Arsine

Safety Data Sheet

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 05/18/2017 Version: 1.0

SECTION 1: Identification

1.1. Product identifier

Product form	:	Substance
Substance name	:	Arsine
Substance type	:	Mono-constituent
CAS-No.	:	7784-42-1
Product code	:	CA-1001-08333
Formula	:	AsH3
Synonym	:	Hydrogen arsenide; Arsenous hydride; Arseniuretted hydrogen; Arsenic trihydride;Arsenic hydride
Product group	:	Specialty Gases

1.2. Recommended use and restrictions on use

No additional information available

1.3. Supplier

Air Liquide Canada Inc.
1250, René Lévesque West Blvd. Suite 1700
H3B 5E6 Montreal, QC - Canada
T 1-800-817-7697
www.airliquide.ca

1.4. Emergency telephone number

Emergency number : 514-878-1667

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

Classification (GHS-CA)

Flammable gases, Category 1	H220
Gases under pressure : Compressed gas	H280
Acute toxicity (inhalation:gas) Category 1	H330
Carcinogenicity, Category 2	H351
Specific target organ toxicity — Repeated exposure, Category 2	H373
Hazardous to the aquatic environment — Acute Hazard, Category 1	H400
Hazardous to the aquatic environment — Chronic Hazard, Category 1	H410

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS-CA labelling

Hazard pictograms (GHS-CA) :

GHS02 GHS04 GHS06 GHS08

Signal word (GHS-CA) : Danger

Hazard statements (GHS-CA) :
H280 - Contains gas under pressure; may explode if heated
H220 - Extremely flammable gas
H351 - Suspected of causing cancer
H373 - May cause damage to organs through prolonged or repeated exposure
H330 - Fatal if inhaled
H410 - Very toxic to aquatic life with long lasting effects
CGA-HG01 - May cause frostbite
CGA-HG04 - May form explosive mixtures with air
CGA-HG11 - Symptoms may be delayed

Precautionary statements (GHS-CA) :
P381 - In case of leakage, eliminate all ignition sources
P377 - Leaking gas fire: Do not extinguish unless leak can be stopped safely
P501 - Dispose of contents/container in accordance with local/regional/national/international regulations.
P403 - Store in a well-ventilated place
P405 - Store locked up
P260 - Do not breathe dust/fume/gas/mist/vapours/spray

P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P284 - In case of inadequate ventilation wear respiratory protection
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P271 - Use only outdoors or in a well-ventilated area
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P302 - IF ON SKIN:
P307+P311 - If exposed: Call a poison center/doctor
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52 °C/125 °F
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG06 - Close valve after each use and when empty
CGA-PG10 - Use only with equipment rated for cylinder pressure
CGA-PG14 - Approach suspected leak area with caution
CGA-PG18 - When returning cylinder, install leak tight valve outlet cap or plug
CGA-PG21 - Open valve slowly

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS-CA)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substances

Substance type : Mono-constituent

Name	Chemical name/Synonyms	Product identifier	%	Classification (GHS-CA)
Arsine (Main constituent)		(CAS-No.) 7784-42-1	> 99.9	Flam. Gas 1, H220 Press. Gas (Comp.), H280 Acute Tox. 1 (Inhalation:gas), H330 Carc. 2, H351 STOT RE 2, H373 Aquatic Acute 1, H400 Aquatic Chronic 1, H410

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Apply artificial respiration with bag and mask if breathing stopped. Get immediate medical advice/attention.

First-aid measures after skin contact : Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

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

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation : Fatal if inhaled.

Symptoms/effects after skin contact : May cause frostbite.

Symptoms/effects after eye contact : Contact with the product may cause cold burns or frostbite.

Symptoms/effects after ingestion : Ingestion is not considered a potential route of exposure.

Symptoms/effects upon intravenous administration : Not known.

Chronic symptoms : Suspected of causing cancer. May cause damage to organs (blood, liver, kidneys) through prolonged or repeated exposure (Inhalation).

Most important symptoms and effects, both acute and delayed : Damage to kidneys and liver. Damage to red blood cells (haemolytic poison). Delayed adverse effects possible. Refer to section 11.

4.3. Immediate medical attention and special treatment, if necessary

Other medical advice or treatment : If you feel unwell, seek medical advice. If breathing is difficult, give oxygen.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

5.2. Unsuitable extinguishing media

Unsuitable extinguishing media : Do not use water jet to extinguish.

5.3. Specific hazards arising from the hazardous product

Fire hazard : This product is flammable.

Explosion hazard : Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries. May form flammable/explosive vapour-air mixture.

Hazardous combustion products : If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Arsenic and its oxides.

5.4. Special protective equipment and precautions for fire-fighters

Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Exposure to fire may cause containers to rupture/explode.

Protection during firefighting : Standard protective clothing and equipment (e.g, Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation.

Personal Precautions, Protective Equipment and Emergency Procedures : EVACUATE ALL PERSONNEL FROM AFFECTED AREA. Use appropriate protective equipment. If leak is on user's equipment, be certain to purge piping before attempting repairs. If leak is on a container or container valve contact the closest Air Liquide Canada location.

6.2. Methods and materials for containment and cleaning up

For containment : Try to stop release if without risk.

Methods for cleaning up : Dispose of contents/container in accordance with local/regional/national/international regulations.

Methods and material for containment and cleaning up : Ventilate area.

6.3. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection"

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Use only non-sparking tools.

Hygiene measures : Do not eat, drink or smoke when using this product.

Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Use only with equipment rated for cylinder pressure. Close valve after each use and when empty. Handle empty containers with care because residual vapours are flammable. In use may form flammable vapour-air mixture.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed.

Storage conditions : Do not expose to temperatures exceeding 52 °C/ 125 °F. Keep container closed when not in use. Protect cylinders from physical damage; do not drag, roll, slide or drop. Store in well ventilated area. Store locked up.

Incompatible products : None known.

Incompatible materials : Oxidizing materials. Air.

Conditions for safe storage, including any incompatibilities : Observe all regulations and local requirements regarding storage of containers. Containers should not be stored in conditions likely to encourage corrosion. Container valve guards or caps should be in place. Containers should be stored in the vertical position and properly secured to prevent them from falling over. Stored containers should be periodically checked for general condition and leakage. Keep container below 50°C in a well ventilated place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials. Segregate from oxidant gases and other oxidants in store. All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Arsine (7784-42-1)		
USA - ACGIH	ACGIH 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
Canada (Quebec)	VEMP (mg/m³)	0.16 mg/m³
Canada (Quebec)	VEMP (ppm)	0.05 ppm
Alberta	OEL TWA (mg/m³)	0.2 mg/m³
Alberta	OEL TWA (ppm)	0.05 ppm
British Columbia	OEL TWA (ppm)	0.005 ppm
Manitoba	OEL TWA (ppm)	0.005 ppm
New Brunswick	OEL TWA (mg/m³)	0.16 mg/m³
New Brunswick	OEL TWA (ppm)	0.05 ppm
New Foundland & Labrador	OEL TWA (ppm)	0.005 ppm
Nova Scotia	OEL TWA (ppm)	0.005 ppm
Nunavut	OEL STEL (ppm)	0.15 ppm
Nunavut	OEL TWA (ppm)	0.05 ppm
Northwest Territories	OEL STEL (ppm)	0.15 ppm
Northwest Territories	OEL TWA (ppm)	0.05 ppm
Ontario	OEL TWA (ppm)	0.005 ppm
Prince Edward Island	OEL TWA (ppm)	0.005 ppm
Saskatchewan	OEL STEL (ppm)	0.15 ppm
Saskatchewan	OEL TWA (ppm)	0.05 ppm
Yukon	OEL STEL (mg/m³)	0.2 mg/m³
Yukon	OEL STEL (ppm)	0.05 ppm
Yukon	OEL TWA (mg/m³)	0.2 mg/m³
Yukon	OEL TWA (ppm)	0.05 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls : Ensure exposure is below occupational exposure limits (where available). Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Consider the use of a work permit system e.g. for maintenance activities. Alarm detectors should be used when toxic gases may be released.

Environmental exposure controls : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Gloves. Safety glasses. Protective clothing. Safety shoes. Respiratory protection.

Hand protection:

Wear working gloves when handling gas containers.

Eye protection:

Wear safety glasses with side shields.

Skin and body protection:

Wear suitable protective clothing, e.g. lab coats, coveralls or flame resistant clothing.

Respiratory protection:

Wear a respirator when performing non-routine tasks not limited to line breaking or sampling. Wear a respirator during routine operations if determined to be necessary during a process-specific review. Consult respirator suppliers' product information or their representatives for the selection of the appropriate respirator. See Sections 5 & 6.

Thermal hazard protection:

None necessary during routine operations.

Appropriate engineering controls:

Ensure exposure is below occupational exposure limits (where available). Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Consider work permit system e.g. for maintenance activities. Alarm detectors should be used when toxic gases may be released.

Environmental exposure controls:

Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment

Other information:

Wear safety shoes while handling containers.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Gas
Appearance	:	Clear, colorless gas.
Colour	:	Colourless
Odour	:	Garlic like.
Odour threshold	:	No data available
pH	:	Not applicable.
Relative evaporation rate (butylacetate=1)	:	No data available
Relative evaporation rate (ether=1)	:	Not applicable for gases and gas mixtures.
Melting point	:	No data available
Freezing point	:	-117 °C
Boiling point	:	-62.5 °C
Flash point	:	No data available
Critical temperature	:	100.95 °C
Auto-ignition temperature	:	285 °C
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	See Section 2.1 and 2.2
Vapour pressure	:	1500 kPa
Vapour pressure at 50 °C	:	No data available
Relative vapour density at 20 °C	:	2.69
Relative density	:	1.6
Relative gas density	:	Heavier than air
Solubility	:	Water: No data available
Log Pow	:	Not applicable for inorganic gases.
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Explosive properties	:	Without adequate ventilation formation of explosive mixtures may be possible.
Oxidising properties	:	None.
Explosive limits	:	No data available

9.2. Other information

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

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	:	Reacts violently with (strong) oxidizers.
Chemical stability	:	Stable under normal conditions.

Possibility of hazardous reactions	:	Can form explosive mixture with air. Reacts vigorously with strong oxidizers and acids.
Conditions to avoid	:	None under recommended storage and handling conditions (see section 7).
Incompatible materials	:	Oxidizing materials. Air.
Hazardous decomposition products	:	Under normal conditions of storage and use hazardous decomposition products should not be produced. When heated to decomposition, emits dangerous fumes.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	:	Not classified
Acute toxicity (dermal)	:	Not classified
Acute toxicity (inhalation)	:	Inhalation:gas: Fatal if inhaled.

Arsine (\f)7784-42-1	
LC50 inhalation rat (ppm)	89 ppm/4h
ATE CA (gases)	89.00000000 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.
IARC group	:	1 - Carcinogenic to humans1 - Carcinogenic to humans
Reproductive toxicity	:	Not classified
STOT-single exposure	:	Not classified
STOT-repeated exposure	:	May cause damage to organs through prolonged or repeated exposure.
Aspiration hazard	:	Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Very toxic to aquatic life with long lasting effects.

12.2. Persistence and degradability

Arsine (7784-42-1)	
Persistence and degradability	Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Arsine (7784-42-1)	
Log Pow	Not applicable for inorganic gases.
Bioaccumulative potential	No data available.

12.4. Mobility in soil

Arsine (7784-42-1)	
Log Pow	Not applicable for inorganic gases.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Effect on ozone layer : No known effects from this product.

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods	:	Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded. Waste gas should be flared through a suitable burner with flash back arrestor. Do not discharge into areas where there is a risk of forming an explosive mixture with air.
Product/Packaging disposal recommendations	:	Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at www.cganet.com for more guidance on suitable disposal methods.

SECTION 14: Transport information

14.1. Basic shipping description

In accordance with TDG

Transportation of Dangerous Goods

UN-No. (TDG)	:	UN2188
TDG Primary Hazard Classes	:	2.3 - Class 2.3 - Toxic Gas.
TDG Subsidiary Classes	:	2.1
Transport Document Description	:	UN2188 ARSINE, 2.3 (2.1)
Proper Shipping Name	:	ARSINE
Hazard labels (TDG)	:	2.3 - Toxic gases 2.1 - Flammable gases

TDG Special Provisions	:	23 - (1) A consignor of these dangerous goods must include, except for UN1005, ANHYDROUS AMMONIA, the words “toxic by inhalation” or “toxic — inhalation hazard” or “toxique par inhalation” or “toxicité par inhalation” in the following places, unless the words are already part of the shipping name: (a)on a shipping document, immediately after the description of the dangerous goods; (b)on a small means of containment, next to the shipping name of the dangerous goods; and (c)on a large means of containment, next to the placard for the primary class of the dangerous goods or the placard for the subsidiary class, if any. For example, the notation on a shipping document would be “UN1935, CYANIDE SOLUTION, N.O.S, Class 6.1, PG I, toxic by inhalation”. (2) This special provision does not apply to a person who transports these dangerous goods in accordance with an exemption set out in sections 1.15, 1.17 or 1.17.1 of Part 1 (Coming Into Force, Repeal, Interpretation, General Provisions and Special Cases). (3) A consignor of UN1005, ANHYDROUS AMMONIA, must include the words “inhalation hazard” or “dangereux par inhalation”: (a)on a shipping document, immediately after the shipping name of the dangerous goods; and (b)on a small means of containment, next to the shipping name of the dangerous goods. When UN1005, ANHYDROUS AMMONIA, is contained in a large means of containment on which is affixed the anhydrous ammonia placard, the words “Anhydrous Ammonia, Inhalation Hazard” or “Ammoniac anhydre, dangereux par inhalation” must be displayed next to the placard in accordance with paragraph 4.18.2(b). SOR/2014-306 38 - A person must not handle, offer for transport or transport these dangerous goods in a large means of containment if they are in direct contact with the large means of containment. SOR/2014-306
ERAP Index	:	25
Explosive Limit and Limited Quantity Index	:	0
Passenger Carrying Ship Index	:	Forbidden
Excepted quantities (TDG)	:	E0
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index	:	Forbidden

14.2. Transport information/DOT - USA

Department of Transport

DOT NA no.	:	UN2188
UN-No.(DOT)	:	2188
Transport Document Description	:	UN2188 Arsine, 2.3 (2.1)
Proper Shipping Name (DOT)	:	Arsine
Contains Statement Field Selection (DOT)	:	DOT_TECHNICAL - Proper Shipping Name - Technical (DOT)
Class (DOT)	:	2.3 - Class 2.3 - Poisonous gas 49 CFR 173.115
Division (DOT)	:	2.3

Hazard labels (DOT)	:	2.3 - Poison gas 2.1 - Flammable gas

Dangerous for the environment	:	No
DOT Special Provisions (49 CFR 172.102)	:	1 - 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.
DOT Packaging Exceptions (49 CFR 173.xxx)	:	None
DOT Packaging Non Bulk (49 CFR 173.xxx)	:	192
DOT Packaging Bulk (49 CFR 173.xxx)	:	245
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	Forbidden
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	Forbidden
DOT Vessel Stowage Location	:	D - The material must be stowed ‘‘on deck only’’ on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.
DOT Vessel Stowage Other	:	40 - Stow ‘‘clear of living quarters’’
Emergency Response Guide (ERG) Number	:	119;173
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. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.
Other information	:	No supplementary information available.

14.3. Air and sea transport

IMDG

UN-No. (IMDG)	:	2188
Proper Shipping Name (IMDG)	:	ARSINE
Transport Document Description (IMDG)	:	UN 2188 ARSINE, 2.3 (2.1), MARINE POLLUTANT/ENVIRONMENTALLY HAZARDOUS
Class (IMDG)	:	2 - Gases
MFAG-No	:	119
Ship Safety Act	:	Gases under pressure/Gases toxic under pressure(Dangerous Goods Notification Schedule first second and third Article Dangerous Goods Regulations)
Port Regulation Law	:	Hazardous materials/High pressure gas (Article 21, Paragraph 2 of Law, Article 12 rule, notice attached table that defines the type of dangerous goods)

IATA

UN-No. (IATA)	:	2188
Proper Shipping Name (IATA)	:	Arsine
Transport Document Description (IATA)	:	UN 2188 Arsine, 2.3 (2.1), ENVIRONMENTALLY HAZARDOUS
Class (IATA)	:	2
Civil Aeronautics Law	:	Gases under pressure/Gases toxic under pressure(Hazardous materials notice Appended Table 1 Article 194 of the Enforcement Regulations)

SECTION 15: Regulatory information

15.1. National regulations

Arsine (7784-42-1)
Listed on the Canadian DSL (Domestic Substances List)

15.2. International regulations

Arsine (7784-42-1)
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 EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
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)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Japanese Poisonous and Deleterious Substances Control Law
Japanese Pollutant Release and Transfer Register Law (PRTR Law)
Listed on INSQ (Mexican National Inventory of Chemical Substances)

SECTION 16: Other information

Date of issue : 05/18/2017

Full text of H-statements:

H220	Extremely flammable gas
H280	Contains gas under pressure; may explode if heated
H330	Fatal if inhaled
H351	Suspected of causing cancer
H373	May cause damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

SDS Canada (GHS)

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