

**AIR LIQUIDE**

# MATERIAL SAFETY DATA SHEET

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

## 1. PRODUCT IDENTIFICATION

**CHEMICAL NAME; CLASS:**      **ARGON**

**SYNONYMS:** Not applicable.

**CHEMICAL FAMILY NAME:** Inert Gas

**FORMULA:** Ar

**PRODUCT USE:**

Document Number: 10016

Inerting, welding and general analytical  
or synthetic chemical uses.

**MANUFACTURED/SUPPLIED FOR:  
ADDRESS:**

**AIR LIQUIDE**

9101-LBJ-FREEWAY, SUITE 800  
DALLAS, TX-75243

**EMERGENCY PHONE:**

CHEMTREC: 1-800-424-9300

**BUSINESS PHONE:**

General MSDS Information 1-972/301-5200  
Fax on Demand: 1-800/231-1366

## 2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR				
			ACGIH		OSHA		
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH 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 Argon contribute significantly to the hazards associated with the product. All hazard information pertinent to Argon 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.				

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:** Argon is a colorless, odorless gas. The main health hazard associated with releases of this gas is asphyxiation, by displacement of oxygen.

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

**INHALATION:** High concentrations of this gas can cause an oxygen-deficient environment. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses.

Under some circumstances of over-exposure, death may occur, due to the displacement of oxygen. The following effects associated with various levels of oxygen are as follows:

<u>CONCENTRATION</u>	<u>SYMPTOM OF EXPOSURE</u>
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:** 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:** There are currently no known adverse health effects associated with chronic exposure to Argon.

**TARGET ORGANS:** Respiratory system.

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

### 4 FIRST-AID MEASURES

**RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO ARGON WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus should be worn.**

Remove victim(s) to fresh air, as quickly as possible. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Only trained personnel should administer supplemental oxygen.

Victim(s) 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).

### 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** Not applicable.

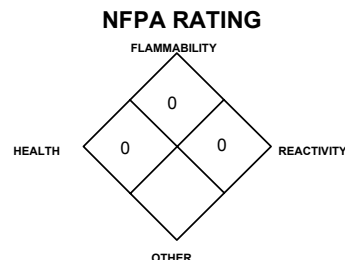
**AUTOIGNITION TEMPERATURE:** Not applicable.

**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.



## 5. FIRE-FIGHTING MEASURES Continued)

**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:** Evacuate immediate area. Uncontrolled 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.

Minimum Personal Protective Equipment should be: **Level B: Self-Contained Breathing Apparatus.** Locate and seal the source of the leaking gas. Allow the gas, which is heavier, than air to dissipate. Monitor the surrounding area for oxygen levels. The atmosphere must have at least 19.5 percent oxygen before personnel can be allowed in the area without Self-Contained Breathing Apparatus.

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

## 7. HANDLING and USE

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

**STORAGE AND HANDLING PRACTICES:** Cylinders should be stored upright and be firmly secured to prevent falling or being knocked-over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting. Cylinders should be stored in dry, well-ventilated areas away from sources of heat, ignition and direct sunlight. Keep storage area clear of materials which can burn. Do not allow area where cylinders are stored to exceed 52°C (125°F). Store containers away from heavily trafficked areas and emergency exits. Store away from process and production areas, away from elevators, building and room exits or main aisles leading to exits. Protect cylinders against physical damage.

Use a check valve or other protective device in the discharge line to prevent hazardous backflow. Never tamper with pressure relief valves and cylinders.

Keep the smallest amount necessary on-site at any one time. Full and empty cylinders should be segregated. Use a first-in, first-out inventory systems to prevent full containers from being stored for long periods of time.

**SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS:** Compressed gases can present significant safety hazards. The following rules are applicable to work situations in which cylinders are being used.

**Before Use:** Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap (where provided) in-place until cylinder is ready for use.

**During Use:** Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Do not use oils or grease on gas-handling fittings or equipment. Immediately contact the supplier if there are any difficulties associated with operating cylinder valve. Never insert an object (e.g wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing a leak to occur. Use an adjustable strap wrench to remove over-tight or rusted caps. Never strike an arc, on a compressed gas cylinder or make a cylinder part of and electric circuit.

**After Use:** Close main cylinder valve. Replace valve protection cap. Mark empty cylinders "EMPTY".

**NOTE:** Use only DOT or ASME code containers designed for gas storage. Close valve after each use and when empty. Cylinders must not be recharged except by or with the consent of owner. For welding and brazing operations, refer to ANSI Z-49.1 "*Safety in Welding and Cutting*" and OSHA safety regulations for welding, cutting, and brazing (29 CFR 1910.252). In addition, see the National Fire Protection Association (NFPA) publication 51 *Oxygen Fuel Gas Welding and Cutting*.

## 7. HANDLING and USE (Continued)

**STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:** Use the proper CGA connections, DO NOT USE ADAPTERS:

<u>THREADED:</u>	0-3000 psig	CGA 580
	3001-5500 psig	CGA 680
	5501-7500 psig	CGA 677
<u>PIN-INDEXED YOKE:</u>	Not Applicable	
<u>ULTRA HIGH INTEGRITY:</u>	0-3000 psig	718

**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:** Use with adequate ventilation. Local exhaust ventilation is preferred, because it prevents chemical dispersion into the work place by eliminating it at its source. If appropriate, install automatic monitoring equipment to detect the level of oxygen.

**RESPIRATORY PROTECTION:** Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection if oxygen levels are below 19.5% or during emergency response to a release of Argon. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), or equivalent State standards.

**EYE PROTECTION:** Safety glasses.

**HAND PROTECTION:** Wear glove protection appropriate to the specific operation for which Argon is used.

**BODY PROTECTION:** Use body protection appropriate for task. Safety shoes are recommended when handling cylinders.

## 9. PHYSICAL and CHEMICAL PROPERTIES

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

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

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

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

**pH:** Not applicable.

**SOLUBILITY IN WATER vol/vol @ 0°C (32°F); and 1 atm:** 0.056 **MOLECULAR WEIGHT:** 39.95

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

**EXPANSION RATIO:** Not applicable.

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

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

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

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

**APPEARANCE AND COLOR:** Argon is a colorless, odorless gas.

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

## 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.

## 11. TOXICOLOGICAL INFORMATION (Continued)

**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:** Not applicable.

**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 is not expected to cause mutagenic effects in humans.

Embryotoxicity: Argon is not expected to cause embryotoxic effects in humans.

Teratogenicity: Argon is not expected to cause teratogenic effects in humans.

Reproductive Toxicity: Argon is not expected to cause adverse reproductive effects in humans.

*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:** Pre-existing respiratory conditions may be aggravated by over-exposure to Argon.

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

**BIOLOGICAL EXPOSURE INDICES (BEIs):** Currently, Biological Exposure Indices (BEIs) are not applicable 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:** Any adverse effect on animals would be related to oxygen deficient environments. No adverse effect is anticipated to occur to plant-life, except for frost produced in the presence of rapidly expanding gases.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** No evidence is currently available on Argon'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. Return cylinders with any residual product to Air Liquide. Do not dispose of locally.

For emergency disposal, secure the cylinder and slowly discharge the gas to the atmosphere in a well-ventilated area or outdoors.

## 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:** Non-Flammable Gas

**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996):** 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 present serious safety hazards and should be discouraged.

**NOTE:** Shipment of compressed gas cylinders which have not been filled with the owners consent is a violation of Federal law (49 CFR, Part 173.301 (b)).

## 14. TRANSPORTATION INFORMATION (Continued)

## 15. REGULATORY INFORMATION

**SARA REPORTING REQUIREMENTS:** Argon is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.

**SARA Threshold Planning Quantity:** Not applicable.

**TSCA INVENTORY STATUS:** Argon is listed on the TSCA Inventory.

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

**CALIFORNIA PROPOSITION 65:** Argon is not on the California Proposition 65 lists.

**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.

**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.

### OTHER 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.

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

## 16. OTHER INFORMATION

**MIXTURES:** When two or more gases or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

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

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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 Argon. 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 Argon 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.