



Conserve O Gram

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Health And Safety Risks of Asbestos

Asbestos is a fibrous mineral that doesn't burn, corrode, or conduct electricity, but which combines easily with many other substances. From 1880 to 1975, asbestos fibers were mixed with asphalt, cement, paper, metals, plaster, plastics, and textiles to produce building, decorating, fireproofing, insulating, manufacturing, and soundproofing materials. Most asbestos containing material (ACM) dates from 1940-1975. Today federal law prohibits the manufacture, processing, and importation of most ACMs.

Asbestos poses risks for staff and researchers as many museums have accessioned sizable numbers of asbestos containing objects into their collections. See the list below for help in identifying likely objects. Many museum buildings have asbestos finishes, fireproofing, insulation, and other components, which when deteriorated may contaminate collections with asbestos or damage the health of staff or researchers.

The Environmental Protection Agency (EPA) estimates 3,000 historical products contain asbestos. Most ACMs are not labeled as having asbestos. ACM objects that may occur in museum collections or structures are listed in figure 1.

Asbestos as a Health and Safety Risk

Asbestos is relatively safe until it is crushed, cut, filed, scraped, or otherwise released from binding materials. Asbestos that can be crushed by hand pressure alone is called friable. When crushed, ACMs break up into fine abrasive fibers that are often invisible to the eye, rather than turning to dust as other minerals do. Humans are most at

risk when they breathe in asbestos fibers. Handling asbestos or even eating in asbestos-contaminated areas can pose risks as well. Individuals exposed to asbestos should have a medical examination that includes a medical history, breathing capacity test and chest x-ray in order to detect problems early. Exposed asbestos particles can penetrate and remain in lungs and airways leading to cancers in the esophagus, larynx, lungs, oral cavity, stomach, colon and kidneys. Because asbestos fibers remain in the body, each exposure increases the likelihood of developing an asbestos-related disease. Asbestos-related diseases may not appear until several decades after exposure.

Figure 1. Sources of asbestos in collections

*appliances
asphalt felt, sheeting, shingles, and tile
brake shoes and clutch pads
carpet padding
ceiling panels and tiles
cement pipes and sheets
chalkboards
fire curtains, doors, and blankets
floor tiles (linoleum and vinyl)
furnace, gas fireplace, and oven gaskets and packing
geological specimens
insulation for buildings, ducts and pipes
mining equipment and paraphernalia
paper such as aircell cardboard
patching and spackling compounds
plaster wrapping materials
roofing materials
sealants and sprays for ceilings
sealants and finishes for floors and walls
taping compounds
textiles (clothing, hot pads, ironing board covers)
textured paints
wall boards, tiles, and textured finishes*

Lung cancer poses the greatest single health risk for those exposed to asbestos fibers. According to the EPA, smokers who are exposed to asbestos have a lung cancer risk that is 50-90 times greater than non-smokers with no asbestos exposure. Asbestosis, a serious, chronic non-cancerous scarring of the lungs that has no effective treatment, is another major risk. Skin rash is an indicator of asbestos exposure by handling.

History of Asbestos Use in the United States

Asbestos was first used in the United States in the early 1880's, to insulate equipment such as steam engines. Widespread asbestos use was rare until the 1940-1975 era, when asbestos was widely used in new and renovated buildings, particularly for public buildings and schools. After surveying 3.6 million public and commercial buildings in 1988, the EPA found friable asbestos in 20% of the structures surveyed. Between 1940 and 1980, the EPA estimates that 27 million Americans had significant occupational exposure to asbestos.

Asbestos Exposure Methods in Collections

Staff or researchers who do not wear proper protective gear while working with asbestos-containing objects may experience dangerous exposure to asbestos. Staff or researchers working in asbestos contaminated office, storage, or research spaces may also suffer from asbestos exposure. Finally, staff or researchers working on collections currently or previously housed in asbestos contaminated spaces may also be dangerously exposed to asbestos.

The most dangerous spaces are those where the ACMs have been disturbed, damaged, or otherwise stirred up or where no sealant or enclosure exists around the ACM. The most dangerous time is during demolition, renovation, or repair of the space, although aggressive cleaning also poses risks. ACM in a heavy traffic area that is often disturbed is more likely to release fibers than ACM in an undisturbed area. Attics and basements frequently contain leaking or damaged asbestos containing materials

such as ceiling or floor tiles, decorative finishes, fire or sound-proofing materials, insulation, shingles, or wallboard.

Damaged ACMs release asbestos particles into the air that are 1,200 times thinner than a human hair. These small and light particles remain in the air for a long time. Asbestos in the air can rain down on collections coating them with fibers. As staff touch contaminated collections, they stir the fibers into the air and onto their clothing and hair. People may ingest asbestos if they eat in areas where there are fibers in the air. Families of exposed staff may inhale asbestos fibers from the exposed person's clothing if precautions aren't taken.

Asbestos exposure levels will vary according to:

- concentration of fibers in the air
- duration of exposure
- worker's breathing rate
- weather conditions or air circulation levels
- type of protective devices the worker wears

The EPA has not set a safe level for asbestos exposure in the air, by ingestion, or by handling, although the Occupational Safety and Health Administration (OSHA) indicates that a permissible exposure limit is 0.1 fibers per cubic centimeter for an 8-hour time weighted average. **Since asbestos damage is cumulative, avoid exposure.**

Protection from Asbestos

Don't work in or place collections in spaces dating from pre-1975 that may contain significant or damaged ACMs, such as:

- spaces with exposed insulation on walls, ceilings, pipes, or wiring
- spaces with damaged wallboard, floor and ceiling tiles, cement, or textured finishes
- spaces undergoing renovation, repair, or energetic cleaning
- spaces near pre-1975 building demolition sites

Don't provide asbestos-contaminated collections, to researchers or staff without taking appropriate precautions. Do not allow staff or researchers to work in asbestos-contaminated spaces.

Avoid entering spaces with disturbed ACMs. **If you must enter an asbestos-contaminated space, work with asbestos-contaminated collections, or work with asbestos-containing objects, wear protective clothing, neoprene gloves, and a rated breathing apparatus with a HEPA filter, such as a P100 filter, that is at least 99.97% efficient with particles down to .3 microns.** Fit test your respirator. Limit asbestos exposure to the shortest period possible. Don't attempt to do asbestos mitigation without special training. If collections have been contaminated with asbestos, contact a conservator equipped and trained to deal with asbestos mitigation.

Identification of Asbestos

Until a product is tested, it is best to assume that the product contains asbestos, unless the label or the manufacturer verifies that it does not. Suspect any pre-1975 composite boards, finishes, flooring, tiling, insulation, and cement materials in a building or as architectural fragments in collections. There are two ways to identify asbestos:

- instrumental analysis, such as microscopy (described in figure 2)
- verification with the manufacturer.

Testing should be done by an appropriate accredited laboratory.¹ EPA Regional Offices can

provide information about laboratories that test for asbestos.

Only trained professionals should sample asbestos. If you must take a sample of asbestos, do the following:

- wear protective clothing, goggles, neoprene gloves, and a fit-tested respirator
- use a fine water mist, such as a plant mister, in the area prior to taking the sample to reduce the amount of asbestos in the air
- disturb the area as little as possible
- collect materials with a small film canister or vial that has a lid
- seal the lid after collecting a specimen, then wipe the outside with a damp cloth
- label the container with the building, room, and area identification information
- send the sample to a designated testing laboratory

Asbestos Management

Don't try to remove or mitigate asbestos by yourself. Only individuals trained in asbestos compliance can remove or disturb asbestos. To manage a space with ACMs:

- keep ACMs in good condition by avoiding heavy activity in the area
- spray undamaged ACMs with appropriate sealants
- repair damaged ACMs by enclosing them as suggested by OSHA and EPA
- get professional help before attempting to remove ACMs

<i>Type of Microscopy</i>	<i>Sample Type</i>	<i>Information Obtained</i>
Phase Contrast Microscopy (PCM)	Bulk	Percentage of asbestos in the tested materials. Note: This test is EPA required for all suspect materials.
Polarized Light Microscopy (PLM)	Bulk	Whether or not the sample is asbestos. Percentage of asbestos in the tested materials.
Transmission Electron Microscopy (TEM)	Small sample of fibers	Whether or not the sample is asbestos. Note: This test does not provide accurate percentage of asbestos.

Figure 2. Types of microscopic analysis used to identify asbestos

The goal is to keep ACMs in good repair and avoid releasing asbestos fibers. Asbestos-contaminated rooms must be repaired or have their ACMs removed by trained mitigation professionals, not curatorial staff. Contact the EPA for names of contractors. If you have asbestos-contaminated collections, trained conservators experienced and qualified to deal with asbestos mitigation should clean them.

Sources of Help

Contact your safety officer. Both the EPA and OSHA have linked regulations relating to asbestos safety. You can obtain more information about asbestos by calling the EPA Toxic Substances Control Act (TSCA) Hotline, (202) 554-1404. The EPA Public Information Center can send you information on EPA regulations at (202) 382-2080 or (202) 475-7751. For copies of asbestos-related regulations, contact the Office of the Federal Register at (202) 382-5475. Finally, the EPA has an Asbestos Ombudsman to provide information on the handling and abatement of asbestos at (800) 368-5888 or (703) 557-1938.

Web-based Resources:

OSHA Asbestos Web Page: <<http://www.osha-slc.gov/SLTC/asbestos/>>

Environmental Protection Agency Asbestos Web Page: <<http://www.epa.gov/earth1r6/6pd/pd-t/asbmatl.htm>>

National Voluntary Laboratory Accreditation Program list of Certified Asbestos Labs: <<http://ts.nist.gov/ts/htdocs/210/214/214.htm>>

Notes

1. For a list of asbestos testing laboratories accredited by the National Institute of Standards and Technology (NIST) see their Web site at <<http://ts.nist.gov/ts/htdocs/210/214/scopes/plm.tm.htm>>

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