOSURE:** If irritation of the eye develops after exposure to this gas mixture, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Seek medical assistance immediately, preferably an ophthalmologist.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Acute or chronic respiratory conditions may be aggravated by over-exposure to the components of this gas mixture. Because of the presence of n-Hexane or n-Pentane in this gas mixture, central nervous system conditions, eye disorders, or skin problems may be aggravated by over-exposure to this gas mixture.

**RECOMMENDATIONS TO PHYSICIANS:** Administer oxygen, if necessary; treat symptoms; eliminate exposure. Be observant for the signs of pulmonary edema.

### 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** 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.

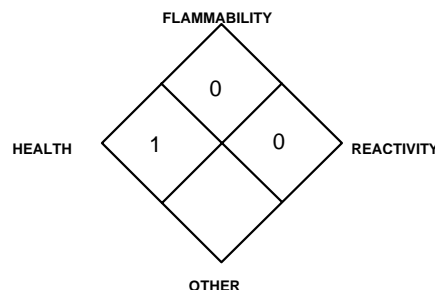
**UNUSUAL FIRE AND EXPLOSION HAZARDS:** This gas mixture is not flammable; however, containers, when involved in fire, may rupture or burst in the heat of the fire.

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.

#### NFPA RATING



### 6. ACCIDENTAL RELEASE MEASURES

**LEAK RESPONSE:** Due to the small size and content of the cylinder, an accidental release of this gas mixture presents significantly less risk Ammonia over-exposure, 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 Ammonia and Oxygen. The concentration of Ammonia must be at acceptable levels (see Section 2, Composition on Information on Ingredients) and the atmosphere must have at least 19.5 percent oxygen before personnel can be allowed in the area without

### 7. HANDLING and USE

**WORK PRACTICES AND HYGIENE PRACTICES:** All work practices should minimize the release of gas mixture containing Ammonia. Eye wash stations/safety showers should be near areas where this gas mixture is used or stored. All work operations should be monitored in such a way that emergency personnel can be immediately contacted in the event of a release. 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°C [70°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 gas mixture in well-ventilated areas. If this gas mixture is used in a poorly-ventilated area, install automatic monitoring equipment to detect the levels of oxygen.

**RESPIRATORY PROTECTION:** No special respiratory protection is required under normal circumstances of use. Use supplied air respiratory protection if the levels of components 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 gas mixture. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.16.33% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

**EYE PROTECTION:** Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

**HAND PROTECTION:** No special protection is needed under normal circumstances of use. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

**BODY PROTECTION:** No special protection is needed under normal circumstances of use. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

## 9. PHYSICAL and CHEMICAL PROPERTIES

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

**GAS DENSITY @ 32°F (0°C) and 1 atm:** .072 lbs/ ft<sup>3</sup> (1.153 kg/m<sup>3</sup>)

**FREEZING/MELTING POINT @ 10 psig:** -345.8°F (-210°C)

**SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C):** 0.906

**SOLUBILITY IN WATER vol/vol @ 32°F (0°C) and 1 atm:** 0.023

**VAPOR RATE (nBuAc = 1):** Not applicable.

**VAPOR PRESSURE @ 70°F (21.1°C) (psig):** Not applicable.

**COEFFICIENT WATER/OIL DISTRIBUTION:** Not applicable.

**BOILING POINT:** -320.4°F (-195.8°C)

**pH:** Not applicable.

**MOLECULAR WEIGHT:** 28.01

**EXPANSION RATIO:** Not applicable.

**SPECIFIC VOLUME (ft<sup>3</sup>/lb):** 13.8

The following information is for this gas mixture.

**APPEARANCE AND COLOR:** This gas mixture is a colorless gas which is either odorless, or has a faint, solvent-like odor.

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

## 10. STABILITY and REACTIVITY

**STABILITY:** Normally stable in gaseous state.

**DECOMPOSITION PRODUCTS:** The thermal decomposition products of n- Hexane and n-Pentane include carbon oxides. The other components of this gas mixture do not decompose, per se, but can react with other compounds in the heat of a fire.

**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** Titanium will burn in Nitrogen (the main component of this gas mixture). Lithium reacts slowly with Nitrogen at ambient temperatures. Components of this gas mixture (n-Pentane and n-Hexane) are also incompatible with strong oxidizers (i.e. chlorine, bromine pentafluoride, oxygen, oxygen difluoride, and nitrogen trifluoride).

**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 gas mixture in 1% concentration or greater:

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

**NITROGEN:**

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

**OXYGEN:**

The toxicity data for Oxygen are related to exposures in a hyperbaric environment and are not likely to occur in industrial exposure situations.

**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:** This gas mixture may cause severe irritation to contaminated tissue.

**SENSITIZATION OF PRODUCT:** The components of this gas mixture are not known to be skin or respiratory sensitizers. Pentane isomers (i.e. n-Pentane) can cause cardiac sensitization to epinephrine.

**REPRODUCTIVE TOXICITY INFORMATION:** Listed below is information concerning the effects of this gas mixture on the human reproductive system.

**Mutagenicity:** The components of this gas mixture are not reported to cause mutagenic effects in humans. Animal mutation data are available for n-Hexane obtained during clinical studies on specific animal tissues exposed to high doses of this compound.

**Embryotoxicity:** The components of this gas mixture are not reported to cause embryotoxic effects in humans.

**Teratogenicity:** The components of this gas mixture are not reported to cause teratogenic in humans.

**Reproductive Toxicity:** The components of this gas mixture are not reported to cause adverse reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of n-Hexane indicate adverse 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.*

**BIOLOGICAL EXPOSURE INDICES (BEIs):** Biological Exposure Indices (BEIs) have been determined for the Carbon Monoxide and Hexane components, as follows:

CHEMICAL DETERMINANT	SAMPLING TIME	BEI
n-HEXANE • n-Hexane in end-exhaled air Notice of Intended Change: • 2,5-Hexanedione in urine	• End of shift • End of shift at end of workweek (currently is "Endo of Shift")	• 5 mg/g creatinine • 0.4 mg/L

## 12. ECOLOGICAL INFORMATION

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

**OXYGEN:** Water Solubility = 1 volume Oxygen/32 volumes water at 20°C. Log K<sub>ow</sub> = -0.65

**PENTANE:** Log K<sub>ow</sub> = 3.39. Water Solubility = 38.5 mg/L. LOG BCF (n-pentane) = calculated, 1.90 and 2.35, respectively. Photolysis, hydrolysis, and bioconcentration are not anticipated to be important fate processes. Biodegradation and soil adsorption are anticipated to be more important processes for this compound.

**n-HEXANE:** Log K<sub>ow</sub> = 3.90-4.11. Water Solubility = 9.5 mg/L. Estimated Bioconcentration Factor =2.24 and 2.89. Bioconcentration in aquatic organisms is low. Hexane is volatile. Rapid volatilization from water and soil is anticipated for this compound. Hexane will float in slick on surface of the water

**NITROGEN:** Water Solubility = 2.4 volumes Nitrogen/100 volumes water at 0°C; 1.6 volumes Nitrogen/100 volumes water at 20°C.

**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** No evidence is currently available on the effects of this gas mixture on plant and animal life.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** No evidence is currently available on the effects of this gas mixture 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 GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.**

**PROPER SHIPPING NAME:** Compressed gases, n.o.s. (\*Oxygen, Nitrogen)\*or the gas component with the next highest concentration next to Nitrogen.

**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 (2000):** 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 gas is considered as Dangerous Goods, per regulations of Transport Canada.

**PROPER SHIPPING NAME:** Compressed gases, n.o.s. (\*Oxygen, Nitrogen)\*or the gas component with the next highest concentration next to Nitrogen.

**HAZARD CLASS NUMBER and DESCRIPTION:** 2.2 (Non-Flammable Gas)

**UN IDENTIFICATION NUMBER:** UN 1956

**PACKING GROUP:** Not Applicable

**HAZARD LABEL:** Class 2.2 (Non-Flammable Gas)

**SPECIAL PROVISIONS:** None

**EXPLOSIVE LIMIT AND LIMITED QUANTITY INDEX:** 0.12

**ERAP INDEX:** None

**PASSENGER CARRYING SHIP INDEX:** None

**PASSENGER CARRYING ROAD VEHICLE OR PASSENGER CARRYING RAILWAY VEHICLE INDEX:** 75

**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000):** 121

**NOTE:** Shipment of compressed gas cylinders via Public Passenger Road Vehicle is a violation of Canadian law (Transport Canada Transportation of Dangerous Goods Act, 1992).

**15. REGULATORY INFORMATION**

**ADDITIONAL U.S. REGULATIONS:**

**U.S. SARA REPORTING REQUIREMENTS:** The components of this 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:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
n-Hexane	NO	NO	YES

**U.S. SARA THRESHOLD PLANNING QUANTITY:** There are no specific Threshold Planning Quantities for the components of this gas mixture. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

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

**U.S. CERCLA REPORTABLE QUANTITIES (RQ):** N-Hexane = 5000 lb (2270 kg)

**OTHER U.S. FEDERAL REGULATIONS:**

- n-Pentane and n-Hexane are subject to the reporting requirements of CFR 29 1910.1000. These chemicals are listed on Table Z.1.
- Pentane is subject to the reporting requirements of Section 112(r) of the Clean Air Act. The Threshold Quantity for this gas is 10,000 lb (4554 kg).
- This gas mixture does not contain any Class I or Class II ozone depleting chemicals (40 CFR part 82).
- Nitrogen, Oxygen, and n-Hexane are not listed Regulated Substances, per 40 CFR, Part 68, of the Risk Management for Chemical Releases. n-Pentane is listed under this regulation in Table 3 as a Regulated Substance (Flammable), in quantities of 10,000 lbs (4,554 kg) or greater.

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

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

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):** No component of this gas mixture is on the California Proposition 65 lists.

**ADDITIONAL CANADIAN REGULATIONS:**

**CANADIAN DSL/NDL INVENTORY STATUS:** The components of this gas mixture are listed on the DSL Inventory.

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:** The components of this gas mixture are not on the CEPA Priorities Substances Lists.

**CANADIAN WHMIS CLASSIFICATION:** This gas mixture is categorized as a Controlled Product, Hazard Classes A and D2B, as per the Controlled Product Regulations.

## 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.  
PO Box 3519, La Mesa, CA 91944-3519  
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