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# PURPOSE

To establish the minimum requirements for the safe use, handling, and disposal of inorganic arsenic or arsenic wastes generated as a by-product of processes using arsine gas.

# SCOPE

The provisions of this specification apply to TI employees, suppliers, vendors, and visitors at TI sites worldwide with operations that utilize inorganic arsenic. Examples of such operations include ion implantation and epitaxial growth.

# reference documents

## TI Standard Policy and Procedure (SP&P) 04-04-01: "Environmental, Health and Safety"

## TI ESH Standard 01.01: "Personal Protective Equipment"

## TI ESH Standard 01.05: "Respiratory Protection Program"

## TI ESH Standard 03.01D: "Chemical Exposure Assessment"

## TI ESH Standard 03.01D Appendix A: TI Occupational Exposure Limits

## TI ESH Standard 03.01F: “Exhaust of Chemicals and Particulates

## TI ESH Standard 06.12: “Movement of Equipment and Parts”

## TI ESH Standard ENV 04.01: "Hazardous Waste Management"

# Definitions

[TI ESH Standards Glossary of Definitions](https://sps01.itg.ti.com/sites/wwf/esh/standards/Knowledge_Bank/00.01.xlsx)

# Requirements

## General Requirements

### Sites shall develop and implement written work practices to minimize the potential exposure to inorganic arsenic.

### Sites shall ensure that all surfaces are maintained as free as practical of inorganic arsenic.

## Housekeeping Procedure(s). Sites shall establish a written housekeeping procedure(s) for each area where inorganic arsenic is used.

### The procedure shall list the appropriate frequencies and methods for performing housekeeping operations.

### Floors and other accessible surfaces contaminated with inorganic arsenic shall not be cleaned with compressed air.

### Where vacuuming methods are selected, high efficiency particulate air (HEPA) vacuums shall be used and emptied in a manner that minimizes the re-entry of inorganic arsenic into the workplace.

### Cleaning methods using brooms, brushes or abrasive pads shall only be performed using wet methods.

### Dust collection and ventilation equipment shall be cleaned, maintained, and checked according to the manufacturers’ instructions to ensure the effectiveness of the system. The maintenance shall be documented.

## Provisions for Surface Wipe Testing

### Wipe samples shall be collected at least annually in the areas where inorganic arsenic is used to measure the effectiveness of housekeeping practices.

### If wipe testing results indicate that the housekeeping practices are inadequate to prevent exposure, the housekeeping practices shall be reviewed and modified as appropriate.

## Provisions for Container Labeling. Sites shall label shipping, storage and waste containing inorganic arsenic:

### In the U.S. the label legend shall read as shown below:

DANGER
CONTAINS INORGANIC ARSENIC
CANCER HAZARD
HARMFUL IF INHALED OR SWALLOWED
USE ONLY WITH ADEQUATE VENTILATION
OR RESPIRATORY PROTECTION

###  Non-U.S. sites shall provide labels that meet the intent of this wording.

## Provisions for Disposal of Arsenic Waste. Sites shall dispose of arsenic waste in accordance with TI ESH Standard ENV 04.01 "Hazardous Waste Management".

## Provisions for Handling and Transporting Contaminated Parts and Equipment. Sites shall implement procedures for handling and transporting arsenic contaminated parts and equipment in accordance with TI ESH Standard 06.12 “Maintenance and Movement of Equipment and Parts”.

## Provisions for Personal Air Monitoring. Sites shall establish personal air monitoring and employee notification programs for arsenic use areas in accordance with TI ESH Specification 03.01D “Chemical Exposure Assessment”.

### If personal air monitoring reveals employee exposure at or above the OEL (see ESH Specification 03.01D Appendix A: TI Occupational Exposure Limits), monitoring shall be repeated at least quarterly until 2 consecutive full shift samples taken more than 7 days apart are below the action level (AL) for inorganic arsenic; or

### If monitoring reveals employee exposure below the OEL, but at or above the AL, full shift monitoring shall be repeated at least every 6 months until 2 consecutive samples taken more than 7 days apart are below the AL.

### If monitoring reveals employee exposure below the AL, re-testing shall only be required when processes, equipment or other materials change which may impact employee exposure.

### Sites shall provide employees with written notification of the employee’s representative airborne exposure in accordance with TI ESH Specification 03.01D “Chemical Exposure Assessment”.

## Provisions for Use of Respiratory Protection

### If respiratory protection is used to prevent exposure to inorganic arsenic above the OEL, the site shall establish a respiratory protection program in accordance with TI ESH Standard 01.05 "Respiratory Protection Program".

### Respiratory protection is required when working with arsenic or arsenic contaminated parts outside an exhaust hood or at other locations where exposure assessments indicate a potential for airborne exposure at or above the OEL.

### When using hydrogen peroxide to clean arsenic contaminated parts, the cleaning must take place in an exhausted hood that meets the requirements of TI ESH Standard 03.01F. If cleaning in an exhausted hood is not possible, respiratory protection using supplied air is required.

## Provisions for Medical Surveillance

### Notify the local occupational health personnel, the WWESH Medical Surveillance Program Administrator and the TI Medical Directorwhen an employee’s representative exposure is above the AL for inorganic arsenic. Notification shall be made to medicalsurveillance@list.ti.com in 2 working days from receipt of the results.

## Regulated Areas

### When work practices alone do not minimize the measured personal monitoring exposure below the TI occupational exposure limit (OEL) for inorganic arsenic (see ESH Specification 03.01D Appendix A: TI Occupational Exposure Limits), the following requirements must be met. Sites shall:

#### Establish regulated areas designated for arsenic use,

#### Develop and implement corrective actions to reduce the potential exposure, and

#### Perform additional air monitoring, after corrective actions have been implemented to determine if the potential for exposure has been reduced below the OEL. If monitoring results indicate the exposure potential remains above the OEL, the sites shall meet the requirements set forth for regulated area.

### Regulated Area Requirements

#### Arsenic usage shall be segregated from other work activities in a manner that minimizes access to the area and protects persons outside the area from exposure to inorganic arsenic;

#### Signs shall be installed at the entrance(s) to the regulated area(s) to alert workers to the presence of inorganic arsenic so that protective steps may be taken before entering;

5.10.2.2.1 In the U.S., signs shall read as shown below:

DANGER
INORGANIC ARSENIC
MAY CAUSE CANCER
DO NOT EAT, DRINK OR SMOKE
WEAR RESPIRATORY PROTECTION IN THIS AREA
AUTHORIZED PERSONNEL ONLY

5.10.2.2.2 Non-U.S. sites shall provide signs that meet the intent of this wording.

#### Additional signage shall be provided to identify PPE requirements for the area as determined using TI ESH Standard 01.01 "Personal Protective Equipment."

#### Sites shall establish facilities for employees who work in a regulated area consisting of the following:

##### Showers;

##### Restrooms;

##### Clean change facility with separate storage for personal (street) and protective clothing and

##### Hand and face washing facilities for use prior to exiting the regulated area.

#### Access to the area shall be restricted to authorized personnel only;

#### Respiratory protection shall be required for persons entering the area (See TI ESH Standard 01.05: "Respiratory Protection Program".

## Training

### Sites shall ensure that TI employees who work with or around arsenic or arsenic-containing materials receive arsenic awareness training. Arsenic awareness training shall be documented and include the following:

#### An explanation of the content of this specification and applicable local, state and national regulations;

#### Uses within the process to include specific locations and potential for exposures within the equipment;

#### Proper storage requirements for inorganic arsenic;

#### Specific tasks which could result in exposure to inorganic arsenic;

#### Medical surveillance requirements;

#### Employee's access to medical and exposure monitoring records, and

#### Protective measures:

##### Engineering controls and work practices associated with the employee's job assignment; and

##### Proper use, limitation, and storage of respirators and other assigned PPE.

### Employees shall receive training upon initial assignment to the work area.

### Employees shall receive refresher training at least every 36 months.

### Employees who are exposed above the AL shall have refresher training at least every 12 months.

# STANDARD Approval

This standard has been approved by David Thomas, TI Vice President.

# Revision history

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Rev# | Date | Nature of Revision | Author/Editor | Approver |
| A | 02/28/06 | Former Std 08.02 “Arsenic Safety” converted to this Spec 03.01G. Major periodic review. | Dale Moore | N/A |
| B | 12/01/06 | Periodic review with 03.01 series standards; 3.1.b moved to 3.1.a.3.c; 3.2 rewritten for clarity | Dale Moore | N/A |
| C | 06/12/2013 | Removed written program requirement. Reformatted document and rearranged content. | Mike Alton | ELC |
| D | 11/09/2016 | Added respirator requirement when using H₂O₂; changed U.S. regulated area signage wording to match OSHA requirements; 5.7.1 and 5.7.2 rewritten for clarity | Hayden Baker | ELC |
| E | 09/25/2019 | Added additional notification requirement for measure exposures above the action limit. | Hayden Baker | ELC |