

DESERT RESEARCH INSTITUTE

Guidelines for Laboratory-Scale Use of ARSENIC/INORGANIC ARSENIC COMPOUNDS

INTRODUCTION

Arsenic and its inorganic compounds are known human carcinogens. Arsenic and inorganic arsenic compounds (such as sodium arsenate and sodium arsenite) are considered particularly hazardous substances (PHSs). As such the use of these chemicals requires the completion of a PHS Use Approval Form and the purchase of these materials must be approved by the Principal Investigator before ordering. The amount purchased should be limited to only the quantity needed to complete the project to avoid disposing the excess as hazardous waste. The user is responsible for ensuring a current Material Safety Data Sheet (MSDS) is obtained unless a one is already available within the laboratory.

The use of arsenic and inorganic arsenic compounds must be conducted in designated areas within the laboratory unless the laboratory itself has been deemed a designated use area. Use areas are required to be posted with appropriate warnings (see Section V.B of the DRI Chemical Hygiene Plan). Additional lab specific details on how and where these materials are used in the lab and lab specific safety measures shall be outlined on the PHS Use Approval Form and may be appended to this document or included in other lab specific safety documents that are used for employee lab specific safety education.

POTENTIAL HAZARDS

In addition to its carcinogenic effects, arsenic is highly toxic and causes irritation of the eyes, skin and respiratory tract. Trivalent arsenic compounds are corrosive to skin.

Acute Exposure: May be fatal if swallowed. Ingestion of arsenic compounds may cause burning of the lips, throat constriction, severe abdominal pain, severe nausea, projectile vomiting, and profuse diarrhea, convulsions, coma, and possibly death within 24 hours. Causes skin irritation with burning pain, itching, and redness. Harmful if inhaled. May cause sore throat, coughing, shortness of breath and delayed edema. Causes skin irritation with burning pain, itching and redness. Causes eye irritation with tearing and burning pain.

Chronic Exposure: Known human carcinogen. Chronic inhalation may cause nasal septum ulceration and perforation. Chronic exposure may cause liver and kidney damage, anemia and other blood cell abnormalities.

Arsenic and its inorganic salts are known human carcinogens, regulated by OSHA in Title 29 Code of Federal Regulation 1910.1018. Lab-scale use of these materials is exempted from the arsenic standard provided exposures to laboratorians is less than the action level of $5 \mu\text{g}/\text{m}^3$ (which is one half the permissible exposure limit) as averaged over an eight hour working day. **If airborne exposure is suspected** at or above the action level, **stop work** and contact EH&S for assistance in conducting a work hazard assessment and hazard mitigation and monitoring protocol.

PERSONAL PROTECTIVE EQUIPMENT

Skin and eye protection should be used when working with arsenic compounds. To prevent skin contact wear latex, Nitrile or other suitable gloves with a lab coat. ANSI Z87 safety glasses shall be used and where dust or splash exposures are possible use chemical safety goggles and a full face shield.

ENGINEERING CONTROLS

Use adequate general or local exhaust ventilation to keep airborne concentrations below the OSHA Action Level ($.005 \text{ mg}/\text{m}^3$). Use only in an area equipped with an emergency shower and eyewash. Weighing arsenic and its compounds should be done in a powders weighing hood.

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SPECIAL HANDLING PROCEDURES & STORAGE REQUIREMENTS

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Avoid ingestion and inhalation. Do not allow contact with water. Use only with adequate ventilation or respiratory protection.

Storage: Store in a tightly closed container. Store in a cool, dry, well ventilated area away from incompatible substances (strong oxidizers, acids, alkalines, active metals, bromine azide, and hydrogen gas). Do not store in metal containers.

SPILL & ACCIDENT PROCEDURES

Skin contact: Remove contaminated clothing (including shoes) immediately. Flush the skin with copious amounts of water (and soap if available) for at least 15 minutes or until no evidence of the substance remains. Get medical attention immediately.

Eye contact: Immediately flush eyes with copious amounts of water for at least 15 minutes (lifting upper and lower eyelids occasionally). Remove contact lenses if they are not rinsed by eyewash. Get medical attention immediately.

Inhalation: Remove from exposure area and to fresh air immediately. If not breathing, give artificial respiration using a bag-valve device or a one-way valve mask (**Do Not** use mouth-to-mouth resuscitation). Get medical attention immediately.

Ingestion: Call Poison Control Center: 1-800-222-1222. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Incidental Spill: Do not attempt cleanup if you feel unsure of your ability to do so, or if you perceive the risk to be greater than normal laboratory operations. Ventilate the area and use proper personal protective equipment. Carefully sweep up solid material; ensuring minimal airborne particulates are generated. Soak up liquids spills with absorbent materials. Place spill clean up materials in a suitable disposal container labeled with the words "hazardous waste". Do not flush to sanitary sewer and avoid runoff into storm sewer and ditches which lead to waterways. Do not get water inside containers of solid waste.

Large Spill: Alert others in immediate area, provide adequate ventilation, evacuate the laboratory, close the doors, and call EH&S emergency number 775-742-6330.

DECONTAMINATION

After cleaning up spilled materials, thoroughly wash the area with soap and water, then rinse. Treat all clean up materials as non-RCRA wastes. Specific instructions may be developed for the lab and should be included here _____

WASTE DISPOSAL

Arsenic waste and spill clean up materials should be placed in properly labeled, suitable containers with securely sealed lids. Submit a [Request for Waste Disposal Form](#) to EH&S to arrange for pick up and disposal.

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MSDS LOCATION (list lab specific location here) _____

TRAINING

Lab specific standard operating procedures must be developed and all laboratorians who work with or are potentially exposed to arsenic and its inorganic compounds in the lab must receive documented training and education about the hazards and how to minimize them.