



# MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

## 1. PRODUCT AND COMPANY INFORMATION

**CHEMICAL NAME; CLASS: ARGON**

**SYNONYMS:** Not applicable.

**CHEMICAL FAMILY NAME:** Inert Gas

**FORMULA:** Ar

**Document Number:** 50004

**Note:** This Material Safety Data Sheet is for Argon supplied in cylinders with 33 cubic feet (935 liters) or less gas capacity (DOT - 39 cylinders). For Argon in large cylinders refer to Document Number 10016

**PRODUCT USE:**

Calibration of Monitoring and  
Research Equipment

**MANUFACTURED/SUPPLIED FOR:**

**ADDRESS:**

**EMERGENCY PHONE:**

**BUSINESS PHONE:**

821 Chesapeake Drive  
Cambridge, MD 21613  
CHEMTREC: 1-800-424-9300  
1-410-228-6400  
General MSDS Information 1-713/868-0440  
Fax on Demand: 1-800/231-1366



## 2. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** Argon is a colorless, odorless gas. The main health hazard associated with overexposure of this gas is asphyxiation, by displacement of oxygen. This gas presents no hazard of flammability or reactivity.

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

**INHALATION:** Due to the small size of an individual cylinder of this product, no unusual health effects from exposure to the product are anticipated under routine circumstances of use. If this product is 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, due to the displacement of oxygen. The following effects associated with various levels of oxygen are as follows:

### OXYGEN

#### CONCENTRATION

#### SYMPTOM OF EXPOSURE

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 and vomiting, collapse or loss of consciousness.

Below 6%: Convulsive movements, possible respiratory collapse, and death.

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

**ACUTE:** Due to the small size of the individual cylinder of this product, no unusual health effects from exposure to the product are anticipated under routine circumstances of use. The most significant hazard associated with this gas 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:** Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may effect the heart and nervous system.

**TARGET ORGANS:** ACUTE: Respiratory system. CHRONIC: Heart, central nervous system.

## 3. 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		
Argon	7440-37-1	99.98%	There are no specific exposure limits for Argon. Argon is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Maximum Impurities		< 0.02%	None of the trace impurities in this product contribute significantly to the hazards associated with the product. All hazard information pertinent to this product has been provided in this Material Safety Data Sheet, per the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200) and State equivalents standards.					

**This material is classified as hazardous under OSHA regulations in the United States and the WHMIS in Canada.**

NE = Not Established.

See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

## 4 FIRST-AID MEASURES

**RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS PRODUCT WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT.**

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 copy of label and MSDS to physician or other health professional with victim(s).

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** None known.

**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and reduce over-exposure.

## 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, inert gas. Use extinguishing media appropriate for surrounding fire.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Argon does not burn; 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 fire-fighters 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, which is heavier than air to dissipate. If necessary, monitor the surrounding area (and the original area of the release) for oxygen. Oxygen levels must be above 19.5% before non-emergency personnel are allowed to re-enter area.

If leaking incidentally from the cylinder or its valve, contact your supplier

## 7. HANDLING AND STORAGE

**WORK PRACTICES AND HYGIENE PRACTICES:** Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations of this product could occur without any significant warning symptoms, due to oxygen deficiency.

**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 significantly 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 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.

**RESPIRATORY PROTECTION:** No special respiratory protection is required under normal circumstances of use. Use supplied air respiratory protection if Oxygen levels are below 19.5%, or unknown, during emergency response to a release of this product. If respiratory protection is 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

**GAS DENSITY @ 70°F (21.1°C) and 1 atm:** 0.103 lbs/cu ft (1.650 kg/m<sup>3</sup>)

**BOILING POINT °F @ 1 atm:** -302°F (-185.9°C)

**FREEZING/MELTING POINT (@ 10 psig):** -308.9°F (-189.2°C)

**SPECIFIC GRAVITY (air = 1) @ 70°F (21.1°C):** 1.38

**SOLUBILITY IN WATER vol/vol at 32°F(0°C) and 1 atm:** 0.056

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

**ODOR THRESHOLD:** Not applicable. Odorless.

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

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

**APPEARANCE, ODOR 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.

**pH:** Not applicable.

**MOLECULAR WEIGHT:** 39.95

**EXPANSION RATIO:** Not applicable.

**SPECIFIC VOLUME (ft<sup>3</sup>/lb):** 9.7

## 10. STABILITY and REACTIVITY

**STABILITY:** Normally stable, inert gas.

**DECOMPOSITION PRODUCTS:** None.

**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** None. Argon is an inert gas.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**CONDITIONS TO AVOID:** Avoid exposing cylinders to extremely high temperatures, which could cause the cylinders to rupture or burst.

## 11. TOXICOLOGICAL INFORMATION

**TOXICITY DATA:** The following data are for Argon:

Standard animal toxicity values are not available. Male rats were exposed for 6 days to 20% oxygen and 80% Argon at 1 atmosphere ambient pressure. No significant changes in blood cell counts or bone marrow were observed. Other animal studies concern the deficiency of (hypoxia) or the narcotic effects of various pressures of Argon, the effects of increased Argon pressures on the central nervous system and decompression sickness.

**SUSPECTED CANCER AGENT:** Argon is not found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC, and therefore is not considered to be, nor suspected to be a cancer-causing agent by these agencies.

**IRRITANCY OF PRODUCT:** Argon is not irritating; however, contact with rapidly expanding gases can cause frostbite to exposed tissue.

**SENSITIZATION OF PRODUCT:** Argon is not a sensitizer.

**REPRODUCTIVE TOXICITY INFORMATION:** Listed below is information concerning the effects Argon on the human reproductive system.

Mutagenicity: Argon has not been reported to cause mutagenic effects in humans.

Embryotoxicity: Argon has not been reported to cause embryotoxic effects in humans.

Teratogenicity: Argon has not been reported to cause teratogenic effects in humans.

Reproductive Toxicity: Argon has not been reported to cause adverse reproductive effects in humans.

## 11. TOXICOLOGICAL INFORMATION (Continued)

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):** Currently, Biological Exposure Indices (BEIs) have not been determined for Argon.

## 12. ECOLOGICAL INFORMATION

**ENVIRONMENTAL STABILITY:** Argon occurs naturally in the atmosphere. The gas will be dissipated rapidly in well-ventilated areas.

**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** Due to the small cylinder size, and the inert nature of Argon, no adverse effect on animals or plants is anticipated if one cylinder of this product is released.

**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:** 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:** Argon, compressed  
**HAZARD CLASS NUMBER and DESCRIPTION:** 2.2 (Non-Flammable Gas)  
**UN IDENTIFICATION NUMBER:** UN 1006  
**PACKING GROUP:** Not Applicable  
**DOT LABEL(S) REQUIRED:** Class 2.2 (Non-Flammable Gas)  
**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000):** 121  
**MARINE POLLUTANT:** Argon is not classified by the DOT as a Marine Pollutant (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:** Argon, compressed  
**HAZARD CLASS NUMBER and DESCRIPTION:** 2.2 (Non-Flammable Gas)  
**UN IDENTIFICATION NUMBER:** UN 1006  
**PACKING GROUP:** Not Applicable  
**HAZARD LABEL:** Class 2.2 (Non-Flammable Gas)  
**SPECIAL PROVISIONS:** 42  
**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:** This gas is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows:

**U.S. SARA THRESHOLD PLANNING QUANTITY:** There are no specific Threshold Planning Quantities for this gas. 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:** Argon is listed on the TSCA Inventory.

**U.S. CERCLA REPORTABLE QUANTITIES (RQ):** Not applicable.

**U.S. STATE REGULATORY INFORMATION:** Argon is covered under the following specific State regulations:

**Alaska - Designated Toxic and Hazardous Substances:** Argon.

**California - Permissible Exposure Limits for Chemical Contaminants:** Argon.

**Florida - Substance List:** Argon.

**Illinois - Toxic Substance List:** Argon.

**Kansas - Section 302/313 List:** No.

**Massachusetts - Substance List:** Argon.

**Michigan - Critical Materials Register:** No.

**Minnesota - List of Hazardous Substances:** Argon.

**Missouri - Employer Information/Toxic Substance List:** Argon.

**New Jersey - Right to Know Hazardous Substance List:** Argon.

**North Dakota - List of Hazardous Chemicals, Reportable Quantities:** No.

**Pennsylvania - Hazardous Substance List:** Argon.

**Rhode Island - Hazardous Substance List:** Argon.

**Texas - Hazardous Substance List:** No.

**West Virginia - Hazardous Substance List:** No.

**Wisconsin - Toxic and Hazardous Substances:** No.

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):** Argon is not on the California Proposition 65 lists.

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

- Argon does not contain any Class I or Class II ozone depleting chemicals (40 CFR part 82).
- Argon is not listed as a Regulated Substance, per 40 CFR, Part 68, of the Risk Management for Chemical Accidental Release.
- Argon is not subject to the reporting requirements of Section 112(r) of the Clean Air Act.
- Argon is not listed in Appendix A as a highly hazardous chemical, per 29 CFR 1910.119: Process Safety Management of Highly Hazardous Chemicals.

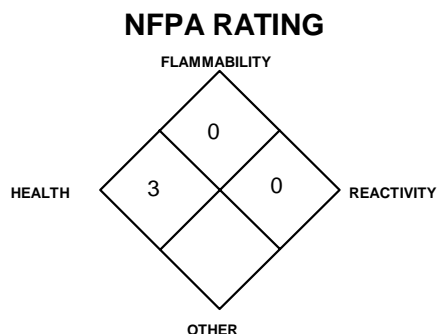
**ADDITIONAL CANADIAN REGULATIONS:**

**CANADIAN DSL/NDL INVENTORY STATUS:** Argon on the Canadian DSL Inventory.

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:** Argon is not on the CEPA Priorities Substances List.

**CANADIAN WHMIS CLASSIFICATION:** Argon is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations.

## 16. OTHER INFORMATION



HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
<b>HEALTH HAZARD</b>	(BLUE)	3	
<b>FLAMMABILITY HAZARD</b>	(RED)	0	
<b>PHYSICAL HAZARD</b>	(YELLOW)	0	
PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
See Section 8			
For Routine Industrial Use and Handling Applications			

**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.

## 16. OTHER INFORMATION (Continued)

### 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 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.

Further information about Argon can be found in the following pamphlets published by: Compressed Gas Association Inc. (CGA), 4221 Walney Road 5<sup>th</sup> floor, Chantilly, VA 20151-2923. Telephone: (703) 788 - 2700.

G-11.1	<i>"Commodity Specification for Argon"</i>
P-1	<i>"Safe Handling of Compressed Gases in Containers"</i>
P-9	<i>"Inert Gases--Argon, Nitrogen, and Helium"</i>
P-14	<i>"Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmospheres"</i>
SB-2	<i>"Oxygen Deficient Atmospheres"</i>
AV-1	<i>"Safe Handling and Storage of Compressed Gases"</i>
	<i>"Handbook of Compressed Gases"</i>

**PREPARED BY:**

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619/670-0609

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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'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.