



Aceti-Oxígeno, S.A.

FABRICANTES DE GASES PARA USO MÉDICO, ALIMENTICIO E INDUSTRIALES

MATERIAL SAFETY DATA SHEET

(MSDS MATERIAL SAFETY DATA SHEET)

Annex 7

GASEOUS ARGON

1. Product and company identification

| | | |
|------|-----------------------|---|
| 1.1 | Product name: | Compressed argon |
| 1.2 | Common chemical name: | Argon |
| 1.3 | IUPAC chemical name: | Argon |
| 1.4 | Chemical family: | Family of Inert Gases |
| 1.5 | Condensed formula: | Ar |
| 1.6 | Synonyms: | Argon |
| 1.7 | Company name: | Aceti-Oxígeno, S.A. |
| 1.8 | Company address: | Panama Mañanitas-Industrial Zone |
| 1.9 | Telephone: | Tel. 321-8888 |
| 1.10 | Emergency Telephone: | 103 Fire Brigade |
| 1.11 | REVISION DATE: | June 20. of 2022, rev. 1, valid until: June 20, 2027 |
| 1.12 | Use: | Industrial, medical and analytical, and in inertization, instrumentation and welding. |

2. Composition or Information on ingredients

| | | |
|-----|-------------------------------|-------------------|
| 2.1 | Ingredient name: | Argon |
| 2.2 | CAS ^[1] Number: | 7440-37-1 |
| 2.3 | Percentage: | > 99% |
| 2.4 | OSHA PEL-TWA ^[2] : | None |
| 2.5 | ACGIH TLV ^[3] : | Simple asphyxiant |
| 2.6 | [LD ₅₀]: | None |
| 2.7 | [LC ₅₀]: | None |

^[1] Chemical Abstracts Service (International Material Identification Number according to the Chemical Abstracts Service)

^[2] Occupational Safety and Health Administration. Permissible Exposure Limits. Time Weighted Average (Occupational Safety and Hygiene Administration. Permissible Exposure Limits. Time weighted average exposure)

^[3] American Conference of Governmental Industrial Hygienists. Threshold Limit Value (North American Conference of Governmental Industrial Public Health. Threshold Limit Value)

3. Risk identification

- 3.1 Considerations and Hazards during Emergencies
 - 3.1.1 High pressure gas
 - 3.1.2 Can quickly cause suffocation
 - 3.1.3 Do not breathe the gas
 - 3.1.4 Rescue workers must require self-contained breathing equipment.
- 3.2 Information on potential health effects
 - 3.2.1 Exposure Routes

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Panama, July 28, 2022.

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- 3.2.1.1 Inhalation: Simple asphyxiant. Argon is not toxic, but it can cause suffocation by displacing oxygen from the air. Exposure to atmospheres deficient in oxygen (less than 19.5%) can cause dizziness, drowsiness, nausea, vomiting, excessive salivation, decreased alertness, loss of consciousness, and death. Severe oxygen deficiency can cause serious damage and even death.
- 3.2.1.2 Contact with eyes: No risk
- 3.2.1.3 Skin contact: No risk
- 3.2.1.4 Skin absorption: No risk
- 3.2.1.5 Ingestion: No risk
- 3.2.2 Chronic Effects: No chronic effects have been established from its use.
- 3.2.3 Medical Conditions aggravated by overexposure: None
- 3.2.4 Other effects of overexposure: None
- 3.2.5 Carcinogenicity: Argon is not listed by NTP^[4], OSHA or IARC^[5]

^[4] National Toxicology Program

^[5] International Agency for Research on Cancer

4. First aid

- 4.1 Inhalation: Move person to fresh air. If there is no breathing, administer artificial respiration. If breathing is difficult, administer oxygen. Get immediate medical attention.
- 4.2 Contact with eyes: No first aid required.
- 4.3 Skin contact: No first aid required.
- 4.4 Ingestion: No first aid required
- 4.5 Remarks to the doctor: None

5. Measures in case of fire

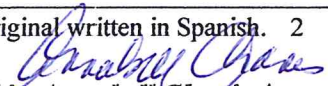
- 5.1 Ignition point: Not applicable because it is a gas.
- 5.2 Auto ignition: Non-flammable
- 5.3 Flammable limits in air, volume by volume:
 - 5.3.1 Lower: Not applicable
 - 5.3.2 Superior: Not applicable
- 5.4 Extinguishing media: Argon is non-flammable and does not stimulate combustion. Use appropriate extinguishing media for the surrounding flammable materials.
- 5.5 Special Instructions to Firefighters: Argon is a simple asphyxiant. If possible, remove argon cylinders from fire area and cool with water. Rescue workers may require self-contained breathing apparatus.
- 5.6 Unusual fire and explosion hazards: On exposure to intense heat or flame, cylinders will rapidly vent and/or rupture violently. Most cylinders are designed to vent their contents when exposed to high temperatures. Pressure in a container can rise due to heat, which can cause it to rupture if pressure relief devices fail to function.
- 5.7 Hazardous combustion products: None known.
- 5.8 Static discharge sensitivity: None
- 5.9 Sensitivity to mechanical impact: None

6. Measures in case of accidental release

- 6.1 Steps to be taken if material is released or spilled:
 - 6.1.1 Evacuate all personnel from the affected area

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- 6.1.2 Disconnect the argon source if there is no additional risk in doing so
- 6.1.3 Ventilate the area or move cylinders outside the facility
- 6.1.4 If a leak is observed from the cylinder body or its valve, immediately contact Aceti-Oxígeno, S.A.

7. Handling and storage

7.1 Precautions for Storage

- 7.1.1 Store and use with adequate ventilation
- 7.1.2 Cylinders must be stored upright with the valve protection cap in place, properly secured to prevent falling or being knocked over.
- 7.1.3 Protect cylinders from any physical damage. Do not drag, roll, slide or drop them.
- 7.1.4 Do not allow storage temperature to exceed 125°F (52°C).
- 7.1.5 Full and empty cylinders must be separated.
- 7.1.6 Use a FIFO (first-in, first-out) inventory system to prevent full cylinders from being stored for long periods of time.

7.2 Precautions to be taken into account for handling.

- 7.2.1 Use a handcart to move cylinders.
- 7.2.2 Never attempt to lift a cylinder by the protective valve cap.
- 7.2.3 Any difficulty in the operation of the valve implies discontinuing its use and contacting Aceti-Oxígeno, S.A.
- 7.2.4 Never insert an object (tool such as wrench, screwdriver, etc.) into the openings of the valve protection cap, as it may be damaged and generate argon leakage.
- 7.2.5 Do not hit the valve protection cap with a hammer. Use an adjustable strap wrench to remove rusted or overtightened plugs.
- 7.2.6 Never bring an electric arc near a compressed gas cylinder or make it part of an electrical circuit.
- 7.2.7 For additional precautions in the use of argon, see Section 16. Other Information.

8. Exposure control and personal protection

8.1 Infrastructure Controls

- 8.1.1 Ventilation: Provide adequate natural ventilation or mechanical ventilation to prevent the appearance of oxygen-deficient atmospheres that contain less than 19.5% oxygen.

8.2 Respiratory Protection

- 8.2.1 General routine use: Not required
- 8.2.2 Emergency Use: Self-contained breathing apparatus or positive pressure airline with face mask is required for use in oxygen-deficient atmospheres. Air-purifying respirator systems will not provide any protection.

- 8.3 Protective Gloves: It is recommended to wear work gloves when handling cylinders.

- 8.4 Eye protection: The use of safety glasses is recommended for handling the cylinders.

- 8.5 Other protective equipment: The use of safety footwear is recommended for handling cylinders. It is advisable to wear cotton clothing to prevent the accumulation of static electricity.

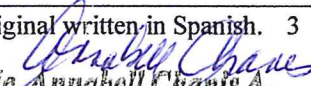
9. Physical and chemical properties

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- 9.1 Molecular Weight: 39.9480 g/mol
- 9.2 Boiling point (1 atmosphere): -302.6°F (-185.9°C)
- 9.3 Specific Gravity (Air = 1) at 70°F (21.1°C) and 1 atmospheric pressure: 1.380
- 9.4 Melting point (1 atmosphere): -308.6°F (-189.2°C)
- 9.5 Vapor pressure at 70°F (21.1°C): Not applicable
- 9.6 Gas density at 70°F (21.1°C) and 1 atmospheric pressure: 0.103 lb/cf or 1,650 Kg/m³

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- 9.7 Evaporation rate (Butyl Acetate = 1): Not applicable because it is a gas.
- 9.8 Solubility in water:
- 9.8.1 Vol/Vol at 32°F (0°C) and 1 atmospheric pressure: 0.056
- 9.9 Expansion Ratio: Not applicable
- 9.10 pH: Not applicable
- 9.11 Appearance, odor and condition: Colorless, odorless and tasteless gas at normal temperature and pressure.
- 9.12 Water/oil distribution coefficient: Not available
- 9.13 Odor threshold: Not applicable

10. Stability and reactivity

- 10.1 Stability: Stable
- 10.2 Conditions to avoid: None
- 10.3 Incompatibilities (Materials to avoid): None
- 10.4 Reactivity:
- 10.4.1 Hazardous decomposition products: None
- 10.4.2 Hazardous polymerization products: Will not occur.

11. Toxicological information

- 11.1 General toxicological effect: Simple asphyxiant
- 11.2 Ability to cause irritation: None
- 11.3 Sensitization to material: None
- 11.4 Effects on the reproductive system: None
- 11.5 Teratogenicity: None
- 11.6 Mutagenicity: None
- 11.7 Synergistic Materials: None

12. Ecological information

No adverse or negative ecological impacts are expected. Argon does not contain Class I or Class II chemicals, which deplete the ozone layer (40 CFR ^[6] Part 82). Argon is not listed as a marine pollutant by DOT ^[7] (49 CFR Part 171)

^[6] Code of Federal Regulations (United States Code of Federal Regulations)

^[7] Department of Transportation of the United States of America

13. Disposal considerations

- 13.1 Waste disposal method: Do not attempt to dispose of residual or unused amounts. Return the cylinder to the supplier.
- 13.2 For emergency disposal, secure cylinder and slowly discharge gas to atmosphere in a well-ventilated area or outdoors.

14. Transport information

- 14.1 DOT/IMO Shipping Name: Compressed Argon.
- 14.2 Hazard Classification: 2.2 (Non-flammable Gas)

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- 14.3 Identification number: UN 1006
- 14.4 Product identification number: 1006
- 14.5 Product Reportable Quantity: Not applicable
- 14.6 Shipping Labels: Non-flammable Gas
- 14.7 Placard: Non-flammable Gas

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14.8 Special Shipping Information: Cylinders must be transported in a secure upright position, in a well-ventilated vehicle. The transport of compressed gases in automobiles or closed body vehicles can present great safety risks and should not be recommended or encouraged.

15. Related regulations

The following information is related to United States regulatory requirements potentially applicable to this product in Panama. Users of this product are responsible for complying with their local or general regulatory requirements.

15.1 United States Federal Regulations

15.1.1 EPA - Environmental Protection Agency

15.1.1.1 CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (40 CFR Parts 117 and 302). Reportable Quantity RQ: Not applicable

15.1.1.2 SARA: Superfund Amendment and Reauthorization Act

Section 302/304: Requires emergency planning based on Threshold Planning Quantities (TPQ) and release reporting based on Reportable Quantities (RQ) of EPA-scheduled substances as extremely hazardous (40 CFR Part 355)

Extremely Hazardous Substance: Not Applicable
Planning Threshold Quantity: Not applicable

Section 311/312: Requires the submission of a Material Safety Data Sheet (MSDS) and a chemical inventory report with identification of the risk classes defined by the EPA (40 CFR Part 370). The hazard classes for this product are:

Immediate: No
Late: No
Pressure: Yes
Reactivity: No
Fire: No

Section 313: Requires submission of annual toxic chemical release reports listed in 40 CFR Part 372. Argon is not required to report under this Section.

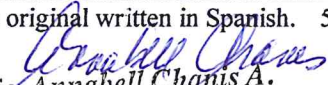
15.1.2 40 CFR Part 68: Risk Management for Chemical Accidental Release: Requires the development and implementation of risk management programs in manufacturing facilities, use, storage, or any other Controlled substance handled in amounts exceeding specified thresholds. Argon is not listed as a regulated substance.

15.1.3 TSCA Toxic Substance Control Act: Argon is listed on the inventory of controlled products by TSCA.

15.2 OSHA Occupational Safety and Health Administration

15.2.1 29 CFR 1910.119: Process Safety Management of Highly Hazardous Chemicals: Requires facilities to develop Process Safety Management based on Threshold Quantities (TQ) of products high-risk chemicals, such as those listed in Appendix A. Argon is not listed in Appendix A as a high-risk chemical.

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16. Additional information

16.1 Special precautions: Use piping and equipment properly designed to withstand working pressures. Use a check valve or other cylinder protection device to prevent and avoid reverse flow.

Shipping compressed gas cylinders that have been filled without the consent of the cylinder owner is a violation of US federal law [49CFR Part 173.301(b)].

16.2 Mixtures: When two or more gases or liquefied products are mixed, their properties can combine to create additional unexpected hazards. Obtain and evaluate the safety information for each component before manufacturing the mixture. Seek advice from an industrial health worker or other qualified person, when carrying out the safety evaluation of the final product. Remember that gases and liquids have properties that can cause severe harm or death.

16.3 Other data:

16.3.1 NFPA Valuation (National Fire Protection Association)

| | |
|--------------|---|
| Health | 0 |
| Flammability | 0 |
| Instability | 0 |
| Special | Simple Asphyxiant (CGA recommended designation) |

16.3.2 HMIS Valuation (Hazardous Materials Identification Systems)

| | |
|--------------|---|
| Health | 0 |
| Flammability | 0 |
| Reactivity | 0 |

Classification of the chemical substance according to the CGA:

Physical hazards: Gases under pressure – Compressed gas.

Health Hazards: N/A.

Environmental Hazards: N/A.

Elements for the communication and signalization of hazards:

Word of warning: Attention.

Hazard statements:

H280: Contains gas under pressure; may explode if heated.

Precautionary advice:

Prevention: N/A.

Answer: N/A.

Storage:

P410+P403: Protect from sunlight. Store in a well-ventilated place.

Elimination: N/A.

Other hazards:

It can act as a simple asphyxiant, diluting the concentration of oxygen in the air to levels below those necessary to support life.

Inhalation of argon in excessive concentrations can cause: dizziness, nausea, vomiting, loss of consciousness and death.

Containers may explode when heated.

Ruptured cylinders can be projected.

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Pictogram/ Hazard Symbol:



- 16.4 Standard valve connection for the United States and Canada
- 16.4.1 Coiled: Standard CGA 580 for cylinders at pressures between 0 and 3000 psig. CGA 680 standard for cylinders with pressures between 3001 and 5500 psig. CGA 677 standard for cylinders with pressures between 5501 and 7500. For Panama the standard is CGA 580.
- 16.4.2 Indexed Pin Yoke: Not Applicable
- 16.4.3 Ultra High Integrity: Standard 718 for cylinders with pressures between 0 and 3000 psig.

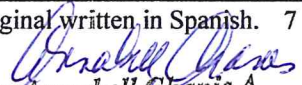
Use the proper CGA connection. DO NOT USE ADAPTERS.

More detailed information on argon can be found in the following documents published by the Compressed Gas Association Inc. (CGA), 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102. Phone (703) 412-0900:

- G-11.1 Commodity Specifications for Argon
- P-9 Inert Gases - Argon, Nitrogen, 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

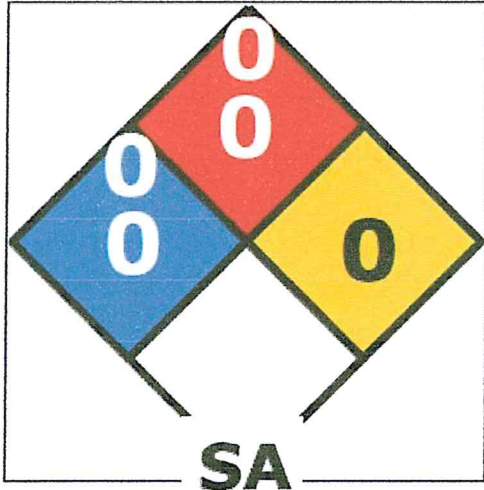
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Conversion Table

| ARGON (Ar) 39.994 g/mol PE=-185.9 °C | | | | | | |
|--------------------------------------|--------|-----------|------------|---------------------|----------------|---------------|
| UNITS | WEIGHT | | GAS VOLUME | | LIQUID VOLUME | |
| | Pounds | Kilograms | SCF Gas | Nm ³ Gas | Liquid gallons | Liquid liters |
| Pounds | 1.000 | 0.454 | 9.671 | 0.254 | 0.086 | 0.326 |
| Kilograms | 2.205 | 1.000 | 21.320 | 0.561 | 0.190 | 0.718 |
| SCF Gas | 0.103 | 0.047 | 1.000 | 0.026 | 0.009 | 0.034 |
| Nm ³ Gas | 3.933 | 1.784 | 38.040 | 1.000 | 0.338 | 1.280 |
| Liquid gallons | 11.630 | 5.276 | 112.500 | 2.957 | 1.000 | 3.785 |
| Liquid liters | 3.072 | 1.394 | 29.710 | 0.781 | 0.264 | 1.000 |



COMPATIBILITY WITH OTHER MATERIALS

Metals

| | |
|---------------------|--------------|
| Bronze | Satisfactory |
| 303 Stainless Steel | Satisfactory |
| 316 Stainless Steel | Satisfactory |
| Aluminum | Satisfactory |
| Zinc | Satisfactory |
| Copper | Satisfactory |
| Monel-metal | Satisfactory |

Plastics

| | |
|---------------|--------------|
| PCTFE | Satisfactory |
| Teflon | Satisfactory |
| Tefzel | Satisfactory |
| Kynar | Satisfactory |
| PVC | Satisfactory |
| Polycarbonate | Satisfactory |

Elastomers

| | |
|--------------|--------------|
| Kalrez | Satisfactory |
| Viton | Satisfactory |
| Buna-N | Satisfactory |
| Neoprene | Satisfactory |
| Polyurethane | Satisfactory |

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Change control:

Revision 01:

- Added safety color code for NFPA and the global harmonized system.
- The format was modified to the standards and approved by the sister companies Infra and Productos del Aire.

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