Material Safety Data Sheets (MSDS)

Ehsan International Gases

Arsine ASH3

SECTION: 1. Product and company identification

Product identifier

Product form: Substance
Name: Arsine
CAS No: 7784-42-1
Formula: AsH1.2.

Relevant identified uses of the substance or mixture and uses advised against
Details of the supplier of the safety data sheet

Praxair, Inc.
39 Old Ridgebury Road
Danbury, CT 06810-5113 –USA
T 1-800-772-9247 (1-800-PRAXAIR) -F 1-716-879-2146
www.praxair.com

Emergency telephone number

Emergency number: Onsite Emergency: 1-800-645-4633

CHEMTREC, 24hr/day 7days/week —Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887 (collect calls accepted, Contract 17729

SECTION 2: Hazards identification

Classification of the substance or mixture

Classification (GHS-US)

Flam. Gas 1	H220
Liquefied gas	H280
Acute Tox. 1 (Inhalation: gas)	H330
Carc. 2	H351
STOT RE 2	H373
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

Label elements
GHS-US labeling
Hazard pictograms (GHS-US)

Signal word (GHS-US): DANGER
Hazard statements (GHS-US): H220 -EXTREMELY FLAMMABLE GAS
H280 -CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
H330 -FATAL IF INHALED
H351 -SUSPECTED OF CAUSING CANCER

Precautionary statements (GHS-US):	H373 -MAY CAUSE DAMAGE TO ORGANS (LIVER) THROUGH PROLONGED OR REPEATED EXPOSURE H410 -VERY TOXIC TO AQUATIC LIFE WITH LONG LASTING EFFECTS CGA-HG04-MAY FORM EXPLOSIVE MIXTURES WITH AIR CGA-HG11 -SYMPTOMS MAY BE DELAYED P201 -Obtain special instructions before use P202 -Do not handle until all safety precautions have been read and understood P210 -Keep away from Heat, Open flames, Sparks, Hot surfaces. -No smoking P260 -Do not breathe gas P271+P403 -Use and store only outdoors or in a well-ventilated place. P273 -Avoid release to the environment. P280+P284 -Wear protective gloves, protective clothing, eye protection, Respiratory protection, and/or face protection. P377 – leaking gas fire: Do not extinguish, unless leak can be stopped safely P381 -Eliminate all ignition sources if safe to do so P405 -Store locked up P501 -Dispose of contents/container in accordance with container. Supplier/owner instructions CGA-PG05 -Use a back flow preventive device in the piping. CGA-PG20+CGA-PG10 -Use only with equipment of compatible materials of Construction and rated for cylinder pressure. CGA-PG12 -Do not open valve until connected to equipment prepared for use. CGA-PG18 -When returning cylinder, install leak tight valve outlet cap or plug. CGA-PG06-Close valve after each use and when empty. CGA-PG02 -Protect from sunlight when ambient temperature exceeds 52°C (125°F

Other hazards

Other hazards not contributing to the: Classification	None.

SECTION 3: Composition/information on ingredients

Substance

Name	Product identifier	%
Arsine (Main constituent)	(CAS No) 778-42-1	100

Mixture

Not applicable

SECTION 4: First aid measures

Description of first aid measures

First-aid measures after inhalation: Immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician. SYMPTOMS MAY BE DELAYED. Consider any exposure as a potentially toxic dose.
First-aid measures after skin Contact: Adverse effects not expected from this product. The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

First-aid measures after eye contact: Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion: Ingestion is not considered a potential route of exposure.

Most important symptoms and effects, both acute and delayed
No additional information available

Indication of any immediate medical attention and special treatment needed
Obtain medical assistance.

SECTION 5: Firefighting measures

Extinguishing media
Suitable extinguishing media: Carbon dioxide, Dry chemical, Water spray or fog.
Special hazards arising from the substance or mixture

Fire hazard: DANGER! Toxic, flammable liquefied gas
Vapor forms explosive mixtures with air and Oxidizing agents. If leaking gas catches fire, do not extinguish flames. Flammable and toxic Vapors may spread from leak and could explode if reignited by sparks or flames. Vapors are Heavier than air and may collect in low spots. Explosive atmospheres may linger. Before entering area, especially confined areas, check with an appropriate device.

Advice for firefighters
Firefighting instructions: DANGER! Toxic, flammable liquefied gas
Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA)
And protective clothing. Immediately cool containers with water from maximum distance. Stop
Flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if
Safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must
Comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

Special protective equipment for fire fighters: Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

Other information: Cylinders are NOT equipped with a pressure relief valve.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

General measures: DANGER! Toxic, flammable liquefied gas immediately evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus and protective clothing. If cylinders are leaking, reduce toxic vapors with water spray or fog. Reverse flow into cylinder may cause rupture. (See section 16.) Shut off flow if without risk. Ventilate area or move cylinder to a well-ventilated area.

For non-emergency personnel
No additional information available

For emergency responders
No additional information available

Environmental precautions
Try to stop release. Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with Local/regional/national/international regulations. Contact supplier for any special requirements.

Methods and material for containment and cleaning up
No additional information available

Reference to other sections
See also sections 8 and 13.

Precautions for safe handling
Precautions for safe handling: Do not breathe gas/vapor. Avoid all contact with skin, eyes, or clothing. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Keep away from heat, hot surfaces, sparks, open flames and other ignition source No smoking. Use only non-sparking tools. Use only explosion-proof equipment. Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g., wrench, screwdriver, and pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the Pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16

Conditions for safe storage, including any incompatibilities
Storage conditions: Store in a cool, well-ventilated place. Store and use with adequate ventilation. Store only Where temperature will not exceed 125°F (52°C). Firmly secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, and USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; and then repair the leak. Never place a container where it may become part of an electrical circuit.

Specific end use(s)
None.

SECTION 8: Exposure controls/personal protection

Control parameters

Arsine (7784-42-1)

ACGIH	ACGIH TLV-TWA (ppm)	0.005 ppm
USA OSHA	OSHA PEL (TWA) (mg/m³)	0.2 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	0.05 ppm

Exposure controls

Appropriate engineering controls: Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards. MECHANICAL (GENERAL): Inadequate -Use only in a closed system. Use explosion proof equipment and lighting.

Hand protection: Neoprene rubber (HNBR) /.

Eye protection: Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder change out or whenever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Skin and body protection: Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where Needed. Wear appropriate chemical gloves during cylinder change out or wherever contact with product is possible. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138.he integrity or accuracy of any version of this document after it has been downloaded or removed from our website.

Respiratory protection: When workplace conditions warrant respirator use, follow a respiratory protection program that Meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type
Respirators are used, the cartridge must be appropriate for the chemical exposure (e.g., an
Organic vapor cartridge). For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection: Wear cold insulating gloves when Trans filling or breaking transfer connections.
Other information: Consider the use of flame resistant anti-static safety clothing. Wear safety shoes while handling Containers.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Physical state:	Gas
Molecular mass:	78 g/mol
Color:	Colorless.
Odor:	Garlic like. Poor warning properties at low concentrations.
Odor threshold:	No data available
PH:	Not applicable.
Relative evaporation rate (butyl acetate=1):	No data available
Relative evaporation rate (ether=1):	Not applicable.

Melting point:	-117 °C (-178 °F)
Freezing point:	No data available
Boiling point:	-62.5 °C (80.1 °F)
Flash point:	Not applicable.
Critical temperature:	99.9 °C (211.8 °F)
Auto-ignition temperature:	No data available
Decomposition temperature:	≈ 230 -240 °C (446 -464 °F)
Flammability (solid, gas):	5.1 -78 vol %
Vapor pressure:	15.1 bar (219.7 Pisa)
Relative vapor density at 20 °C:	No data available
Relative density:	1.6
Density:	3.23 kg/m³ (0.20 lb./ft3) (vapor density at 21.1°C (70°F) and 1 atm)
Relative gas density:	2.7
Solubility:	Water:
Log POW:	Not applicable.
Log Know:	Not applicable.
Viscosity, kinematic:	Not applicable.
Viscosity, dynamic:	Not applicable.
Explosive properties:	Forms explosive mixtures with air and oxidizing agents.
Oxidizing properties:	None.

Explosion limits:
No data available

Other information

Gas group:	Liquefied gas
Additional information:	Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

Reactivity
No additional information available

Chemical stability
Stable under normal conditions.

Possibility of hazardous reactions
May occur.

Conditions to avoid
Exposure to light or heat in the presence of moisture.

Incompatible materials
Oxidizing agents. Nitric acid. Halogens. Potassium. Ammonia.

Hazardous decomposition products

SECTION 11: Toxicological information

Information on toxicological effects

Acute toxicity: **Inhalation: gas: FATAL IF INHALED.**

Arsine (\f) 7784-42-1LC50 inhalation rat (ppm)	10 ppm/4h
ATE US (gases)	10.000 ppmV/4h
Skin corrosion/irritation:	Not classified PH: Not applicable.
Serious eye damage/irritation:	Not classified
PH:	Not applicable.
Respiratory or skin sensitization	not classified
Germ cell mutagenicity:	Not classified
Carcinogenicity:	SUSPECTED OF CAUSING CANCER.
Arsine (778442-1) IARC group	Carcinogenic to humans
Reproductive toxicity:	Not classified
Specific target organ toxicity (single exposure):	Not classified
Specific target organ toxicity (repeated exposure):	MAY CAUSE DAMAGE TO ORGANS (LIVER) THROUGH PROLONGED OR REPEATED

EXPOSURE.
Aspiration hazard: Not classified

SECTION 12: Ecological information

Toxicity

Ecology -general: VERY TOXIC TO AQUATIC LIFE WITH LONG LASTING EFFECTS.

Persistence and degradability

Arsine (7784-42-1)

Persistence and degradability not applicable for inorganic gases.

Bio accumulative potential

Arsine (7784-42-1)

Log POW	Not applicable.
Log Kow	Not applicable.
Bio accumulative potential	No data available.

Mobility in soil

Arsine (7784-42 -1)

Mobility in soil	No data available.
Ecology-soil	Because of its high volatility, the product is unlikely to cause ground or water pollution

Other adverse effects

Effect on ozone layer: None.

Effect on the global warming: No known effects from this product

SECTION 13: Disposal considerations

Waste treatment methods

Waste disposal recommendations: Do not attempt to dispose of residual or unused quantities. Return container to supplier

SECTION 14: Transport information

In accordance with DOT

Transport document description: UN2188 Arsine, 2.3
UN-No. (DOT): UN2188
Proper Shipping Name (DOT): Arsine
Transport hazard classes (DOT): 2.3 -Class 2.3 -Poisonous gas 49 CFR 173.115
Hazard labels (DOT): Poison Gas 2.1-Flammable gas

DOT Special Provisions (49 CFR 172.102):

This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone A (see 173.116(a) or 173.133(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter

Additional information

Emergency Response Guide (ERG) Number: 119
Other information: No supplementary information available.
Special transport precautions:

Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: -Ensure there is adequate ventilation. -Ensure that containers are firmly secured.

Transport by sea
UN-No. (IMDG): 2188
Proper Shipping Name (IMDG): ARSINE
Class (IMDG): 2 -Gases
MFAG-No: 119
Air transporting-No. (IATA): 2188
Proper Shipping Name (IATA): Arsine
Class (IATA): 2
Civil Aeronautics Law: Gases under pressure/Gases toxic under pressure

SECTION 15: Regulatory information

US Federal regulations

Arsine (7784-42-1)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Listed on the United States SARA Section 302

SARA Section 302 Threshold Planning Quantity (TPQ)	100
SARA Section 311/312 Hazard Classes	Delayed (chronic) health hazard Fire hazard immediate (acute) health hazard Reactive hazard sudden release of pressure hazard

National regulations

Arsine (7784-42-1)

- Listed on IARC (International Agency for Research on Cancer)
- Listed on the AICS (Australian Inventory of Chemical Substances)
- Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
- Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
- Listed on the Korean ECL (Existing Chemicals List)
- Listed on NZIoC (New Zealand Inventory of Chemicals)
- Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
- Japanese Poisonous and Deleterious Substances Control Law
- Japanese Pollutant Release and Transfer Register Law (PRTR Law)
- Listed on the Canadian IDL (Ingredient Disclosure List)

US State regulations

Arsine (7784-42-1)

U.S. -California -Proposition 65 -Carcinogens List	No
U.S. -California -Proposition 65 -Developmental Toxicity	No
U.S. -California -Proposition 65 -Reproductive – Female	No
U.S.-California -Proposition 65 –Reproductive Toxicity - Male	No
State or local regulations	U.S. -Massachusetts -Right to Know List U.S. -New Jersey -Right to Know Hazardous Substance List U.S. -Pennsylvania -RTK (Right to Know) -Environmental Hazard List U.S. -Pennsylvania -RTK (Right to Know) List

SECTION 16: Other information

Other information

When you mix two or more chemicals, 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 You evaluate the end product. Before using any plastics, confirm their compatibility With this product.

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS 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 Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

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NFPA health hazard prompt medical attention was	4 -Very short exposure could cause death or serious residual injury even though given.
NFPA fire hazard	4 -Will rapidly or completely vaporize at normal pressure and temperature, or is Readily dispersed in air and will burn readily.
NFPA reactivity	2 -Normally unstable and readily undergo violent decomposition but do not Detonate. Also: may react violently with water or may form potentially explosive Mixtures with water.
Health	4 Severe Hazard -Life-Threatening, major or permanent damage may result from Single or repeated overexposures
Flammability	4 Severe Hazard
Physical	2 Moderate Hazard