

ASBESTOS REMOVAL STANDARD

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1. SCOPE

This standard covers the precautionary measures to follow when removing asbestos-containing materials as well as legal requirements as mandated by 29 CFR 1926.58, the standard which covers all construction work involving asbestos. The scope of this engineering standard is limited to those requirements and recommendations having to do with asbestos removal. Other requirements of 29 CFR 1926.58 such as the labeling of intact asbestos insulation and the general industry requirements from 29 CFR 1910.1001 will not be discussed here. More than half of the states have laws related to asbestos. Those unique state regulations are not covered in this standard, but whenever state requirements are more stringent, they should be followed over the Federal regulations.

Asbestos was used extensively in the past for insulating boilers, furnace linings, steam pipe covering, duct work, gaskets, brake linings, sound insulation, roofing, floor tiles, and for general fireproofing. When materials are suspected of containing asbestos, assume that they do unless current analytical testing confirms otherwise. Samples of bulk material can be analyzed by the Environmental Health Laboratory at Alcoa Technical Center. Additional discussion of sample analysis is included in Section 2.2 on sampling. For purposes of this engineering standard, materials will be classified as asbestos containing materials (ACM) if they contain greater than 0.1% asbestos.

New limits imposed by 29 CFR 1926.58 are a permissible exposure limit (PEL) of 0.2 fiber/cubic centimeter of air (0.2 f/cc) and an action level of 0.1 f/cc. Many of the requirements of the OSHA asbestos standard for construction are predicated upon levels of airborne asbestos compared to these limits.

ASBESTOS REMOVAL CHECKLIST

1. Industrial hygienist and/or environmental engineer must be contacted prior to removal of any materials suspected of containing asbestos.
2. Obtain current, reliable analysis of materials suspected of containing asbestos.
3. Notification procedures consistent with Federal and local regulations must be followed.
4. Employees involved in asbestos removal operations must have had training or certification where required within the last 12 months.
5. Appropriate medical surveillance as well as employee fitness to wear a respirator must be addressed.
6. Employee respirator fit tests must be current.
7. Appropriate protective clothing must be specified and worn for each job.
8. Regulated areas, with asbestos warning signs, must be established where air concentrations could exceed the PEL.
9. Large Asbestos Demolition/Renovation Projects must be done in negative pressure enclosures whenever feasible.
10. Competent persons must supervise activities within regulated areas of large scale jobs.
11. Initial personal exposure monitoring is required at the beginning of each job.
12. Daily exposure monitoring is required for large scale demolition renovation projects.
13. Work area must receive a thorough visual inspection after the clean-up phase to insure adequate clean-up. Air monitoring may also be warranted to document safe exposure levels.



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2.2.1 Bulk Sampling

During planning phases of asbestos removal jobs, it is recommended that asbestos bulk sampling be conducted to determine the extent of asbestos containing materials (ACM). Bulk sampling conducted previously is sufficient to serve this purpose if the results of that previous sampling were conducted using methods sufficiently sensitive to detect the presence of asbestos at 0.1% and the results are considered by the location Industrial Hygienist to be reliable. Recommended test methods are polarized light microscopy or other methods of equal or greater precision. Alcoa's Environmental Health Laboratory has the capability of conducting this analysis and is involved in an N.B.S. (National Bureau of Standards) quality assurance program to maintain analytical accuracy. Arrangements can be made with EHL to analyze rush samples by contacting them prior to sampling and by sending samples via overnight express mail. Any outside laboratory used for bulk asbestos sample analysis must use comparable analytical methods and maintain a quality assurance program.

2.2.2 Air Monitoring - Personal Exposures

Personal air samples are required by the construction standard. Appendix A, a mandatory appendix to the Asbestos Standard, describes NIOSH Method 7400 including both sampling and analytical procedures. NIOSH Method 7400 utilizes a 25 mm diameter open face cassette with a 50 mm extension cowl. Written justification must be made if another method is used. Additionally, the Asbestos Standard mandates a laboratory quality assurance program to be instituted by laboratories conducting analysis of samples required by this standard. ATC's EHL has instituted a quality assurance program to meet the specific requirements of 29 CFR 1926.58. If other laboratories are used, they must also have acceptable QA programs.

All personal air samples are required to be taken in the employees breathing zone. Sufficient samples should be taken to be representative of each employee's 8-hour (full shift) exposure. Effected employees, or their designated representatives, have the right under the OSHA regulation to observe any monitoring of employee exposure to asbestos. Written results of personal asbestos monitoring are required to be made available to effected employees within 15 days of the receipt of such results. Just as with all personal sampling results, OSHA Record Retention Requirements, 29 CFR 1910-20, mandate that they be kept for the duration of the individual's employment plus 30 years.

Initial monitoring is required at the beginning of each asbestos job to determine the asbestos concentrations to which employees will be exposed. Exceptions to this requirement are when there is objective data to indicate that the ACM cannot release fibers in concentrations exceeding the action level or when there is historical data for closely resembling conditions.

Daily monitoring is required for large scale demolition renovation projects. Large scale demolition renovation projects are defined by examples under Section 2.6 Work Practices. The definition of large scale demolition renovation projects pre-supposes that the employee exposures will exceed the action level of 0.1 fibers per cubic centimeter of air (0.1 f/cc). There must be sufficient samples to represent exposures of each employee assigned to work in the regulated work area. Regulated work areas are also explained further in Section 2.6. EHL recommends minimum sample time of 2 hours at 2 lpm.

2.2.3 Air Sampling - Area Sampling

While area sampling is not required by the asbestos regulations, it may be prudent in some circumstances. Area sampling is recommended in the non-mandatory Appendix E of the OSHA Construction Standard for Asbestos for large scale asbestos removal projects which utilize negative air pressure enclosures. Area samples are recommended in the work area, in the clean change room at the periphery of the restricted area, and in the area of the portable ventilation unit exhaust. Additional area samples are recommended in the asbestos removal area following cleanup. The enclosure should not be dismantled unless final clearance samples are below the OSHA action level of 0.1 f/cc. EPA recommends that these clearance samples be less than 0.01 f/cc for schools. Areas such as offices, lunchrooms, and control rooms should meet the EPA's recommended "clearance level" of 0.01 f/cc. Clearance sampling for the purpose of determining the adequacy of cleanup is done after surfaces in the work area have been allowed to dry thoroughly. Use of forced air equipment is sometimes used to conduct aggressive sampling in order to dislodge any stray fibers from surfaces and thereby represent worst case conditions.



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Exposure Level (X)	Respirator Type
$X \leq 10$ (PEL)	- 1/2 mask HEPA
10 (PEL) $< X \leq 50$ (PEL)	- Full facepiece HEPA
50 (PEL) $< X \leq 100$ (PEL)	- PAPR HEPA - 1/2 mask supplied air (positive pressure mode)
100 (PEL) $< X \leq 1000$ (PEL)	- Full face supplied air (positive pressure mode)
$X > 1000$ (PEL)	- Full face supplied air with auxiliary SCBA

PEL - OSHA permissible exposure limit - 0.2 f/cc
HEPA - High efficiency particulate absolute
SCBA - Self contained breathing apparatus

Reusable respirators should be thoroughly cleaned with a damp rag to remove any asbestos contamination prior to sanitization and storage (refer to Engineering Standard 18.1.1). The rags should be disposed of as asbestos-containing waste.

2.5.2 Clothing Appropriate work clothing is required to be provided to employees when they are exposed to asbestos above the PEL or when the possibility of eye irritation exists. The purpose of special clothing for asbestos jobs is to prevent the contamination of street clothing that will be worn home by the employee. The type of work clothing which is necessary depends on the type of work that will be done.

For large removal operations, where there is a greater possibility of contamination, employees will need whole body coverings including:

Coveralls or Work Clothes - These can be either disposable garments or reusable garments which are dedicated to asbestos work.

Footwear - Molded rubber boots with safety toes can be washed or wiped clean of asbestos contamination following the job. Disposable rubber shoe coverings can be used to protect work shoes from contamination and they are available in styles of sufficient durability to withstand use in the work environment. Tyvek shoe covers would only be adequate under the most controlled conditions and they do present a greater slipping hazard than rubber shoe coverings. Pant legs should be worn outside any boots or shoe coverings and taped to them around the ankles.

Work Gloves - Work gloves to be used should be selected on the basis of hand protection required. Inexpensive cotton work gloves are a good choice because they can be laundered during the job and disposed of at the job's completion. Sleeves of coveralls should be brought down over gloves and taped at the wrists.

Head Coverings - Disposable head coverings are recommended when jobs involve removal of overhead asbestos or are excessively dusty. Tyvek hoods are available attached to disposable coveralls or as a separate garment.

Eye Protection - Safety glasses, faceshields, vented goggles, or other appropriate eye protection must comply with the provisions of 29 CFR 1910.133.

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- (a) Negative pressure enclosures must be constructed in the regulated area whenever feasible. Feasibility is not determined by cost, rather it relates to factors such as space limitations or greater hazards. It is recommended that this enclosure comply with guidelines in the Appendix F to the Asbestos Construction Standard. This non-mandatory Appendix is entitled "Work Practices and Engineering Controls for Major Asbestos Removal, Renovation, and Demolition Operations". Enclosures may be temporary structures lined with a double layer of 6 mil flame retardant polyethylene sealing all of the seams and penetrations through the plastic sheeting. A single means of access and egress should be provided with all other doors sealed. This doorway should be covered with a double flap of plastic sheeting to separate the work area from the hygiene facility which will be discussed further in Section 2.7. Ventilation is to be provided using a number of HEPA filter units sufficient to achieve three to four air changes per hour in the enclosure. OSHA also recommends a pressure of -0.02 inches of water within the enclosure. By definition, HEPA filters must be capable of removing 99.97% of the asbestos particles from the air. HEPA units are to be operated 24 hours a day during the entire project. Exhaust air must be adequately filtered for asbestos removal and should go, if possible, to the outside of the building where the asbestos project is being conducted.
- (b) Competent persons must supervise activities within regulated areas, including setting up negative pressure enclosures and ensuring its integrity, ensuring that engineering controls are functioning, controlling access to the regulated area, ensuring that employees entering regulated areas are properly outfitted with PPE, ensuring that employees are adequately trained, sampling exposures, inspecting employees work clothing for rips and tears, ensuring that employees follow decontamination procedures. Responsibilities of competent persons are described in 29 CFR 1916.58 (b), (e) (ii) (A)-(E), and (e) (6) (iii).
- (c) Only authorized persons are to be allowed within the restricted area. All such persons must comply with training requirements (Section 2.2), medical surveillance requirements (Section 2.4), and the personal protection requirements including respiratory protection (Section 2.5).

2.6.3 Small-Scale Short Duration Asbestos Jobs. Engineering controls and safe work practices are required to be used to control exposures during small scale asbestos jobs to levels below the action level of 0.1 f/cc. OSHA does not require negative pressure enclosures, supervision by a "competent person" or decontamination facilities for small-scale, short duration tasks. Examples of such tasks include pipe repair, valve replacement, installing electrical conduits, installing or removing drywall, roofing, and other general building maintenance or renovation involving only limited exposure to asbestos. Any asbestos removal which can be accomplished in a glove bag is considered to be a small-scale job. Controls and work practices which can be used to control exposures during small-scale jobs include:

- (a) Wet methods - Amended water or removal encapsulants.
- (b) Removal methods such as carefully cutting asbestos from pipes or other surfaces.
- (c) Glove bags.
- (d) Removal of entire asbestos insulated pipe or structure.
- (e) Mini-enclosures.

2.6.4 Dust Suppression Techniques. Wherever feasible, wet removal methods are required to be utilized. In a very limited number of situations wet removal is not feasible such as:

1. Situations where electrical hazards exist such as removal of asbestos from a "live" electrical box.
2. Removing asbestos insulation from a live steam pipe.

Where it is not possible to disconnect electricity or to turnoff the steam, asbestos material can be removed in a dry state. Prior to removal, asbestos material should be sprayed with water containing a wetting agent to enhance penetration. Airless sprayers are recommended for application of wetting agents. The wetting agent should consist of 50% polyoxyethylene ester and 50% polyoxyethylene ether in a concentration of one ounce in five gallons of water. The material should be kept wet during all stages of work to minimize exposure to employees and emissions to outside air. Water should not be used if this would introduce other hazards (i.e., electrical, generation of toxic gases, etc.).

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- (a) Equipment Room - The equipment room, also known as the dirty room, is the area connected directly to the work area with a double flap type doorway. This is the area in which the workers remove contaminated work clothing before proceeding to the shower room. It also serves as an equipment storage area. Asbestos waste containers may also be decontaminated and moved out of the work area via the equipment room. Separated from the equipment room by a double flap is the shower room.
- (b) Shower Room - Shower facilities should be contiguous with both the equipment room and the clean room. All workers leaving the work area are required to shower. Showers can also be used to clean contaminated equipment and materials such as respirators and work boots which are being taken out of the restricted area for further sanitization. Shower facilities could also be used to decontaminate the outside of asbestos waste containers. Separated from the shower room by a double flap is the clean room. The subject of contaminated shower water is addressed in Section 2.8.4.
- (c) Clean Room - Clean rooms or change rooms should provide for storage of workers' street clothes and personal belongings. They should also be equipped with towels (disposable towels are available) and Clean PPE needed for the job.

When it is not feasible to construct decontamination facilities adjoining the worksite because of space limitations or the lack of water, the Construction Standard allows for some alternative procedures to prevent spread of asbestos contamination between the job site and remote shower facilities.

- (a) HEPA vacuum protective clothing at the worksite, then proceed to showers or
- (b) Change into new disposable suits at the worksite before proceeding to the showers.
- (c) Exposed skin areas should be wiped clean with wet toweling or premoistened towelettes.

2.7.3 Exceptions. Small scale asbestos jobs do not require the use of decontamination facilities, however, practices must be adopted to prevent spread of asbestos away from the job site. HEPA vacuuming disposable clothing is strongly recommended as such a practice. Following this, disposable clothing can be removed and properly discarded with other asbestos waste.

2.7.4 Laundering. Reusable asbestos work clothing or other personal protective equipment (PPE) should be stored in containers labeled with asbestos warning labels. Any person who launders or cleans contaminated PPE or work clothing is required to be informed of the potential harmful effects of asbestos and protective measures that should be taken. Contaminated work clothing should not be shaken or handled in a way that is likely to create airborne fibers.

2.8 Waste Disposal. Federal regulations which deal with asbestos waste are contained in the NESHAPS (40 CFR 61, Subpart M). As part of the notification procedure described in Section 2.1, generators of asbestos waste from renovation/demolition projects are asked to describe the method of containing asbestos waste as well as the name of the waste site to which waste will be taken for disposal.

2.8.1 Containers To reduce generation of airborne fibers, asbestos waste should be placed into disposal containers while wet. The type of container which is appropriate for asbestos waste is dependent upon the type of waste. All asbestos waste containers shall be free of asbestos dust before leaving the restricted area.

OSHA regulations require that asbestos waste containers be labeled with the following:

DANGER

CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

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- (d) Obtain documentation of contractors' fiscal qualifications including financial performance, assets, liabilities, legal judgements, and insurance.
- (e) Have a specific understanding as to what constitutes successful job completion. Recommended is a thorough visual inspection to insure adequate cleaning followed by air monitoring.

3.2 Contractor Requirements

- (a) The Construction Standard for Asbestos also requires that contractors/employers inform other employers on the worksite of the nature of asbestos work and the requirements pertaining to regulated areas.
- (b) Other Hazard Communication issues relevant to contractors working in Alcoa facilities are covered in Engineering Standard 33.052.4 "Application of the OSHA Hazard Communication Standard for Outside Contractors".
- (c) The contractor must supply Alcoa with copies of all documents (notifications, air monitoring results, landfill approvals, etc.) generated by the contractor in accordance with regulatory requirements.
- (d) It is recommended that the contractor afford Alcoa the opportunity to review the landfill to be used for disposal of the material.
- (e) Some local asbestos regulations require third party oversight of contracted asbestos removal work. While asbestos contractors are responsible for conducting asbestos removal in compliance with all applicable regulations, Alcoa location Industrial Hygienist should be given the opportunity to evaluate asbestos control during removal work as deemed necessary by their professional judgement.

4. REFERENCES

For further information, you may find the following references helpful:

1. Bureau of National Affairs 49 BSP-57, "BNA Special Report, Asbestos Abatement: Risks and Responsibilities", 1987. (800)372-1033
2. EPA Report Number 560/5-85-024, "Guidance for Controlling Asbestos-Containing Materials in Buildings", 1985 June. EPA publications are available by contacting EPA at following toll free number: (800)424-9065.
3. EPA Report Number 530-SW-85-007 "Asbestos Waste Management Guidance: Generation, Transport, Disposal", 1985 May.
4. U.S. EPA Regulations for Asbestos (CFR Title 40, Part 61, Subparts M.)
5. I.H. Technical Bulletin No. 86-4. Available through Pittsburgh Safety and Industrial Hygiene Division.
6. OSHA Safety & Health Standard 29 CFR 1926.58 - Asbestos for the Construction Industry.

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4. Disposable Protective Garments --

Dupont Type 14 "Tyvek"; available through area distributors.

Kimberly Clark Corp.
1400 Holcomb Bridge Road
Roswell, GA 30076 (404)587-8114
(Disposable coveralls, hoods, towels and wipers)

MSA
PO Box 426
Pittsburgh, PA 15230 (412)273-5000
(Protective clothing, gloves and headwear)

5. Decontamination Units --

Aerospace America, Inc.
900 Truman Parkway
Bay City, MI 48706 (517)684-2121
(Showers and water filtration)

Creative Inovations
PO Box 3257
West Chester, PA 19381 (215)696-4952
(Decon Chamber, Spot Shot Shower, and Water Filtration)

Personal Protection, Inc.
PO Box 737
Crystal Lake, IL 60014 (312)658-2321
(Contaminant and decontamination systems)

Pezanni & Reid Equipment Co.
3960 West Ford Street
Detroit, MI 48216 (313)554-4000
(Decontamination trailers)

Evergreen Safety Systems, Inc.
14045 W. 66th Ave.
PO Box 1207
Arvada, CO 80001 (303)422-2185
(Portable decontamination units)

This engineering standard is provided solely for the purpose of the removal of asbestos. It is not intended to be a replacement for any asbestos removal standard. The user is responsible for the selection of the appropriate equipment and materials for the removal of asbestos. The user is also responsible for the selection of the appropriate personnel for the removal of asbestos. The user is also responsible for the selection of the appropriate training for the removal of asbestos.

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NON-HAZARDOUS WASTE BY RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) REGULATIONS

Please print or type (Form designed for use on elite (12-pitch) typewriter.)

F A NON-HAZARDOUS WASTE

NON-HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No.		Manifest Document No.		2. Page 1 of		Information in the shaded areas is not required by Federal law.	
3. Generator's Name and Mailing Address 									
4. Generator's Phone (.....)									
5. Transporter 1 Company Name			6. US EPA ID Number						
7. Transporter 2 Company Name			8. US EPA ID Number						
9. Designated Facility Name and Site Address			10. US EPA ID Number						
11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)				12. Containers		13. Total		14. Unit	
				No. Type		Quantity		Wt/Vol	
a.									
b.									
c.									
d.									
Additional Descriptions for Materials (If Used)									
15. Special Handling Instructions and Additional Information 									
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.									
Printed/Typed Name						Signature		Date Month Day Year	
17. Transporter 1 Acknowledgement of receipt of Materials									
Printed/Typed Name						Signature		Date Month Day Year	
18. Transporter 2 Acknowledgement of Receipt of Materials									
Printed/Typed Name						Signature		Date Month Day Year	
19. Discrepancy Indication Space 									
ARD 014212									
20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in item 19									
Printed/Typed Name						Signature		Date Month Day Year	

ATTACHMENT 1

ASBESTOS DEMOLITION/RENOVATION NOTIFICATION

Check appropriate block(s).

- ☐ Demolition/renovation greater than or equal to 260 linear ft. or 160 square ft. (10 day notification required before demolition, if planned).
- ☐ Demolition/renovation less than 260 linear ft. or 160 square ft. (20 day notification required before demolition). Complete items (1) thru (5) only.
- ☐ Demolition ☐ Renovation

1. Name of owner:
Address:

Name of operator (contractor):
Address:

2. Description of facility (include size, age and prior use).

3. Estimate of amount of friable asbestos _____ linear ft. _____ square ft.
Explain techniques of estimation if less than 260 linear ft. or 160 square ft.

4. Location of facility.

5. Scheduled starting date _____ Completion date _____

6. Nature of planned demolition or renovation and methods to be used.

7. Procedures to be used to insure compliance with 40 CFR §61.22(d).

8. Name and Location of waste site where asbestos will be dumped.

Solid Waste Permit No. _____

9. If ordered demolition, the name, title and authority of State or local governmental representative who has ordered the demolition.

Number of days to demolish _____

Delivered (date stamp)

ARD 014213