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ASBESTOS

5 mppcf

Asbestos is a generic term applying to a number of mineral silicates that are incombustible in air and can be separated into filaments. The most widely used in industry is chrysotile, a magnesium silicate from serpentine. Other types include amosite (an iron magnesium silicate), crocidolite (a sodium iron silicate), tremolite (a calcium magnesium silicate) and anthophyllite (also an iron magnesium silicate).

Miller and Sayers (1) showed that intraperitoneal injection of amosite, chrysotile and crocidolite in guinea pigs produced the reaction of an inert dust. Vorwald et al. (2) confirmed this for short fibers (under 3μ) but observed that long fibers produced a fibrous reaction. Continuing unpublished work by Gardner, these workers demonstrated that long fibers (20 microns and above) produced peribronchiolar fibrosis in lower animals, and developed evidence that this resulted from mechanical rather than chemical action. Asbestos dust containing 0.6 per cent fibers longer than 10 microns, in concentrations of 138 mppcf (or 0.8 million "long" fibers per cu. ft.), was capable of producing experimental asbestosis in guinea pigs. When the concentration was 6.7 per cent fibers over 10 microns, 40 mppcf (equivalent to 2.7 million "long" fibers per cu. ft.), the reaction developed in approximately half the time.

That exposure to asbestos is associated with development of a potentially disabling pneumoconiosis in man has been amply demonstrated by industrial experience, (3,4,5,6,7,8,9,10,11). The present threshold limit was recommended by Dreessen et al. (8), after study of 541 employees in three asbestos textile plants using chrysotile. Only three doubtful cases of pneumoconiosis were found in those exposed to dust concentrations under 5 mppcf, whereas numerous well-marked cases were found above 5 mppcf. Counts were from impinger-collected samples in ethyl alcohol and distilled water. Both fibrous and nonfibrous particles were counted, but the latter greatly predominated. While chemical analyses of collected samples of air-borne dust corresponded to those of settled dust samples, it is believed that dust counts of particulates by conventional methods can be expected to give only an indirect measure of the risk of asbestosis because of the great relative importance of long fibers.

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