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# PURPOSE

The purpose of this standard is to establish the minimum requirements necessary for management of asbestos at TI sites**.**

# SCOPE

The provisions of this standard apply to TI sites where asbestos-containing materials (ACM) is contained or suspected to be contained in building construction materials or production or facilities equipment.

The provisions of this standard apply to all TI employees, suppliers, vendors, and visitors at TI sites worldwide.

# reference documents

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

## TI ESH Standard 01.05: “Respiratory Protection”

## TI ESH Standard 03.01D: “Chemical Exposure Assessment”

## TI ESH Standard ENV04.01: “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 not use asbestos-containing materials in building construction, repair of existing facilities or in production or facilities equipment.

### Sites shall not use asbestos-containing fire-suppression materials (e.g. blankets).

### Building occupants working in or adjacent to asbestos abatement activities shall be notified in advance of such activities.

#### Notification to occupants may be in the form of email, signs placed in conspicuous locations, or by other means.

## Management of Asbestos

### Sites shall ensure all ACM is identified and documented. If a material is not confirmed to be asbestos-free it must be assumed to contain asbestos. One or more of the following methods may be utilized to identify asbestos:

#### Reviewing architectural drawings and specifications, material safety data sheets, manufacturers’ equipment specifications, letters from property owners, and other documentation; and

#### Conducting a physical asbestos survey to determine the presence, location and quantity of ACM in the building.

## Asbestos survey

### The asbestos survey shall be conducted by a Competent Person who is properly trained, equipped, and licensed or certified for the task.

### Survey documentation shall include:

#### Locations of ACMwithin the facility;

#### A description of the survey results and the laboratory analytical results for all ACM samples supporting the findings of the survey; and

#### Any areas within the facility (e.g. cleanroom) that are inaccessible for survey should be documented and surveyed at a future date. The future date should be either when the area(s) are made accessible; or prior to construction, renovation, or repair activities.

### The asbestos survey shall be conducted in a manner that does not result in the disturbance of ACM, with the exception of ACM sampling conducted by a Competent Person.

## Asbestos Operations and Maintenance Plan (O&M Plan)

### Sites shall develop and implement an operations and maintenance plan for managing known or suspected sources of ACM. The plan shall include the following:

#### A description of the procedures used to identify and label ACM;

#### Location of ACM within the facility;

#### A description of the procedures used to inspect all friable ACM known to be on site. This inspection must be performed and documented at least annually in order to determine the condition of the ACM, and to determine if abatement or alteration to an operation and maintenance procedure is warranted;

#### A description of the work practices, worker training, personal air monitoring, medical surveillance and record keeping programs for all activities that involve working in and around the areas with identified ACM and that have the potential to disturb ACM; and

#### A process for determining if site activities involving ACM trigger any regulatory notification or paperwork requirements and for providing such notifications.

### Asbestos that is contained and in good condition and being managed under the O & M Plan does not have to be removed.

## Labeling

### Sites shall label known or suspected friable ACM locations (such as insulation on manufacturing equipment, boilers, tanks, and piping) to indicate the presence of asbestos and warn against creating dust.

### In the U.S., labels shall read as shown below. Non-U.S. sites shall provide labels in the country’s native language that meet the intent of the following:

DANGER

CONTAINS ASBESTOS FIBERS

MAY CAUSE CANCER

CAUSES DAMAGE TO LUNGS

DO NOT BREATHE DUST

AVOID CREATING DUST

1. It is not necessary to label nonfriable ACM (such as floor tile and transite panels) unless a potential for disturbance of the material might release airborne asbestos fibers (e.g., cutting or grinding a transite panel to install electrical or telephone cables).

## Regulated Areas

### Sites shall establish regulated areas where airborne concentrations of asbestos exceed or may reasonably be expected to exceed the Occupational Exposure Limit (OEL) and / or excursion limit and in areas where abatement activities are conducted.

1. When abatement work is performed within a glove bag, the area within the glove bag should be considered a regulated area.

### Access to regulated areas shall be limited to Authorized Persons.

### Regulated areas shall be maintained as a negative pressure enclosure in accordance with Appendix B to protect persons outside the area from exposure to airborne asbestos.

### Sites shall install signs at regulated areas to indicate the presence of asbestos so that protective steps may be taken before entering. In the U.S., signs shall read as shown below. Non-U.S. sites shall provide signs in the country’s native language that meet the intent of the following:

DANGER

ASBESTOS

MAY CAUSE CANCER

CAUSES DAMAGE TO LUNGS

AUTHORIZED PERSONNEL ONLY

### Authorized Persons entering a regulated area shall be provided with personal protective equipment (e.g., protective clothing) to prevent their exposure to airborne asbestos fibers, and be required to wear respirators selected in accordance with Appendix A (Respiratory Protection for Asbestos Fibers) and used in accordance TI ESH Standard 01.05: “Respiratory Protection"”.

### Authorized Persons shall be provided with and required to use hygiene facilities to remove asbestos fibers before exiting a regulated area to minimize risk of releasing airborne asbestos fibers.

## ACM Abatement

### Sites shall remove ACM when it is in poor condition or when it will be disturbed during renovation or demolition activities.

#### If nonfriable ACM could crumble or be reduced to powder during its removal, the ACM shall be removed prior to beginning any other construction.

### All activities involved in the abatement of ACM, or in which ACM may be disturbed, shall be performed using one of the following methods:

#### Negative pressure enclosure (NPE) systems designed and constructed to maintain a negative pressure throughout the duration of the abatement activity. NPE system design and associated work practices shall be conducted in accordance with Appendix B – Requirements for Negative Pressure Enclosures.

1. When nonfriable ACM (e.g., transite board and resilient floor coverings such as floor tiles) can be removed without crumbling or reducing it to powder and without releasing asbestos fibers, the use of negative pressure enclosures and/or HEPA-filtered exhaust may not be required. A negative exposure assessment for any work practices used must have been performed within the previous 12 months and must demonstrate that OELs are not exceeded for each work practice employed.

#### Glovebag systems used for straight runs of piping, elbows and other connections shall be designed and installed to completely contain asbestos fibers that may be released during abatement. Glovebag system design and associated work practices shall be conducted in accordance with Appendix C – Requirements for Glovebag Systems.

### Personal Air Monitoring

#### Personal air monitoring shall be conducted for personnel whose exposure to airborne asbestos fibers could potentially exceed the OEL during asbestos abatement projects.

#### Sites shall provide employees with written notification of their employee(s) representative airborne exposure as soon as possible, but not to exceed 15 working days after receipt of monitoring results in accordance with the notification provisions of TI ESH Specification 03.01D: "Chemical Exposure Assessment”.

##### When employee representative airborne exposures exceed the OEL, written notification shall indicate that the OEL was exceeded and include a description of corrective actions taken to reduce exposure to or below the OEL.

### Work Practices

#### Prohibit the use of high-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air;

#### Prohibit the use of compressed air used to remove asbestos, or asbestos containing materials, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air;

#### Prohibit dry sweeping, shoveling or other dry clean-up of dust and debris containing ACM and potential ACM;

#### Adequately wet the ACM to avoid creating dust during ACM removal;

#### Thoroughly wipe-down all exposed surfaces to collect any remaining asbestos fibers or dust following abatement of the ACM;

#### Prevent any remaining asbestos fibers from becoming airborne following completion of the wipe-down by applying an adhesive to exposed surfaces;

#### Conduct air monitoring to verify asbestos fiber concentration inside the containment following abatement and wipe-down is less than the OEL of 0.1 fibers / cc (8-hour time-weighted average) before dismantling the temporary containment, and

#### Note: In regulated areas in which asbestos fibers may reasonably be expected to become trapped (e.g., in corners or crevices) or otherwise undisturbed following abatement and wipe-down, the air within the containment should be agitated (i.e., with an air blowing device) prior to air monitoring to help ensure accurate results.

#### Dispose of all waste ACM, contaminated clothing, disposable tools, containment materials, and air filters in sealed impermeable bags or other containers in accordance with Section 5.8.

### Project Supervision

#### Projects involving the abatement of friable ACM shall be supervised by a Competent Person to ensure safe work practices are followed. Duties of a Competent Person shall include the following:

##### Ensure that a regulated area, enclosures, or other containment are setup in accordance with regulations and provisions of this standard;

##### Ensure proper notification of building occupants and other potentially affected persons;

##### Inspect the enclosure or containment periodically to ensure integrity;

##### Establish entry and exit procedures to control access to the area;

##### Supervise all air monitoring for employees;

##### Ensure that Authorized Persons working within the enclosure and / or using glove bags wear respirators and protective clothing;

##### Ensure the set up, use and removal of engineering controls, and use of safe work practices are in compliance with regulations and provisions of this standard;

##### Ensure that engineering controls are functioning properly;

##### Ensure that Authorized Persons use the hygiene facilities and follow proper decontamination procedures, and

##### Ensure food, beverages and tobacco products are not consumed in the regulated area.

### Medical Surveillance

#### Sites shall implement a medical surveillance program for Authorized Persons who perform abatement activities for a combined total of 30 or more days per year or where personnel are potentially exposed to airborne asbestos fibers at or above the OEL, irrespective of respirator use.

#### Medical examinations or procedures shall be performed by or under the supervision of a licensed physician (e.g., TI’s approved Occupational Health Clinics), at no cost to the individual prior to assignment and annually thereafter. Physicians shall provide a written opinion of risk and limitations for all personnel in the program.

#### Medical examinations shall be conducted in accordance with the Occupational Health Examination Protocols.

## Handling and Disposal of ACM

### All ACM waste material shall be handled and disposed of in a manner which minimizes risk of releasing airborne asbestos fibers.

### ACM waste material shall be handled and disposed as follows:

#### Adequately wet and place friable ACM waste material in sealed impermeable containers, e.g., polyethylene bags within drums. The containers shall be labeled indicating that ACM is present and warning against creating dust;

#### Nonfriable ACM waste material shall be disposed of at a location and handled in a manner to minimize the potential for generating airborne asbestos fibers;

#### Friable ACM waste material shall be transported with the waste shipping documents (e.g., a waste manifest, identifying the type and amount of waste, waste generator, waste transporter, name and address of the facility where the waste will be taken).

## Training

### Housekeeping and maintenance personnel who work in areas that potentially contain ACM, but do not disturb it, shall receive general asbestos awareness training upon initial hire and annually thereafter which includes the following:

#### Location of ACM;

#### Health effects and hazard information;

#### Recognition of ACM damage or deterioration, and

#### Site protocol for reporting asbestos related issues.

### Personnel who perform work involving abatement (removal), clean-up and disposal of ACM shall receive training in accordance with 5.9.1 plus the following:

#### Critical barriers (or equivalent isolation methods) and / or negative pressure enclosures;

#### Relationship between smoking and asbestos in producing lung cancer;

#### Respirator use in accordance with TI ESH Standard 01.05: “Respiratory Protection”;

#### Air monitoring procedures;

#### Specific work practices, engineering controls;

#### Hygiene facilities (e.g., washing and showering);

#### Decontamination and disposal procedures, and

#### Emergency procedures.

## Record Keeping

### Asbestos records shall be maintained as follows:

### For the duration of personnel’s employment, plus 30 years:

#### Personal air monitoring results;

#### Medical surveillance records, and

#### Training records.

### For the duration of ownership of the site (and transferred to successive owners):

#### Asbestos surveys;

#### Summary of abatement and removal projects;

#### Documentation of annual inspections;

#### Waste shipping documents, and

#### Personnel and regulatory agency notifications.

# STANDARD Approval

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

# Revision history

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Rev#** | **Date** | **Nature of Revision** | **Author/Editor** | **Approver** |
| A | 01/24/2008 | 2007 major periodic review; 3.1 exception removed; 3.2.b.3 documentation required for annual inspection; obsolete notes (a) and (b) removed from App. A. | Gene Schaefers | Brenda Harrison |
| B | 9/24/2012 | 2012 Revision - Updated format, Standardized terminology and use of defined words, Moved content from “Work Practices” section to a new section named “Containment”  Moved requirements related to work practices from “Appendix B – Requirements for Negative Pressure Enclosures” to “Work Practices” section, Revised the requirements of “Appendix B – Requirements for Negative Pressure Enclosures” into a logical order | Laurie Lehmberg | N/A |
| C | 06/26/2013 | Reformatted into ESHMS format | Mike Alton | ELC |
| D | 09/28/2016 | Updated signage and label verbiage to align with US OSHA requirements. Sec. 5.3.2: added requirement to identify inaccessible areas as part of building survey. Sec. 5.7.2: added requirement for Negative Exposure Assessment for non-friable ACM removal methods | Hayden Baker, Greg Werchan; John Willis - ed. |  |
|  |  |  |  |  |

1. Respiratory Protection For Asbestos Fibers

|  |  |
| --- | --- |
| **Airborne concentration of asbestos or conditions of use** | **Required Respirator** |
| 1. Not in excess of 1 fiber (f) / cubic centimeter (cc) (10 x OEL) | 1. Half mask air-purifying respirator other than a disposable respirator equipped with high efficiency particulate air filters. |
| 2. Not in excess of 5f / cc (50 x OEL) | 2. Full face piece air purifying respirator equipped with high efficiency particulate air filters. |
| 3. Not in excess of 10f / cc (100 x OEL) | 3. Any powered air purifying respirator equipped with high efficiency particulate air filter or any supplied air respirator operated in continuous flow mode. |
| 4. Not in excess of 100f / cc (1000 x OEL) or unknown concentration | 4. Full face piece air purifying respirator operated in pressure demand mode. |
| 5. Greater than 100f / cc (1000 x OEL) or unknown concentration | 5. Full face piece air purifying respirator operated in pressure demand mode, equipped with an auxiliary positive pressure self-contained breathing apparatus. |
|  |  |

1. Requirements for Negative Pressure Enclosures (NPE)

Design and work practice requirements for NPE systems shall include, at a minimum, the following:

## Isolate HVAC systems by sealing with a double layer of 6 millimeters thick plastic or equivalent;

## Deactivate electrical circuits, unless they are equipped with ground-fault circuit interrupters.

## Place and secure impermeable drop cloths or plastic sheeting with duct tape (or equivalent) on surfaces beneath, around, and above all removal activity to enclose the area;

## Place barriers over all the openings to the regulated area,

## Shall maintain negative pressure throughout the period of use;

## Shall direct air movement away from employees performing asbestos work within the enclosure, and toward a HEPA filter or a collection device;

## Shall provide at least 4 air changes per hour with the air exhausted through a high efficiency particulate air (HEPA) filter;

## Shall maintain a minimum of -0.508 column millimeters (-0.02 column inches) of water pressure differential, relative to outside pressure as measured using a manometer;

## Inspect for breaches and smoke-test for leaks, and seal any leaks before beginning work within the enclosure and at the beginning of each shift;

## Prohibit eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics;

## Hygiene Facilities

Sites shall establish hygiene facilities consisting of an equipment room (staging area), shower area, and clean change room for the decontamination of persons and equipment.

Note: Hygiene facilities should be located adjacent and connected in series to regulated areas where feasible.

## Personnel shall only enter and exit the regulated area through the hygiene facility.

## Equipment rooms shall be supplied with impermeable, labeled bags and containers for the containment and disposal of contaminated protective equipment.

## Shower facilities shall be located between the equipment room and the clean change room.

## Clean change rooms shall be equipped with a locker or storage container for each Authorized Person.

Where it is not feasible to install shower facilities and / or clean change rooms, ACM contamination shall be removed from protective clothing and equipment in the regulated area using a HEPA vacuum.

1. Requirements for Glovebag Systems

Design and work practice requirements for glovebag systems shall include, at a minimum, the following:

###### Prior to installing glovebag systems, loose and friable ACM adjacent to the glovebag operation shall be wrapped and sealed in two layers of 6 millimeters thick plastic, or otherwise contained.

###### Shall be made of 6 millimeters thick plastic and shall be seamless at the bottom;

###### Shall be designed for that purpose and used without modifications;

###### Shall be installed so that it completely encloses and covers the circumference of pipe or other structure where the work is to be done;

###### Shall be smoke-tested for leaks and any leaks sealed prior to use;

###### Shall not be used on surfaces whose temperature exceeds 150 deg. F (65.5 deg. C);

###### Shall be collapsed by removing air within them using a HEPA vacuum prior to disposal, and

###### Shall be used only once and disposed of in accordance with section 3.5.