

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Arsenic trioxide (MSDS No. P-6206-D)	Trade Name: Arsenic Trioxide
Chemical Name: Arsenic Trioxide	Synonyms: Arsenic oxide, arsenic (III) oxide, arsenious trioxide, arsenious acid anhydride, arsenite, crude arsenic, white arsenic
Formula: As ₂ O ₃	Chemical Family: Inorganic oxide
Telephone:	Company Name: Praxair, Inc. 39 Old Ridgebury Road Danbury, CT 06810-5113
Emergencies: 1-800-645-4633*	
CHEMTREC: 1-800-424-9300*	
Routine: 1-800-PRAXAIR	

* Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier, Praxair sales representative, or call 1-800-PRAXAIR (1-800-772-9247).

2. Composition/Information on Ingredients



See section 16 for important information about mixtures.

INGREDIENT	CAS NUMBER	CONCENTRATION	OSHA PEL	ACGIH TLV-TWA (2002)
Arsenic Trioxide	1327-53-3	>99%*	0.01 mg/m ³ **	0.01 mg/m ³ **

*The symbol > means "greater than."

**Inorganic compounds as arsenic.

3. Hazards Identification

	<p>EMERGENCY OVERVIEW</p> <p>DANGER! Poisonous, nonflammable solid.</p> <p>Cancer hazard.</p> <p>Contains inorganic arsenic.</p> <p>Use only with adequate ventilation or respiratory protection.</p> <p>Harmful or fatal if inhaled or swallowed.</p> <p>Harmful if absorbed through the skin.</p> <p>Irritates the eyes, skin, and respiratory tract.</p> <p>May cause allergic skin reaction.</p> <p>May cause liver, kidney, blood cell, and nervous system damage.</p> <p>Self-contained breathing apparatus must be worn by rescue workers.</p> <p>Odor: None</p>	
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THRESHOLD LIMIT VALUE: TLV-TWA = 0.01 mg/m³, inorganic compounds as arsenic (ACGIH, 2002). TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION—Irritates the esophagus; causes headache, coughing, breathing difficulty, chest pains, and pulmonary edema (fluid in the lungs).

SKIN CONTACT—Irritates the skin and can be absorbed through it.

SWALLOWING—Produces a metallic or garlic-like aftertaste. Causes nausea, vomiting, abdominal pain, and difficulty in swallowing. Profuse, watery, sometimes bloody diarrhea is accompanied by dehydration, intense thirst, fluid-electrolyte disturbances, severe hypotension (low blood pressure), metabolic acidosis, hemolysis (breakage of red blood cells), pancytopenia (sharply reduced blood count involving multiple cell types), anemia, Mees' lines (transverse, white lines in the nails), peripheral neuropathy with muscle wasting, tingling sensations, and widely distributed burning pain. Symptoms appear within 30 to 60 minutes with delays of up to several hours if the material is ingested with food. Brain damage may appear in 4 to 6 months.

EYE CONTACT—Irritates the eyes and conjunctival tissue.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: Nose, eye, and skin irritation, tearing, photophobia (sensitivity to light), hair loss, perforation of the nasal septum (tissue between the nostrils), hoarseness, and painful ulceration of the wrists, scrotal skin, lips, and nostrils. Aplastic anemia, nausea and vomiting (infrequent), and cirrhosis of the liver (rare) may also occur.

OTHER EFFECTS OF OVEREXPOSURE: Ingestion has caused premature birth with subsequent death of infant. See section 11, Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Blood or liver disorders.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: See section 11.

CARCINOGENICITY: Inorganic arsenic compounds are listed by NTP as *known to be human carcinogens*. Inorganic arsenic is an OSHA-regulated chemical—see OSHA Standard 1910.1018. Arsenic and arsenic compounds are listed by the IARC as *Group 1: Carcinogenic to Humans*.

4. First Aid Measures

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

SKIN CONTACT: Immediately remove contaminated clothing, taking care not to shake off toxic arsenic trioxide dusts. Shower with plenty of water, rinsing away all loose material; then wash thoroughly with soap and water to remove remaining particles. See a physician for treatment of reddened or blistered skin.

SWALLOWING: Contact a poison control center (see section 16) and follow their advice. Normal first aid for a conscious and alert victim is to have the victim drink two glasses of warm water; then induce vomiting. Never give anything by mouth to an unconscious, convulsive, or unresponsive person. Seek immediate medical attention.

EYE CONTACT: Do not allow victim to rub the eyes or to keep them tightly closed. Immediately flush eyes thoroughly with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN: Support respiratory and cardiovascular function. Assure adequate hydration and renal function; alkalization of the urine may prevent disposal of red blood cell products by hemolysis

in renal tubular cells. Chelation therapy may be indicated if urine arsenic levels exceed 200 µg/liter. See section 11, Toxicological Information.

5. Fire Fighting Measures

FLASH POINT (test method):	Not Applicable.
AUTOIGNITION TEMPERATURE:	Not Applicable.
FLAMMABLE LIMITS IN AIR , % by volume:	LOWER: Not Applicable. UPPER: Not Applicable.

EXTINGUISHING MEDIA: Arsenic trioxide cannot catch fire. Use media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: DANGER! Poisonous, nonflammable solid.

Immediately evacuate all personnel from danger area. Toxic fumes may be given off when arsenic trioxide is heated to decomposition. Wear self-contained breathing apparatus with full facepiece, operated in the pressure demand mode, and full protective clothing when participating in fire fighting and rescue activities. Do not allow runoff to drain into sewers and waterways. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Toxic fumes and poisonous arsine gas resulting from thermal decomposition.

HAZARDOUS COMBUSTION PRODUCTS: Not applicable.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: DANGER! Poisonous, nonflammable solid. Immediately evacuate all personnel from danger area. Wear self-contained breathing apparatus with full facepiece, operated in the pressure demand mode, and full protective clothing. **Small spills: Do not sweep!** Scoop up material with a clean shovel. Carefully place material into a clean, dry container. Cover container and remove from area. Remove remaining residue by flushing spill area with water. **Large Spills:** Flush spill to containment area with water for later reclamation or disposal. Neutralize spill with agricultural lime, crushed limestone, or sodium bicarbonate. Damp-mop areas of remaining residue with dilute sodium bicarbonate solution.

WASTE DISPOSAL METHOD: Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN STORAGE: Store only in a cool, dry area with adequate ventilation, restricted to compatible poisons. (See section 10.) Floors and shelves should be made of materials that will not absorb arsenic trioxide. Keep containers tightly closed.

PRECAUTIONS TO BE TAKEN IN HANDLING: Handle and use only with appropriate personal protective equipment. (See section 8.) Keep containers tightly closed when not in use.

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST—Where possible, processes should be enclosed so no arsenic trioxide dust escapes into the work area. Where dust may escape, use a local or general exhaust system to keep airborne concentration below the TLV/PEL. Local ventilation is preferred to control contamination at its source.

MECHANICAL (general)—Acceptable if airborne concentration of arsenic trioxide dust can be maintained below the TLV/PEL.

SPECIAL—None

OTHER—None

RESPIRATORY PROTECTION: Select in accordance with OSHA Standard 1910.1018. The respiratory protection use must conform with OSHA rules as specified in 29 CFR 1910.134.

SKIN PROTECTION: Wear chemically protective gloves, gauntlets, boots, and aprons, as appropriate, to prevent prolonged or repeated skin contact. Suitable materials include butyl rubber and polycarbonate. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133

EYE PROTECTION: Safety glasses or protective goggles. Select in accordance with OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: Select in accordance with OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

9. Physical and Chemical Properties

MOLECULAR WEIGHT:	197.82
SPECIFIC GRAVITY (H ₂ O = 1) at 39.2°F (4°C) and 1 atm:	3.865
DENSITY at 39.2°F (4°C):	241.29 lb/ft ³ (3.865 g/cm ³)
SOLUBILITY IN WATER:	Slight
PERCENT VOLATILES BY VOLUME:	0
pH:	Water solution is slightly acidic.
BOILING POINT at 1 atm:	869°F (465°C)—sublimes
MELTING POINT at 1 atm:	599°F (315°C)
APPEARANCE, ODOR, AND STATE:	White, odorless, tasteless powder

10. Stability and Reactivity

STABILITY:
 Unstable Stable

INCOMPATIBILITY (materials to avoid): Acids (forms highly toxic arsine gas); aluminum, chlorine trifluoride, fluorine, hydrogen fluoride, oxygen difluoride, mercury, sodium chlorate, sodium nitrate, and zinc fillings (produces violent reactions). Arsenic trioxide in combination with moisture is corrosive to many metals.

HAZARDOUS DECOMPOSITION PRODUCTS: Arsenic trioxide fumes and arsine gas.

HAZARDOUS POLYMERIZATION: May Occur Will Not Occur

CONDITIONS TO AVOID: Incompatible materials, elevated temperatures, dispersion to the atmosphere.

11. Toxicological Information

LD_{Lo}, oral, human—1429 µg/kg; LD₅₀, oral, rat—14,600 µg/kg. Oral doses as low as 29 µg/kg have produced symptoms in humans. Prolonged exposure has produced brain damage in rats. Exposure has produced premature birth in humans and teratogenic and mutagenic effects in rats.

12. Ecological Information

Arsenic trioxide does not contain any Class I or Class II ozone-depleting chemicals. Arsenates (salts or esters of arsenic trioxide) are listed as marine pollutants by DOT.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Contact your supplier. Also see section 6 for disposal following spills.

14. Transport Information

DOT/IMO SHIPPING NAME: Arsenic trioxide

HAZARD CLASS:	PACKING GROUP:	IDENTIFICATION NUMBER:	PRODUCT RQ:
6.1	II	UN 1561	1 lb (0.454 kg)

SHIPPING LABEL(s): POISON

PLACARD (when required): POISON

SPECIAL SHIPPING INFORMATION: None

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

U.S. FEDERAL REGULATIONS:**EPA (ENVIRONMENTAL PROTECTION AGENCY)**

CERCLA: COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (40 CFR Parts 117 and 302):

Reportable Quantity (RQ): 1 lb (0.454 kg)

SARA: SUPERFUND AMENDMENT AND REAUTHORIZATION ACT:

SECTIONS 302/304: Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of Extremely Hazardous Substances (EHS) (40 CFR Part 355):

TPQ: 100/10,000 lb (45.4/4,536 kg)

EHS RQ: 1 lb (0.454 kg)

SECTIONS 311/312: Require submission of MSDSs and reporting of chemical inventories with identification of EPA hazard categories. The hazard categories for this product are as follows:

IMMEDIATE: Yes

PRESSURE: No

DELAYED: Yes

REACTIVITY: No

FIRE: No

SECTION 313: Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

Arsenic trioxide is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40CFR Part 372.

40 CFR 68: RISK MANAGEMENT PROGRAM FOR CHEMICAL ACCIDENTAL RELEASE PREVENTION: Requires development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Arsenic trioxide is not listed as a regulated substance.

TSCA: TOXIC SUBSTANCES CONTROL ACT: Arsenic trioxide is listed on the TSCA inventory.

OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR 1910.119: PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Arsenic trioxide is not listed in Appendix A as a highly hazardous chemical.

STATE REGULATIONS:

CALIFORNIA: Arsenic trioxide (as inorganic arsenic) is listed by California under the SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65).

WARNING: Inorganic arsenic compounds are chemicals known to the State of California to cause cancer and reproductive toxicity.

(California Health and Safety Code §25249.5 et seq.)

PENNSYLVANIA: Arsenic trioxide is subject to the PENNSYLVANIA WORKER AND COMMUNITY RIGHT-TO-KNOW ACT (35 P.S. Sections 7301-7320).

16. Other Information

Be sure to read and understand all labels and instructions supplied with all containers of this product.

SPECIAL PRECAUTIONS: *Poisonous, nonflammable solid.* Use only with adequate ventilation or respiratory protection. (See section 8.) Have safety showers and eyewash fountains immediately available to exposed workers. Use only with materials compatible with arsenic trioxide. (See section 10.) If possible, use only in a closed system. *Do not eat or smoke* in areas where arsenic trioxide is used or stored. Follow OSHA Standard 1910.1018, which restricts or prohibits these and other activities in defined, regulated areas.

MIXTURES: When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Remember, gases and liquids have properties that can cause serious injury or death.

HAZARD RATING SYSTEMS:

NFPA RATINGS:

HEALTH = 3
FLAMMABILITY = 0
INSTABILITY = 0
SPECIAL = None

HMIS RATINGS:

HEALTH = 3*
FLAMMABILITY = 0
PHYSICAL HAZARD = 0

**An asterisk used in conjunction with HMIS health hazard ratings designates a carcinogenic or reproductive hazard.*

POISON CONTROL CENTER: Poison Control Centers provide round-the-clock medical information to aid victims of accidental poisoning. Check the emergency listings of your local phone directory for the one serving your area. (Emergency numbers usually appear on inside front cover.) If the poison control center is not listed or you are unable to locate it, contact the largest hospital in your community for the number. Post the number in areas where arsenic trioxide is stored, handled, and used.

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair MSDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current Praxair MSDSs for these products, contact your Praxair sales representative or local distributor or supplier. If you have questions regarding Praxair MSDSs, would like the form number and date of the latest MSDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (**Phone:** 1-800-PRAXAIR; **Address:** Praxair Call Center, Praxair, Inc., PO Box 44, Tonawanda, NY 14151-0044).

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