

ASBESTOS GUIDE

How to recognize **Asbestos-Containing Products** in Your House?

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INTRODUCTION

Asbestos, a group of naturally occurring minerals, has been widely used ever since ancient times due to its convenient properties, accessibility and low cost. According to the Occupational Health and Safety Administration regulations, it is assumed that any residential building built before 1980 has asbestos-containing materials present.

Even though occupational exposure is the primary the circumstance in which people are in regular contact with airborne asbestos fibers, inhabitants whose house was built before the mentioned period are also at high risk. As asbestos-containing materials begin aging, they tend to become brittle as well. When such products are even slightly disturbed, fibers might be released into the air and subsequently inhaled or ingested by the inhabitants.

The purpose of this guide is to offer basic information regarding asbestos, how exposure occurs, the most common conditions caused by it and, most importantly, how to recognize asbestos-containing products in your home in order to properly dispose of it.

1. WHAT IS ASBESTOS?

Asbestos is a group of naturally occurring minerals which can be found in soil and rocks. The **most** significant deposits of asbestos are located in Canada, the United States, Russia and South Africa. These minerals can be found in 20 states in the U.S., including California, Arizona, North Carolina, New York and Vermont.

There are six types of asbestos fibers, according to the U.S. Environmental Protection Agency: **chrysotile** (white asbestos), which is also the most commonly used, **amosite**, **crocidolite** (blue asbestos), **tremolite**, **anthophyllite** and **actinolite**. Chrysotile is present in 90% of all asbestos-containing products due to the fact that this type perfectly illustrates the numerous practical properties of asbestos:

- Durability
- Resistance to extreme heat and fire
- Insolubility in water
- Inability to conduct electricity
- Chemical resistance
- Inertness
- Sound absorption

However, it was not until the early 1970s that the hazardous health effects of prolonged exposure were formally confirmed by multiple government agencies. Consequently, asbestos mining and employment decreased drastically and 55 countries even banned it completely.

Asbestos has been deemed carcinogenic by both the International Agency for Research on Cancer and the U.S. Environmental Protection Agency. Unfortunately, exposure is far from representing a rare occurrence since asbestos is still used by numerous companies, thus posing a tremendous threat to public health. Additionally, since these minerals have had a high prevalence in the construction industry, the majority of buildings erected before the mid 1980s, including houses, are very likely to have asbestos in their insulation, wallboards, or floor tiles.



2. ASBESTOS AWARENESS FOR HOMEOWNERS

Despite a notable decrease of asbestos use in the U.S. during the last four decades, these toxic minerals are still widely present in numerous buildings, as well as in various consumer products. It has been estimated that nearly 5,000 asbestos-containing products have been manufactured over the course of the last century in the U.S.

The raw appearance of these silicate minerals is similar to that of wood. After asbestos is mined, the fibers are separated from the various rocks they occur on and subsequently processed and refined. The final result consists in bunches of long, hair-like fibers which may be added in a wide range of products such as insulation and cement in order to strengthen or fireproof the materials. It is worthy of note that asbestos fibers cannot be observed without a microscope in a large number of consumer products.

Asbestos has been considered a miraculous mineral for more than a century because of its chemical, mechanical, and electrical properties. These desirable properties have caused asbestos being widely used constituent in buildings and building materials. The durability of asbestos fibers made them ideal for building materials like insulation, drywall, paint, floor tiles, ceiling tiles, roof tiles, vinyl flooring, pipe insulation, etc.

Where might asbestos be found in your home?

- **Asbestos in pipes.** Ever since the late 1800s, asbestos fibers had been a part of pipe manufacturing. Many of these old pipes are still in the ground today growing concerns about their deterioration and the exposure to the toxic mineral. Asbestos pipe poses an even greater risk when there is potable water that circulates through them. A World Health Organization report using updated data from the Centers for Disease Control and Prevention indicated that most of the U.S. population consume water containing low levels of asbestos residues. Because asbestos is a known carcinogen and the only cause of mesothelioma, testing is required to ensure your drinking water is asbestos-free.



- **Asbestos in electrical wiring.** Homeowners should be especially cautious when it comes to buildings constructed between the 1930s and the 1980s because there is a high chance that wire work has been done with asbestos-containing materials. Asbestos in electric wiring insulation was typically used to prevent deadly fires in buildings. The people most likely to be exposed to the asbestos in electric wiring include electrician, construction workers, and home DIY enthusiasts.



- **Asbestos in furnaces.** In the past, it was common for asbestos to be mixed in the material used to build furnaces all across the nation, with the main purpose of acting as an insulator in regard to boilers, burners and hot fireboxes. The most common components of furnaces that contain asbestos in their mixture are ducts, heat shields, stoves, chimney, firebricks, kilns, and flues. Deteriorated old furnaces should be treated with caution by the homeowner and they should be removed as soon as possible.



- **Asbestos in air conditioning.** The air conditioning systems inside your home can contain asbestos whereby exposure to friable and highly respirable fibers may occur involuntarily. Because of its thermal resistance properties, asbestos has been widely used in HVAC air conditioning systems, particularly in the insulation surrounding the reheating banks or coils throughout the ductwork. It is very likely that the millboard material surrounding the heating banks starting to deteriorate over time and release and liberate the material, including the asbestos fibers into the air stream. In case you find yourself faced with an air conditioning unit that is potentially contaminating your home with asbestos, you should take immediate action because air ducts can turn your living spaces into a hazardous environment.



Other places you might find asbestos are:

- Vinyl floor tiles
- Ceiling tiles
- Vermiculite insulation in attics and walls
- Sheetrock/Drywall
- Roofing and siding
- Gutters
- Fence
- Window putty
- Textures paint and patching compounds
- Soundproofing or decorative material

How asbestos becomes a hazard

Levels of fibers and dust may be higher in buildings containing asbestos materials, especially where the materials are damaged. As a result of physical processes such as drilling, grinding, buffing, cutting, or striking, the tiny fibers break off and suspended in the air and they may remain airborne for long periods of time before settling in the dust. Water damage, continual vibration, aging, and physical impact can also increase the friability of asbestos-containing materials making fibers release more likely.

Some domestic activities that allow asbestos fibers to release into the environment:

- Removing vermiculite insulation
- Removing old roofing shingles
- Sanding asbestos-containing floor tiles
- Cleaning the work area by using a household vacuum cleaner
- Reuse or recycling asbestos waste
- Disposing asbestos waste in a domestic garbage bin
- Laundering asbestos-contaminated clothing

3. HOW TO IDENTIFY ASBESTOS IN YOUR HOME

An asbestos inspection of your home can help uncover any materials that could potentially pose harm to yourself and your family, particularly if the products are loosely-bound, brittle or severely damaged.

While you can do your own walk-through, it's important to realize that asbestos can be in any part of your home from floor tiles to roof sheets, toilet seats to wall panels. Popcorn ceiling and coating on walls and beams may also contain asbestos, as well as any decorative varnishes and plasters. There is also the possibility that asbestos fibers were mixed in the cement sheeting from the floors and from the walls, not to mention that there might also be asbestos-embedded lagging on the hot water pipes.

But how do you find and identify asbestos in your home in the first place?

Asbestos occurs naturally on various rocks, such as serpentine, in the form of bundles of **thin long hair-like fibers**. Each visible fiber is made of millions of fibrils which can be observed only microscopically. However, there are notable differences between the particularities of each of the six distinct asbestos types. While chrysotile, the most prevalent type of commercial asbestos, has long, white and curly fibers, crocidolite asbestos is blue and its fibers are straight. It is also worthy of note that asbestos is typically processed prior to being added in

commercial products, which significantly changes its natural appearance.

Chrysotile asbestos, employed in over 90% of all asbestos-containing materials and products worldwide, is also one of the most dangerous types. Its fibers are **long, white and curly**. The hardness of naturally occurring chrysotile is comparable to that of a human fingernail. The fibers can easily be separated into thinner strands of fibrils and vary in length from several millimeters to over 4 inches. Chrysotile asbestos is insoluble in water. However, it is not resistant to acids. It was preponderantly used in gaskets, pipe insulation and boiler seals.

Crocidolite asbestos is the second most commonly used type. It has straight blue fibers. Nevertheless, the heat resistance of crocidolite asbestos is relatively low. The fibers are soft and friable. It is considered to be the most lethal, as the human body cannot eliminate the fibers once inhaled or ingested due to their shape. Crocidolite asbestos can be found in thermal and pipe insulation, rope lagging, cement products and coatings.

Amosite asbestos is the second most used type in the U.S. Its fibers are **brown and straight**. These minerals are particularly prevalent in Africa. According to EPA, amosite is also the second most dangerous type of asbestos. It may be present in high concentrations of up to 40% in insulating board. Other products which might contain amosite asbestos are thermal insulation and ceiling tiles.

Tremolite asbestos is scarcely encountered in consumer products. However, it may occasionally be present in insulation, paint, roofing materials and sealants as a contaminant, as well as in talcum powder and vermiculite. The color of fibers can be **white, green or grey**. Approximately 80,000 pounds of tremolite asbestos are mined in India every year.

Anthophyllite asbestos is rarely employed for commercial use as well. These minerals were primarily mined in Finland. The color of fibers can range from **white to brown**. It can also be encountered in various products such as vermiculite and talc powder as a contaminant. Composite flooring is one of the few products which may contain anthophyllite asbestos.

Actinolite asbestos was never present in consumer products. Nevertheless, it may occasionally occur as a contaminant in sealants, paints and even toys. It is most commonly found in metamorphic rock in the form of **dark green** crystals or fibrous aggregates. The texture of actinolite asbestos is significantly less flexible than that of the other five types.

Asbestos materials are sorted into two categories depending on how dangerous they are:

Non-friable materials refer to asbestos-containing materials in which the asbestos is firmly bound in the matrix of the material. These materials are unlikely to release levels of asbestos fibers into the

airborne environment if they are left undisturbed. Therefore, they generally pose a low health hazard. Examples of non-friable asbestos-containing material that include:

- Asbestos cement sheet
- Asbestos cement molded products
- Bitumen-based water proofing
- Vinyl floor tiles
- Roof sheeting and capping
- Uttering
- Gables, eaves/soffits
- Water pipes and flues
- Flexible building boards
- Imitation brick cladding
- Fencing
- Carports and sheds
- Waterproofing membrane
- Telecommunications pits
- Some window putty
- Expansion joints
- Packing under beams
- Concrete formwork

When non-friable asbestos materials are severely damaged, either by human action or weathering, they also become a source of exposure, which means removal might be necessary.

Friable materials are easy to break or to crumble by hand and more likely to release inhalable fibers. Friable asbestos materials are highly dangerous to health. Examples of friable asbestos-containing materials include:

- Thermal lagging, such as pipe insulation
- Sprayed coatings, laggings and loose asbestos fill
- Millboard
- Insulating boards
- Ropes, yarns and cloths
- Sheet vinyl underlay or backing
- Asbestos cement products in degraded state

In order to be able to identify asbestos, you first need to have an idea of what you are looking for when it comes to products and materials around the home where the toxic substance could be lurking. One of the easiest ways you can recognize asbestos is by looking at a material's surface pattern, asbestos materials will have a swirl or dimpled pattern on the surface.

Basic considerations that may help you identify asbestos in your home:

- Check if there are signs of disturbed asbestos materials
- Uncovered insulation made with vermiculite asbestos tends to have a grey-brown coloring and has a coarse, pebble-like texture
- Look at disintegrated insulation, pipes, vinyl flooring, and stovetop pad
- Check decorative finishes and appliances for asbestos
- On the outside of your home, asbestos sheets were often joined by aluminum runners, which were held on by small nails; on the inside, the asbestos sheets were held together with plastic or wooden runners in the same way; check joints on buildings for asbestos
- Check the old ceiling for cover traps, light bases, and vent covers as all these can be made of asbestos cement sheet
- Asbestos cement sheets used as formwork - common areas to find this are below fireplaces or heaters, behind concrete slabs and steps leading to and around the house.
- Check for a date on the suspect asbestos material

Identifying asbestos can be challenging due to the age and deteriorated condition of many building materials and the lack of visible brand names and products number on many items. It should be pointed out that although asbestos can be presumed from a visual inspection, its presence can be confirmed by taking a

sample and having it tested at a certified asbestos testing laboratory. Until the tests are complete, it's best to limit damage and avoid handling those materials.

4. ASBESTOS-CONTAINING PRODUCTS

Prolonged exposure to asbestos is accountable for the death of over 12,000 Americans annually. Although the majority of circumstances in which frequent contact with these toxic mineral occurs focus on the workplace (construction sites, chemical industries, shipyards, power plants, the metal industries etc.), environmental exposure is by no means less dangerous.

The inhabitants of houses erected before the mid 1980s are at a particularly high risk, as asbestos was significantly more widespread during the last century. It is thus of crucial importance to be well-informed in regards to the household materials and products which may contain asbestos. The following list includes the most commonly encountered asbestos-containing products in a house. However, it is far from being exhaustive.

Construction materials and products

- Vinyl floor tiles
- Insulation
- Cement wallboards
- Adhesives
- Roof shingles
- Floor backing
- Ceiling tiles
- Boilers

- Heating ducts
- Tar paper
- Textured paints and coating
- Decorative plasters
- Fire doors
- Sheet rope
- Wires
- Mastics
- Tapes
- Putty
- Asphalt floor tiles
- Acoustical plasters
- Zonolite insulation
- Roofing felt

Household appliances and other items

- Electric heaters
- Dishwashers
- Slow cookers
- Barbecue mitts
- Stovepipe rings
- Deep fryers
- Ovens
- Hair dryers
- Broilers

- Toasters
- Fertilizers
- Curling irons
- Talcum powder
- Cigarette filters
- Stove mats
- Washers
- Potholders
- Ironing board covers
- Crock pots
- Electric blankets
- Popcorn poppers

Removing asbestos materials from your house is not always necessary. They might not pose a threat to your health as long as the asbestos-containing materials are in good condition. If you suspect one item in your house contains asbestos, it is highly recommended to avoid disturbing it, particularly if the product is brittle or friable, as more fibers will subsequently be released into the air.

However, if you identified a non-friable or undisturbed product which might contain asbestos, you can further avoid contamination by sealing or encapsulating it. These alternative methods should be used exclusively for slightly damaged non-friable asbestos-containing materials. For brittle or severely damaged products, as well as for large

appliances or contaminated areas, you are strongly advised to seek professional help.

Sealing entails the prevention of fibers being released into the air. Duct tape or specially designed sealants for asbestos products (spray, paint or coating) can be used in this respect by applying it over the damaged areas of the item. For instance, if a small portion of asbestos tape wrap on a heating duct is torn or frayed, covering it with duct tape may represent the most suitable method of avoiding exposure. Nevertheless, it is important to remember that sealing, regardless of the product employed, is only a temporary solution. The asbestos-containing item will require appropriate disposal in the future, as it continues to deteriorate.

Encapsulation is generally preferred for insulation on heating systems and furnaces, as well as for popcorn ceilings. It is carried out by using either penetrating or bridging encapsulates, depending on the nature of the material and the complexity of the damage. Its purpose is also to prevent further contamination with asbestos fibers by covering the item with a thick sealant. Similarly, encapsulation is a temporary solution as well.

If you decide to remove asbestos yourself, it is essential to follow the instructions presented in the fifth chapter of this guide in order to minimize exposure and further contamination of your home.

5. DO IT YOURSELF ASBESTOS REMOVAL PROCESS

There are no federal regulations that ban a homeowner from removing asbestos from his/her own residence, in fact, in all states and territories, a non-licensed person is legally allowed to remove non-friable asbestos as long as the area is no bigger than 10m². However, some states may have some different about asbestos self-removal by a homeowner such as obtaining a conventional demolition permit before starting demolition work in area with asbestos containing materials. The best source for information on requirements in your area is the local building department or health department.

The procedures used for dealing with asbestos in the home depending on where the asbestos is found, the condition of the material, and whether it is friable or non-friable. In some cases, asbestos-containing materials may be repaired or isolated, in other cases, they must be removed.

When deciding whether the material must be removed or not the following criteria are generally assessed:

- Overall condition, possibility of repair
- Accessibility, can it be damaged easily?
- Does the surface exhibit mark damage?
- Is safe containment still possible?

The chance of inhaling asbestos dust increases when renovating, carrying out repair work or removing asbestos materials, but the risk to your health is very low if you take the necessary safety precautions. Thus, it's essential that you take all the necessary precautions to protect yourself and others when dealing with asbestos.

Equipment for safe asbestos removal includes:

- Wet wipe or a vacuum with a HEPA (high-efficiency particulate air) filter to keep asbestos from becoming airborne
- Hand drill or low-speed battery powered drill
- Sealable plastic bags for disposal
- Pump sprayer filled with water
- Duct tape
- Sealant
- Plastic sheets to seal off the work area
- Barricades
- Bolt cutters for sheets bolted in place
- Asbestos-waste container, labeled appropriately
- All the necessary personal protective equipment
- Before you consider asbestos removal as a do-it-yourself project, consider the following cautions:
 - Clear the area where the asbestos is to be removed to cut down on the risk of contaminating furniture, clothing and other items with asbestos fibers

- Cover anything that can't be removed including walls and floors with thick polyethylene sheeting
- Isolate the area where work is to be done from the rest of the house by using tape and plastic sheets
- Turn off any heating or cooling systems to minimize the spread of any released fibers
- Install a new electrical system to power negative air pressure units and avoid contamination of air outside the working area
- Install decontamination enclosure systems
- Close windows and doors and seal off other places when dust can get in with plastic sheeting and duct tape
- Advise family members and neighbors to leave the area; if not they do not leave, make sure they stay indoors for as long as they can with the windows and doors shut
- Post warning signs to prevent public access to the work area

Protecting yourself while you work:

- Wear a particulate air-filter respirator with a high-efficiency particulate air (HEPA) filter
- Wear a disposable coverall, disposable rubber gloves, rubber boots and protective eye goggles the entire time that you are in the contaminant area
- For extra safety wear bags over your shoes or wear shoes that will be thrown away soon

- Wet down the asbestos until it can't become airborne in the case that it's moved quickly or if there is ventilation
- Sweep the asbestos into a special bag designed for its removal and be sure to double seal the bag once all of the asbestos is scooped up into it
- Remove all protective clothing and gear inside the airlock before you leave the contaminant area to prevent the spread of asbestos fibers outside the containment area.
- Dampen and double wrap the asbestos

Dealing with asbestos is important at every stage, from working to remove it, to make sure it's disposed of properly. Any debris or protective equipment worn should be properly disposed at the end day to avoid contamination. All asbestos waste should be double-bagged and sealed in leak-tight containers while still wet, then labeled clearly and taken to qualified landfills that have specific requirements for securing the waste and preventing fibers from escaping into the air. You should never handle asbestos waste without wearing the appropriate gloves and safety equipment, and these should be removed and bagged up once any other waste has been properly dealt with.

6. ASBESTOS SAFETY DOS AND DON'TS

Asbestos is only harmful when it's disturbed and becomes broken down into particles that are small enough to be inhaled into our lungs, increasing our risk of developing certain types of lung cancer. Although most asbestos-related cancer occurs in people who've been exposed to asbestos long term, it's still best to play it safe.

Work removing asbestos that does not require a license must nevertheless be carried out with cautiousness. If you decide to undertake home renovations where asbestos may be present, here are some DO's and DON'Ts points to be aware of:

Don'ts:

- Disturb undamaged asbestos unnecessarily
- Waterblast the asbestos-based material
- Break asbestos cement sheets or drop them
- Saw, sand, scrap or drill holes in asbestos materials
- Remove vinyl flooring by sanding or grinding
- Handle asbestos with bare hands
- Use dusting, sweeping or brushing methods as this will circulate asbestos fibers into the air
- Use compressed air tools
- Use domestic vacuum cleaners
- Eat, drink, or smoke near the work area

- Remove your personal protective equipment until all cleanup is completed
- Dispose of asbestos waste in domestic garbage bins
- Re-use, store, recycle or illegally dump asbestos products.

Do's:

- Test for asbestos prior to any renovation project or removal of certain building materials
- Wear the appropriate personal protective clothing and equipment
- Prepare your work area properly
- Maintain activities to a minimum in any areas having damaged material that may contain asbestos
- Spray the working area with water using a spray bottle prior to and during asbestos removal to prevent dust and airborne fibers
- Take every precaution to avoid damaging asbestos material
- Carefully remove asbestos sheets to prevent breakage
- Wash your hands and face rigorously with soap and water before lunch breaks and after you've finished work for the day
- Keep the material wet until it is packaged
- Turn off all electricity where you are working; as water is being used in this process, it is safe to check for electrical hazards
- Thoroughly clean the work area, tools and equipment after finishing the job to ensure that cross-contamination is minimized
- Wash all clothing worn under the coveralls and shower thoroughly

- Use wet rags and mops to clean up work area, tools and equipment
- Clearly label the packages 'Caution Asbestos' using a permanent marker pen
- Dispose of asbestos-containing waste only at an approved landfill site that has the capacity to deal with it.

7. THE DANGERS OF ASBESTOS EXPOSURE

Asbestos is a health hazard only when it becomes airborne. Contamination occurs when fibers that have been released into the air following friction or any kind of disturbance of asbestos-containing products are inhaled or ingested. Old construction materials and appliances entail a particularly high risk in this respect, since their brittleness makes it more likely for asbestos fibers to be released in the air if such products are even slightly disturbed. Similarly, friable asbestos-containing materials, such as those found in heaters, hot water systems and stoves manufactured before the 1980s, may pose a greater threat to your health than bound products, in which fibers are tightly embedded.

Asbestos fibers may be released into the air during product use, maintenance work, repair, remodeling, demolition, drilling, installation of electrical wiring, and so on, since homeowners can damage asbestos-containing materials.

If these tiny fibers are disturbed, they become airborne and can be easily inhaled. However, your chances of developing an asbestos-related disease vary, according to National Cancer Institute. For example, it depends on the length, the amount and the source of the exposure. The size, shape, chemical makeup of the fibers, are also contributing factors. Other individual factors include whether you smoke and if you have a pre-existing lung disease.

Exposure can be of three types, depending on the context in which contact with asbestos occurs:

- occupational exposure
- environmental exposure
- secondary exposure

Occupational exposure is responsible for the majority of asbestos-related cancers, since it is the most common and generally involves great amounts of asbestos which employees are in regular contact with. There are over 75 occupational groups associated with a high risk of developing conditions such as asbestosis or pleural mesothelioma following frequent exposure to asbestos, including construction workers, firefighters, power plant workers, insulators and shipyard workers. In order to avoid or at least limit exposure, employees should wear appropriate equipment (coveralls, respirators etc.) while performing tasks which imply asbestos, such as demolition operations.

Long-term or repeated exposure to asbestos is responsible for:

- asbestosis
- pleural plaques
- pleural effusion
- mesothelioma
- pleurisy
- lung cancer
- pleural thickening

Environmental exposure entails an indirect contact with either naturally occurring asbestos or fibers which became airborne due to human activities such as construction, demolition or mining. In the first case, contamination may happen when deposits of asbestos are accidentally disturbed following gardening or riding a bicycle, for instance, while the latter typically implies a higher level of exposure since the concentration of asbestos in old buildings or around mines is significantly increased. Thus, people who live in close proximity to construction or mining sites have a great risk of inhaling or ingesting asbestos due to environmental exposure. Despite a series of strict regulations regarding protective measures during construction and demolition operations having been enforced in the U.S., there are numerous instances in which the rules are completely neglected.

Secondary exposure occurs when people become contaminated following contact with a person who carries asbestos fibers on their clothes, skin, shoes, or in their hair. The families of asbestos workers are the most vulnerable to secondary exposure, particularly if employees are not required to undergo a series of protective measures in order to remove asbestos from their equipment prior to exiting the premises of their workplace. Unfortunately, a large number of companies fail to enforce appropriate procedures in this respect, endangering the wellbeing of workers and their families.

Understanding the importance of safely managing asbestos in and around your home is the key to protecting yourself against unwanted contamination. If you do not feel confident to safely handle or remove the material, you should engage an asbestos abatement contractor.