Chemical Safety Data Sheet MSDS / SDS

Arsine SDS

Revision Date:2024-04-25 Revision Number:1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier

Product name: Arsine

CAS: 7784-42-1

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: For R&D use only. Not for medicinal, household or other use.

Uses advised against: none

Company Identification

Company: Chemicalbook.in

Address: 5 vasavi Layout Basaveswara Nilayam Pragathi Nagar Hyderabad, India -500090

Telephone: +91 9550333722

SECTION 2: Hazards identification

Classification of the substance or mixture

Gases under pressure: Compressed gas
Flammable gases, Category 1A, Flammable gas

Acute toxicity - Category 2, Inhalation
Specific target organ toxicity – repeated exposure, Category 2
Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1
Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 1

GHS label elements, including precautionary statements

Pictogram(s)

Signal word Danger

Hazard statement(s)

H220 Extremely flammable gas
H330 Fatal if inhaled
H373 May cause damage to organs through prolonged or repeated exposure
H410 Very toxic to aquatic life with long lasting effects

Precautionary statement(s)

Prevention

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P271 Use only outdoors or in a well-ventilated area.
P284 [In case of inadequate ventilation] wear respiratory protection.
P273 Avoid release to the environment.

Response

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 In case of leakage, eliminate all ignition sources.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P316 Get emergency medical help immediately.
P320 Specific treatment is urgent (see ... on this label).
P319 Get medical help if you feel unwell.
P391 Collect spillage.

Storage

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

P403+P233 Store in a well-ventilated place. Keep container tightly closed.

Disposal

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

Substance

Chemical name:	Arsine
Common names and synonyms:	Arsine
CAS number:	7784-42-1
EC number:	232-066-3
Concentration:	100%

SECTION 4: First aid measures

Description of necessary first-aid measures

If inhaled

Fresh air, rest. Refer for medical attention.

Following skin contact

ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention .

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor or Poison Control Center immediately.

Most important symptoms/effects, acute and delayed

This material is highly toxic by inhalation; a very short exposure to small quantities may cause death or permanent injury. Arsine is the most powerful hemolytic poison encountered in industry. (EPA, 1998)

Indication of immediate medical attention and special treatment needed, if necessary

no data available

SECTION 5: Firefighting measures

Suitable extinguishing media

Cool containers that are exposed to flames with water from the side until well after fire is out. Isolate for 1/2 mile in all directions if tank car or truck is involved in fire. Let small fires burn. Use water spray, fog, or foam for large fires. For massive fire in cargo area use unmanned hose holder or monitor nozzles; if this is impossible, withdraw from area and let fire burn. (EPA, 1998)

Specific hazards arising from the chemical

Vapors may travel to a source of ignition and flash back. Container may explode in heat of fire. When heated to decomposition, emits highly toxic fumes. Can react vigorously with oxidizing materials. May explode when exposed to chlorine, nitric acid, or potassium plus ammonia. On exposure to light, moist arsine decomposes quickly, depositing shiny black arsenic. (EPA, 1998)

Special protective actions for fire-fighters

Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out. In other cases extinguish with powder, carbon dioxide. In case of fire: keep cylinder cool by spraying with water. Combat fire from a sheltered position.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Remove all ignition sources. NEVER direct water jet on liquid. Do NOT let this chemical enter the environment.

Environmental precautions

Evacuate danger area! Consult an expert! Remove all ignition sources. NEVER direct water jet on liquid. Do NOT let this chemical enter the environment. Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus.

Methods and materials for containment and cleaning up

Collect and arrange disposal. Keep the chemical in suitable and closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding) if in liquid state. Do NOT expose to friction or shock. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

Conditions for safe storage, including any incompatibilities

Fireproof if in building. Cool. Ventilation along the floor.

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

TLV: 0.005 ppm as TWA

Biological limit values

no data available

Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear face shield or eye protection in combination with breathing protection.

Skin protection

Cold-insulating gloves. Protective clothing.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state:	Gaseous.
Colour:	Arsine is a colourless, flammable, and highly toxic gas. It has a garlic-like or fishy odour that can be detected at concentrations of 0.5 ppm and above. Because arsine is not irritating and produces no immediate symptoms, persons exposed to hazardous levels may be unaware of its presence. It is generally shipped in cylinders as a liquefied compressed gas. Arsine gas is generated when metals or crude ores containing arsenic impurities are treated with acid. Arsine gas is also used in the semiconductor industry when depositing arsenic on microchips.
Odour:	no data available
Melting point/freezing point:	-117 °C.
Boiling point or initial boiling point and boiling range:	-62.48 °C. Remarks:Atmospheric pressure.
Flammability:	Extremely flammable.

Lower and upper explosion limit/flammability limit:	no data available
Flash point:	285 °C.
Auto-ignition temperature:	no data available
Decomposition temperature:	no data available
pH:	no data available
Kinematic viscosity:	no data available
Solubility:	20 cc/100 cc (NTP, 1992)
Partition coefficient n-octanol/water:	no data available
Vapour pressure:	16 Bar. Temperature:20 °C. Remarks:Source: Gestis.;26 Bar. Temperature:40 °C. Remarks:Source: Gestis.;> 760 mm Hg. Temperature:20 °C. Remarks:Source: Knovels Handbook.
Density and/or relative density:	1.461 kg/l. Temperature:-62.;3.52 kg/m3. Temperature:0 °C.;2.722.
Relative vapour density:	2.66 to 2.695 (EPA, 1998) (Relative to Air)
Particle characteristics:	no data available

SECTION 10: Stability and reactivity

Reactivity

Decomposes on heating and under the influence of light and moisture. This produces toxic arsenic fumes. Reacts with strong oxidants. This generates explosion hazard. May decompose explosively on shock, friction or concussion.
Arsine (SA) reacts with strong oxidants, causing an explosion hazard.Arsine (SA) decomposes on heating and under the influence of light and moisture, producing toxic arsenic fumes.

Chemical stability

no data available

Possibility of hazardous reactions

The gas is heavier than air and may travel along the ground; distant ignition possible. As a result of flow, agitation, etc., electrostatic charges can be generated.,Vapors are heavier than air. They will spread along the ground and collect and stay in poorly-ventilated, low-lying, or confined areas (e.g., sewers, basements, and tanks).Hazardous concentrations may develop quickly in enclosed, poorly-ventilated, or low-lying areas. Keep out of these areas. Stay upwind.ARSINE decomposes into its elements (arsenic, gaseous hydrogen) when heated to 300°C. Can form accidentally by the reaction of arsenic impurities with mineral acids (hydrochloric acid, sulfuric acid) in the presence of common metals (iron, zinc). A reducing agent---not oxidized by air at room temperature [Kirk-Othmer, 3rd ed., Vol. 3, 1978, p. 251], but may react vigorously with other oxidizing agents [Sax, 9th ed., 1996, p. 279]. Moderately explosive in combination with chlorine or nitric acid. When heated to decomposition or ignited, it emits highly toxic fumes of metallic arsenic.

Conditions to avoid

no data available

Incompatible materials

CHEMICAL PROFILE: An extremely toxic gas with an unpleasant garlic-like odor. Confirmed human carcinogen. It decomposes into its elements (arsenic, hydrogen gas) below 300 C. It may be accidentally formed by the reaction of arsenic impurities with mineral acids (hydrochloric acid, sulfuric acid) in the presence of common metals (iron, zinc). It is not oxidized by air at room temperature. [Kirk-Othmer, 3rd ed., Vol. 3, 1978, p. 251]. Moderately explosive when exposed to chlorine, nitric acid or ammonia containing potassium. When heated to decomposition or ignited it emits highly toxic fumes of metallic arsenic. It can react vigorously with oxidizing materials [Sax, 9th ed., 1996, p. 279]. (REACTIVITY, 1999)

Hazardous decomposition products

no data available

SECTION 11: Toxicological information

Acute toxicity

Oral: no data available

Inhalation: no data available

Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

NIOSH-Ca

Reproductive toxicity

no data available

STOT-single exposure

Rapid evaporation of the liquid may cause frostbite. The substance may cause effects on the blood. This may result in destruction of blood cells. The effects may be delayed. Medical observation is indicated. See Notes. Exposure could cause death.

STOT-repeated exposure

This substance is carcinogenic to humans.

Aspiration hazard

A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

SECTION 12: Ecological information

Toxicity

Toxicity to fish: no data available

Toxicity to daphnia and other aquatic invertebrates: no data available

Toxicity to algae: no data available

Toxicity to microorganisms: no data available

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

Other adverse effects

no data available

SECTION 13: Disposal considerations

Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

UN Number

ADR/RID: UN3522 (For reference only, please check.)
IMDG: UN3522 (For reference only, please check.)
IATA: UN3522 (For reference only, please check.)

UN Proper Shipping Name

ADR/RID: ARSINE, ADSORBED (For reference only, please check.)
IMDG: ARSINE, ADSORBED (For reference only, please check.)
IATA: ARSINE, ADSORBED (For reference only, please check.)

Transport hazard class(es)

ADR/RID: 2.3 (For reference only, please check.)
IMDG: 2.3 (For reference only, please check.)
IATA: 2.3 (For reference only, please check.)

Packing group, if applicable

ADR/RID: (For reference only, please check.)
IMDG: (For reference only, please check.)
IATA: (For reference only, please check.)

Environmental hazards

ADR/RID: Yes
IMDG: Yes
IATA: Yes

Special precautions for user

no data available

Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

Safety, health and environmental regulations specific for the product in question

European Inventory of Existing Commercial Chemical Substances (EINECS)

Listed.

EC Inventory

Listed.

United States Toxic Substances Control Act (TSCA) Inventory

Listed.

China Catalog of Hazardous chemicals 2015

Listed.

New Zealand Inventory of Chemicals (NZIoC)

Listed.

(PICCS)

Listed.

Vietnam National Chemical Inventory

Listed.

IECSC)

Listed.

Korea Existing Chemicals List (KECL)

Listed.

SECTION 16: Other information

Abbreviations and acronyms

CAS: Chemical Abstracts Service

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

IMDG: International Maritime Dangerous Goods

IATA: International Air Transportation Association

TWA: Time Weighted Average

STEL: Short term exposure limit

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

References

IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home

HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm

IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/

eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en

CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple

ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp

ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg

Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

ECHA - European Chemicals Agency, website: https://echa.europa.eu/

Other Information

The symptoms of poisoning do not become manifest until a few hours or even days have passed.Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.See ICSC 0013.