

## Material Safety Data Sheet

### 1. Chemical Product and Company Identification

<b>Product Name:</b>	Argon, Refrigerated Liquid (MSDS No. P-4564-F); this product is also known as Argon (Cryogenic Liquid)	<b>Trade Name:</b>	Liquid Argon
<b>Chemical Name:</b>	Argon	<b>Synonyms:</b>	Argon (Cryogenic Liquid)
<b>Formula:</b>	Ar	<b>Chemical Family:</b>	(Rare Gas) Noble Gas
<b>Telephone:</b>	<b>Emergencies:</b> 1-800-633-8253* <b>PERS:</b> 1-800-633-8253* <b>Routine:</b> 1-800-408-6425	<b>Company Name:</b>	Alliance Gas Products. 2001-F Peralta Street Oakland, CA 94607

*\*Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information contact your supplier.*

### 2. Composition / Information on Ingredients

INGREDIENT NAME	CAS NUMBER	PERCENTAGE	OSHA PEL	ACGIH TLV-TWA
Argon	7440-37-1	>99%	None currently established	Simple asphyxiant

### 3. Hazards Identification

#### EMERGENCY OVERVIEW

**WARNING! Extremely cold liquid and gas under pressure.**  
**Can cause rapid suffocation.**  
**Can cause severe frostbite.**  
**May cause dizziness and drowsiness.**  
**Self-contained breathing apparatus may be required by rescue workers.**  
**Odor: None**

**THRESHOLD LIMIT VALUE:** Simple asphyxiant (ACGIH 1997).

**EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:**

**INHALATION**—Asphyxiant. Effects are due to lack of oxygen. Moderate concentrations may cause headache, drowsiness, dizziness, excitation, excess salivation, vomiting, and unconsciousness. Lack of oxygen can kill.

**SKIN CONTACT**—No harm expected from vapor. Cold gas or liquid may cause severe frostbite.

**SWALLOWING**—An unlikely route of exposure, but severe frostbite of the lips and mouth may result from contact with the liquid.

**EYE CONTACT**—No harm expected from vapor. Cold gas or liquid may cause severe frostbite.

**EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:** No harm expected.

**OTHER EFFECTS OF OVEREXPOSURE:** Argon is an asphyxiant. Lack of oxygen can kill.

**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** The toxicology and the physical and chemical properties of argon suggest that overexposure is unlikely to aggravate existing medical conditions.

**SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:** None known.

**CARCINOGENICITY:** Argon is not listed by NTP, OSHA, or IARC.

<b>4. First Aid Measures</b>
------------------------------

**INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

**SKIN CONTACT:** For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). In case of massive exposure, remove clothing while showering with warm water. Call a physician.

**SWALLOWING:** An unlikely route of exposure. This product is a gas at normal temperature and pressure.

**EYE CONTACT:** Immediately flush eyes thoroughly with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

**NOTES TO PHYSICIAN:** *There is no specific antidote. This product is inert. Treatment of over-exposure should be directed at the control of symptoms and the clinical condition.*

<b>5. Fire Fighting Measures</b>
----------------------------------

<b>FLASH POINT (test method)</b>	Not applicable	<b>AUTOIGNITION TEMPERATURE</b>	Not applicable
<b>FLAMMABLE LIMITS IN AIR, % by volume</b>	<b>LOWER</b>	Not applicable	<b>UPPER</b> Not applicable

**EXTINGUISHING MEDIA:** Argon cannot catch fire. Use media appropriate for surrounding fire.

**SPECIAL FIRE FIGHTING PROCEDURES:**

**WARNING! Extremely cold liquid and gas under pressure.** Evacuate all personnel from danger area. Immediately spray containers with water from maximum distance until cool, taking care not to direct spray onto vents on top of container. Do not discharge sprays into liquid Argon. Liquid argon will freeze water rapidly. When containers have cooled, move them away from fire area if without risk. Self-contained breathing apparatus may be required by rescue workers. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Liquid or vapor cannot catch fire. Heat of fire can build pressure in closed container and cause it to rupture. No part of a container should be subjected to a temperature higher than 125°F (52°C). Liquid Argon containers are equipped with pressure relief devices. Venting vapors may obscure visibility. Liquid causes severe frostbite, a burn-like injury. (See section 3.)

**HAZARDOUS COMBUSTION PRODUCTS:** None known.

## 6. Accidental Release Measures

**STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:**

**WARNING! Extremely cold liquid and gas under pressure.** Argon is an asphyxiant. Lack of oxygen can kill. Evacuate all personnel from danger area, using self-contained breathing apparatus where needed. Extremely cold liquid and gas. Avoid contact with spilled liquid and allow it to evaporate. Liquid causes severe frostbite, a burn-like injury. (See section 3.) Shut off leak if without risk. Ventilate area of leak or move container to a well-ventilated area. Test for sufficient oxygen, especially in confined spaces, before allowing reentry.

**WASTE DISPOSAL METHOD:** Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations. If necessary, call your local supplier for assistance.

## 7. Handling and Storage

**PRECAUTIONS TO BE TAKEN IN STORAGE:** Store and use with adequate ventilation. Do not store in a confined space. Cryogenic containers are equipped with a pressure relief device and a pressure controlling valve. Under normal conditions these containers will periodically vent product. Use adequate pressure relief devices in systems and piping to prevent pressure buildup; entrapped liquid can generate extremely high pressures when vaporized by warming.

**PRECAUTIONS TO BE TAKEN IN HANDLING:** Never allow any unprotected part of your body to touch uninsulated pipes or vessels containing cryogenic fluids. Flesh will stick to the extremely cold metal and will tear when you try to pull free.

Use a suitable hand truck to move containers. Cryogenic containers must be handled and stored in an upright position. Do not drop or tip containers, or roll them on their sides. If valve is hard to open, discontinue use and contact your supplier. For other precautions in using argon, see section 16.

## 8. Exposure Controls/Personal Protection

**VENTILATION/ENGINEERING CONTROLS:**

**LOCAL EXHAUST**—Use a local exhaust system, if necessary, to prevent oxygen deficiency.

**MECHANICAL (general)**—General exhaust ventilation may be acceptable if it can maintain an adequate supply of air.

**SPECIAL**—None

**OTHER**—None

**RESPIRATORY PROTECTION:** Use air-purifying or air-supplied respirators, as appropriate, where local or general exhaust ventilation is inadequate. Adequate ventilation must keep worker exposure below applicable TLVs for fumes, gases and other by-products of welding with argon. An air-supplied respirator must be used in confined spaces. Respiratory protection must conform to OSHA rules as specified in 29 CFR 1910.134.

**SKIN PROTECTION:** Wear loose-fitting, cryogenic gloves.

**EYE PROTECTION:** Safety glasses and a full face shield are recommended. Select in accordance with OSHA 29 CFR 1910.133.

**OTHER PROTECTIVE EQUIPMENT:** Metatarsal shoes for container handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

### 9. Physical and Chemical Properties

<b>MOLECULAR WEIGHT:</b> 39.95	<b>EXPANSION RATIO:</b> for liquid at boiling point to gas at 70°F (21.1°C):1 to 841
<b>SPECIFIC GRAVITY (air=1):</b> At 70°F (21.1°C) and 1 atm: 1.38	<b>SOLUBILITY IN WATER:</b> vol/vol at 32°F (0°C): 0.056
<b>LIQUID DENSITY:</b> At boiling point and 1 atm: 87.02 lb/ft <sup>3</sup> (1394 kg/m <sup>3</sup> )	<b>VAPOR PRESSURE:</b> AT 68°F (20°C): Not applicable
<b>PERCENT VOLATILES BY VOLUME:</b> 100	<b>EVAPORATION RATE (Butyl Acetate=1):</b> High
<b>BOILING POINT (1 atm):</b> -302.6°F (-185.9°C)	<b>pH:</b> Not applicable
<b>MELTING POINT (1 atm):</b> -308.6°F (-189.2°C )	
<b>APPEARANCE, ODOR, AND STATE:</b> Colorless, odorless cryogenic liquid	

### 10. Stability and Reactivity

<b>STABILITY:</b>	UNSTABLE	STABLE	X
<b>INCOMPATIBILITY (materials to avoid):</b> None currently known. Argon is chemically inert.			
<b>HAZARDOUS DECOMPOSITION PRODUCTS:</b> None			
<b>HAZARDOUS POLYMERIZATION:</b>	May Occur	Will Not Occur	X

**CONDITIONS TO AVOID:** None currently known.

### 11. Toxicological Information

Argon is a simple asphyxiant.

### 12. Ecological Information

No adverse ecological effects expected. Argon does not contain any Class I or Class II ozone-depleting chemicals. Argon is not listed as a marine pollutant by DOT.

### 13. Disposal Considerations

**WASTE DISPOSAL METHOD:** Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier. For emergency disposal, secure container in a well-ventilated area or outdoors, then slowly discharge gas to the atmosphere.

### 14. Transport Information

<b>DOT/IMO SHIPPING NAME:</b> Argon, refrigerated liquid	<b>HAZARD CLASS:</b> 2.2
<b>IDENTIFICATION NUMBER:</b> UN 1951	<b>PRODUCT RQ:</b> Not applicable
<b>SHIPPING LABEL(s):</b> NONFLAMMABLE GAS	<b>PLACARD (When required):</b> NONFLAMMABLE GAS

**SPECIAL SHIPPING INFORMATION:** Containers should be transported in a secure position, in a well-ventilated vehicle. Containers transported in an enclosed, nonventilated compartment of a vehicle can present serious safety hazards.

Shipment of compressed gas cylinders that have been filled without the owner's consent is a violation of federal law [49 CFR 173.301(b)].

### 15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

#### U.S. FEDERAL REGULATIONS:

##### EPA (Environmental Protection Agency)

**CERCLA:** Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (40 CFR Parts 117 and 302):

**Reportable Quantity (RQ):** None

**SARA:** Superfund Amendment and Reauthorization Act:

- **SECTIONS 302/304:** Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of extremely hazardous substances (40 CFR Part 355):

**Threshold Planning Quantity (TPQ):** None.

**Extremely Hazardous Substances (40 CFR 355):** None.

- **SECTIONS 311/312:** Require submission of Material Safety Data Sheets (MSDSs) and chemical inventory reporting with identification of EPA hazard classes. The hazard classes for this products are as follows:

IMMEDIATE: Yes

PRESSURE: Yes

DELAYED: No

REACTIVITY: No

FIRE: No

- **SECTION 313:** Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

Argon does not require reporting under Section 313.

**40 CFR 68:** Risk Management Program for Chemical Accidental Release Prevention: Requires development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Argon is not listed as a regulated substance.

**TSCA:** Toxic Substances Control Act: Argon is listed on the TSCA inventory.

**OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION):**

**29 CFR 1910.119 :** Process Safety Management of Highly Hazardous Chemicals: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Argon is not listed in Appendix A as a highly hazardous chemical.

**STATE REGULATIONS:**

**CALIFORNIA:** This product is not listed by California under the Safe Drinking Water Toxic Enforcement Act of 1986 (Proposition 65).

**PENNSYLVANIA:** This product is subject to the Pennsylvania Worker and Community Right-To-Know Act (35 P.S. Sections 7301-7320).

**16. Other Information**

Be sure to read and understand all labels and instructions supplied with all containers of this product.

**SPECIAL PRECAUTIONS:** *Extremely cold liquid and gas under pressure.* Use piping and equipment adequately designed to withstand pressures to be encountered. Avoid materials incompatible with cryogenic use; some metals such as carbon steel may fracture easily at low temperature. **Prevent reverse flow.** Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. To prevent liquid or cold gas from being trapped in piping between valves, equip the piping with pressure relief devices. Use only transfer lines designed for cryogenic liquids. **Gas can cause rapid suffocation due to oxygen deficiency.** Store and use with adequate ventilation. Praxair recommends piping all vents to the exterior of the building. Close container valve after each use; keep closed even when empty. **Never work on a pressurized system.** If a leak occurs, close the cylinder valve, blow the system down by venting vapor to a safe place, then repair the leak.

**MIXTURES:** When you mix two or more gases or liquefied gases, you can 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 evaluate the end product. Remember, gases and liquids have properties that can cause serious injury or death.

**HAZARD RATING SYSTEMS:****NFPA RATINGS:**

HEALTH = 3  
FLAMMABILITY = 0  
REACTIVITY = 0  
SPECIAL SA (CGA recommends this rating to designate Simple Asphyxiant.)

**HMIS RATINGS:**

HEALTH = 3  
FLAMMABILITY = 0  
REACTIVITY = 0

**STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:**

**THREADED:** CGA-295 (cryogenic liquid withdrawal)  
**PIN-INDEXED YOKE:** Not applicable  
**ULTRA-HIGH-INTEGRITY CONNECTION:** Not applicable

Use the proper CGA connections. **DO NOT USE ADAPTERS.**

Ask your supplier about free Praxair safety literature as referenced on the label for this product; you may also obtain copies by calling 1-800-PRAXAIR. Further information about argon can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 1725 Jefferson Davis Highway, Arlington, VA 22202-4102, Telephone (703) 412-0900.

- AV-1 *Safe Handling and Storage of Compressed Gases*
- AV-5 *Safe Handling of Liquefied Nitrogen and Argon*
- G-11.1 *Commodity Specification for Argon*
- P-9 *Inert Gases—Argon, Nitrogen, and Helium*
- P-14 *Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmospheres*
- SB-2 *Oxygen-Deficient Atmospheres*
- V-1 *Compressed Gas Cylinder Valve Inlet and Outlet Connections*  
*Handbook of Compressed Gases, Third Edition*

Praxair asks users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents and contractors of the information on this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

---

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

---

Praxair MSDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current Praxair MSDSs for these products, contact your Praxair sales representative or local distributor or supplier.

Praxair is a trademark of Praxair Technology, Inc.

Praxair, Inc.  
39 Old Ridgebury Road  
Danbury CT 06810-5113

