

ARSENIC TRIOXIDE

ATO

CAUTIONARY RESPONSE INFORMATION

Common Synonyms Arsenic sesquioxide Arsenous acid Arsenous acid anhydride Arsenous oxide White arsenic	Solid crystals or powder Sinks and mixes slowly with water.	White	Odorless
<p>Restrict access. AVOID CONTACT WITH SOLID AND DUST. Stay upwind. Use water spray to "knock down" dust. Notify local health and pollution control agencies. Protect water intakes.</p>			
Fire	Not flammable. POISONOUS GASES MAY BE PRODUCED WHEN HEATED.		
Exposure	<p>CALL FOR MEDICAL AID. DUST POISONOUS IF INHALED. Irritating to eyes, nose and throat. Move victim to fresh air. If in eyes, hold eyelids open and flush with plenty of water. If breathing is difficult, give oxygen.</p> <p>SOLID POISONOUS IF SWALLOWED. Irritating to skin and eyes. Remove contaminated clothing and shoes. Flush affected areas with plenty of water. IF IN EYES, hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk and have victim induce vomiting. IF SWALLOWED and victim is UNCONSCIOUS OR HAVING CONVULSIONS, do nothing except keep victim warm.</p>		
Water Pollution	HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.		

1. CORRECTIVE RESPONSE ACTIONS

Stop discharge
Collection Systems: Dredge

2. CHEMICAL DESIGNATIONS

2.1 CG Compatibility Group: Not listed.
2.2 Formula: As₂O₃
2.3 IMO/UN Designation: 6.1/1561
2.4 DOT ID No.: 1561
2.5 CAS Registry No.: 1327-53-3
2.6 NAERG Guide No.: 151
2.7 Standard Industrial Trade Classification: 52329

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Bureau of Mines approved respirator; protective gloves, eye protection; full protective coveralls.
- 3.2 **Symptoms Following Exposure:** Ingestion causes irritation of mucous membrane, weakness, loss of appetite, gastrointestinal disturbances. Overdose can cause arsenic poisoning, but symptoms are delayed.
- 3.3 **Treatment of Exposure:** Get medical attention after all exposures to this compound. Be alert for arsenic poisoning symptoms. SKIN: Wash thoroughly with soap and water; remove contaminated clothing and shower with soap and water; irritations, except for milder cases which disappear in a day or two, should have medical attention. INGESTION: Vomiting should be induced and a physician should be called at once; drink freely of lime water, sweet milk, or raw eggs, followed by castor oil or any brisk cathartic.
- 3.4 **TLV-TWA:** 0.01 mg/m³ as arsenic
- 3.5 **TLV-STEL:** Not listed.
- 3.6 **TLV-Ceiling:** Not listed.
- 3.7 **Toxicity by Ingestion:** Grade 4; oral mouse LD₅₀ = 45 mg/kg
- 3.8 **Toxicity by Inhalation:** Currently not available.
- 3.9 **Chronic Toxicity:** Arsenic compounds may be carcinogenic.
- 3.10 **Vapor (Gas) Irritant Characteristics:** Currently not available
- 3.11 **Liquid or Solid Characteristics:** Currently not available
- 3.12 **Odor Threshold:** Odorless
- 3.13 **IDLH Value:** 5 mg/m³ as arsenic.
- 3.14 **OSHA PEL-TWA:** 0.01 mg/m³ as arsenic.
- 3.15 **OSHA PEL-STEL:** Not listed.
- 3.16 **OSHA PEL-Ceiling:** Not listed.
- 3.17 **EPA AEGL:** Not listed

4. FIRE HAZARDS

- 4.1 **Flash Point:**
Not flammable
- 4.2 **Flammable Limits in Air:** Not flammable
- 4.3 **Fire Extinguishing Agents:** Not pertinent
- 4.4 **Fire Extinguishing Agents Not to Be Used:** Not pertinent
- 4.5 **Special Hazards of Combustion Products:** Toxic fumes of arsenic trioxide and arsine may be formed in fire situations.
- 4.6 **Behavior in Fire:** May volatilize and form toxic fumes of arsenic trioxide.
- 4.7 **Auto Ignition Temperature:** Not pertinent
- 4.8 **Electrical Hazards:** Not pertinent
- 4.9 **Burning Rate:** Not pertinent
- 4.10 **Adiabatic Flame Temperature:** Not pertinent
- 4.11 **Stoichiometric Air to Fuel Ratio:** Not pertinent
- 4.12 **Flame Temperature:** Not pertinent
- 4.13 **Combustion Molar Ratio (Reactant to Product):** Not pertinent
- 4.14 **Minimum Oxygen Concentration for Combustion (MOCC):** Not listed

5. CHEMICAL REACTIVITY

- 5.1 **Reactivity with Water:** No reaction
- 5.2 **Reactivity with Common Materials:** No reaction
- 5.3 **Stability During Transport:** Stable
- 5.4 **Neutralizing Agents for Acids and Caustics:** Flush with water
- 5.5 **Polymerization:** Not pertinent
- 5.6 **Inhibitor of Polymerization:** Not pertinent

6. WATER POLLUTION

- 6.1 **Aquatic Toxicity:**
5.3 mg/l/8 days/salmon/harmful*
*Type of water not specified
- 6.2 **Waterfowl Toxicity:** Currently not available
- 6.3 **Biological Oxygen Demand (BOD):**
Currently not available
- 6.4 **Food Chain Concentration Potential:**
None
- 6.5 **GESAMP Hazard Profile:**
Bioaccumulation: 0
Damage to living resources: 3
Human Oral hazard: 4
Human Contact hazard: II
Reduction of amenities: XXX

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** Refined: 99%; Crude: 95%
- 7.2 **Storage Temperature:** Ambient
- 7.3 **Inert Atmosphere:** No requirement
- 7.4 **Venting:** Pressure-vacuum
- 7.5 **IMO Pollution Category:** Currently not available
- 7.6 **Ship Type:** Currently not available
- 7.7 **Barge Hull Type:** Currently not available

8. HAZARD CLASSIFICATIONS

- 8.1 **49 CFR Category:** Poison
- 8.2 **49 CFR Class:** 6.1
- 8.3 **49 CFR Package Group:** II
- 8.4 **Marine Pollutant:** No
- 8.5 **NFPA Hazard Classification:**
- | Category | Classification |
|---------------------------|----------------|
| Health Hazard (Blue)..... | 3 |
| Flammability (Red)..... | 1 |
| Instability (Yellow)..... | 0 |
- 8.6 **EPA Reportable Quantity:** 1 pound
- 8.7 **EPA Pollution Category:** X
- 8.8 **RCRA Waste Number:** P012
- 8.9 **EPA FWPCA List:** Yes

9. PHYSICAL & CHEMICAL PROPERTIES

- 9.1 **Physical State at 15° C and 1 atm:** Solid
- 9.2 **Molecular Weight:** 197.8
- 9.3 **Boiling Point at 1 atm:** 855°F = 457°C = 730°K
- 9.4 **Freezing Point:** 599°F = 315°C = 588°K
- 9.5 **Critical Temperature:** Not pertinent
- 9.6 **Critical Pressure:** Not pertinent
- 9.7 **Specific Gravity:** 3.7 at 20°C (solid)
- 9.8 **Liquid Surface Tension:** Not pertinent
- 9.9 **Liquid Water Interfacial Tension:** Not pertinent
- 9.10 **Vapor (Gas) Specific Gravity:** Not pertinent
- 9.11 **Ratio of Specific Heats of Vapor (Gas):**
Not pertinent
- 9.12 **Latent Heat of Vaporization:** Not pertinent
- 9.13 **Heat of Combustion:** Not pertinent
- 9.14 **Heat of Decomposition:** Not pertinent
- 9.15 **Heat of Solution:** Currently not available
- 9.16 **Heat of Polymerization:** Not pertinent
- 9.17 **Heat of Fusion:** 22.2 cal/g
- 9.18 **Limiting Value:** Currently not available
- 9.19 **Reid Vapor Pressure:** Currently not available

NOTES

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9.20 SATURATED LIQUID DENSITY		9.21 LIQUID HEAT CAPACITY		9.22 LIQUID THERMAL CONDUCTIVITY		9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit inch per hour-square foot-F	Temperature (degrees F)	Centipoise
	N O T P E R T I N E N T		N O T P E R T I N E N T		N O T P E R T I N E N T		N O T P E R T I N E N T

9.24 SOLUBILITY IN WATER		9.25 SATURATED VAPOR PRESSURE		9.26 SATURATED VAPOR DENSITY		9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
34	0.328		N O T		N O T		N O T
36	0.405		P E R T I N E N T		P E R T I N E N T		P E R T I N E N T
38	0.483						
40	0.561						
42	0.639						
44	0.716						
46	0.794						
48	0.872						
50	0.950						
52	1.028						
54	1.105						
56	1.183						
58	1.261						
60	1.339						
62	1.417						
64	1.494						
66	1.572						
68	1.650						
70	1.728						
72	1.805						
74	1.883						
76	1.961						
78	2.039						
80	2.117						
82	2.194						
84	2.272						