

ARSENIC STANDARD SOLUTION 1000 MG/L

GHS Safety Data Sheet

Version No:2.0

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

ARSENIC STANDARD SOLUTION

OTHER NAMES

"elemental and ion standard in aqueous solution", "arsenic standard solution", "As standard for AAS",
"defined quantity analytical standard"

PRODUCT USE

Laboratory reagent, standard solution of known arsenic concentration,
for atomic spectroscopy.

SUPPLIER

Company: S D FINE - CHEM LIMITED

Address:

315- 317, T.V.IND.ESTATE,

248 WORLI ROAD,

MUMBAI- 400 030, INDIA

technical@sdfine.com

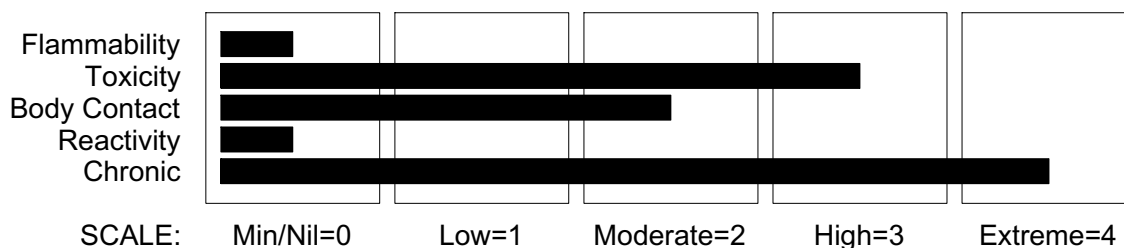
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Section 2 - HAZARDS IDENTIFICATION

HAZARD RATINGS



GHS Classification

Acute Aquatic Hazard Category 3

Acute Toxicity (Inhalation) Category 2

Acute Toxicity (Oral) Category 3

Carcinogen Category 1A

Chronic Aquatic Hazard Category 3

Eye Irritation Category 2A

Skin Corrosion/Irritation Category 2

Skin Sensitizer Category 1

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Section 2 - HAZARDS IDENTIFICATION



EMERGENCY OVERVIEW

HAZARD

DANGER

Determined by using GHS criteria:

H330 H301 H315 H319 H317 H350 H402 H412

Fatal if inhaled

Toxic if swallowed

Causes skin irritation

Causes serious eye irritation

May cause allergic skin reaction

May cause CANCER

Harmful to aquatic life

Harmful to aquatic life with long lasting effects

PRECAUTIONARY STATEMENTS

Prevention

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Do not breathe dust/fume/gas/mist/vapours/spray.

Avoid breathing dust/fume/gas/mist/vapours/spray.

Wash thoroughly after handling.

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

Use only outdoors or in a well-ventilated area.

Contaminated work clothing should not be allowed out of the workplace.

Avoid release to the environment.

Wear protective gloves/protective clothing/eye protection/face protection.

Use personal protective equipment as required.

Wear respiratory protection.

Response

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

IF ON SKIN: Wash with plenty of soap and water.

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

IF exposed or concerned: Get medical advice/ attention.

Immediately call a POISON CENTER or doctor/physician.

Specific treatment is urgent (see MSDS).

Rinse mouth.

If skin irritation or rash occurs: Get medical advice/attention.

If eye irritation persists: Get medical advice/attention.

Wash contaminated clothing before reuse.

Storage

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

Store locked up.

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Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
arsenic trioxide	1327-53-3	<2
nitric acid	7697-37-2	<4
water	7732-18-5	>60

Section 4 - FIRST AID MEASURES

SWALLOWED

- If poisoning occurs, contact a doctor or Poisons Information Centre.
- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
- For advice, contact a Poisons Information Centre or a doctor.

Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:

- Induce vomiting with fingers down the back of the 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.

Symptoms of acute poisoning by arsenic ingestion, which develop within 4 hours include epigastric pain, vomiting and watery diarrhoea, nausea and vomiting. Blood may appear in vomitus and stools. If amount ingested is sufficiently high, shock, rapid pulse and coma may develop, followed by death within 24 hours. 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 haemorrhagic 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

- 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 Centre 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.

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Section 4 - FIRST AID MEASURES

SKIN

- If skin or hair contact occurs:
 - 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.

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 haematological 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.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Jets of water.
- Water spray or fog.
- Foam.

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Section 5 - FIRE FIGHTING MEASURES

- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Fire Brigade 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.

FIRE/EXPLOSION HAZARD

- Non combustible.
 - Not considered a significant fire risk, however containers may burn.
- Emits toxic fumes if involved in fire.

FIRE INCOMPATIBILITY

- None known.
- Emits toxic fumes if involved in fire.

PERSONAL PROTECTION

Glasses:	Gloves:	Respirator:
Not normally required.	When handling larger quantities:	Type AE- P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.
- Wipe up.
- Place in a suitable, labelled container for waste disposal.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- 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 labelled containers for recycling.
- Neutralise/decontaminate residue.
- Collect solid residues and seal in labelled 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.

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

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Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Limit all unnecessary personal contact.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- 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.
- 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.

SUITABLE CONTAINER

- Packaging as recommended by manufacturer.
- Check that containers are clearly labelled.
- Glass container is suitable for laboratory quantities.

STORAGE INCOMPATIBILITY

- Segregate from strong acids and strong alkalis.
- Avoid contamination of water, foodstuffs, feed or seed.

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



+: May be stored together

O: May be stored together with specific preventions

X: Must not 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
Australia Exposure Standards	nitric acid (Nitric acid)	2	5.2	4	10

The following materials had no OELs on our records

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

• water:

CAS:7732- 18- 5

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m ³)	Revised IDLH Value (ppm)
arsenic trioxide	5	
nitric acid		25

MATERIAL DATA

ARSENIC STANDARD SOLUTION 10 MG/ML:

- None assigned. Refer to individual constituents.

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 yet to be determined.

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 emphasise

- 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.

Currently available analytical methods for monitoring workplace concentrations in most cases yield total levels of the elements arsenic, nickel or cobalt in the substances analysed. 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.

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).

The threshold value is based on analysis of metal content.

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.

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.

NITRIC ACID:

- For nitric acid:

Odour Threshold Value: 0.27 ppm (detection)

NOTE: Detector tubes for nitric acid, measuring in excess of 5 ppm, are commercially available.

The TLV-TWA is protective against corrosion of the skin, tissue and other membranes, against irritation to the eyes and mucous membranes, and against acute pulmonary oedema or chronic obstructive lung disease. It is not clear whether the TLV-TWA and STEL values will prevent potentiation of the toxicity of inhaled nitrogen

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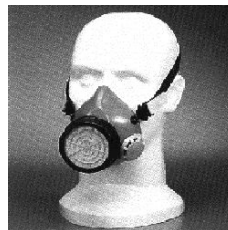
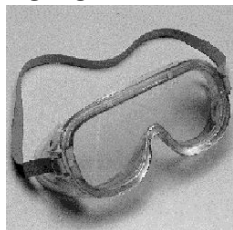
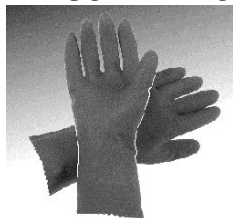
Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

dioxide.

WATER:

- No exposure limits set by NOHSC or ACGIH.

PERSONAL PROTECTION



EYE

- No special equipment for minor exposure i.e. when handling small quantities.
- OTHERWISE:
- Safety glasses with side shields.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

- Polyethylene gloves.
- PVC gloves.
- Rubber Gloves.

OTHER

- Laboratory coat.
- Eyewash unit.

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	AE- AUS P	-
1000	50	-	AE- AUS P
5000	50	Airline *	-
5000	100	-	AE- 2 P
10000	100	-	AE- 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. For further information consult your

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

- None under normal operating conditions.
- Provide adequate ventilation in warehouse or closed storage areas.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Clear, colourless, odourless liquid. Mixes with water.

PHYSICAL PROPERTIES

Liquid.
Mixes with water.
Toxic or noxious vapours/gas.

State	Liquid	Molecular Weight	74.92 As
Melting Range (°C)	Not available	Boiling Range (°C)	100 approx H2O
Solubility in water (g/L)	Miscible	Flash Point (°C)	Not applicable
pH (1% solution)	Not available	Decomposition Temp (°C)	Not available
pH (as supplied)	<1	Autoignition Temp (°C)	Not applicable
Vapour Pressure (kPa)	as water	Upper Explosive Limit (%)	Not applicable
Specific Gravity (water=1)	1.02	Lower Explosive Limit (%)	Not applicable
Relative Vapour Density (air=1)	Not available.	Volatile Component (%vol)	Not available.
Evaporation Rate	Not available		

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Product is considered stable and hazardous polymerisation will not occur.
- For incompatible materials - refer to Section 7 - Handling and Storage.*

Section 11 - TOXICOLOGICAL INFORMATION

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.
- Considered an unlikely route of entry in commercial/industrial environments.

EYE

- This material can cause eye irritation and damage in some persons.

SKIN

- This material can cause inflammation of the skin on contact in some persons.
- Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.

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Section 11 - TOXICOLOGICAL INFORMATION

INHALED

- The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of the material, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.
- Not normally a hazard due to non-volatile nature of product.

CHRONIC HEALTH EFFECTS

- There is sufficient evidence to suggest that this material directly causes cancer in humans.

- Primary route of exposure is usually by skin contact/eye contact.

As with any chemical product, contact with unprotected bare skin; inhalation of vapour, mist or dust in work place atmosphere; or ingestion in any form, should be avoided by observing good occupational work practice. 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 localised 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.

The liquid is toxic if ingested in quantity.

TOXICITY AND IRRITATION

- Not available. Refer to individual constituents.

ARSENIC TRIOXIDE:

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (human) LDLo: 1.43 mg/kg

Oral (man) LDLo: 29 mg/kg

Oral (rat) LD50: 14.6 mg/kg

- 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 indrinikng water as a confirmed human carcinogen (IARC 1).

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS.

NITRIC ACID:

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (human) LDLo: 430 mg/kg

Inhalation (rat) LC50: 2500 ppm/1h * * DuPont

Unreported (man) LDLo: 110 mg/kg

Inhalation (Cat) LC: 500 mg/m³/4h

Inhalation (Rat) LC50: 130 mg/m³/4h

Oral (Human) LD: 430 mg/kg

IRRITATION

Nil Reported

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Section 11 - TOXICOLOGICAL INFORMATION

Inhalation (Cat) TCl_o: 300 mg/m³/2h

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production. The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

The material may produce respiratory tract irritation, and result in damage to the lung including reduced lung function.

The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.

Oral (?) LD₅₀: 50-500 mg/kg *

[Various Manufacturers]

WATER:

■ No significant acute toxicological data identified in literature search.

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

CAS~

Australia Exposure Standards - Carcinogens

Carcinogen Category

1

Section 12 - ECOLOGICAL INFORMATION

arsenic trioxide 96 hr LC₅₀ (30.93) mg/L Asiatic knifefish Fish Source:

Refer to data for ingredients, which follows:

NITRIC ACID:

ARSENIC TRIOXIDE:

■ DO NOT discharge into sewer or waterways.

ARSENIC STANDARD SOLUTION 10 MG/ML:

No data

ARSENIC TRIOXIDE:

■ Hazardous Air Pollutant: Yes

■ Fish LC₅₀ (96hr.) (mg/l): 9.33 (48hr)

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

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Section 12 - ECOLOGICAL INFORMATION

■ 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.

■ 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 volatilisation, 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 aluminium 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 utilisation 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).

NITRIC ACID:

■ For oxides of nitrogen:

Environmental fate

Oxides of nitrogen are part of the biogeochemical cycling of nitrogen, and are found in air, soil and water. In the atmosphere, oxides of nitrogen are rapidly oxidised to nitrogen dioxide (half-life about 50 days), which dissolves in water to produce dilute nitric acid and precipitates in rain. An increased rate of formation of oxides of nitrogen therefore contributes to 'acid rain'.

In the stratosphere, oxides of nitrogen play a crucial role in maintaining the level of ozone. Ozone is formed through the photochemical reaction of nitrogen dioxide and oxygen. However, too little nitrogen dioxide results in too little ozone being formed. On the other hand, too much nitric oxide reduces the level of ozone because of an increase in the reaction of ozone to convert nitric oxide to nitrogen dioxide.

In the lower atmosphere, oxides of nitrogen play a major role in the formation of photochemical smog in a complex set of reactions that lead to the formation of a variety of nitrated organic compounds (from volatile organic matter) and excessive levels of ozone.

Environmental transport The oxides of nitrogen travel as gases through soil and the atmosphere, and in solution in water in soils, rivers and lakes, and rain and snow.

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

Ecotoxicity

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

continued...

ARSENIC STANDARD SOLUTION 1000 MG/L

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Section 12 - ECOLOGICAL INFORMATION

water	LOW	LOW	HIGH
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Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Treat and neutralise at an effluent treatment plant.
- Recycle containers if possible, or dispose of in an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION

HAZCHEM:

☐ None

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: UN, IATA, IMDG

Section 15 - REGULATORY INFORMATION

REGULATIONS

Regulations for ingredients

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

"Australia Exposure Standards","Australia Hazardous Substances","Australia High Volume Industrial Chemical List (HVICL)","Australia Inventory of Chemical Substances (AICS)","International Chemical Secretariat (ChemSec) REACH SIN* List (*Substitute It Now!) 1.0","OECD Representative List of High Production Volume (HPV) Chemicals"

nitric acid (CAS: 7697-37-2) is found on the following regulatory lists;

"Australia Exposure Standards","Australia Hazardous Substances","Australia High Volume Industrial Chemical List (HVICL)","Australia Inventory of Chemical Substances (AICS)","Australia National Pollutant Inventory","Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix E (Part 2)","Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix F (Part 3)","Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 5","Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 6","GESAMP/EHS Composite List - GESAMP Hazard Profiles","IMO IBC Code Chapter 17: Summary of minimum requirements","IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk","International Council of Chemical Associations (ICCA) - High Production Volume List","OECD Representative List of High Production Volume (HPV) Chemicals"

water (CAS: 7732-18-5) is found on the following regulatory lists;

"Australia Inventory of Chemical Substances (AICS)","IMO IBC Code Chapter 18: List of products to which the Code does not apply","OECD Representative List of High Production Volume (HPV) Chemicals"

No data for Arsenic Standard Solution (5504-78)

Section 16 - OTHER INFORMATION

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
Arsentrioxid (Diarsetrioxid)	1327- 53- 3	T+, N	R 45		R 28 R 34 R 50/53

continued...

ARSENIC STANDARD SOLUTION 1000 MG/L

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Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
arsenic trioxide	1327- 53- 3, 1303- 24- 8, 13473- 03- 5

EXPOSURE STANDARD FOR MIXTURES

■ "Worst Case" computer-aided prediction of spray/ mist or fume/ dust components and concentration:

■ Composite Exposure Standard for Mixture (TWA) :100 mg/m³.

■ 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.

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

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