

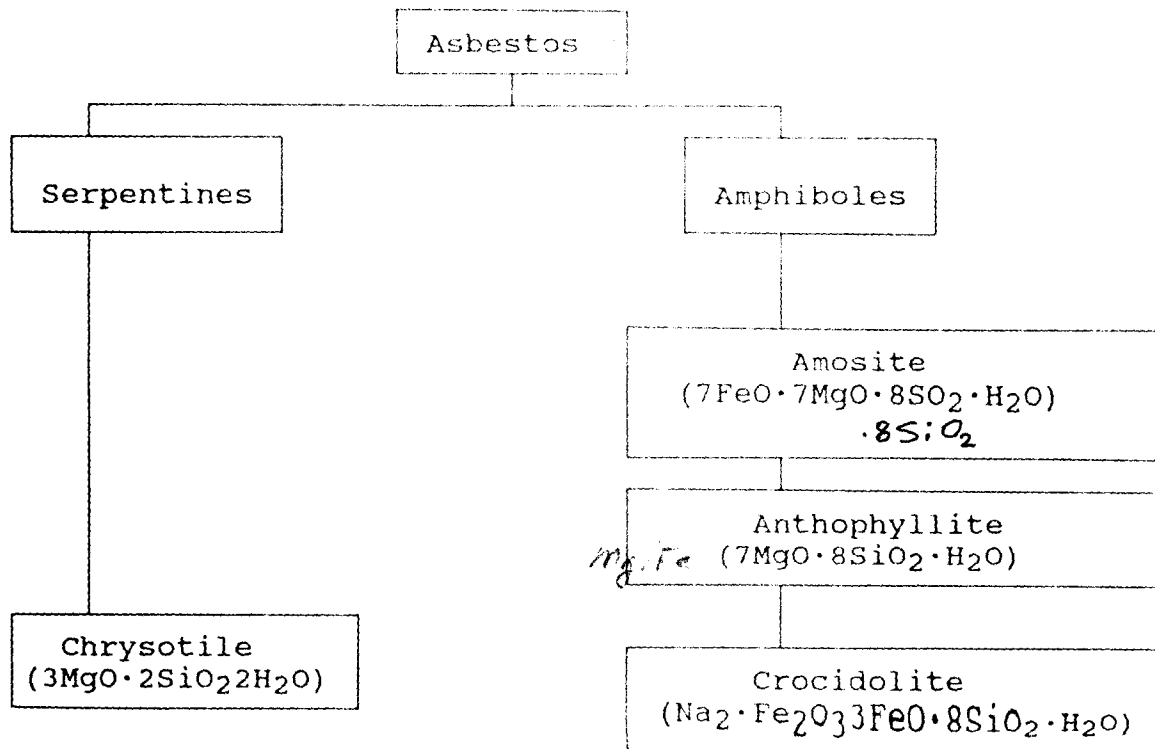
From: ASBESTOS: REVIEW OF PROPERTIES, USES, HAZARDS
& REGULATIONS, DAVE WHITEHEAD
JUNE 1988; STAFF REPORT TO
NYS SENATOR JOHN DALY.

II. CHEMICAL AND PHYSICAL PROPERTIES

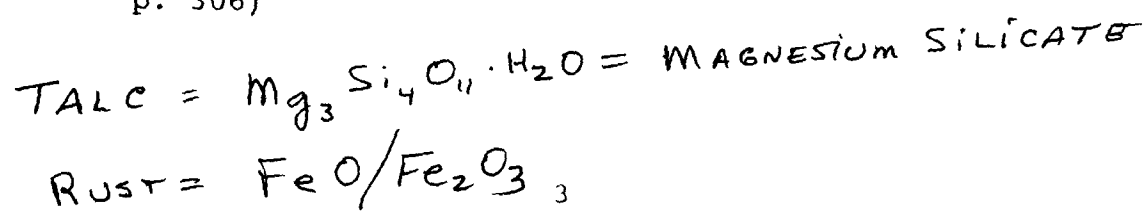
There are four different commercially important minerals that are collectively called asbestos (Figure 1). All four are naturally occurring, flexible, heat resistant, silicate fibers with a high aspect ratio (a ratio of length to width of 10:1 or more). These four minerals fall into one of two categories. Chrysotile asbestos is found in a type of rock called serpentine rock, and so is called a serpentine fiber. The other three types of asbestos, anthophyllite, crocidolite and amosite, are found in amphibole rock and so are referred to as amphiboles. Most chrysotile asbestos is contaminated with a fifth asbestos fiber, tremolite, which is an amphibole. Tremolite has no commercial use.

Figure 1

Mineralogic Classification and Chemical Composition
of Common Commercial Types of Asbestos



(Source: adapted from the New England Journal of Medicine 1982;
p. 306)



V. RISKS ASSOCIATED WITH NON-OCCUPATIONAL EXPOSURE TO ASBESTOS

Asbestos is present at ambient levels in most urban centers. The ambient air in Paris is contaminated with average concentrations of asbestos ranging from 0.2 to 1.7 ng/cubic meter (one nanogram is 1/100,000,000 gram). Table 4 lists the asbestos content of ambient air in several major American cities.

Table 4

Asbestos Concentration In Ambient Air Samples For Various Cities

City	Fibers (weight)* Nanograms/m ³	Fibers Numbers/m ³ †
Manhattan	30	1,000
Philadelphia	70	2,300
Washington, DC	21	700
Frankfort, KY	0.9	30
San Francisco	25	830
Los Angeles, freeway	27	900

* conversion 2 fibers/ml=app. 60,000 ng/m³

† conversion 1 fiber/m³ = .000001 fiber/cm³

(Source: adapted from Gross and Braun, 1984, p. 16)

Asbestos fibers also have been found in the municipal water supplies of many cities, including Seattle, San Francisco, Atlanta, Philadelphia, New York and Boston. Most of the asbestos probably comes from serpentine rock lining the stream beds or aquifers from which the water has been taken. It is also conceivable that some contamination of water results when rainfall washes airborne asbestos into surface waters. The concentrations of asbestos in municipal water supplies have ranged from 1,000,000 to 2,400,000,000 fibers/liter. The highest concentrations were found in San Francisco and Philadelphia, the lowest in Atlanta and Boston.

The New York State Department of Health (NYSDOH) is conducting a study of asbestos in the municipal water supplies in communities throughout the state. The residents of Woodstock, New York were forced to drink bottled water

levels of 300,000,000 fibers/liter. This high level of contamination was due to the deterioration of asbestos cement pipes which carried the water. The NYSDOH study will first assess the amount and condition of asbestos cement pipes in the State, and then will determine the asbestos levels of the various water systems which use asbestos cement pipes. A final report is expected in 1988.

A study was done of the asbestos content of the municipal water supplies of Canadian towns which are located in the drainage areas of chrysotile formations. Fiber content in these municipal water supplies ranged from 22,000,000 fibers/liter to 1,200,000,000 fibers/liter. Disproportionate numbers of ill health effects were not noted among the residents of these towns who had had no occupational exposure to asbestos (Gross and Braun, p. 20). Most scientists believe that exposure to ambient concentrations of asbestos in water does not cause significant disease (Deweese, 1986).

However, the same is not necessarily true for ambient air concentrations of asbestos. While almost all urban dwellers harbor some asbestos fibers in their lungs and suffer no ill effects, areas with especially high concentrations of asbestos in the ambient air often have significantly higher than average rates of lung cancer (Gross and Braun, 1984). Staten Island, for instance, has a very high lung cancer rate. The bedrock of Staten Island contains a large amount of serpentine rock which contains chrysotile veins. Excavation for development and construction projects exposes the asbestos veins to air and weather, which results in flaking of the rock and release of the fibers into the air. This is a relatively recent discovery and substantial study will have to be done to determine the actual levels of asbestos in the ambient air and to determine any link with the lung cancer rate on Staten Island.

It is doubtlessly true that asbestos exposure can cause disease, but the public health consequences of non-occupational asbestos exposure are unknown. There are several reasons for this seeming contradiction. Most asbestos related diseases have long latency periods, variable, often non-specific symptoms and wide-ranging manifestations in a variety of organs. Assessing a victim's exposure is often very difficult. Determining the amount of asbestos a person may have ingested or inhaled, the type of asbestos fiber involved, and the duration of exposure is often impossible.