

## Asbestos: Uses and Hazards

Asbestos is one of the most desirable industrial minerals. It possesses an unusual combination of exploitable properties, such as long fibrous shape, high strength and flexibility, low thermal and electrical conductivity, high adsorbency, high chemical and mechanical durability, and relative incombustibility. Paradoxically, these industrially desirable physical properties of asbestos also appear to be responsible for a highly undesirable one—carcinogenicity.

The widespread use of serpentine asbestos and certain amphiboles by our industrial society for such items as brake linings and clutch facings, electrical and heat insulation, fireproofing materials, cement on water pipes, tiles, packings, filters, and construction materials in ceilings and furnace ducting has contributed greatly to human safety and convenience. At the same time, however, the mineral substances themselves have posed a hazard.

The health hazards of certain forms of asbestos under certain conditions have been found to be so great that several countries have taken extraordinary actions to reduce or even ban the use of asbestos altogether. Today only very specialized types of construction using asbestos materials are allowed in the United States. These specialized applications must be away from living areas, working areas, or any frequently inhabited area. Severe restrictions have also been placed on products that may have inadvertently contained traces of asbestos, such as talcum powder and home insulation.

Although these products are restricted today, many that were used in the near past are now seen to be health hazards. Their identification and removal or sealing is being carried out in public facilities, particularly in the schools.

What are these particles called asbestos? There are several types of fibrous particles that are targeted as harmful, but we will address the most common ones. Three types of asbestos have been associated with home and commercial construction and insulation. These three constitute more than 99 percent of all the asbestos used. One

of these has been used in about 95 percent of all construction. This most common variety is called chrysotile. The other two are amosite and crocidolite.

Chrysotile is a serpentine mineral that occurs almost exclusively in metamorphic rocks. The mineral is fibrous and generally has a whitish color, which gives it the common name of “white asbestos.”

Amosite is a rare asbestos and a variety of another mineral, the amphibole grunerite. Amosite was mostly mined in South Africa and not widely used in the public domain although employed in the shipping industry. The tan color is common to this mineral and usually it is called “brown asbestos.”

Crocidolite is another rare asbestos and also a variety of an amphibole riebeckite. It was mined only in the Transvaal and Cape Provinces of South Africa, in Western Australia, and in Bolivia. Crocidolite is commonly called “blue asbestos.”

Deposits of these asbestos are found in four types of rocks: (1) banded ironstones (amosite and crocidolite); (2) alpine-type ultramafic rocks, including ophiolites (chrysotile); (3) stratiform ultramafic intrusions (chrysotile); and (4) serpentinized limestone (chrysotile). In the Pacific Northwest only the second type occurs and this mostly in Oregon and Montana.

These hazardous particles can be identified by a polarizing microscope, electron microscope or x-ray methods. Once determined to be a hazardous variety, the asbestos should either be removed or completely sealed in place so that no particles can infiltrate the living area. Instructions for removal and sealing may be obtained from the Environmental Protection Agency (EPA) at the following address:

Environmental Protection Agency  
Office of Toxic Substances  
Washington, D.C. 20460

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