Material Safety Data Sheet

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Version 1.2
According to 91/155/EEC

Classified as Hazardous according to the criteria of EU Annex 1 and NOHSC.

1 - Product and Company Information

Product Name	ARSENIC(III) OXIDE, 99.99%
Product Number	255483
Company	Sigma-Aldrich Pty, Ltd Unit 2, 14 Anella Avenue Castle Hill NSW 1765 Australia
Technical Phone #	+61 2 9841 0555
Fax	+61 2 9841 0500
Emergency Phone #	+61 2 9841 0566

2 - Composition/Information on Ingredients

Product Name	CAS #	EC no	Annex I Index Number
ARSENIC TRIOXIDE	1327-53-3	215-481-4	033-003-00-0

Formula	As2O3
Molecular Weight	197.84 AMU
Synonyms	Acide arsenieux (French) * Anhydride arsenieux (French) * Arsenic blanc (French) * Arsenic oxide * Arsenic(III) oxide * Arsenic sesquioxide * Arsenic trioxide (ACGIH) * Arsenicum album * Arsenigen saure (German) * Arsenious acid * Arsenious oxide * Arsenious trioxide * Arsenite * Arsenolite * Arsenous acid * Arsenous acid anhydride * Arsenous anhydride * Arsenous oxide * Arsenous oxide anhydride * Arsentrioxide * Arsodent * Claudelite * Claudetite * Crude arsenic * Diarsenic trioxide * RCRA waste number P012 * White arsenic

3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT

May cause cancer. Also very toxic if swallowed. Causes burns. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Carc. Cat.1

4 - First Aid Measures

AFTER INHALATION

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

AFTER SKIN CONTACT

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

AFTER EYE CONTACT
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

AFTER INGESTION
If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

5 - Fire Fighting Measures

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

SPECIAL RISKS
Specific Hazard(s): Emits toxic fumes under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

6 - Accidental Release Measures

PERSONAL PRECAUTION PROCEDURES TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

7 - Handling and Storage

HANDLING
Directions for Safe Handling: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Conditions of Storage: Keep tightly closed.

8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS
Safety shower and eye bath. Use only in a chemical fume hood.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Wash thoroughly after handling.

EXPOSURE LIMITS - DENMARK

Source	Type	Value
OEL	TWA	0.05 mg/m3

EXPOSURE LIMITS - GERMANY

Source	Type	Value
TRGS 900	OEL	0.1 mg/m3, E

Remarks: 4
Remarks: TRK,2,5,25,TRGS 901-21

EXPOSURE LIMITS - SWITZERLAND

Source	Type	Value
OEL	OEL	0.1 mg/m3

Remarks: E K M

EXPOSURE LIMITS - UNITED KINGDOM

Source	Type	Value
OEL	TWA	0.1MG(AS)/M3

Remarks: Carcinogen.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory Protection: Government approved respirator.
Hand Protection: Compatible chemical-resistant gloves.
Eye Protection: Chemical safety goggles.

9 - Physical and Chemical Properties

Appearance	Physical State: Solid Color: White Form: Powder

Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	N/A	
Flash Point	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Oxidizing Properties	N/A	
Explosive Properties	N/A	
Explosion Limits	N/A	
Vapor Pressure	N/A	
SG/Density	3.738 g/cm3	
Partition Coefficient	N/A	
Viscosity	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
Evaporation Rate	N/A	
Bulk Density	N/A	
Decomposition Temp.	N/A	
Solvent Content	N/A	
Water Content	N/A	
Surface Tension	N/A	
Conductivity	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

10 - Stability and Reactivity

STABILITY
Conditions of Instability: May decompose on exposure to moist air or water.
Conditions to Avoid: Heat.
Materials to Avoid: Oxidizing agents, Metals.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Arsenic oxides.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

11 - Toxicological Information

RTECS NUMBER: CG3325000

ACUTE TOXICITY

LDLO
Oral
Man
114 mg/kg
Remarks: Behavioral:Muscle weakness. Lungs, Thorax, or Respiration:Acute pulmonary edema. Kidney, Ureter, Bladder:Urine volume decreased.

LDLO
Oral
Man
29 mg/kg
Remarks: Behavioral:Sleep. Behavioral:Muscle weakness. Gastrointestinal:Hypermotility, diarrhea.

LDLO
Oral
Man
286 mg/kg
Remarks: Cardiac:Arrythmias (including changes it conduction). Liver:Liver function tests impaired. Other changes

LDLO
Oral
Human
1.429 mg/kg

LDLO
Oral
Man
2857 mg/kg
Remarks: Behavioral:Coma. Liver:Fatty liver degeneration. Kidney, Ureter, Bladder:Renal function tests depressed.

LD50
Oral
Rat
14.6 mg/kg

LD50
Intraperitoneal
Rat
871 MG/KG

LD50
Oral
Mouse
31.5 mg/kg

LD50

Subcutaneous
Mouse
9800 UG/KG

LD50
Intravenous
Mouse
10700 UG/KG

LD50
Oral
Rabbit
20.19 mg/kg

SENSITIZATION
Respiratory: May cause allergic respiratory reaction.

SIGNS AND SYMPTOMS OF EXPOSURE
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Inhalation may result in spasm, inflammation and edema of the larynxand bronchi, chemical pneumonitis, and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Prolonged exposure to arsenic compounds can cause exfoliation and pigmentation of skin, herpes, inflammation of nerves, and nasal septum ulceration. Dry mouth, a metallic taste, drowsiness, loss of appetite, excessive salivation, nausea, vomiting and a foul, garlic-like breath.

ROUTE OF EXPOSURE
Skin Contact: Causes burns.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes burns.
Inhalation: May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion: May be fatal if swallowed.

TARGET ORGAN INFORMATION
G.I. System. Heart. Brain. Kidneys. Skin. Bone marrow. Peripheral nervous system.

CONDITIONS AGGRAVATED BY EXPOSURE
Exposure to arsenic compounds can cause burning and dryness of the oral and nasal cavities, muscle spasms, irritation of the gastrointestinal tract, nausea, vomiting and diarrhea which can progress to shock and death.

CHRONIC EXPOSURE - CARCINOGEN
Result: This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Rat
Route of Application: Intratracheal
Exposure Time: 15W
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

Hamster
Route of Application: Intratracheal
Exposure Time: 15W
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

Rat
Route of Application: Intratracheal
Exposure Time: 15W
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

Hamster
Route of Application: Intratracheal
Exposure Time: 15W
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

Hamster
Route of Application: Intratracheal
Exposure Time: 15W
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

Rat
Route of Application: Intratracheal
Exposure Time: 15W
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

Hamster
Route of Application: Intratracheal
Exposure Time: 24W
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

Hamster
Route of Application: Intratracheal
Exposure Time: 24W
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

Hamster
Route of Application: Intratracheal
Exposure Time: 15W
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

IARC CARCINOGEN LIST

Rating: Group 1

CHRONIC EXPOSURE - MUTAGEN

Human
1 UMOL/L
Cell Type: lung
Unscheduled DNA synthesis

Human
500 UMOL/L
Cell Type: HeLa cell

DNA inhibition

Human
1200 NMOL/L
Cell Type: leukocyte
Cytogenetic analysis

Human
2 UG/CM3
Cell Type: lymphocyte
Sister chromatid exchange

Mouse
1 MG/KG
Intraperitoneal
Micronucleus test

Mouse
20 ML/KG
Oral
DNA inhibition

Mouse
3696 MG/KG
Oral
Cytogenetic analysis

Mouse
28500 UG/M3
Cell Type: Other cell types
Cytogenetic analysis

Hamster
250 NMOL/L
Cell Type: lung
Micronucleus test

CHRONIC EXPOSURE - TERATOGEN

Species: Mouse
Dose: 8250 UG/KG
Route of Application: Oral
Exposure Time: (7-17D PREG)
Result: Specific Developmental Abnormalities: Immune and reticuloendothelial system. Effects on Newborn: Behavioral.

Species: Mouse
Dose: 1650 UG/KG
Route of Application: Oral
Exposure Time: (7-17D PREG)
Result: Specific Developmental Abnormalities: Central nervous system.

Species: Mouse
Dose: 28500 UG/M3/4H
Route of Application: Inhalation
Exposure Time: (9-12D PREG)
Result: Effects on Embryo or Fetus: Cytological changes (including somatic cell genetic material). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse

Dose: 260 UG/M3/4H
Route of Application: Inhalation
Exposure Time: (9-12D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Woman
Dose: 600 MG/KG
Route of Application: Oral
Exposure Time: (30W PREG)
Result: Effects on Newborn: Apgar score (human only). Effects on Newborn: Other neonatal measures or effects.

Species: Rat
Dose: 30 MG/KG
Route of Application: Oral
Exposure Time: (9D PREG)
Result: Maternal Effects: Other effects. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Species: Rat
Dose: 10 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (9D PREG)
Result: Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Eye, ear.

Species: Rat
Dose: 20800 UG/KG
Route of Application: Intratracheal
Exposure Time: (8W MALE)
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count).

Species: Mouse
Dose: 224 MG/KG
Route of Application: Oral
Exposure Time: (MULTIGENERATIONS)
Result: Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Species: Mouse
Dose: 3636 MG/KG
Route of Application: Oral
Exposure Time: (1-18D PREG)
Result: Effects on Fertility: Abortion.

CMR CAT.: Carc. Cat.1

12 - Ecological Information

No data available.

13 - Disposal Considerations

SUBSTANCE DISPOSAL
Contact a licensed professional waste disposal service to dispose

of this material. Observe all federal, state, and local environmental regulations.

14 - Transport Information

RID/ADR
- UN#: 1561
- Class: 6.1
- PG: II
- Proper Shipping Name: Arsenic trioxide

IMDG
- UN#: 1561
- Class: 6.1
- PG: II
- Proper Shipping Name: Arsenic trioxide
- Marine Pollutant: No
- Severe Marine Pollutant: No

IATA
- UN#: 1561
- Class: 6.1
- PG: II
- Proper Shipping Name: Arsenic trioxide
- Inhalation Packing Group I: No

15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES
- ANNEX I INDEX NUMBER: 033-003-00-0
- NOTA: E
- INDICATION OF DANGER: T+ N
  Very toxic. Dangerous for the environment.
- R-PHRASES: 45 28 34 50/53
  May cause cancer. Also very toxic if swallowed. Causes burns. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
- S-PHRASES: 53 45 60 61
  Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste. Avoid release to the environment. Refer to special instructions/safety data sheets.

COUNTRY SPECIFIC INFORMATION

Germany
- WGK: 3

SWITZERLAND
- SWISS POISON CLASS: 1*

16 - Other Information

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc.,

shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

DISCLAIMER

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