What is asbestos?

Asbestos is the name applied to a group of six different minerals that occur naturally in the earth. They are chrysotile, amosite, crocidolite, tremolite, actinolite, and anthophyllite. Of the asbestos used commercially, over 95% is chrysotile which is white in color and found in serpentine rock. These minerals are made up of fibers that vary in length, and may be straight or curled. They can be so small that they are invisible to the naked eye. Asbestos fibers do not have any detectable odor or taste.

Asbestos became a popular commercial product because it is strong, won’t burn, resists corrosion, and insulates well. There are two forms of asbestos.

1. **Friable**: A “friable” substance is one that can be crumbled or easily broken to a powder or dust under hand pressure when dry. All friable asbestos-containing materials (ACM), or materials contaminated by friable ACM, are considered hazardous waste. Examples include sprayed acoustical ceilings, paper insulation on furnace ducting, and pipe insulation that is of the soft crumbly type. Friable materials are not a health hazard as long as they remain undamaged and undisturbed.

2. **Non-friable**: A non-friable material is a hard material that is not easily broken, such as floor tile, hard cement-like pipes and panels. Non-friable asbestos-containing wastes are considered to be non-hazardous (regardless of their asbestos content), but are still subject to the labeling requirements of the Cal-OSHA regulations.

How is asbestos used?

Because of the properties mentioned above, asbestos has been used in building materials, friction products, and heat-resistant fabrics. The following are examples of products that may contain asbestos:

- Insulation for boilers, tanks, and other vessels
- Pipe insulation
- Textured or sprayed acoustical ceiling
- Structural Steel sprayed or troweled-on fireproofing
- Duct insulation
- Furnace insulating pads
- Sheetrock joint compounds
- Wall and ceiling plaster (non-acoustic)
- Patching plaster
- Heater register tape and insulation
- Furnace duct insulation
- Pipe covering
- Roofing felts, shingles, patching tars, etc.
- Acoustic ceiling tiles (glued-on or laidin)
- Asbestos cement shingles (Transite siding)
- Sheet vinyl flooring, vinyl floor tiles and mastics
- Linoleum sheet flooring
- Sheetrock (only in specialty uses)
- Sealants and coatings
- Ceramic tile grout
- Window glazing
- Fire-doors
- Textured paints and street and concrete paint
- Laboratory tabletops
- Clutch, brake, transmission components
- Fuse box liners
- Fireplace artificial logs or ashes
- Conduits for electrical wire
- Corrosive chemical containers
- Electric motor components
- Heat protective pads
- Paper products
- Textiles (including curtains, stage firecurtains)
- Fireproof blankets
- Specialized theatrical materials

**How does asbestos get into the environment?**

Asbestos fibers can enter the air and water from the weathering of natural deposits, and the wearing down or disturbance of man-made asbestos products. Small fibers and fiber-containing particles may be carried long distances by wind or water currents before settling. Larger fibers and particles tend to settle more quickly. Asbestos fibers do not break down to other compounds in the environment. Therefore, they can remain in the environment indefinitely. Asbestos fibers do not build up or “concentrate” in plants or animals. Products that contain asbestos and are thrown away can also pollute the environment, therefore the law requires proper disposal.

**Who is at risk for asbestos exposure?**

In the past, asbestos exposure was mainly confined to workers who mined and milled the raw material
or those engaged in product manufacture. Since industrial use of asbestos has decreased over the last 40 years, these occupational exposures have declined. Today, most exposures occur during repair, renovation, removal, and maintenance of asbestos that was installed years ago. The most heavily exposed people in the U.S. are construction trades people. Carpenters, roofers, utility workers, electricians, pipe-fitters, steel mill workers, sheet metal workers, boilermakers, and laborers are at risk of exposure to asbestos through construction materials, insulation coverings of pipes, boilers, industrial furnaces, and other sources. Mechanics working with brake and transmission products also may be exposed to asbestos. Fortunately, workers are now protected by State and Federal OSHA regulations. However, people who work with asbestos without proper protections are likely to be exposed to much higher levels of asbestos particles in air.

Exposure can also occur when fibers released to the air are inhaled by persons not directly handling asbestos. For example, family members can be exposed from the dust carried home on an exposed worker’s clothes. Street dust may contain small quantities of fibers from brake linings or crushed asbestos-containing rock used in road construction. Custodial workers can be exposed by asbestos-containing debris accumulated on floors or improperly thrown out in the regular garbage. On rare occasions, asbestos has been found in small amounts in talc and play sand.

What are the routes of exposure?

Inhaling asbestos fibers suspended in air is the most important route of exposure. These fibers can come from natural deposits of asbestos in rocks or from the wearing down of man-made products such as insulation, ceiling and floor tiles, roof shingles, cement, automotive brakes and clutches, and many other sources.

Higher outdoor exposure levels may occur if you are near an asbestos mine or factory, a building that is being torn down or renovated, or near a waste site where asbestos is not properly covered up or stored to protect it from wind erosion. Higher indoor exposure can occur if asbestos was previously used for insulation, ceiling or floor tiles, or other purposes, and whether these asbestos-containing materials are in good condition or are deteriorated and easily crumbled.

Exposure to asbestos can also occur by drinking fibers present in water. Fibers can enter water by being
eroded from natural deposits or piles of waste asbestos, from asbestos-containing cement pipes used to carry drinking water, or from filtering through asbestos-containing filters. Most drinking water supplies in the U.S. have concentrations less than 1 million fibers per liter (MFL).

**What are the health effects of asbestos?**

If you are exposed to a substance such as asbestos, many factors will determine whether harmful health effects will occur and what the type and severity of those health effects will be. These factors include the dose (how much), the duration (how long), how often, the route or pathway from which you are exposed (breathing, eating, drinking, or skin contact), your individual characteristics such as age, gender, nutritional status, family traits, life-style, and state of health, and other chemicals to which you are exposed, such as cigarette smoke. Cigarette smoking works synergistically with asbestos exposure to greatly increase your chance of getting lung cancer. The greater the total exposure to asbestos, the greater the chance you will become ill. Some experts believe that there is no definite safe exposure level for asbestos. The best way to protect yourself is to limit your exposure as much as possible.

The chronic (long-term) health effects after exposure to asbestos take years to develop. There are no known acute (short-term) effects from asbestos. That means that even inhaling high amounts of asbestos would not cause immediate symptoms the way exposure to a toxic gas leak or chemical spill might. Diseases caused by long-term inhalation exposure to asbestos include: asbestosis, pleural plaques, lung cancer, and mesothelioma.

**Asbestosis**

Asbestosis is a chronic lung disease whose signs and symptoms result from permanent changes in lung tissue due to asbestos exposure. The earliest and most prominent sign is shortness of breath. Symptoms rarely become apparent until at least ten years after the first exposure. Asbestos fibers become lodged in the lungs, irritating the lung tissues and inflaming the small air tubes and sacs in the lungs. As the inflammation continues, permanent tissue damage, called fibrosis, develops. This damaged tissue does not expand and contract like normal lung tissue, and so breathing becomes difficult. Shortness of breath will increase over time, even after the exposure stops. Asbestosis is a serious disease, and can eventually lead to disability or death in people exposed to high amounts of asbestos. Asbestosis does not usually occur in people exposed to low levels of asbestos.
Pleural Plaques

Pleural plaques are localized scars, or fibrosis, that form in the lung tissue as a result of exposure to asbestos. Pleural plaques are not associated with any specific symptoms and are benign but many people who exhibit pleural plaques may also develop asbestosis or mesothelioma.

Lung Cancer & Mesothelioma

Asbestos workers were found to have increased chances of getting cancer of the lung and mesothelioma. Mesothelioma is a cancer of the thin membrane that surrounds the lung and other internal organs. Both lung cancer and mesothelioma are usually fatal. These diseases do not appear immediately, but develop only after a number of years. There is a substantial latency period (10-40 years in humans) between the exposure to asbestos and the occurrence of lung cancer or mesothelioma.

Early symptoms of lung cancer are coughing, chest pains, and coughing up blood. Smoking greatly increases the risk of developing lung cancer from exposure to asbestos. Mesothelioma is a rare and deadly form of cancer that is almost always caused by exposure to asbestos. It is truly an “asbestos cancer” and it may result from relatively light exposure to asbestos. Early symptoms of mesothelioma are shortness of breath or pain in the chest or abdomen. This risk of mesothelioma is not increased by smoking.

Other Types of Exposures

The health effects from swallowing asbestos are unclear. Some groups of people who have been exposed to asbestos fibers in their drinking water have higher-than-average death rates from cancer of the esophagus, stomach, and intestines. However, it is very difficult to tell whether this is caused by asbestos or by something else and medical science has been inconclusive on this subject.

If you get asbestos fibers on your skin, very few of these fibers, if any, pass through the skin into your body. Asbestos workers often developed “asbestos warts” on their hands, but this is a benign condition. There are no known serious health effects from skin exposure. Additionally, asbestos has not been shown to affect reproduction or cause birth defects.

Are there medical tests to determine exposure?

Anyone frequently exposed to asbestos on the job should have regular medical exams. The worker should discuss his or her work history with a physician, and the examination should include a complete
medical history, physical examination, and possibly a chest x-ray and lung function test. The most common test used to determine if you have been exposed to asbestos is a chest x-ray. The x-ray cannot detect the asbestos fibers themselves, but can detect early signs of lung disease caused by asbestos. However, since lung disease caused by asbestos may take many years to develop, x-rays cannot detect recent asbestos exposure. While other substances besides asbestos can sometimes produce similar changes in the lungs, this test is usually reliable for detecting asbestos-related effects. The examination should also assess for other diseases that may mimic the symptoms of asbestosis, especially other lung and heart conditions. There are no simple blood or urine tests for asbestos.

**What are some ways to prevent asbestos exposure?**

Indoor air may become contaminated with fibers released from building materials, especially if they are damaged or crumbling. Common sources in homes are sprayed asbestos ("cottage cheese") ceilings, furnace duct tape or paper covering (sometimes inside the duct), linoleum flooring, pipe insulation, boiler coverings, wall board joint compound, vinyl flooring and acoustic ceiling tiles. Home owners should not undertake repairs or removal of asbestos-containing materials without professional guidance or services.

If the asbestos containing material is in good condition, the best thing to do is to leave it alone. Disturbing it may create a health hazard where none existed before. Undamaged asbestos-containing materials are not thought to release a significant number of fibers and are not a health hazard.

There are three ways for dealing with asbestos: repair/encapsulation, enclosure, and removal.

**Repair/Encapsulation**

These terms refer to the use of either a penetrating encapsulant or a bridging encapsulant, or both, to treat limited areas of damage to friable asbestos contaminated material (ACM), such as pipe insulation or acoustical ceiling material. The penetrating encapsulant infiltrates the ACM to bind it together. The bridging encapsulant is used to create a durable surface over the ACM to prevent damage or abrasion from casual contact. The potential problems with this method are that encapsulating undamaged material may cause damage to the material or hide future damage, or that encapsulation may make it more difficult to remove the material later.

A combination of repair/encapsulation is when an encapsulant is sprayed or brushed on the asbestos
containing material. The encapsulant is normally a mixture of chemicals that help it penetrate into the materials that forms a water proof seal. The idea is to encapsulate the material to keep fibers from being released and reduce the chance for further damage.

**Enclosure**
This method is the process of creating physical, air and water tight barriers around the materials. The barrier will protect the asbestos material and prevent the release of asbestos fibers into the air. This should be performed only if the area will not be disturbed.

**Removal**
There is no simple or “best” way to deal with asbestos flooring removal. In general, it is advisable to leave the material in place. New floors may be laid directly over the old floor. Another option is to build a new plywood floor over the old floor and then the new floor is laid on the plywood. If planning to remove the acoustic ceiling material, the kitchen flooring, or any other suspect asbestos-containing material, contact a certified asbestos removal contractor. Asbestos removal can be dangerous, difficult and expensive. Only a trained and licensed contractor should remove asbestos. It requires proper testing, isolation techniques, protective equipment, and disposal.

Asbestos-containing ceiling material in a home does not necessarily need to be removed, as long as the occupants of the home can avoid disturbing it. Asbestos ceiling material should not be dusted with a feather-duster, for example. Even cobwebs should be removed by gently pressing a wet paper towel against the material to collect the cobweb. Closets that have asbestos material sprayed on the ceiling must be arranged so items on the top shelf do not touch the material. No hooks, nails or screws should be installed into the material as this would likely cause fiber release. The top edges of all the drapes and blinds in the house should be lowered to ensure that the ceiling material does not get rushed when they are drawn.

**Taking Samples**
Unfortunately, visually inspecting the ceiling cannot determine if asbestos is present, even by an experienced inspector. You must submit small samples of the material to an analytical laboratory where they can be examined under a microscope. You can use an at home asbestos kit to see if you home is exposed.