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Asbestos

Significant Properties

A characteristically silky, fibrous mineral. Breaks into filaments or fibers readily.

Chemical Formula: $3 \text{MgO} \cdot 2 \text{SiO}_2 \cdot 2 \text{H}_2\text{O}$ (for chrysotile, the mineral in 95 per cent of commercial asbestos). Calcium-magnesium silicate and Iron Magnesium silicate are also found in nature and are also called asbestos.

Flash point: Does not burn.

Solubility: Virtually insoluble in water and body fluids.

Uses

Asbestos is used alone or mixed with cement-like substances for insulation, fire proofing and other construction purposes; mixed with cotton or other textile fibers, it is woven into fire resistant cloth. In MARINITE, asbestos is incorporated in amounts that vary between 25 and 50 per cent and, since it is widely used in handling molten aluminum, this material probably constitutes the largest potential source of asbestos dust in RMC plants. Advice from the manufacturer states that MARINITE dust should be treated as though it were entirely asbestos dust.

Hygienic Standards

Recommended maximum for asbestos dust in air (8 hours): 5 million particles per cubic foot (MPPCF).

Health Hazards

Acute. None. The unlikelihood of the asbestos dissolving in water or tissue fluids makes any toxic reaction very remote.

Chronic. Inhaling asbestos dust can cause particles to be trapped in the lungs and retained there. Long continued inhalation of large amounts of this dust results in lung changes (pneumoconiosis) and the name, asbestosis, has been applied to these changes. If exposure to excessive asbestos dust is allowed to continue long enough, injury will result. These lung changes resemble silicosis in that they are not disabling in the early stages. When allowed to develop unchecked asbestosis can become disabling. Ten to twenty years of daily exposure are probably needed to induce serious lung changes.

The onset of symptoms in asbestosis, as in silicosis, is slow but in advanced stages symptoms are likely to be somewhat more severe than in silicosis. Dyspnea is a cardinal symptom. Lack of appetite occurs in advanced asbestosis, and cyanosis (with related symptoms) are seen more frequently than in silicosis.

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The fibrosis caused by inhaling asbestosis is diffuse and tends to be most prominent in the basal portions of the lungs in contrast to the more generalized distribution of nodular fibrosis induced by silica. Asbestos is believed to have a mechanical rather than chemical action and fibers in the range of 20 to 50 microns are the most hazardous to the lungs. Experiments involving dust containing only fibers ground to less than 20 microns failed to induce asbestosis in animals.

The prognosis in early or moderately advanced asbestosis is good provided the inhalation of asbestos dust is discontinued or provided the dustiness is very greatly reduced. Unlike silicosis, asbestosis does not tend to progress after exposure has been adequately decreased. In very advanced stages, asbestosis commonly involves considerable emphysema and frequently progresses to right heart strain and failure.

Tuberculosis has not been found with any unusual frequency among cases of asbestosis. However, cancer has been alleged (mostly in Europe) in connection with asbestosis. This remains unproven.

Industrial Hygiene Practice

Prevention of asbestosis depends entirely in controlling the dust containing asbestos (MARINITE). Enclosure of dusty operations or the use of local exhaust ventilation are the best means of maintaining the amount of dust at or below the safe level of 5 MPPCF. Dust respirators approved by the U.S. Bureau of Mines should be worn where exhaust ventilation cannot be installed for controlling asbestos dust.

Airborne asbestos dust can be sampled (1) with an electrostatic precipitator or (2) by aspirating air through water in impinger flasks, and dust counts made by the light field technique.

Medical Procedures

First Aid. None required.

Surveillance.

(1) Preplacement examination, including chest x-rays, should be used to avoid placing a workman with lung abnormalities in a potentially dusty job.

(2) Periodic re-examinations should be made of persons who work in dusty areas.

(3) Treatment. Other than early removal from exposure no satisfactory treatment for asbestosis has been found.

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Industrial Hygiene Department

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