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Produktinformation



Forschungsprodukte & Biochemikalien



Zellkultur & Verbrauchsmaterial



Diagnostik & molekulare Diagnostik



Laborgeräte & Service

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Lieferung & Zahlungsart

siehe unsere [Liefer- und Versandbedingungen](#)

Zuschläge

- Mindermengenzuschlag
- Trockeneiszuschlag
- Gefahrgutzuschlag
- Expressversand

SZABO-SCANDIC HandelsgmbH

Quellenstraße 110, A-1100 Wien

T. +43(0)1 489 3961-0

F. +43(0)1 489 3961-7

mail@szabo-scandic.com

www.szabo-scandic.com

[linkedin.com/company/szaboscandic](https://www.linkedin.com/company/szaboscandic) 

Arsenic(III) iodide

sc-233893



The Power is Question

Material Safety Data Sheet

Hazard Alert Code
Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Arsenic(III) iodide

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Company: Santa Cruz Biotechnology, Inc.

Address:

2145 Delaware Ave

Santa Cruz, CA 95060

Telephone: 800.457.3801 or 831.457.3800

Emergency Tel: CHEMWATCH: From within the US and
Canada: 877-715-9305

Emergency Tel: From outside the US and Canada: +800 2436
2255 (1-800-CHEMCALL) or call +613 9573 3112

PRODUCT USE

Formerly used as a dermatitide.

SYNONYMS

AsI₃, "arsenic iodide", "arsenous iodide", "arsenous triiodide", triiodoarsine

Section 2 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Limited evidence of a carcinogenic effect.

Toxic by inhalation and if swallowed.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

- Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.
- Ingestion may produce nausea, vomiting and diarrhea, bloody stools, shock, rapid pulse and coma. Severe gastritis or

gastroenteritis may occur as a result of lesions produced by vascular damage from absorbed arsenic (and not local corrosion); symptoms may be delayed for several hours. Eventually a violent hemorrhagic gastroenteritis leads to profound loss of fluid and electrolyte resulting in shock and death. Occasionally alimentary symptoms are mild or absent in which case symptoms are usually referable to the central nervous system, headache, vertigo, muscle spasm or convulsion, delirium and, sometimes, mania. In advanced poisonings by arsenic and its inorganic salts, nervous symptoms are prominent; disorders of the brain (encephalopathies) and peripheral neuritis (more commonly) have been described. A prickling sensation (paresthesia), decreased sensitivity to sensation and pain (hypoesthesia), eventually paralysis and muscular atrophy appear, usually in the legs. "Glove and stocking" distribution of sensory loss may be prominent. The toxic moiety is presumed to be trivalent arsenic in the form of inorganic arsenious acid (arsenite) or an organic arsenoxide. Arsenites are active enzyme inhibitors. Arsenic and its compounds may damage the stem cell which acts as the precursor to components of the blood. Loss of the stem cell may result in pancytopenia (a reduction in the number of red and white blood cells and platelets) with a latency period corresponding to the lifetime of the individual blood cells. Granulocytopenia (a reduction in granular leukocytes) develops within days and thrombocytopenia (a disorder involving platelets), within 1-2 weeks, whilst loss of erythrocytes (red blood cells) need months to become clinically manifest. Aplastic anaemia develops due to complete destruction of the stem cells.

EYE

■ Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals.

SKIN

- Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.
- There is some evidence to suggest that this material can cause inflammation of the skin on contact in some persons.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Arsenic can cause skin irritation characterized by eczema, scaling, sensitization, and discoloration and thickening of the palms and soles.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

- Inhalation of dusts, generated by the material, during the course of normal handling, may produce toxic effects.
- There is some evidence to suggest that the material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
- Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
- Inhaling materials containing arsenic can cause severe irritation to the nose, throat and lungs. Prolonged exposure can cause severe structural damage to the nose.

CHRONIC HEALTH EFFECTS

- There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

There is limited evidence that, skin contact with this product is more likely to cause a sensitization reaction in some persons compared to the general population.

Based on experience with animal studies, there is a possibility that exposure to the material may result in toxic effects to the development of the fetus, at levels which do not cause significant toxic effects to the mother.

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. Prime symptom is breathlessness; lung shadows show on X-ray.

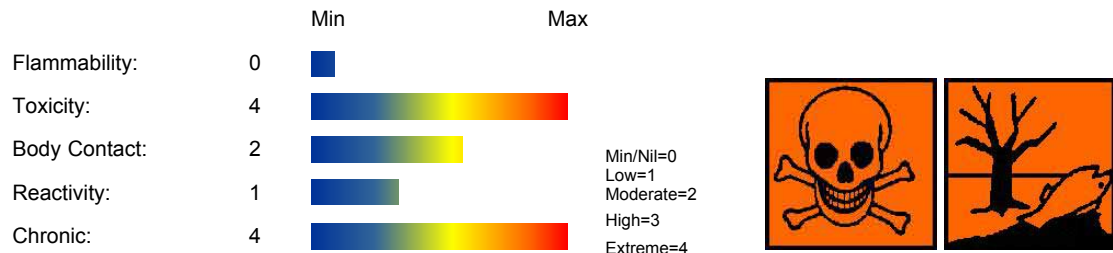
Long-term exposure to arsenic and its inorganic salts may produce loss of appetite, nausea and vomiting, low fever, persistent headache, pallor, weakness and phlegm. Skin effects include redness, eczema, pigmentation, diffuse hair loss, scaling of the palms and soles, sloughing, brittle nails, white lines or bands on the nails, loss of hair and nails, and localized swelling. Kidney damage can occur and liver enlargement with jaundice may develop into cirrhosis (hardening of the liver), with fluid in the abdomen. Nervous system effects involving the extremities (numbness, tingling, burning pain, weakness, inco-ordination) may also occur. Arsenic is well-known to cause cancer in humans.

Iodine and iodides, may give rise to local allergic reactions such as hives, rupture of skin blood vessels, pain in joints or diseases of the lymph nodes.

Iodine and iodides cause goiter and diminished as well as increased activity of the thyroid gland. A toxic syndrome resulting from chronic iodide overdose and from repeated administration of small amounts of iodine is characterized by excessive saliva production, head cold, sneezing, conjunctivitis, headache, fever, laryngitis, inflammation of the bronchi and mouth cavity, inflamed parotid gland, and various skin rashes. Swelling and inflammation of the throat, irritated and swollen eyes and lung swelling may also occur. Swelling of the glottis, necessitating a tracheotomy has been reported. Use of iodides in frequency can cause fetal death, severe goiter, hypothyroidism and the cretinoid appearance of the newborn.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

HAZARD RATINGS



NAME	CAS RN	%
arsenic triiodide	7784-45-4	>99
reacts slowly with oxygen in air to produce		
iodine	7553-56-2	
hydrolyses slowly in aqueous solution to produce		

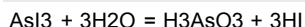
hydrogen iodide in aqueous solution to produce

[hydrogen iodide](#) 10034-85-2

[arsenic trioxide](#) 1327-53-3

[arsenic acid](#) 7778-39-4

Some suggestion of equilibrium occurring as



Section 4 - FIRST AID MEASURES

SWALLOWED

-
- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
- Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:
 - For advice, contact a Poisons Information Center or a doctor.
 - Urgent hospital treatment is likely to be needed.
 - If conscious, give water to drink.
- INDUCE vomiting with fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

NOTE: Wear a protective glove when inducing vomiting by mechanical means.

- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
- If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
- If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

EYE

- If this product comes in contact with the eyes:
 - Immediately hold eyelids apart and flush the eye continuously with running water.
 - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
 - Continue flushing until advised to stop by the Poisons Information Center or a doctor, or for at least 15 minutes.
 - Transport to hospital or doctor without delay.
 - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

- If skin contact occurs:
 - Immediately remove all contaminated clothing, including footwear
 - Flush skin and hair with running water (and soap if available).
 - Seek medical attention in event of irritation.

INHALED

-
- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.

NOTES TO PHYSICIAN

- For acute or short term repeated exposures to arsenic, soluble compounds: Treat as per arsenic poisoning.
- Acute skin lesions such as contact dermatitis usually do not require other treatment than removal from exposure.
- If more severe symptoms of the respiratory system, the skin or the gastro-intestinal tract occur, British Anti-Lewisite (BAL, dimercaprol) may be given. Prompt administration in such cases is vital; to obtain maximum benefit such treatment should be administered within 4 hours of poisoning.
- In addition, general treatment such as prevention of further absorption from the gastro-intestinal tract are mandatory.
- General supportive therapy such as maintenance of respiration and circulation, maintenance of water and electrolyte balance and control of nervous system effects, as well as elimination of absorbed poison through dialysis and exchange transfusion, may be used if feasible.
- Dimercaprol is given by deep intramuscular injection as a 5% solution in peanut oil (or a 10% solution with benzyl-benzoate in vegetable oil). It is usually given in a dose of 3 mg/kg, 4-hourly, for the first two days, or twice daily for up to seven days. [ILO Encyclopedia]
- BAL Therapy is effective for hematological manifestations of chronic arsenic poisoning but not for neurological symptoms. Watch for side effects (e.g. urticaria, burning sensation in the lips, mouth and throat, fever, conjunctivitis etc).
- Some relief results from administration of diphenhydramine (Benadryl) (1.5 mg/kg intramuscularly or by mouth every 6 hour). [Ellenhorn and Barceloux: Medical Toxicology]

BIOLOGICAL EXPOSURE INDEX - BEI (Notice of Intent to Establish)

BEIs represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Inorganic arsenic metabolites in urine	35 ug/gm creatinine	End of workweek	B

B: Background levels occur in specimens collected from subjects NOT exposed

Consult specific documentation.

* Preplacement and periodic medical examinations are essential for workers exposed to arsenic on a regular basis. Preplacement physical examinations should give particular attention to allergic and chronic skin lesions, eye disease, psoriasis,

chronic eczematous dermatitis, hyperpigmentation of the skin, keratosis and warts, baseline weight, baseline blood and haemoglobin counts, baseline urinary arsenic determinations. Annual physical examinations should give attention to general health, weight, skin condition, and any evidence of excessive exposure or absorption of arsenic.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible
Upper Explosive Limit (%):	Not applicable
Specific Gravity (water=1):	4.688
Lower Explosive Limit (%):	Not applicable

EXTINGUISHING MEDIA

-
- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

-
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

-
- Non combustible.
- Not considered to be a significant fire risk, however containers may burn.

Decomposition may produce toxic fumes of: hydrogen iodide, metal oxides, arsenic compounds.
May emit poisonous fumes.

FIRE INCOMPATIBILITY

- None known.

PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

Respirator:

Type B-P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

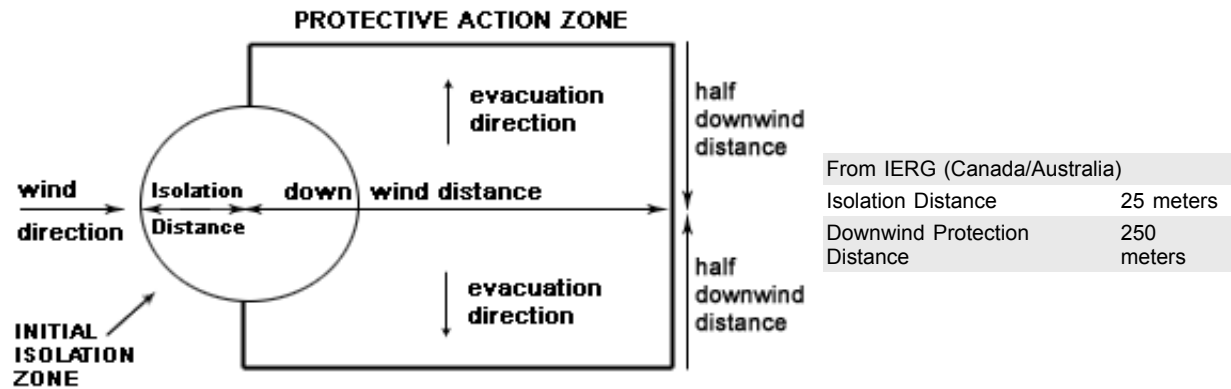
MINOR SPILLS

-
- Clean up waste regularly and abnormal spills immediately.
- Avoid breathing dust and contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.
- Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use).
- Dampen with water to prevent dusting before sweeping.
- Place in suitable containers for disposal.

MAJOR SPILLS

-
- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labeled containers for recycling.
- Neutralize/decontaminate residue.
- Collect solid residues and seal in labeled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

PROTECTIVE ACTIONS FOR SPILL



FOOTNOTES

1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.

2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.

3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.

4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills". LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.

5 Guide 152 is taken from the US DOT emergency response guide book.

6 IERG information is derived from CANUTEC - Transport Canada.

ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)

AEGL 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

-
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

RECOMMENDED STORAGE METHODS

-
- Lined metal can, Lined metal pail/drum
- Plastic pail
- Polyliner drum
- Packing as recommended by manufacturer.
- Check all containers are clearly labeled and free from leaks.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):

- Removable head packaging;

- Cans with friction closures and
 - low pressure tubes and cartridges may be used.
- Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages * . - In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage*. - * unless the outer packaging is a close fitting molded plastic box and the substances are not incompatible with the plastic. All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.

STORAGE REQUIREMENTS

-
- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X: Must not be stored together

O: May be stored together with specific preventions

+: May be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC	Notes
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	arsenic triiodide (Arsenic and compounds (as As))	-	0.5	-	0.5				
Canada - Alberta Occupational Exposure Limits	arsenic triiodide (Arsenic, elemental & inorganic compounds as As)		0.01						
Canada - British Columbia Occupational Exposure Limits	arsenic triiodide (Arsenic and inorganic compounds, as As)		0.01						A1, 1
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	arsenic triiodide (Arsenic, inorganic compounds (as As); see 1910.1018.)	Varies with compound							
US - California Permissible Exposure Limits for Chemical Contaminants	arsenic triiodide (Arsenic and inorganic arsenic compounds; see also Section 5214)		0.01						
US - Hawaii Air Contaminant Limits	arsenic triiodide (Arsenic, inorganic compounds, (as As))		0.01						See °12-202-31
US - Michigan Exposure Limits for Air Contaminants	arsenic triiodide (Arsenic, inorganic compounds (as As); see R 325.51601 et seq.F)		0.01						
US - Washington Permissible exposure limits of air contaminants	arsenic triiodide (Arsenic, inorganic compounds (as As) (when use is covered by chapter 296-848 WAC))		0.01						
US - Washington Permissible exposure limits of air contaminants	arsenic triiodide (Arsenic, inorganic compounds (as As) (when use is not covered by chapter 296-848 WAC))		0.2		0.6				
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	arsenic triiodide (Arsenic, and inorganic compounds, (as As))		0.01		0.03				T20

US OSHA Permissible Exposure Levels (PELs) - Table Z1	arsenic triiodide (Arsenic, inorganic compounds (as As); see 1910.1018)	0.01			
US ACGIH Threshold Limit Values (TLV)	arsenic triiodide (Arsenic - Inorganic compounds)	0.01			Measured as As. TLV Basis: lung cancer
US NIOSH Recommended Exposure Limits (RELs)	arsenic triiodide (Arsenic (inorganic compounds, as As))		0.002		
US - Oregon Permissible Exposure Limits (Z1)	arsenic triiodide (Arsenic, Inorganic Compounds (as As))	0.01			(TWA (See 1910.1018))
Canada - Nova Scotia Occupational Exposure Limits	arsenic triiodide (Arsenic - Inorganic compounds)	0.01			Measured as As. TLV Basis: lung cancer
Canada - Prince Edward Island Occupational Exposure Limits	arsenic triiodide (Arsenic - Inorganic compounds)	0.01			Measured as As. TLV Basis: lung cancer
Canada - Northwest Territories Occupational Exposure Limits (English)	arsenic triiodide (Arsenic & soluble compounds (as As))	0.2	0.6		
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	arsenic triiodide (Arsenic, organic compounds (as As))	0.5			
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	arsenic triiodide (Arsenic, elemental, and inorganic compounds (except Arsine), (as As))	0.1			
US ACGIH Threshold Limit Values (TLV)	arsenic triiodide (Iodides)	0.01			TLV Basis: Hypothyroidism; upper respiratory tract irritation
Canada - Prince Edward Island Occupational Exposure Limits	arsenic triiodide (Iodides)	0.01			TLV Basis: Hypothyroidism; upper respiratory tract irritation
Canada - Nova Scotia Occupational Exposure Limits	arsenic triiodide (Iodides)	0.01			TLV Basis: Hypothyroidism; upper respiratory tract irritation
Canada - British Columbia Occupational Exposure Limits	iodine (Iodine, Inhalable Revised 2008)	0.01	0.1		
Canada - Ontario Occupational Exposure Limits	iodine (Iodine)			0.1	1
US - Minnesota Permissible Exposure Limits (PELs)	iodine (Iodine)			0.1	1
US ACGIH Threshold Limit Values (TLV)	iodine (Iodine)	0.01	0.1		TLV Basis: Hypothyroidism; upper respiratory tract irritation
US NIOSH Recommended Exposure Limits (RELs)	iodine (Iodine)			0.1	1
Canada - Alberta Occupational Exposure Limits	iodine (Iodine)			0.1	1
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	iodine (Iodine)			0.1	1
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	iodine (Iodine)	(C)0.1	(C)1		
US - Vermont					

Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	iodine (Iodine)			0.1	1		
US - California Permissible Exposure Limits for Chemical Contaminants	iodine (Iodine)			0.1	1		
US - Idaho - Limits for Air Contaminants	iodine (Iodine)			0.1	1		
US - Hawaii Air Contaminant Limits	iodine (Iodine)			0.1	1		
US - Alaska Limits for Air Contaminants	iodine (Iodine)			0.1	1		
US - Michigan Exposure Limits for Air Contaminants	iodine (Iodine)			0.1	1		
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	iodine (Iodine)	0.7	1	1	1		
US - Washington Permissible exposure limits of air contaminants	iodine (Iodine)			0.1			
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	iodine (Iodine)			0.1			
US - Oregon Permissible Exposure Limits (Z1)	iodine (Iodine)			0.1	1		
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	iodine (Iodine)			0.1	1		
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	iodine (Iodine)			0.1	1.0		
US OSHA Permissible Exposure Levels (PELs) - Table Z1	iodine (Iodine)			0.1	1		
Canada - Northwest Territories Occupational Exposure Limits (English)	iodine (Iodine)			0.1	1		
Canada - Nova Scotia Occupational Exposure Limits	iodine (Iodine)	0.01			0.1		TLV Basis: Hypothyroidism; upper respiratory tract irritation
Canada - Prince Edward Island Occupational Exposure Limits	iodine (Iodine)	0.01			0.1		TLV Basis: Hypothyroidism; upper respiratory tract irritation
Canada - Prince Edward Island Occupational Exposure Limits	arsenic trioxide (Arsenic trioxide)		0.01				TLV Basis-Critical Effect(s): Cancer (lung, skin); lung
US ACGIH Threshold Limit Values (TLV)	arsenic trioxide (Arsenic trioxide)		0.01				TLV Basis-Critical Effect(s): Cancer (lung, skin); lung
Canada - Nova Scotia Occupational Exposure Limits	arsenic trioxide (Arsenic trioxide)		0.01				TLV Basis-Critical Effect(s): Cancer (lung, skin); lung
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	arsenic trioxide (K Arsenic trioxide production (as As))		(See Table 14)				

Canada - Yukon Carcinogens with a Permitted Exposure	arsenic trioxide (Arsenic trioxide production - (As) ₂ (O) ₃ (as As))	0.05	
Canada - Northwest Territories Occupational Exposure Limits (English)	arsenic trioxide (Arsenic trioxide production (as As))	0.05	0.15
US ACGIH Threshold Limit Values (TLV)	arsenic acid (Arsenic acid)	0.01	Measured as As. TLV Basis: Lung cancer
Canada - Prince Edward Island Occupational Exposure Limits	arsenic acid (Arsenic acid)	0.01	Measured as As. TLV Basis: Lung cancer
Canada - Nova Scotia Occupational Exposure Limits	arsenic acid (Arsenic acid)	0.01	Measured as As. TLV Basis: Lung cancer

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m ³)	Revised IDLH Value (ppm)
arsenic triiodide	5	
iodine		2
arsenic trioxide	5	
arsenic acid	5	

MATERIAL DATA

ARSENIC ACID:

ARSENIC TRIIODIDE:

ARSENIC TRIOXIDE:

■ Use control measures / protective gear to avoid any personal contact. The ES-TWA is based solely on the prevention of systemic effects due to inhalation and is not protective against the substantial risk of cancer produced by exposure to inorganic arsenic. Some jurisdictions require health surveillance be performed on occupationally exposed workers.

Such surveillance should emphasize

- demography, occupational and medical history and health advice
- physical examination with emphasis on the peripheral nervous system and skin.
- urinary total arsenic
- records of personal exposure

ARSENIC ACID:

ARSENIC TRIIODIDE:

ARSENIC TRIOXIDE:

■ Inorganic arsenic compounds appear to produce an increased incidence of skin and lung cancers following their use in medicine, after drinking arsenic-contaminated water, or after occupational exposure. Cancers at other sites have been described but a clear association has, as yet, to be determined.

ARSENIC ACID:

ARSENIC TRIOXIDE:

■ Currently available analytical methods for monitoring workplace concentrations in most cases yield total levels of the elements arsenic, nickel or cobalt in the substances analyzed. The differentiation of the type of chemical compound, which is necessary from a toxicological standpoint, is frequently not possible without special analytical measures. Because of such difficulties in the identification of individual compounds of these elements, it is recommended that the threshold values be applied in general for the relevant element and its compounds as a basis for meeting safety precautions, even if it has not been analytically proved that carcinogenic compounds of these elements are present in the work area.

ARSENIC ACID:

HYDROGEN IODIDE:

■ Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.

OSHA (USA) concluded that exposure to sensory irritants can:

- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

ARSENIC ACID:

ARSENIC TRIOXIDE:

■ The technical exposure limit, TRK (Technische Richtkonzentrationen), defines the airborne concentration of named carcinogenic materials which is the minimum possible given the state of current technologies. TRK values are assigned only for materials for which there is no current MAK (German exposure standard). Observance of the TRK value is intended to reduce the risk of adverse effects on health but does NOT completely eliminate it. Since no threshold doses can be determined for carcinogens, health considerations require that the exposure limits be kept as far as possible below the TRK and that the TRK value be gradually reduced. The limitation of exposure peaks is regulated as follows; Short-term exposure limit: 5 x TRK Short-term exposure duration: 15 min/average Frequency per work shift: 5 times Interval: 1 hour. Report No. 35 1999, Deutsche Forschungsgemeinschaft.

ARSENIC ACID:

ARSENIC TRIOXIDE:

- The threshold value is based on analysis of metal content.

ARSENIC ACID:

ARSENIC TRIOXIDE:

- It is recommended that this TRK value also be used as a basis for protective measures for arsenic and all its compounds which are not mentioned here (with the exception of arsine).

ARSENIC TRIIODIDE:

- Use control measures / protective gear to avoid any personal contact. The ES-TWA is based solely on the prevention of systemic effects due to inhalation and is not protective against the substantial risk of cancer produced by exposure to inorganic arsenic. Some jurisdictions require health surveillance be performed on occupationally exposed workers.

Such surveillance should emphasize

- demography, occupational and medical history and health advice
- physical examination with emphasis on the peripheral nervous system and skin.
- urinary total arsenic
- records of personal exposure

IODINE:

Iodine is an intense irritant to the eyes, mucous membranes and skin and a respiratory irritant in animals. The no-effect concentration in humans for ocular and upper respiratory tract irritation is 0.1 ppm.

ARSENIC TRIOXIDE:

- Use control measures / protective gear to avoid any personal contact. The ES-TWA is based solely on the prevention of systemic effects due to inhalation and is not protective against the substantial risk of cancer produced by exposure to inorganic arsenic. Some jurisdictions require health surveillance be performed on occupationally exposed workers.

Such surveillance should emphasize

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- physical examination with emphasis on the peripheral nervous system and skin.
- urinary total arsenic
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TRK: 0.1 mg/m³

NOTE: Detector tubes for arsenic trioxide, measuring in excess of 0.2 mg/m³ (calculated as As), are commercially available.

ARSENIC ACID:

- Use control measures / protective gear to avoid any personal contact. The ES-TWA is based solely on the prevention of systemic effects due to inhalation and is not protective against the substantial risk of cancer produced by exposure to inorganic arsenic. Some jurisdictions require health surveillance be performed on occupationally exposed workers.

Such surveillance should emphasize

- demography, occupational and medical history and health advice
- physical examination with emphasis on the peripheral nervous system and skin.
- urinary total arsenic
- records of personal exposure

(measured as inhalable fraction of the aerosol).

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TRK: 0.1 mg/m³

PERSONAL PROTECTION



Consult your EHS staff for recommendations

EYE

-
- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. DO NOT wear contact lenses.

HANDS/FEET

- Wear chemical protective gloves, eg. PVC.

Wear safety footwear or safety gumboots, eg. Rubber.

NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,

- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER

-
- Overalls.
- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.
-
- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory . These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

RESPIRATOR

■ Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half-face Respirator	Full-Face Respirator
1000	10	B-1 P	-
1000	50	-	B-1 P
5000	50	Airline*	-
5000	100	-	B-2 P
10000	100	-	B-3 P
	100+		Airline* *

* - Continuous Flow ** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

ENGINEERING CONTROLS

■ Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator. Correct fit is essential to obtain adequate protection an approved self contained breathing apparatus (SCBA) may be required in some situations. Provide adequate ventilation in warehouse or closed storage area.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapors, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favorable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at

the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.

State	Divided solid	Molecular Weight	455.67
Melting Range (°F)	285.62	Viscosity	Not Applicable
Boiling Range (°F)	752~	Solubility in water (g/L)	Reacts
Flash Point (°F)	Not applicable	pH (1% solution)	1.1 (0.1 N)
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not applicable	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not applicable	Specific Gravity (water=1)	4.688
Lower Explosive Limit (%)	Not applicable	Relative Vapor Density (air=1)	>1
Volatile Component (%vol)	Negligible	Evaporation Rate	Not Applicable

APPEARANCE

Orange-red crystalline powder; mixes with water (1:12) to form yellow solution. Tendency to sublime below 100 deg C. Does not hydrolyse rapidly and may be recovered from solution unchanged within 5 hours. Melts to form a red liquid.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

-
- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerization will not occur.

STORAGE INCOMPATIBILITY

- - Contact with acids produces toxic fumes
- Metals and their oxides or salts may react violently with chlorine trifluoride. Chlorine trifluoride is a hypergolic oxidizer. It ignites on contact (without external source of heat or ignition) with recognized fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition. The state of subdivision may affect the results.

Arsine, an extremely poisonous (lethal) gas with a garlic odour can be generated when the material reacts with acids, alkalis or water in the presence of an active metal (zinc, aluminium, magnesium, sodium, iron etc.).

- Avoid strong acids, bases.
- NOTE: May develop pressure in containers; open carefully. Vent periodically.

Segregate from alcohol, water.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

arsenic triiodide

TOXICITY AND IRRITATION

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.
 - Arsenic compounds are classified by the European Union as toxic by inhalation and ingestion and toxic to aquatic life and long lasting in the environment. IARC classify arsenic indrinking water as a confirmed human carcinogen (IARC 1).
- No significant acute toxicological data identified in literature search.
WARNING: arsenic triiodide is regulated by the US OSHA as cancer hazard.

CARCINOGEN

Arsenic and arsenic compounds (NB: This evaluation applies to the group of compounds as a whole and not necessarily to all individual compounds within the group)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	1
Arsenic, inorganic	US EPA Carcinogens Listing	Carcinogenicity	A
Arsenic, inorganic	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A
Arsenic - Inorganic compounds	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A1
Iodides	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A4
INORGANIC ARSENIC COMPOUNDS	US Environmental Defense Scorecard Recognized	Reference(s)	P65

		Carcinogens		
INORGANIC ARSENIC COMPOUNDS		US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65
ARSENIC (ORGANIC OR INORGANIC COMPOUNDS)		US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65-MC
ARSENIC COMPOUNDS		US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	HAZMAP, IARC
Arsenic and its compounds (Inorganic) (as As)		US NIOSH Recommended Exposure Limits (RELs) - Carcinogens	Carcinogen	Ca
Radionuclides, α-particle-emitting, internally deposited (NB: Specific radionuclides for which there is sufficient evidence for carcinogenicity to humans are also listed individually as Group 1 agents)		International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	1
Iodine		US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A4
RADIONUCLIDES		US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65
RADIONUCLIDES		US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65
Arsenic in drinking-water		International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	1
Arsenic trioxide		US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A1
ARSENIC OXIDE (3)		US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65-MC
ARSENIC OXIDE (3)		US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65-MC
Arsenic acid		US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A1
ARSENIC ACID		US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65-MC
ARSENIC ACID		US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65-MC
Arsenic acid (as As)		US NIOSH Recommended Exposure Limits (RELs) - Carcinogens	Carcinogen	Ca
SKIN				
arsenic triiodide	US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs) - Skin		Skin	X
arsenic triiodide	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants - Skin		Skin Designation	X
arsenic triiodide	US - Washington Permissible exposure limits of air contaminants - Skin		Skin	X
arsenic triiodide	US - Hawaii Air Contaminant Limits - Skin Designation		Skin Designation	X
arsenic triiodide	US - California Permissible Exposure Limits for Chemical Contaminants - Skin		Skin	X

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

ARSENIC TRIOXIDE:

ARSENIC ACID:

ARSENIC TRIIODIDE:

■ Speciation of arsenic is an important consideration in the fate, movement, and action of this substance. Chemical and biochemical transformations of arsenic include oxidation, reduction and methylation which affects its volatilization, adsorption, dissolution and biological disposition. The transport of arsenic in the environment is largely controlled by absorption/ desorption processes in soils and sediments. Sediment movement is responsible for transport of arsenic soil residues to their ultimate sinks in deep ocean sediments. The clay fraction, plus ferrous and aluminum oxides which coat clay particles, adsorb arsenicals which then undergo transformation as discussed earlier. Conversions of arsenic to volatile alkylarsines leads to air

transport losses from soil. Inorganic arsenic occurs in water in different oxidation states depending on the pH and Eh of the water. Arsenate is apparently reduced by bacteria to arsenite in marine environments because the ratio of total arsenate to total arsenic is much lower than that predicted thermodynamically. Methylation of arsenic occurs in both freshwater and marine systems where arsenate occurs as arsenate, arsenite, methanearsonic acid and dimethylarsinic acid. Arsenate predominates because this is the most stable form.

Bioaccumulation occurs in some aquatic species such as seaweeds, freshwater algae and crustaceans. Some arsenic in water flea (*Daphnia Magna*) and algae occurs as arseno-analogues of phospholipids leading to the mistaken impression that accumulation and utilization of arsenic takes place at the expense of phosphate. Crabs, lobsters and other marine organisms accumulate organo-arsenicals in the food chain. Although human activity may alter the local picture of environmental arsenic there is little evidence that this affects the global scale arsenic cycle.

Airborne concentrations of arsenic in urban areas may range from a few nanograms to a few tenths of a microgram per cubic meter; airborne arsenic is generally inorganic. In oxygenated soils inorganic arsenic is present in pentavalent form; under reducing conditions it occurs as the trivalent form.

Drinking Water Standards:

arsenic: 50 ug/l (UK max.) 0.01mg/L (WHO provisional guideline)

chloride:400 mg/l (UK max.)

250 mg/l (WHO guideline)

Soil Guideline:

Dutch Criteria: 29 mg/kg (target)

55 mg/kg (intervention)

Air Quality Standard:

No safe levels recommended due to carcinogenic properties (WHO guideline).

■ Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

IODINE:

ARSENIC TRIOXIDE:

ARSENIC ACID:

ARSENIC TRIIODIDE:

■ Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

IODINE:

HYDROGEN IODIDE:

ARSENIC TRIOXIDE:

ARSENIC ACID:

ARSENIC TRIIODIDE:

■ DO NOT discharge into sewer or waterways.

IODINE:

HYDROGEN IODIDE:

ARSENIC TRIIODIDE:

■ Iodine is an important element in studies of environmental protection and human health, global-scale hydrologic processes and nuclear nonproliferation. Biogeochemical cycling of iodine is complex, because iodine occurs in multiple oxidation states and as inorganic and organic species that may be hydrophilic, atmophilic, and biophilic. Experiments illustrate complex behavior with various processes occurring, including iodate reduction, irreversible retention or mass loss of iodide, and rate-limited and nonlinear sorption. There was an appreciable iodate reduction to iodide, presumably mediated by the structural Fe(II) in some clay minerals; therefore, careful attention must be given to potential interconversion among species when interpreting the biogeochemical behavior of iodine in the environment.

Iodine (I₂) is electrochemically reduced to ionic iodide by natural processes but humic acid appears to promote the reaction.

The different oxidation species of iodine have markedly different sorption properties. Hence, changes in iodine redox states can greatly affect the mobility of iodine in the environment. A major microbial role has been suggested in the past to account for at least some of these redox changes. Both soluble ferrous iron and sulfide, as well as iron monosulfide (FeS) were shown to abiologically reduce iodate to iodide. These results indicate that ferric iron and/or sulfate reducing bacteria are capable of mediating both direct, enzymatic, as well as abiotic reduction of iodate in natural anaerobic environments.

Environmental and geological evidence indicates that iodine can become associated with natural organic matter (NOM) in soils and sediments. Previous studies have shown that iodine (including I¹²⁹I) can be strongly retained in organic-rich surface soils and sediment and that soluble iodine may be associated with dissolved humic material. Iodine and iodate undergo an abiotic pseudo first-order reaction with peat leading to either reduction of iodate or iodine to iodide or incorporation of the iodine atoms into the organic matrix. Iodine appears to be incorporated in sphagnum peat by aromatic substitution for hydrogen on phenolic constituents of the peat.

ARSENIC TRIIODIDE:

IODINE:

■ Very toxic to aquatic organisms.

■ Prevent, by any means available, spillage from entering drains or watercourses.

■ The material is classified as an ecotoxin* because the Fish LC₅₀ (96 hours) is less than or equal to 0.1 mg/l

* Classification of Substances as Ecotoxic (Dangerous to the Environment)

Appendix 8, Table 1

Compiler's Guide for the Preparation of International Chemical Safety Cards: 1993 Commission of the European Communities.

Toxicity Fish: LC₅₀(96)36-200mg/L

Nitrif. inhib.: slight inhib

HYDROGEN IODIDE:

■ Ecotoxicity:

The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9. Acute testing with fish showed 96h-LC₅₀ at about pH 3.5.

ARSENIC TRIOXIDE:

■ Hazardous Air Pollutant:	Yes
■ Fish LC ₅₀ (96hr.) (mg/l):	9.33 (48hr)
ARSENIC ACID:	
■ Hazardous Air Pollutant:	Yes

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
iodine	HIGH		LOW	HIGH
arsenic trioxide			LOW	
arsenic acid			LOW	

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Toxicity characteristic: use EPA hazardous waste number D004 (waste code E) if this substance, in a solid waste, produces an extract containing greater than 5 mg/L of arsenic.

B. Component Waste Numbers

When arsenic trioxide is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number P012 (waste code T).

When arsenic acid is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number P010 (waste code T).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

! Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.
- Bury residue in an authorized landfill.
- Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - TRANSPORTATION INFORMATION



DOT:

Symbols:	None	Hazard class or Division:	6.1
Identification Numbers:	UN1557	PG:	I
Label Codes:	6.1	Special provisions:	IB7, IP1, T6, TP33
Packaging: Exceptions:	None	Packaging: Non-bulk:	211
Packaging: Exceptions:	None	Quantity limitations: Passenger aircraft/rail:	5 kg
Quantity Limitations: Cargo aircraft only:	50 kg	Vessel stowage: Location:	A
Vessel stowage: Other:	137		

Hazardous materials descriptions and proper shipping names:

Arsenic compounds, solid, n.o.s. inorganic, including arsenates, n.o.s.; arsenites, n.o.s.; arsenic sulfides, n.o.s.; and organic compounds of arsenic, n.o.s.

Air Transport IATA:

ICAO/IATA Class:	6.1	ICAO/IATA Subrisk:	None
UN/ID Number:	1557	Packing Group:	I
Special provisions:	A3		

Shipping Name: ARSENIC COMPOUND, SOLID, N.O.S. (CONTAINS ARSENIC TRIIODIDE)

Maritime Transport IMDG:

IMDG Class:	6.1	IMDG Subrisk:	None
UN Number:	1557	Packing Group:	I
EMS Number:	F-A,S-A	Special provisions:	43

Limited Quantities: None

Shipping Name: ARSENIC COMPOUND, SOLID, N.O.S. inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides, n.o.s.(contains arsenic triiodide)

Section 15 - REGULATORY INFORMATION

arsenic triiodide (CAS: 7784-45-4) is found on the following regulatory lists;

"Canada Non-Domestic Substances List (NDSL)", "US - Massachusetts Oil & Hazardous Material List", "US - New Jersey Right

to Know Hazardous Substances","US Toxic Substances Control Act (TSCA) - Inventory"
Regulations for ingredients

iodine (CAS: 7553-56-2) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits","Canada - British Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Ontario Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (French)","US - Alaska Limits for Air Contaminants","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California Permissible Exposure Limits for Chemical Contaminants","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Permissible Exposure Limits (Z1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)","US DOE Temporary Emergency Exposure Limits (TEELs)","US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals","US NIOSH Recommended Exposure Limits (RELs)","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US Toxic Substances Control Act (TSCA) - Inventory","WHO Guidelines for Drinking-water Quality - Chemicals for which guideline values have not been established"

hydrogen iodide (CAS: 10034-85-2) is found on the following regulatory lists;

"Canada - Saskatchewan Industrial Hazardous Substances","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (French)","US - Alabama Precursor Chemicals","US - Massachusetts Oil & Hazardous Material List","US - New Jersey Right to Know Hazardous Substances","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest","US DOE Temporary Emergency Exposure Limits (TEELs)","US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals","US EPA Acute Exposure Guideline Levels (AEGs) - Interim","US NFPA 45 Fire Protection for Laboratories Using Chemicals - Flammability Characteristics of Common Compressed and Liquefied Gases","US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide","US Toxic Substances Control Act (TSCA) - Inventory","USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27"

arsenic trioxide (CAS: 1327-53-3,1303-24-8,13473-03-5) is found on the following regulatory lists;

"Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Yukon Carcinogens with a Permitted Exposure","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (French)","International Chemical Secretariat (ChemSec) REACH SIN* List (*Substitute It Now!) 1.0","OECD Representative List of High Production Volume (HPV) Chemicals","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity","US - Connecticut Hazardous Air Pollutants","US - Maine Chemicals of High Concern List","US - Massachusetts Oil & Hazardous Material List","US - New Jersey Right to Know Hazardous Substances","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Vermont Hazardous Constituents","US - Vermont Hazardous Waste - Acutely Hazardous Wastes","US - Washington Discarded Chemical Products List - ""P"" Chemical Products","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US CERCLA Priority List of Hazardous Substances","US CWA (Clean Water Act) - List of Hazardous Substances","US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US EPA Acute Exposure Guideline Levels (AEGs) - Interim","US List of Lists - Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the Clean Air Act","US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide","US RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261","US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes","US SARA Section 302 Extremely Hazardous Substances","US Toxic Substances Control Act (TSCA) - Inventory"

arsenic acid (CAS: 7778-39-4,7774-41-6) is found on the following regulatory lists;

"Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (French)","OECD Representative List of High Production Volume (HPV) Chemicals","US - Massachusetts Oil & Hazardous Material List","US - New Jersey Right to Know Hazardous Substances","US - Pennsylvania - Hazardous Substance List","US - Vermont Hazardous Constituents","US - Vermont Hazardous Waste - Acutely Hazardous Wastes","US - Washington Discarded Chemical Products List - ""P"" Chemical Products","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US CERCLA Priority List of Hazardous Substances","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US Department of Transportation (DOT) Marine Pollutants - Appendix B","US DOE Temporary Emergency Exposure Limits (TEELs)","US List of Lists - Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the Clean Air Act","US RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261","US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes","US Toxic Substances Control Act (TSCA) - Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Skin contact may produce health damage*.
- Cumulative effects may result following exposure*.
- May produce discomfort of the respiratory system and skin*.

- Possible skin sensitizer*.
 - May possibly be harmful to the fetus/ embryo*.
- * (limited evidence).

Germany Hazard classification and labelling of medicines with antineoplastic effects (ATC Code L01 and L02)

INN	CAS	Danger	CMR effects Cat 1&2	CMR effects Cat 3	Other
	7784- 45- 4				
	7553- 56- 2				
	10034- 85- 2				
Arsentrioxid	1327- 53- 3	T+, N	R 45		R 28 R 34 R
(Diarsetrioxid)					50/53

Ingredients with multiple CAS Nos

Ingredient Name	CAS
arsenic trioxide	1327-53-3, 1303-24-8, 13473-03-5
arsenic acid	7778-39-4, 7774-41-6

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■ Classification of the mixture and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references. A list of reference resources used to assist the committee may be found at: www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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