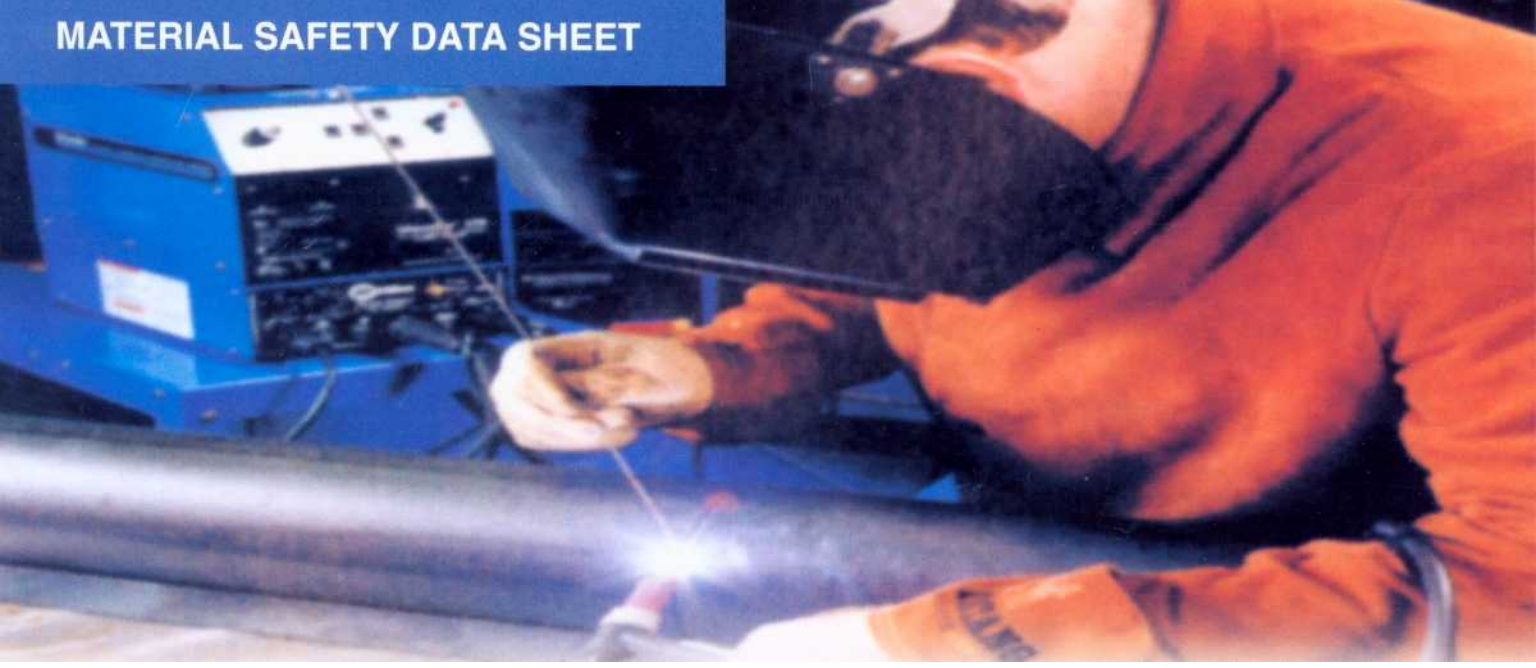

ARGON

CHEMICAL PRODUCT

PRODUCT NAME: Argon, compressed
CHEMICAL NAME: Argon
CHEMICAL FAMILY: Inert Gas
SYMBOL: Ar
SYNONYMS: Argon
[USES]: Various, inerting, medical, instrumentation

INGREDIENT COMPOSITION INFORMATION

INGREDIENTS NAME	PERCENTAGE	OHSA PEL-TWA	ACGIH TLV-TWA
Argon	>99%	None	Simple Asphyxiant

HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

CAUTION! High pressure gas.
Can cause rapid suffocation.
Do not breathe gas.
Self-contained breathing apparatus may be required by rescue workers.

POTENTIAL HEALTH EFFECTS:

ROUTES OF EXPOSURE:

INHALATION: Simple asphyxiant. Argon is non-toxic, but may cause suffocation by displacing the oxygen in air. Exposure to oxygen-deficient atmosphere (<19.5%) may cause dizziness, drowsiness, nausea, vomiting, excess salivation, diminished mental alertness, loss of consciousness and death. Exposure to atmosphere containing 8% to 10% or less oxygen will bring about unconsciousness without warning and so quickly that the individuals cannot help or protect themselves. Lack of sufficient oxygen may cause serious injury or death.

EYE CONTACT: Not applicable.

SKIN CONTACT. Not applicable.

[SKIN ABSORPTION]: Not applicable.

[INGESTION]: Not applicable
CHRONIC EFFECTS: Not established
MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None
OTHER EFFECTS OF OVEREXPOSURE: None
CARCINOGENICITY: Argon is not listed.

FIRST AID MEASURES

INHALATION: Persons suffering from lack of oxygen should be removed to fresh air. If victim is not breathing, administer artificial respiration. If breathing, administer oxygen. Obtain prompt medical attention.
EYE CONTACT. Not applicable
SKIN CONTACT: Not applicable
INGESTION: Not applicable
NOTES TO PHYSICIAN: None

FIRE FIGHTING MEASURES

FLASH POINT: Not applicable AUTOIGNITION: Not applicable
FLAMMABLE LIMITS IN AIR BY VOLUME:
LOWER: Not applicable UPPER: Not applicable
EXTINGUISHING MEDIA: Argon is nonflammable and does not support combustion. Use extinguishing media appropriate for surrounding fire.
SPECIAL FIRE FIGHTING INSTRUCTIONS: Argon is a simple asphyxiant. If possible, remove argon cylinders from fire area or cool with water.Self-contained breathing apparatus may be required for rescue workers.
UNUSUAL FIRE **AND EXPLOSION HAZARDS:** Upon exposure to intense heat or flame, cylinder may vent rapidly and/or rupture violently. Most cylinders are designed to vent contents when exposed to elevated temperatures. Pressure in a container can build up due to heat and it may rupture if pressure relief device should fail to function.
HAZARDOUS COMBUSTION PRODUCTS: None known
[SENSITIVITY TO STATIC DISCHARGE]: None
[SENSITIVITY TO MECHANICAL IMPACT]: None

ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Evacuate all personnel from the affected area. Shut off source of argon, if possible without risk. Ventilate area or remove cylinders to an outdoor location. If leaking from cylinder or its valve, contact your supplier.

HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling or being knocked over. Protect cylinders from physical damage; do not drag, roll, slide or drop. Do not allow storage area temperature to exceed 125°F (52°C). 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.
PRECAUTIONS TO BE TAKEN IN HANDLING: Use a suitable hand truck for cylinder movement. Never attempt to lift a cylinder by its valve protection cap. If user experiences any difficulty operating valve, discontinue use and contact supplier. 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 a part of an electrical circuit. For additional precautions in using argon, see other Information.

EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS:
VENTILATION: Natural or mechanical, to prevent oxygen-deficient atmospheres under 19.5%oxygen.
RESPIRATORY PROTECTION (SPECIFY TYPE):
General Use: None required
Emergency Use: Self-contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in an oxygen-deficient atmosphere. Air purifying respirators will not provide protection.
PROTECTIVE GLOVES : Work gloves are recommended when handling cylinders.
EYE PROTECTION : Safety glasses are recommended when handling cylinders.
OTHER PROTECTIVE EQUIPMENT : Safety shoes are recommended when handling cylinders.

PHYSICAL AND CHEMICAL PROPERTIES

MOLECULAR WEIGHT: 28.0134
BOILING POINT @101.325 kpa @ 185.9°C
RELATIVE DENSITY, GAS @ 101.325 kpa @ 0°C Air = 1 = 1.380
TRIPLE POINT TEMPERATURE = -308.9°F
VAPOR PRESSURE (AT 20 °C): Not applicable
EVAPORATION RATE (Butyl Acetate =1): Gas, not applicable
SOLUBILITY IN WATER: @ 101.325 kpa (per partial pressure 20°C = 0.0337 cm 3/1 cm3 water
EXPANSION RATIO: Not applicable [pH]: Not applicable
APPEARANCE, ODOR AND STATE: Colorless, odorless and tasteless gas at normal temperature and pressure.
[COEFFICIENT OF WATER/OIL DISTRIBUTION]: Not available
[ODOR THRESHOLD]: Not applicable

STABILITY AND REACTIVITY

STABILITY: Stable
CONDITIONS TO AVOID: None
INCOMPATIBILITY (Materials to Avoid) : None
REACTIVITY:
A) HAZARDOUS DECOMPOSITION PRODUCTS: None **B) HAZARDOUS POLYMERIZATION:** Will not occur

TOXICOLOGICAL INFORMATION

Argon is a simple asphyxiant
(IRRITANCY OF MATERIAL): None **(SENSITIZATION TO MATERIAL):** None
(REPRODUCTIVE EFFECTS): None
(TERATOGENICITY): None **(MUTAGENICITY):** None
(SYNERGISTIC MATERIALS): None

ECOLOGICAL INFORMATION

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

DISPOSAL CONSIDERATIONS

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

TRANSPORT INFORMATION

DOT/IMO SHIPPING NAME: Argon, compressed
HAZARD CLASS: 2.2 (Nonflammable Gas)
IDENTIFICATION NUMBER: UN 1006
PRODUCT RQ: Not applicable
SHIPPING LABEL(s) : Nonflammable gas
PLACARD (When required): Nonflammable gas
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 and should be discouraged.

OTHER INFORMATION

SPECIAL PRECAUTIONS: Use piping and equipment adequately designed to withstand pressures to be encountered. Use a check valve or other protective apparatus in any line or piping from the cylinder to prevent reverse flow.
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 each have their properties that can cause serious injury or death.

OTHER INFORMATION:

NFPA RATINGS:		**HMIS RATINGS:**	
HEALTH:	=0	HEALTH:	=0
FLAMMABILITY:	=0	FLAMMABILITY:	=0
INSTABILITY:	=0	REACTIVITY:	=0

SPECIAL: =SA (CGA Recommends this to designate simple asphyxiant.)

MATERIAL SAFETY DATA SHEET

LIQUID ARGON

CHEMICAL PRODUCT

PRODUCT NAME: Argon, refrigerated liquid
CHEMICAL NAME: Argon
CHEMICAL FAMILY: Inert Gas
FORMULA: Ar
SYNONYMS: Argon
[USES]: Various, inerting

INGREDIENT COMPOSITION INFORMATION

INGREDIENTS NAME	PERCENTAGE	OHSA PEL-TWA	ACGIH TLV-TWA
ARGON	99.98	None	Simple **Asphyxiant**

HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING! Extremely cold liquid and gas under pressure.
Can cause rapid suffocation.
Can cause severe frostbite.

POTENTIAL HEALTH EFFECTS:

ROUTES OF EXPOSURE:

INHALATION: Simple asphyxiant. Argon is non-toxic, but may cause suffocation by displacing the oxygen in air. Exposure to oxygen-deficient atmosphere (<19.5%) may cause dizziness, drowsiness, nausea, vomiting, excess salivation, diminished mental alertness, loss of consciousness and death. Exposure to atmospheres containing 8%
to 10% or less oxygen will bring about unconsciousness without warning and so quickly that the individuals cannot help or protect themselves. Lack of sufficient oxygen may cause serious injury or death.

EYE CONTACT. Tissue freezing and severe cryogenic burns of eyes

SKIN CONTACT. Tissue freezing and severe cryogenic burns of skin.

[SKIN ABSORPTION]: Not applicable

[INGESTION]: Not applicable

CHRONIC EFFECTS: Not established

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None

OTHER EFFECTS OF OVEREXPOSURE: None

CARCINOGENICITY: Argon is not listed.

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 pressure relief devices to control internal pressure. Under normal conditions these containers will periodically vent product. Some metals such as carbon steel may become brittle at low temperatures and will easily fracture. Prevent entrapment of liquid in closed systems or piping without pressure relief.

PRECAUTIONS TO BE TAKEN IN HANDLING: Never allow any unprotected part of the body to touch un-insulated pipes or vessels that contain cryogenic fluids. The extremely cold metal will cause the flesh to stick fast and tear when one attempts to withdraw from it. Use a suitable four-wheel hand truck for container movement. Cryogenic containers shall be handled and stored in an upright position. Do not drop or roll containers on their sides. If user experiences any difficulty operating container valve, discontinue use and contact supplier. For additional precautions in using liquid argon see other Information.

EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS:

VENTILATION: Natural or mechanical to prevent oxygen-deficient atmospheres under 19.5%oxygen.

RESPIRATORY PROTECTION (SPECIFY TYPE):

General Use: None required

Emergency Use: Self-contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in an oxygen deficient atmosphere. Air purifying respirators will not function.

PROTECTIVE GLOVES : Loose fitting thermal insulated or leather gloves.

EYE PROTECTION : Full face shield and safety glasses are recommended.

OTHER PROTECTIVE EQUIPMENT : Safety shoes are recommended when handling liquid containers. Long sleeve shirts and trousers without cuffs.

PHYSICAL AND CHEMICAL PROPERTIES

ATOMIC WEIGHT. 39.948

BOILING POINT (1 ATM): @ 101.325 kpa = - 185.9°C

DENSITY LIQUID @ 101.325 kpa @ 87.29°K = 1.3919 kg/cm3

TRIPLE POINT TEMPERATURE - 308.9°F

VAPOR PRESSURE (AT 20 °C): Not applicable

EVAPORATION RATE (Butyl Acetate =1): Gas, not applicable

SOLUBILITY IN WATER: @ 101.325 Kpa partial pressure @ 20°C =0.0337 cm3/1 cm3 water

[pH]: Not applicable

APPEARANCE, ODOR AND STATE: Colorless, odorless cryogenic liquid

[COEFFICIENT OF WATER/OIL DISTRIBUTION]: Not available

[ODOR THRESHOLD]: Not applicable

STABILITY AND REACTIVITY

STABILITY: Stable

CONDITIONS TO AVOID: None

INCOMPATIBILITY (Materials to Avoid) : None

REACTIVITY:

A) HAZARDOUS DECOMPOSITION PRODUCTS: None

B) HAZARDOUS POLYMERIZATION: Will not occur

TOXICOLOGICAL INFORMATION

Argon is a simple asphyxiant

(IRRITANCY OF MATERIAL): None

(SENSITIZATION TO MATERIAL): None

(REPRODUCTIVE EFFECTS): None

(TERATOGENICITY): None

(MUTAGENICITY): None

(SYNERGISTIC MATERIALS): None

ECOLOGICAL INFORMATION

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

DISPOSAL CONSIDERATIONS

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

TRANSPORT INFORMATION

DOT/IMO SHIPPING NAME: Argon, compressed
HAZARD CLASS: 2.2 (Nonflammable Gas)
PRODUCT RQ: Not applicable
SHIPPING LABEL(s) : Nonflammable gas
PLACARD (When required): Nonflammable gas
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 and should be discouraged.

OTHER INFORMATION

SPECIAL PRECAUTIONS: Use piping and equipment adequately designed to withstand pressures to be encountered. Use a check valve or other protective apparatus in any line or piping from the cylinder to prevent reverse flow.
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 each have their properties that can cause serious injury or death.

OTHER INFORMATION:

NFPA RATINGS:
HEALTH: = 0
FLAMMABILITY: = 0
INSTABILITY: = 0
SPECIAL: = SA (CGA Recommends this to designate simple asphyxiant.)

HMIS RATINGS:
HEALTH: = 0
FLAMMABILITY: = 0
REACTIVITY: = 0