

Chapter 12

Protective Clothing

General Information

Protective clothing is worn during inspections of active asbestos removal projects to prevent asbestos exposure, reduce skin irritation, ease decontamination and comply with regulatory requirements.

Asbestos is a known cause of asbestosis, mesothelioma, lung cancer and other ailments. Using protective clothing and following proper decontamination procedures help to protect the inspector and his/her family members by preventing asbestos from being brought home from the worksite.

Use of protective clothing can also reduce the occurrence of skin problems associated with ACM contact. ACM commonly contains substances such as mineral wool, fiberglass, plaster and cement that can produce rashes in sensitive individuals. Long-term exposure to ACM can also lead to the development of “asbestos warts” (benign skin growths).

Protective clothing can also ease the decontamination process. Following an inspection, an improperly protected individual will find it very difficult to remove ACM from his/her clothing, skin and hair. There is no assurance that contaminated street clothing can be entirely decontaminated via standard washing.

Also, OSHA, in its asbestos standards, specifically requires the use of protective clothing in most situations where asbestos has been or is being disturbed.

Selection of Personal Protective Clothing

Disposable coveralls, foot and head coverings, and gloves are commonly worn in contaminated environments. These items are available in many styles and materials. The advantage of a particular style depends on what type of inspection is being conducted.

Inspectors must decide whether protective clothing is necessary during inspection of pre-removal, post-removal and outside worksites. In general, protective clothing must be worn any time friable ACM is being disturbed (e.g., while inspecting an operating abatement site) or if there is any uncertainty as to the adequacy of cleanup of an area. Inspectors also must wear protective clothing when examining asbestos waste storage areas and when opening bags of Asbestos Containing Waste Material (ACWM).

Recommended Protective Clothing

Protective outer garments are made of a wide variety of materials for many purposes. The basic outer garment is a full body coverall (with a hood and foot coverings attached). Where foot coverings are not attached, separate disposable foot covers should be used. This issue is discussed below.

Two categories of full body coveralls exist: non-breathable (such as Tyvek®) and breathable (such as KleenGuard®).

Non-breathable fabrics provide good protection from asbestos contamination and the best protection from chemical exposure; however they can add significantly to heat stress. When chemical exposures are not a principal concern, the asbestos worksite personnel often use breathable suits to lower the potential for heat stress.

Both breathable and non-breathable outer garments tear easily, especially at high stress areas (armpits, crotch). Applying duct tape to these areas strengthens the seams. OSHA requires suits to remain intact so holes and tears must be mended or, if necessary, the suit replaced.

Disposable coveralls come in a variety of sizes; even individuals who are tall or heavy should be able to purchase appropriate outer garments.

A portion of the following information has been extracted from EPA's *Health and Safety Guidelines for EPA Asbestos Inspectors*. Requirements from the OSHA asbestos construction standard are also included.

Removal, Demolition, and Renovation Inspections

Inspectors should be prepared to wear the following protective clothing when entering a removal, demolition, or renovation area:

- disposable, full-body outer coveralls.

Those with attached hoods and foot covers are preferable. Coveralls with an expanded back should be worn with an SCBA. In certain cases, an inspector may be required to use chemically resistant (e.g., Tyvek®) or fire retardant coveralls.

- a bathing suit (or equivalent) or inner disposable coveralls.

When a changing or decontamination area is available, all street clothing should be removed before donning protective clothing. When clothing is removed, the inspector may choose to wear a bathing suit under the protective clothing. If it is not possible to remove street clothing, the inspector should roll up pant legs and sleeves and don inner disposable coveralls. Outer coveralls are then worn over the bathing suit or inner coveralls.

- disposable gloves taped to the outer coveralls.

Gloves should be chosen that are appropriate to the hazards on the job site. Latex gloves are not the best choice for many chemicals. If chemical hazards are not present, cotton work gloves are considered a minimum for proper hand protection.

- disposable booties (e.g., Tyvek® or equivalent, if the coveralls do not have attached foot covering).
- rubber boots with steel toes and shanks.

The use of easily-decontaminated knee high rubber boots is a general industry practice. It is preferred, and in some cases required, to wear boots having steel toes and shanks. These are worn over the disposable coverall foot covers or disposable booties.

- disposable outer booties (water-resistant material) taped to outer coveralls.

Individuals entering areas of known or suspect hazardous chemicals or waste may be required to use disposable outer booties.

- hard hats, safety glasses, safety shoes, hearing protection, when required by the situation or by the owner/operator.

On many industrial and commercial sites the use of these items are mandatory and there are significant OSHA requirements for their use. If standard leather safety shoes are the protective footwear available, outer disposable booties should be used to avoid contamination which can be tracked from the site.

Collecting Bulk Samples

Inspectors should wear the following protective clothing over their street clothes when collecting bulk samples whenever there is a significant chance of releasing fibers or when entering areas that may contain significantly damaged ACM:

- disposable, full-body, hooded coveralls;
- eye and head protection as needed;
- disposable gloves and shoe coverings.

Waste Disposal and Storage Site Inspections

Inspectors should wear the following protective clothing over their street clothes when inspecting asbestos waste disposal and storage sites:

- disposable, full-body, hooded coveralls;
- disposable gloves and shoe coverings.

Abandoned Building Inspections

Inspectors should wear, or carry with them, the following protective clothing while inspecting an abandoned building:

- disposable, full-body, hooded coveralls;
- eye and head protection as needed;
- disposable gloves and shoe coverings.

Operational Practices for Entering and Exiting Sites

Since inspectors visit many different types of asbestos sites, the *Health and Safety Guidelines for EPA Asbestos Inspectors* describes procedures to be followed at sites that do and do not have functional three-stage decontamination systems.

Entering and Exiting Site with a Three-Stage Decontamination System

A three-stage decontamination system consists of a clean room, shower room, and equipment room (sometimes referred to as a dirty room) adjacent and connected to the regulated area. A detailed description of this type of decontamination system can be found in Section (j), *Hygiene facilities and practices for employees*, in OSHA's *Construction Standard*, 29 CFR 1926.1101. An operating three-stage decontamination system is required to be attached to all Class I work areas. All persons entering and exiting the area must decontaminate as described below:

Prior to Entering the Clean Room

- Ask the site operator for permission to dispose of any ACWM you might create during the inspection.
- Examine the respirator thoroughly to determine whether it will function properly.
- Make sure that you have all materials and equipment necessary to conduct the inspection safely (e.g., protective clothing, respirator, duct tape, extra plastic bags, spray bottle, disposable towels, flashlight, camera, etc.). All materials carried into the contaminated area should be sealed in a plastic bag to minimize contamination.
- If you take a camera that is not waterproof into the contaminated area, seal it in an impermeable clear camera box to protect it and facilitate decontamination.

In the Clean Room

- Remove all street clothing including socks and underwear. If desired, don a bathing suit (or equivalent). If a clean storage area is available hang or store clothing in facilities provided; otherwise, seal removed clothing in a clean plastic bag to avoid any contamination.

- Don disposable, full-body, hooded coveralls. Do not yet put on the hood or zip up the suit.
- Since disposable garment booties rip quite easily, wear disposable, reinforced, or steel-shank/steel-toe or washable rubber boots over coveralls. If steel-toed boots will be used elsewhere, disposable rubber (or equivalent) covers must be used to prevent contamination. Use duct tape to attach boots to coveralls.

Note: Inspectors should NEVER use disposable garment booties as the only foot covering. This could result in significant foot injuries and would constitute an OSHA violation.

- Don respirator facepiece and tighten straps. Perform negative-and positive-pressure seal check for air-purifying respirators.
- Fit the hood of the coveralls snugly around the respirator facepiece and zip up the coveralls. Use duct tape to close gap at neck if desired.
- Don disposable gloves. Use duct tape to seal them to the coveralls.
- Proceed to the shower area; leave disposable towels (sealed in a plastic bag), an extra plastic bag and soap near the shower.
- Proceed through the equipment room to the contaminated area and conduct the inspection.

Before Leaving the Contaminated Area

- While standing near the exit, HEPA vacuum (if possible) and wet wipe all visible debris from protective clothing, sample containers, sampling equipment, and any other items which are being taken out of the work area. (Use a spray bottle and disposable towels as necessary). Proceed to the equipment room.

In the Equipment Room

- Decontaminate, as much as possible, all non-disposable equipment including footwear. If decontamination is not possible, seal all contaminated non-disposable materials in a plastic bag and take them with you to decontaminate later.
- While still wearing the respirator, carefully remove the outer boots or booties and gloves and take off the coveralls, rolling them inside out in the process. If a PAPR is worn, remove the belt that supports the motor/filter unit and hold the unit while removing coveralls.

- Place all disposable contaminated protective clothing in a proper waste disposal container and place non-disposable items in the shower.
- Wearing only the respirator and bathing suit, proceed to the shower.

In the Shower Area

- While keeping the respirator as dry as possible, clean non-disposable items and place them in the clean room just outside of the shower (without leaving the shower).
- Thoroughly wet the entire body. Remove respirator. Soak and dispose of HEPA filter cartridges as asbestos-containing waste (if permitted, and if the waste container in the equipment room is accessible from the shower, place the soaked cartridges there). Clean respirator and place it into the clean room.
- If wearing a bathing suit, remove and thoroughly rinse it, put it in a plastic bag, and place it in the clean room. Finish showering, thoroughly washing the entire body with soap and water.
- Proceed to the clean room.

In the Clean Room

- Dry off and dress in street clothes.
- If available and permitted, place all disposables (including used towels) in labeled asbestos waste bags provided on site. Otherwise, place disposables in labeled plastic bags and remove them for proper disposal.

Entering and Exiting Sites without a Three-Stage Decontamination System

Inspections are often required at sites where a three-stage decontamination system is not available. When confronted with such a situation, the inspector must use his or her judgment regarding the safest method of conducting the inspection.

Before Entering the Contaminated Area

- Examine the respirator thoroughly to determine whether it will function properly.
- Make sure you have all materials and equipment necessary to conduct the inspection safely (e.g., protective clothing, respirator, duct tape, extra plastic bags, spray bottle, disposable towels, flashlight, camera, etc.). All materials carried into the contaminated area should be sealed in a plastic bag to minimize contamination.
- If you take a camera that is not waterproof into the contaminated area, seal it in an impermeable clear camera box to protect it and facilitate decontamination.

- Leave all street clothing on. Short-sleeve shirts and short pants are preferable. If you are wearing long pants or long sleeves, roll them up.
- Don inner booties and inner disposal coveralls over street clothes. (Inner footwear and foot coverings will not be necessary if steel-shank/steel-toe or washable boots are worn).
- Don outer disposable coveralls.
- Since disposable garment booties will rip quite easily, wear disposable, reinforced, or steel-shank/steel-toe or washable rubber boots over coveralls. If steel toe boots will be used elsewhere, disposable rubber (or equivalent) covers must be used to prevent contamination. Duct tape can be used to attach boots to coveralls.

Note: Inspectors should NEVER use disposable garment booties as the only covering for feet. This could result in significant foot injuries and would constitute an OSHA violation.

- Fit the respirator facepiece to the face, tighten the facepiece straps and perform negative-and positive-pressure field checks for air-purifying respirator.
- Fit the hood of the coveralls snugly around the respirator facepiece and zip up the coveralls.
- Don disposable gloves; use duct tape to seal gloves to the sleeves of the outer coveralls.
- Proceed to the contaminated area and conduct the inspection.

Before Leaving the Contaminated Area

- While standing near the exit, HEPA vacuum (if possible) and wet wipe all visible debris from the outer protective clothing. Use a spray bottle containing amended water and disposable towels to wet wipe the suit; use plenty of water. Standing at the doorway inside the work area, remove outer protective clothing and immediately step outside the area. Place all disposable materials in a proper container for disposal.

Outside the Contaminated Area

- Once outside, thoroughly wet wipe and mist spray the respirator and inner protective clothing. Move away from the doorway and remove the respirator and inner protective clothing. Place all disposable materials into a proper container for disposal.
- Seal all contaminated non-disposable materials in a plastic bag and take them with you to decontaminate later.

Disposal of Contaminated Clothing

Contaminated or potentially contaminated protective clothing worn during asbestos inspections should be discarded as asbestos-containing waste. Other asbestos-contaminated waste materials include coveralls, disposable boots, disposable gloves, respirator cartridges, and other items such as paper towels or wet wipes. Inspectors can usually discard their ACWM in appropriate waste containers provided by the owner/operator. Since the owner/operator must treat the waste disposed in this container as asbestos-containing, the inspector can assume that the material he or she discards will be disposed of properly. Although this procedure is generally acceptable, it is always a good idea to obtain permission from the owner/operator before discarding contaminated clothing.

There will be cases, however, when disposal of contaminated clothing will present a problem to the inspector. For example, the inspector may be conducting an inspection where the owner/operator is not properly disposing of waste, or where permission to discard inspector waste is not granted. In such cases, proper handling and subsequent disposal of contaminated materials become the responsibility of the inspector. It is important, therefore, that the inspector bring an appropriately-labeled asbestos waste bag to the site and dispose of it later in accordance with agency policy.