

MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Mail Stop 2320
Gaithersburg, Maryland 20899-2320

SRM Number: 83d
MSDS Number: 83d
SRM Name: Arsenic Trioxide

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Description: This Standard Reference Material (SRM) consists of highly purified arsenic trioxide and is intended for use in reductometric standardization. It conforms to the American Chemical Society specifications for analytical reagent grade material. SRM 83d is supplied as a crystalline material in a unit of 60 g.

Substance: Arsenic Trioxide

Other Designations: Arsenic Trioxide (arsenic oxide; arsenic sesquioxide; arsenicum album; arsenioux; arsenous acid; arsenous acid anhydride)

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component	CAS Number	EINECS	Nominal Concentration (%)
Arsenic Trioxide	1327-53-3	215-481-4	100

Index, R/S Phrases (EC): T+, C, N, R28, R34, R45, R50/53, S45, S53, S60, S61 (see "Section 15").

3. HAZARD IDENTIFICATION

Major Health Hazards: It is potentially fatal if swallowed; it presents respiratory tract irritation, skin irritation, eye irritation, allergic reactions, and a cancer hazard (in humans).

Physical Hazards: none reported

Potential Health Effects

Inhalation: irritation and difficulty breathing

Skin Absorption: irritation, allergic reactions, and absorption may occur

Eye Contact: irritation and sensitivity to light

Ingestion: weakness, nausea, vomiting, diarrhea, dizziness, headache, chest pain, stomach pain, changes in body temperature, skin disorders, white lines on the fingernails, changes in blood pressure, pain in extremities, blood disorders, liver damage, kidney damage, nerve damage

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	X	
In the International Agency for Research on Cancer (IARC) Monographs	X	
By the Occupational Safety and Health Administration (OSHA)	X	

4. FIRST AID MEASURES

Skin Contact: Rinse affected area with soap and water for at least 15 minutes while removing contaminated clothing. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance immediately.

Inhalation: Immediately remove victim to fresh air. If breathing has stopped, give artificial respiration by qualified personnel. If breathing is difficult, give oxygen. Lay victim with head and chest lower than hips to improve drainage of fluids from the lungs. Obtain medical assistance.

Ingestion: Contact local poison control center or physician immediately. Never make an unconscious person vomit or drink fluids. When vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: negligible fire hazard

Extinguishing Media: Use regular dry chemical, carbon dioxide, water or regular foam.

Fire Procedures: Fire fighters should wear full protective clothing and self-contained breathing apparatus when this material is involved in a fire. If possible, stop the product flow.

Flash Point (°C): Not Applicable

Autoignition (°C): Not Applicable

Flammability Limits in Air (Volume %): **UPPER:** Not Applicable

LOWER: Not Applicable

Flammability Class (OSHA): Not Applicable

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Do not touch spilled material. For small spills, absorb with sand or other non-combustible material. Collect with absorbent material and place into suitable container.

Environmental Precautions: See "Section 13".

Clean-up Methods: Collect spilled material in appropriate container for proper disposal.

7. HANDLING AND STORAGE

Storage: Store and handle in accordance with all current regulations and standards. Keep separated from incompatible substances. Store in a cool, dry place. Store in a well-ventilated area.

Precautions for Safe Handling: See "Section 8".

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Hazardous Component	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Arsenic Trioxide	100	ACGIH TWA: 10 µg/m ³ *
		OSHA TWA: 0.01 mg/m ³ *
		NIOSH Ceiling: 0.002 mg/m ³ (15 minutes)*
		Woman, Oral: TD _{LO} : 20 mg/kg
		Woman, Oral: TD _{LO} : 549 mg/kg
		Man, Oral: TD _{LO} : 1 4857 µg/kg
		Man, Oral: LD _{LO} : 286 mg/kg
		Rat, Intraperitoneal: LD ₅₀ : 871 mg/kg

*Arsenic and inorganic compounds except arsine

Engineering: An eye wash station and drench shower should be readily available near the handling and use areas.

Ventilation: Provide local exhaust ventilation system.

Respirator: Respiratory protection is required under conditions of frequent use or heavy exposure.

Eye Protection: Wear safety goggles. **DO NOT** wear contact lenses in the laboratory.

Personal Protection: Wear safety goggles along with chemically resistant gloves and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Arsenic Trioxide	
Appearance and Odor: crystalline powder, amorphous solid; odorless	Boiling Point: 465 °C
Relative Molecular Mass: 197.84	pH (0.5 M Solution): not applicable
Specific Gravity: 3.738	Odor Threshold: not available
Vapor Pressure (@ 212.5 °C): 1 mmHg	Melting Point: 312 °C
Water Solubility: 3.7 %	Solvent Solubility: acids, alkali, dilute hydrochloric acid, glycerol, carbonate solutions; insoluble in chloroform, ether, alcohol

10. STABILITY AND REACTIVITY

Stability: X Stable Unstable

Stable at normal temperature and pressure.

Conditions to Avoid: Avoid the material coming into contact with heat, flames, sparks and other sources of ignition. Avoid generating dust. Keep out of water supplies and sewers.

Incompatibility (Materials to Avoid): acids, metals, halogens, oxidizing materials, metal carbide

Hazardous Decomposition or Byproducts: Thermal decomposition of arsenic trioxide may produce miscellaneous products.

Hazardous Polymerization: ___ Will Occur X Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: X Inhalation X Skin X Ingestion

Health Hazards (Acute): Inorganic arsenic compounds may cause irritation of the respiratory tract with cough, foamy sputum, pain in the chest, dyspnea, and possibly pulmonary edema. There may be cyanosis of the face, giddiness, restlessness, lassitude, headache, extreme general weakness, an initial rise, and then fall in temperature, hypotension, pain in the limbs, and leukocytosis. Delayed gastrointestinal symptoms may include nausea, vomiting, colic and diarrhea. Acute, severe systemic intoxication by inhalation is unlikely, but if sufficient amounts are absorbed, other effects as described in acute ingestion are possible. One case of a single prolonged exposure to an arsenical weed spray resulted in megaloblastic anemia.

Medical Conditions Generally Aggravated by Exposure: diabetes, heart or cardiovascular disorders, immune system disorders or allergies, kidney disorders, liver disorders, nervous system disorders, skin disorders and allergies

12. ECOLOGICAL INFORMATION

Adverse Effects: Not Applicable

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with federal, state and local regulations.

14. TRANSPORTATION INFORMATION

DOT Registry: Arsenic Trioxide, UN1561

15. REGULATORY INFORMATION

U.S. REGULATIONS

SARA TITLE III SARA Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE: Yes

CHRONIC: Yes

FIRE: No

REACTIVE: No

SUDDEN RELEASE: No

EC CLASSIFICATION

T+ Very Toxic

C Corrosive

N Dangerous for the Environment Carcinogen Category 1

EC RISK AND SAFETY PHRASES

R 28 Very toxic if swallowed

R 34 Causes burns

R 45 May cause cancer

R 50/53 Very toxic to aquatic organisms; may cause long-term adverse effects in the aquatic environment.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

S 53 Avoid exposure - obtain special instructions before use.

S 60 This material and/or its container must be disposed of as hazardous waste.

S 61 Avoid the release of the material into the environment. Refer to special instructions/Safety data sheets.

16. OTHER INFORMATION

Sources: MDL Information Systems, Inc., MSDS *Arsenic Trioxide*, 15 December 2003.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use as a guide in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST **DOES NOT** certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.