

ASBESTOS

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Background

Federal OSHA began regulating workplace asbestos exposure in 1970, adopting a permissible exposure limit (PEL) to regulate worker exposures. Over the years, more information on the adverse health effects of asbestos exposure has become available, prompting the agency to revise the asbestos standard several times to better protect workers. In 1994, OSHA issued a revised final standard regulating asbestos exposure in all industries. The revised standard for the construction industry lowers the PEL from 0.2 fibers per cubic centimeter (f/cc) of air to 0.1 f/cc.

Approximately 3.2 million workers in new construction, building renovation, and maintenance and custodial¹ work in buildings and industrial facilities are affected by the new standard. OSHA estimates that at least 42 cancer deaths per year will be avoided in all industries, in addition to lives saved by earlier OSHA standards.

Work Classification

OSHA's standard establishes a new classification system for asbestos construction work that clearly spells out work practices that reduce worker exposures. Four classes of construction activity are matched with control requirements.²

Class I asbestos work, the most hazardous class of asbestos jobs, involves the removal of asbestos-containing or presumed-asbestos-containing thermal insulation and sprayed-on or troweled-on surfacing.³ Thermal insulation includes asbestos-containing materials applied to pipes, boilers, tanks, ducts, or other structural components to prevent heat loss or gain. Surfacing materials may include decorative plaster on ceilings, acoustical materials on decking, or fireproofing on structural members.

Class II work includes the removal of other types of asbestos-containing materials that are not thermal insulation, such as flooring and roofing materials. Removing intact incidental roofing materials such as cements, mastics, coatings, and flashings is not regulated as Class II. Examples of Class II work include removal of floor or ceiling tiles, siding, roofing, or transite panels.

¹Pure custodial work in manufacturing facilities is covered by the general industry asbestos standard.

²See Appendix for a list of provisions by work classification.

³This includes thermal system insulation and surfacing material found in buildings constructed before 1981.

When a competent person deems roofing material being removed as intact, the roofing contractor may make a negative exposure assessment and avoid initial monitoring if both the following conditions are met:

- Employees have been trained.
- The work practices set forth in the rule are strictly followed.

Class III asbestos work includes repair and maintenance operations where asbestos-containing or presumed-asbestos-containing materials are disturbed.

Class IV operations include maintenance and custodial activities in which employees contact but do not disturb asbestos-containing materials. These activities must be related to the construction project, usually resulting from Class I, II, or III activities.

Scope and Application

The asbestos standard for the construction industry regulates asbestos exposure for the following activities:

- Demolishing or salvaging structures where asbestos is present
- Removing or encapsulating asbestos-containing materials
- Constructing, altering, repairing, maintaining, or renovating asbestos-containing structures or substrates
- Installing asbestos-containing products
- Cleaning up asbestos spills/emergencies
- Transporting, disposing of, storing, containing, and housekeeping involving asbestos or asbestos-containing products on a construction site

Provisions of the Standard

Employers must follow several provisions to comply with the asbestos standard. OSHA has established strict exposure limits and requirements for exposure assessment, medical surveillance, recordkeeping, "Competent Persons," regulated areas, and hazard communication.

Permissible Exposure Limit (PEL) — Employers must ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 f/cc as an eight-hour Time-Weighted Average (TWA).

Excursion limit — Employers must ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1 f/cc as averaged over a sampling period of 30 minutes.

Threshold-Limit Value — Short-Term Exposure Limit (TLV-STEL) is the maximum concentration to which workers can be continuously exposed for a period of up to 15 minutes without suffering irritation, chronic or irreversible tissue change, or narcosis of sufficient degree to increase accident proneness, impair self-rescue, or materially reduce work efficiency, provided that no more than four excursions per day are permitted, with at least 60 minutes between exposure periods, and provided that the daily TLV-TWA also is not exceeded. The STEL is a maximum allowable concentration, or ceiling, not to be exceeded during the 15-minute excursion.

Exposure assessments and monitoring — Employers must assess all asbestos operations for their potential to generate airborne fibers. Employers must use exposure monitoring data to assess employee exposures.

Initial Exposure Assessments

The designated "Competent Person"⁴ must assess exposures immediately before or as the operation begins to determine expected exposures. The assessment must be done in time to comply with all standard requirements triggered by exposure data or the lack of a negative exposure assessment⁵ and to provide information ensuring control systems are appropriate and work properly.

The initial exposure assessment must be based on the following:

- The results of employee exposure monitoring.⁶
- All observations, information, or calculations indicating employee exposure to asbestos, including any previous monitoring.
- The presumption that employees performing Class I asbestos work are exposed in excess of the PEL and STEL until exposure monitoring proves they are not.

Negative Exposure Assessments

For any specific asbestos job that trained employees perform, employers may show that exposure will be below the PEL by performing an assessment and confirming it by the following:

- ❑ “Objective data” demonstrating an asbestos-containing material or activities involving it cannot release airborne fibers in excess of the PEL and STEL.
- ❑ “Historical data” from prior monitoring for similar asbestos jobs performed within 12 months of the current job and obtained during work operations conducted under similar conditions.
- ❑ Employees’ training and experience were no more extensive for previous jobs than training for current employees.
- ❑ Data shows a high degree of certainty that employee exposures will not exceed the PEL and STEL under current conditions.
- ❑ Current initial exposure monitoring used breathing zone air samples representing the eight-hour TWA and 30-minute short-term exposures for each employee in those operations most likely to result in exposures over the PEL for the entire asbestos job.

Exposure Monitoring

Employee exposure measurements must be made from breathing zone air samples representing the eight-hour TWA and 30-minute short-term exposures for each employee.

Employers must take one or more samples representing full-shift exposure to determine the eight-hour TWA exposure in each work area. To determine short-term employee exposures, employers must take one or more samples representing 30-minute exposures for the operations most likely to expose employees above the excursion limit in each work area.

Employers must allow affected employees and their designated representatives to observe any employee exposure monitoring. When observation requires entry into a regulated area, the employer must provide and require the use of appropriate PPE.

⁴Defined by the standard as one who can identify existing asbestos hazards in the workplace and who has the authority to correct these hazards.

⁵A negative exposure assessment demonstrates that employee exposure during an operation is consistently below the PEL.

⁶Unless there has been a negative exposure assessment. In certain less-hazardous operations, the employer may be exempt from monitoring.

Periodic Monitoring

For Class I and II jobs, employers must monitor daily each employee working in a regulated area, unless a negative exposure assessment for the entire operation already exists and nothing has changed. When all employees use supplied-air respirators operated in positive-pressure mode, however, employers may discontinue daily monitoring. If employees are performing Class I work using control methods not recommended in the standard, employers must continue daily monitoring, even when employees use supplied-air respirators.

For operations other than Class I and II, employers must monitor all work in which exposures can exceed the PEL often enough to validate the exposure prediction.

If periodic monitoring shows employee exposures below the PEL and STEL, the employer may discontinue monitoring.

Additional Monitoring

Changes in processes, control equipment, level of personnel experience, or work practices that could result in exposures above the PEL or STEL — regardless of a previous negative exposure assessment for a specific job — require additional monitoring.

Medical Surveillance

Employers must provide a medical surveillance program for all employees:

- Who are or will be exposed to asbestos at or above the PEL or STEL for a total of 30 or more days per year and engage in Class I, II, or III work. (Note: The 30-day requirement excludes days in which less than one hour is spent in Class II or III work when work practices specified by the code are followed.)
- Who wear negative-pressure respirators.

A licensed physician must perform/supervise all medical exams and procedures, which will be provided at no cost to employees and at a reasonable time of day and week.

Employers must make medical exams and consults available to employees:

- Prior to employee assignment to an area where negative-pressure respirators are worn.
- Within 10 working days after the 30th day of exposure for employees assigned to an area where exposure is at or above the PEL for 30 or more days per year.
- At least annually thereafter.
- When the examining physician suggests them more frequently.

If, however, the employee was examined within the past 12 months and that exam meets the criteria of the standard, another medical exam is not required.

Medical exams must include the following:

- A medical and work history.
- Completion of a standardized questionnaire with the initial exam and an abbreviated standardized questionnaire with annual exams.
- A physical exam focusing on the pulmonary and gastrointestinal systems.
- Any other exams or tests suggested by the examining physician.

Employers must provide the examining physician:

- A copy of OSHA's asbestos standard and its appendices.
- A description of the affected employee's duties relating to exposure.
- The employee's representative exposure level or anticipated exposure level.
- A description of any personal protective equipment and respiratory equipment used.
- Information from previous medical exams not otherwise available.

It is the employer's responsibility to obtain the physician's written opinion containing results of the medical exam and the following:

- Any medical conditions of the employee that increase health risks from asbestos exposure.
- Any recommended limitations on the employee or protective equipment used.
- A statement that the employee has been informed of the results of the medical exam and any medical conditions resulting from asbestos exposure.

- A statement that the employee has been informed of the increased risk of lung cancer from the combined effect of smoking and asbestos exposure.

The physician must not reveal specific findings or diagnoses unrelated to occupational exposure to asbestos in the written opinion. The employer must provide a copy of the physician's written opinion to the affected employee within 30 days of receipt.

Recordkeeping

Objective data records

If employers use objective data to demonstrate that products made from or containing asbestos cannot release fibers in concentrations at or above the PEL or STEL, they must keep an accurate record for as long as it is relied on and include the following information:

- The exempt product.
- The source of the objective data.
- The testing protocol, test results, and analysis of the material for release of asbestos.
- A description of the exempt operation and support data.
- Other data relevant to operations, materials, processes, or employee exposures.

Monitoring records

Employers must keep the following records of all employee exposure monitoring for at least 30 years:

- Date of measurement.
- The operation involving asbestos exposure that was monitored.
- Sampling and analytical methods used and evidence of their accuracy.
- Number, duration, and results of samples taken.
- Type of protective devices worn.
- Names, social security numbers, and exposures of the employees.

Employers must make exposure records available upon request to affected employees and former employees, their designated representatives, and OSHA.

Medical surveillance records

Employers must keep all medical surveillance records for the duration of the employee's employment plus 30 years, including:

- Employee's name and social security number.
- The employee's medical exam results, including the medical history, questionnaires, responses, test results, and physician's recommendations.
- The physician's written opinions.
- Employee medical complaints related to asbestos exposure.
- A copy of the information provided to the examining physician

Employee medical surveillance records must be available to the subject employee, to anyone having specific written consent of that employee, and to OSHA.

Other recordkeeping requirements

Employers must maintain all employee training records for one year beyond the last date of employment for each employee.

Where data demonstrate presumed-asbestos-containing materials do not contain asbestos, building owners or employers must keep the records for as long as they rely on them. Building owners must maintain written notifications on the identification, location, and quantity of asbestos-containing or presumed-asbestos-containing materials for the duration of ownership and transfer the records to successive owners.

When an employer ceases to do business without a successor to keep the records, the employer must notify the director of the National Institute for Occupational Safety and Health (NIOSH) at least 90 days prior to their disposal and transmit them as requested.

“Competent Person” Requirements

On all construction sites with asbestos operations, employers must name a “Competent Person,” qualified and authorized to ensure worker safety and health, as required by OSHA. Under these requirements for safety and health prevention programs, the competent person must frequently inspect job sites, materials, and equipment.

The competent person must inspect Class I job sites at least once during each work shift and upon employee request. The competent person must inspect Class II and Class III job sites often enough to assess changing conditions and upon employee request.

At Class I or II asbestos-work job sites, the competent person must supervise the following:

- The integrity of regulated areas, enclosures, or other containments by on-site inspection.
- Procedures to control entry and exit of the job site.
- Employee exposure monitoring.
- Employee use of required protective clothing, equipment, and glove bags⁷, if used.
- Proper setup, removal, and performance of engineering controls, work practices, and personal protective equipment.
- Employee use of hygiene facilities and required decontamination procedures.
- Notification requirements.

The competent person must attend a comprehensive training course for contractors and supervisors certified by the U.S. Environmental Protection Agency (EPA) or a state-approved training provider or a course that is equivalent in length and content.

For Class III and IV asbestos work, training must include a course equivalent in length and content to the 16-hour “Operations and Maintenance” course developed by EPA for maintenance and custodial workers.⁸

Regulated Areas

A regulated area is a marked site where employees work with asbestos. It includes any adjoining area(s) where debris and waste from asbestos work accumulates or where airborne concentrations of asbestos exceed or can exceed the PEL.

All Class I, II, and III asbestos work must be done within regulated areas. Only authorized personnel⁹ may enter. The designated competent person supervises all asbestos work performed in the area.

Employers must mark the regulated area in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne asbestos. Critical barriers¹⁰ or negative-pressure enclosures may mark the regulated area.

Posted warning signs marking the area must be easily readable and understandable. The signs must bear the following information:

DANGER

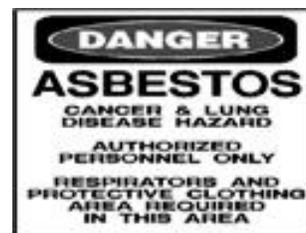
ASBESTOS

CANCER AND LUNG DISEASE HAZARD

AUTHORIZED PERSONNEL ONLY

RESPIRATORY AND PROTECTIVE CLOTHING

ARE REQUIRED IN THIS AREA



Employers must supply a respirator to all persons entering regulated areas. Employees must not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.

An employer performing work in a regulated area must inform other employers on site of the:

- Nature of the work.
- Regulated area requirements.
- Measures taken to protect on-site employees.



The contractor creating or controlling the source of asbestos contamination must abate the hazards. All employers with employees working near regulated areas must assess each day the enclosure's integrity or the effectiveness of control methods to prevent airborne asbestos from migrating.

⁷A plastic bag-like enclosure of an asbestos-containing material, with glove like appendages through which materials and tools may be handled.

⁸ For more specific information, see EPA Standard on Asbestos 40 CFR 763.92(a)(2).

⁹Any person permitted by the employer and required by work duties to be in regulated areas.

¹⁰Plastic sheeting placed over all openings to the work area to prevent airborne asbestos from migrating to an adjacent area.

A general contractor on a construction project must oversee all asbestos work, even though he or she may not be the designated competent person. As supervisor of the entire project, the general contractor determines whether asbestos contractors comply with the standard and ensures that they correct any problems.

Communication of Hazards Notification Requirements

The communication of asbestos hazards is vital to prevent further overexposure. Most asbestos-related construction involves previously installed building materials. Building owners are often the only or best source of information concerning these materials. Building owners and employers of potentially exposed employees have specific duties under the standard.

Before beginning work, building owners must identify all thermal insulation, sprayed or troweled-on surfacing materials, and resilient flooring material installed before 1981. Building owners must notify the following in writing about the possible presence, locations, and quantity of asbestos-containing materials:

- Prospective employers applying or bidding for work in or adjacent to areas containing asbestos.
- All workers in or adjacent to these areas.
- Tenants who may occupy the areas containing asbestos.

All employers discovering asbestos-containing materials on a worksite must notify the building owner and other employers on site within 24 hours. They must inform building owners of the presence, location, and quantity of the asbestos containing-materials. Employers also must inform building owners and employees working in nearby areas of the precautions taken to confine airborne asbestos. Within 10 days of project completion, employers must inform building owners and other employers on site of the location and quantity of remaining asbestos-containing materials and any final monitoring results.

At any time, employers or building owners may demonstrate that a material does not contain asbestos by inspecting the material according to the requirements of the Asbestos Hazard Response Act (40 CFR 763, Subpart E) and by performing tests to prove asbestos is not present.

Employers do not have to inform employees that building materials do not contain asbestos; however, employers must retain the information, data, and analysis supporting the determination.

Signs

At entrances to rooms or areas containing asbestos thermal insulation and surfacing materials, the building owner must post signs identifying the material, its location, and work practices that ensure it is not disturbed.

Employers must post signs in regulated areas to inform employees of the dangers and precautions.



Labels

Employers must attach warning labels to all products and containers of asbestos, including waste containers, and all installed asbestos products, when possible. Labels must be printed in large, bold letters on a contrasting background and used in accordance with OSHA's Hazard Communication Standard.

All labels must contain a statement warning against breathing asbestos fibers and contain the following legend:

DANGER

CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

CANCER AND LUNG DISEASE HAZARD



Labels are not required when asbestos concentration is less than 1 percent by weight or a bonding agent, coating, or binder has altered asbestos fibers, prohibiting the release of airborne asbestos over the PEL or STEL during reasonable use, handling, storage, disposal, processing, or transportation.

When building owners or employers identify previously installed possible-asbestos-containing materials, labels or signs must be attached or posted to inform employees which materials contain asbestos. Attached labels must be clearly noticeable and readable.

Employee Information and Training

General Training Requirements

Employers must provide training for all employees installing and handling asbestos-containing products and for employees performing Class I through IV asbestos operations. Training must be provided at no cost and before or upon beginning these jobs and at least annually thereafter.

Training courses must be easily understandable to employees and must inform them of the following:

- Ways to recognize asbestos.
- Adverse health effects of asbestos exposure.
- The relationship between smoking and asbestos in causing lung cancer.
- Operations that could result in asbestos exposure and the importance of protective controls to minimize exposure.
- The purpose, proper use, fitting instruction, and limitations of respirators.
- The appropriate work practices for performing asbestos jobs.
- Medical surveillance program requirements.
- The contents of the asbestos standard.
- The names, addresses, and phone numbers of public health organizations that provide information and materials or conduct smoking-cessation programs.
- Required signs and labels and their meanings.

The employer also must provide, at no cost to employees, written materials relating to employee training and self-help smoking cessation programs.

Additional Training Based on Work Class

For Class I, training must be equivalent in curriculum, method, and length to the EPA Model Accreditation Plan asbestos abatement worker training (40 CFR 763, Subpart E, Appendix C). Eight hours of annual refresher training is required.

For Class II work involving asbestos-containing material such as roofing, flooring, siding materials, ceiling tiles, or transite panels training must include hands-on training and last at least eight hours. Annual refresher is required; no duration is specified.

For Class III operations, training must be equivalent in curriculum and method to the 16-hour "Operations and Maintenance" course developed by EPA for maintenance and custodial workers whose work disturbs asbestos-containing materials (See 40 CFR 763.92). The course must include hands-on training in proper respirator use and work practices. Annual refresher training is required; no duration is specified.

For Class IV operations, training must be equivalent in curriculum and method to EPA awareness training. Training must focus on locations of asbestos-containing or presumed-asbestos-containing materials and ways to recognize damage and avoid exposure. The course must be at least two hours long. Annual refresher training is required, no duration is specified.

Employers must provide OSHA and the director of NIOSH all information and training materials upon request.

Methods of Compliance

Control Measures

For all covered work, employers must use the following control methods to comply with the PEL and STEL:

- Local exhaust ventilation equipped with HEPA-filter¹¹ dust collection systems.
- Enclosure or isolation of processes producing asbestos dust.
- Ventilation of the regulated area to move contaminated air away from the employees' breathing zone and toward a filtration or collection device equipped with a HEPA filter.
- Engineering and work practice controls to reduce exposure to the lowest possible levels, supplemented by respirators to reach the PEL or STEL or lower.

Employers must use the following engineering controls and work practices for all operations, regardless of exposure levels:

- Vacuum cleaners equipped with HEPA filters to collect all asbestos-containing or presumed-asbestos-containing debris and dust.
- Wet methods or wetting agents to control employee exposures, except when wetting methods would cause electrical hazards, equipment malfunction, slipping hazards or other hazards.
- Prompt cleanup and disposal of asbestos-contaminated wastes and debris in leak-tight containers.

The following work practices and engineering controls are prohibited for all asbestos-related work or work that disturbs asbestos or presumed-asbestos-containing materials, regardless of measured exposure levels or the results of initial exposure assessments:

- High-speed abrasive disc saws not equipped with a point-of-cut ventilator or enclosure with HEPA-filtered exhaust air.
- Compressed air to remove asbestos or asbestos-containing materials unless the compressed air is used with an enclosed ventilation system.
- Dry sweeping, shoveling, or other dry cleanup of dust and debris
- Employee rotation to reduce exposure.

¹¹High-efficiency particulate air (HEPA) filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

OSHA's Asbestos standard established specific requirements for each class of asbestos work in construction:

Class I Work

A designated competent person must supervise all Class I work, including installing and operating the control system. Employers must place barriers over all openings to regulated areas or use another barrier or isolation method to prevent airborne asbestos from migrating for the following:

- Class I jobs removing more than 25 linear or 10 square feet of thermal insulation or surfacing material.
- Other Class I jobs without negative exposure assessments.
- Areas adjacent to a Class I regulated area where employees are working.

Otherwise, employers must perform perimeter area surveillance during each work shift. No asbestos dust should be visible. Perimeter monitoring must show that clearance levels are met (as contained in 40 CFR 763, Subpart E of the "EPA Asbestos in Schools" rule) or that perimeter area levels are no greater than background levels.

For all Class I jobs:

- HVAC systems must be isolated in the regulated area by sealing with a double layer of 6- mil plastic or the equivalent.
- Impermeable drop cloths must be placed on surfaces beneath all removal activity.
- All objects within the regulated area must be covered with secured impermeable drop cloths or plastic sheeting.
- For jobs without a negative exposure assessment or where exposure monitoring shows the PEL is exceeded, employers must ventilate the regulated area to move the contaminated air away from the employee breathing zone and toward a HEPA filtration or collection device.

In addition, employees performing Class I work must use one or more of the following control methods:

- Negative-pressure enclosure systems must be used when the configuration of the work area makes it impossible to erect an enclosure.
- Glove bag systems can be used to remove asbestos-containing or presumed-asbestos-containing materials from straight runs of piping.
- Negative-pressure glove bag systems can be used to remove asbestos or presumed-asbestos-containing materials from piping.
- Negative-pressure glove box systems can be used to remove asbestos or presumed-asbestos-containing materials from pipe runs.
- Water spray process systems may be used to remove asbestos or presumed-asbestos-containing materials from cold-line piping if employees carrying out the process have completed a 40-hour training course on its use in addition to training required for all employees performing Class I work.
- A walk-in enclosure that accommodates no more than two people (mini-enclosure) may be used if the disturbance or removal can be completely contained by the enclosure.

Employers may use different or modified engineering and work practice controls if the following provisions are met:

- The control method encloses, contains, or isolates the process or source of airborne asbestos dust or captures and redirects the dust before it enters into the employees' breathing zone.
- A certified industrial hygienist or licensed professional engineer qualified as a project designer evaluates work area, work practices, and engineering controls. That person must certify, in writing, that the planned control method adequately reduces direct and indirect employee exposure to or below PEL under worst-case conditions. The planned control method must also prevent asbestos contamination outside the regulated area. This must be determined by samplings meeting the requirements of the "EPA Asbestos in Schools" rule or perimeter monitoring.

Class II Work

The competent person must supervise all Class II work.

Employers must use critical barriers over all openings to the regulated area or another barrier or isolation method to prevent airborne asbestos from migrating for the following:

- All indoor Class II jobs without a negative exposure assessment.
- Situations where changing conditions indicate exposure above the PEL.
- Situations where asbestos-containing materials are not removed substantially intact.

Otherwise, employers must perform perimeter area monitoring to verify that the barrier works properly. Impermeable drop cloths must be placed on all surfaces beneath removal activities.

All Class II asbestos work can use the same work practices and requirements as Class I asbestos jobs. Alternatively, Class II work can be performed more easily using simple work practices set out in the standard for specific jobs.

For removing vinyl and asphalt flooring materials containing asbestos or installed in buildings constructed before 1981 and not verified as asbestos-free, employers must ensure employees do the following:

- Not sand flooring or its backing.
- Not rip up resilient sheeting.
- Not dry sweep.
- Not use mechanical chipping unless performed in a negative-pressure enclosure.
- Use vacuums equipped with HEPA filters to clean floors.
- Use wet methods when removing resilient sheeting by cutting.
- Use wet methods to scrape residual adhesives and/or backing.
- Remove tiles intact, unless impossible.
- Omit wetting if tiles are heated and removed intact.
- Assume resilient flooring material, including associated mastic and backing, are asbestos-containing, unless an industrial hygienist determines it asbestos-free.

To remove asbestos-containing roofing materials, employers must ensure that employees do the following:

- Remove them intact.
- Use wet methods when possible.
- Continuously mist cutting machines during use, unless the competent person determines misting to be unsafe.
- Immediately HEPA-vacuum all loose dust along the cut.
- Lower to the ground as soon as possible or by the end of the work shift any unwrapped or un-bagged roofing material in a covered, dust-tight chute, crane, or hoist.
- Transfer unwrapped materials to a closed receptacle to prevent dispersing the dust when lowered.
- Isolate roof-level heating and ventilation air intake sources or shut down the ventilation system.

When removing cementitious asbestos-containing siding and shingles or transite panels, employers must ensure that employees do the following:

- Not cut, abrade, or break siding, shingles, or transite panels unless methods less likely to result in asbestos fiber release cannot be used.
- Spray each panel or shingle with amended water¹² before removing.
- Lower to the ground any unwrapped or un-bagged panels or shingles in a covered dust-tight chute, crane, or hoist or place them in an impervious waste bag or wrap them in plastic sheeting as soon as possible or by the end of the work shift.
- Cut nails with flat, sharp instruments.

When removing asbestos-containing gaskets, employers must ensure that employees:

- Remove gaskets within glove bags if they are visibly deteriorated and unlikely to be removed intact.
- Thoroughly wet the gaskets with amended water prior to removing.
- Immediately place the wet gaskets in a disposal container.
- Scrape, using wet methods to remove residue.

For removal of any other Class II asbestos-containing material, employers must ensure employees do the following:

- Not cut, abrade, or break the material
- Thoroughly wet the material with amended water before and during removal
- Remove the material intact, if possible
- Immediately bag or wrap removed asbestos-containing materials or keep them wet until transferred to a closed receptacle at the end of the work shift

¹²Water to which surfactant (a wetting agent) has been added to increase the ability of the liquid to penetrate an asbestos-containing material.

Employers may use different or modified engineering and work practice controls if either of the following are true:

- They can demonstrate by employee exposure data during the use of such methods and under similar conditions that employee exposure will not exceed the PEL under any anticipated circumstance.
- The competent person evaluates the work area, the projected work practices, and the engineering controls, and certifies in writing that they will reduce all employee exposure to below the PEL under expected conditions. The evaluation must be based on exposure data for conditions closely resembling those of the current job and for employees with equivalent training and experience.

Class III Work

Employers must use wet methods and local exhaust ventilation when feasible during Class III work. Where drilling, cutting, abrading, sanding, chipping, breaking, or sawing thermal insulation or surfacing material occurs, employers must use impermeable drop cloths as well as mini-enclosures, glove bag systems, or other effective isolation methods. Where a negative exposure assessment exists or monitoring shows the PEL is exceeded, employers must contain the area with impermeable drop cloths and plastic barriers or other isolation methods and ensure that employees wear respirators.

Class IV Work

Employees conducting Class IV asbestos work must have attended an asbestos-awareness training program. Employees must use wet methods and HEPA vacuums to promptly clean asbestos-containing or presumed-asbestos-containing debris. When cleaning debris and waste in regulated areas, employees must wear respirators. In areas where thermal insulation or surfacing material is present, employees must assume that all waste and debris contain asbestos.

Respiratory Protection

Respirators must be used for the following:

- Class I asbestos jobs.
- Class II work where an asbestos-containing material is not removed substantially intact.
- Class II and III work not using wet methods.
- Class II and III work without a negative exposure assessment.
- Class III jobs where asbestos-containing or presumed-asbestos-containing thermal insulation or surfacing material is cut, abraded, or broken.
- Class IV work within a regulated area where respirators are required.
- Work where employees are exposed above the PEL or STEL and in emergencies.

Employers must provide respirators at no cost to employees, selecting the appropriate type from among those approved by the Mine Safety and Health Administration (MSHA) and NIOSH.

For all employees performing Class I work in regulated areas and for jobs without a negative exposure assessment, employers must provide full-face-piece supplied-air respirators operated in pressure-demand mode and equipped with an auxiliary positive-pressure, self-contained breathing apparatus.¹³ However, a tight-fitting powered air-purifying respirator (PAPR) is permitted if the exposure assessment and monitoring show that the exposure levels do not exceed 1 f/cc as an eight-hour TWA. When the PAPR is used, either HEPA egress cartridges or auxiliary bottles of air for supplied-air respirators are allowed.

Employers must institute a respiratory program in accordance with OSHA's Respiratory Protection requirements. Employers must permit employees using filter respirators to change the filters when breathing resistance increases; employers must maintain an adequate supply of filters. Employers must permit employees wearing respirators to leave work areas to wash their faces and respirator face-pieces to prevent skin irritation.

Employers must ensure that respirators fit properly, with minimal face-piece leakage. For employees wearing negative-pressure respirators, employers must perform initial quantitative or qualitative face-fit tests and at least every six months thereafter. The qualitative fit tests can only be used for fit testing half-mask respirators (where permitted) or for full-face-piece air-purifying respirators (where they are worn at levels where half-face-piece air-purifying respirators are permitted). Employers must conduct qualitative and quantitative fit tests in accordance with OSHA's Respiratory Protection standard and use the tests to select face-pieces that provide the required protection.

Employers must not assign any employee to tasks requiring respirator use if physical exams and the examining physician's recommendations show that he or she would be unable to function normally while using a respirator. Employers must assign such employees to other jobs or give them the opportunity to transfer to different positions in the same geographical area and with the same seniority, status, pay rate, and job benefits, if such positions are available.

Protective Clothing

Employers must provide and require the use of protective clothing such as coveralls or similar whole-body clothing, head coverings, gloves, and foot coverings for the following:

- ❑ Any employee exposed to airborne asbestos exceeding the PEL or STEL.
- ❑ Work without a negative exposure assessment.
- ❑ Any employee performing Class I work involving the removal of over 25 linear or 10 square feet of asbestos-containing or presumed-asbestos-containing thermal insulation or surfacing materials.

Employers must launder contaminated clothing to prevent the release of airborne asbestos in excess of the PEL or STEL. Any employer who gives contaminated clothing to another person for laundering must inform him or her of the contamination.

Employers must transport contaminated clothing in sealed, impermeable bags or other closed impermeable containers bearing appropriate labels.

The competent person must examine employee work-suits at least once per work-shift for rips or tears. Rips or tears found while the employee is working must be mended or replaced immediately.

¹³Unless the "Competent Person" determines that wearing such a respirator is not feasible, in which case a tight-fitting powered air-purifying respirator may be worn. Employers must provide half-mask purifying respirators equipped with high-efficiency filters for Class II and III asbestos jobs without a negative exposure assessment and for Class III jobs where work disturbs asbestos-containing or presumed-asbestos-containing thermal insulation or surfacing materials.

Hygiene Facilities

Decontamination Requirements for Class I Asbestos Work

For employees performing Class I asbestos jobs involving more than 25 linear or 10 square feet of asbestos-containing or presumed-asbestos-containing thermal insulation or surfacing materials, employers must create a decontamination area adjacent to and connected with the regulated area. Employees must enter and exit the regulated area through the decontamination area.

The decontamination area must be composed of an equipment room, shower area, and clean room in series. The equipment room must be supplied with impermeable, labeled bags and containers to store and dispose of contaminated protective equipment. Shower facilities must be adjacent to both the equipment and clean rooms, unless work is performed outdoors or this arrangement is impractical. If so, employers must ensure that employees remove asbestos contamination from their work-suits in the equipment room using a HEPA vacuum before proceeding to a shower nonadjacent to the work area or remove their contaminated work-suits in the equipment room, don clean work-suits, and proceed to a shower non-adjacent to the work area.

The clean room must have a locker or appropriate storage container for each employee unless work is performed outdoors or this arrangement is not possible. In such a case, employees may clean protective clothing with a portable HEPA vacuum before leaving the regulated area. Employees must change into street clothes in clean change areas.

Before entering the regulated area, employees must enter the decontamination area through the clean room, remove and deposit street clothing in a provided locker, and put on protective clothing and respiratory protection before leaving the clean area. To enter the regulated area, employees must pass through the equipment room.

Before exiting the regulated area, employees must remove all gross contamination and debris and then remove their protective clothing in the equipment room, depositing the clothing in labeled, impermeable bags or containers. Employees must shower before entering the clean room to change into street clothing.

When employees consume food or beverages at the Class I worksite, employers must provide lunch areas with airborne asbestos levels below the PEL and/or excursion limit.

Decontamination Requirements for Other Class I and Class II and III Asbestos Work without a Negative Exposure Assessment and Where Exposures Exceed the PEL

Employers must establish an equipment area adjacent to the regulated area for the decontamination of employees and their equipment. The area must be covered by an impermeable drop cloth on the floor (or horizontal work surface) and must be large enough to accommodate equipment cleaning and personal protective equipment removal without spreading contamination beyond the area. Before removing work clothing, employees must clean it with a HEPA vacuum. All equipment and the surfaces of containers filled with asbestos-containing materials must be cleaned prior to removal. Employers must ensure employees enter and exit the regulated area through the equipment area.

Decontamination requirements for Class IV work

Employers must ensure employees performing Class IV work within a regulated area comply with the hygiene practices required of employees performing work with higher classifications in that regulated area. Otherwise, employees cleaning up thermal system insulation or asbestos-containing debris must use decontamination facilities required for Class II and III work where exposure exceeds the PEL or no negative exposure assessment exists.

Smoking

Employers must ensure that employees performing any class of asbestos work do not smoke in any work area with asbestos exposure.

Housekeeping

Asbestos waste, scrap, debris, bags, containers, equipment, and contaminated clothing consigned for disposal must be collected and disposed of in sealed, labeled, impermeable bags or other closed, labeled impermeable containers. Employees must use HEPA-filtered vacuuming equipment and must empty it so as to minimize asbestos reentry into the workplace.

All vinyl and asphalt flooring material must remain intact unless the building owner demonstrates that the flooring does not contain asbestos. Sanding flooring material is prohibited. Employees stripping finishes must use wet methods and low abrasion pads at speeds lower than 300 revolutions per minute. Burnishing or dry buffing may be done only on flooring with enough finish that the pad cannot contact the flooring material. Employees must not dust, sweep, or vacuum without a HEPA filter in an area containing thermal insulation or surfacing material or visibly deteriorated asbestos-containing materials. Employees must promptly clean and dispose of dust and debris in leak-tight containers.

Provision Reference Guide (By Class of Work)

Provision	Class I	Class II	Class III	Class IV
Definition	Removal of thermal insulation and surfacing materials	Removal of all other asbestos not thermal insulation or surfacing materials	Maintenance and repair operations disturbing asbestos-containing materials	Housekeeping and custodial operations (including constructions site cleanup)
Regulated Areas	Required (signs required)	Required (signs required)	Required (signs required)	Required (signs required)
Competent Person	Required on site: -Inspect each work-shift -Contractors and supervisors training required	Required on site: -Inspect often -Contractors and supervisors training required	Required on site: -Inspect often -Operations and maintenance required	Required on site: -Inspect often -Operations and maintenance required
Air Monitoring	-Initial if no Negative Exposure Assessment (NEA) -Daily if no NEA -Terminate if < Permissible Exposure Limit (PEL) -Additional if conditions change	-Initial if no NEA -Daily if no NEA -Terminate if < PEL -Additional if conditions change	-Initial if not NEA -Periodic to accurately predict if > PEL -Terminate if < PEL -Additional if conditions change	
Medical Surveillance	Required if: -Wearing negative pressure respirator -> PEL -> 30 days exposure/year	Required if: -Wearing negative pressure respirator -> PEL -> 30 days exposure/year	Required if: -Wearing negative pressure respirator -> PEL -> 30 days exposure/year	Required if: -Wearing negative pressure respirator -> PEL
Respirators	Mandatory for all Class I jobs	Mandatory if: -Non-intact removal -No NEA -> PEL -Dry removal (Except roofing) -In emergencies	Half-mask air-purifying respirator minimum if: -No NEA -Thermal insulation or surfacing materials disturbed -> PEL Mandatory if: -Dry removal (Except roofing) -In emergencies	Mandatory if: -In regulated area when required -If > PEL -In emergencies
Protective Clothing and Equipment	Required for all jobs if: -> 25 linear or 10 ft ² of thermal insulation or surfacing materials removal -No NEA -> PEL	Required for all jobs if: -No NEA -> PEL	Required for all jobs if: -No NEA -> PEL	Required for all jobs if: -No NEA -> PEL
Training	Equivalent to Asbestos Hazard Response Act (AHERA) worker course	Equivalent to Asbestos Hazard Response Act (AHERA) worker course	Equivalent to AHERA operations and maintenance course	Equivalent to AHERA awareness training

Provision	Class I	Class II	Class III	Class IV
Decontamination Procedures	<p>Full decon unit required if >25 linear or 10 ft² of thermal insulation or surfacing materials removal:</p> <ul style="list-style-type: none"> -Connected shower/clean room required -Vacuum, change, shower elsewhere -Detailed procedures <p>-Lunch area required</p> <p>-If < 25 linear or 10 ft² of thermal insulation or surfacing materials removal or > PEL or no NEA:</p> <ul style="list-style-type: none"> -Equipment room/area required -Drop cloths required -Area must accommodate cleanup -Must decontaminate all personal protective equipment -Must enter regulated area through equipment room/decon area <p>-No smoking in work area</p>	<p>If > PEL or no NEA:</p> <ul style="list-style-type: none"> -Equipment room/area required -Drop cloths required -Area must accommodate cleanup -Must decontaminate all personal protective equipment -Must enter regulated area through equipment room/decon area <p>-No smoking in work area</p>	<p>If > PEL or no NEA:</p> <ul style="list-style-type: none"> -Equipment room/area required -Drop cloths required -Area must accommodate cleanup -Must decontaminate all personal protective equipment -Must enter regulated area through equipment room/decon area <p>-If NEA, must vacuum</p> <p>-No smoking in work area</p>	<p>If > PEL or no NEA:</p> <ul style="list-style-type: none"> -Equipment room/area required -Drop cloths required -Area must accommodate cleanup -Must decontaminate all personal protective equipment -Must enter regulated area through equipment room/decon area <p>-If NEA, must vacuum</p> <p>-No smoking in work area</p>
Required Work Practices and Engineering Controls	<ul style="list-style-type: none"> -Wet methods -HEPA vacuum -Prompt cleanup/disposal 	<ul style="list-style-type: none"> -Wet methods -HEPA vacuum -Prompt cleanup/disposal 	<ul style="list-style-type: none"> -Wet methods -HEPA vacuum -Prompt cleanup/disposal 	<ul style="list-style-type: none"> -Wet methods -HEPA vacuum -Prompt cleanup/disposal
Required Work Practices and Engineering Controls to Comply with Permissible Exposure Limit (PEL)	<ul style="list-style-type: none"> -HEPA local exhaust -Enclosure -Directed ventilation -Other work practices -Supplement with respirators 	<ul style="list-style-type: none"> -HEPA local exhaust -Enclosure -Directed ventilation -Other work practices -Supplement with respirators 	<ul style="list-style-type: none"> -HEPA local exhaust -Enclosure -Directed ventilation -Other work practices -Supplement with respirators 	<ul style="list-style-type: none"> -HEPA local exhaust -Enclosure -Directed ventilation -Other work practices -Supplement with respirators
Prohibited Work Practices and Engineering Controls	<ul style="list-style-type: none"> -High-speed abrasive disc saws without HEPA -Compressed air without capture device -Dry sweeping/shoveling -Employee rotation 	<ul style="list-style-type: none"> -High-speed abrasive disc saws without HEPA -Compressed air without capture device -Dry sweeping/shoveling -Employee rotation 	<ul style="list-style-type: none"> -High-speed abrasive disc saws without HEPA -Compressed air without capture device -Dry sweeping/shoveling -Employee rotation 	<ul style="list-style-type: none"> -High-speed abrasive disc saws without HEPA -Compressed air without capture device -Dry sweeping/shoveling -Employee rotation

<i>Provision</i>	<i>Class I</i>	<i>Class II</i>	<i>Class III</i>	<i>Class IV</i>
<p>Controls and Work Practices</p>	<p>-Critical barriers/ isolation methods required if:</p> <p>* > 25 linear or 10 ft² of thermal insulation or surfacing materials removal * < 25 linear or 10 ft² of thermal insulation or surfacing materials removal only if no NEA or adjacent workers -HVAC isolation required -Drop cloths required -Directed ventilation required if no NEA or > PEL</p> <p>Also, one or more of the following controls must be used:</p> <p>-Negative-pressure enclosure -Glove bag for straight runs of pipe -Negative-pressure glove box for pipe runs -Water spray process -Mini-enclosure</p>	<p>For indoor work only:</p> <p>-Critical barriers/ isolation methods required if:</p> <p>*No NEA *Likely > PEL *Non-intact removal -Drop cloths required</p> <p>If > PEL, must use:</p> <p>-Local HEPA exhaust -Process isolation -Directed ventilation -Additional feasible controls supplemented with respirators</p> <p>For removal of vinyl and asphalt flooring:</p> <p>-No sanding -HEPA vacuum -Wet methods -No dry sweeping -Chipping done in negative-pressure enclosure -Intact removal, if possible -Dry heat removal allowed -Assume contains asbestos without an analysis</p> <p>For removal of built-up roofing or asbestos -cement shingles:</p> <p>-Intact removal, if possible -Wet methods -Lower in dust-tight chute by day's end -Cut nail heads</p> <p>For removing gaskets:</p> <p>-Use glove bags if not intact -Wet removal -Prompt disposal -Wet Scraping</p> <p>Other requirements:</p> <p>-Wet Methods -Intact removal, if possible -Cutting, abrading, or breaking prohibited</p>	<p>-Critical barriers required if :</p> <p>*No NEA *PEL via monitoring -Drop cloths required -Local HEPA exhaust required</p> <p>Enclosure or isolation of operation required if:</p> <p>-TSI or SM is drilled, cut, abraded, sanded, sawed, or chipped</p>	<p>See Required Work Practices and Engineering Controls</p>

