FILE NAME: Owens Corning (OC)

DATE: 0000

DOC#: OC207

DOCUMENT DESCRIPTION: Hygienic Guide Services on Asbestos

American Industrial Hygiene Association

HYGIENIC GUIDE SEIRES

Asbestos

I. Hygienic Standards

A. RECOMMENDED MAXIMUM ATMOSPHERIC CONCENTRATION (8 hours): 5 million particles per cubic foot of air (MPPCF).[1]

(1) Basis for Recommendation: Experience in industry,[2,3,4,5,6] and animal experiments.[6,7]

B. SEVERITY OF HAZARDS:

(1) Health: Long continued inhalation of asbestos dust results in a form of pneumoconiosis known as asbestosis. The primary effect of inhalation is an interstitial pulmonary fibrosis. The disease is characterized by asbestos bodies in the lungs and sputum. Based on roentgenological examinations, asbestosis can be classified as minimal, moderate, and advanced. It is a serious disease in some instances, but more frequently it remains nondisabling for many years, even without appreciable symptoms, as long as some other serious disease does not supervene to cause death.[8] Chief symptoms of advanced asbestosis are variable cough, dyspnea, substernal chest pains, decreased chest expansion, weakness, emaciation, clubbed finger tips, and curved fingernails. Any appreciable decrease in the amount of asbestos dust in the breathing atmosphere will cause a decrease in the incidence and severity of asbestosis. Individual susceptibility varies.[9] There have been reports of an increased incidence of lung cancer in persons with asbestosis.[8]

(2) Fire: None.

C. SHORT EXPOSURE TOLERANCE: Not applicable.

II. Significant Properties

A fibrous magnesium calcium silicate which occurs in various combinations as white, greyish or greenish masses, either compact or of long silky fibers, flax-like and readily separated. About 95% of commercial asbestos is chrysotile, which is derived from serpentine, and is a hydrous magnesium silicate containing from 12 to 14 per cent water of crystallization.

III. Industrial Hygiene Practice

A. RECOGNITION: The spinning and weaving of asbestos, in combination with other textiles for fire proof and heat resistant cloth, results in dust exposure. It may be used by itself or combined with other materials for valve packings, gaskets, boiler lagging and pipe covering, protective clothing, shielding materials, and as automotive brake linings. In the building industry it is used in the manufacture of asbestos cement products, heat insulating, and fireproofing materials.

B. EVALUATION OF EXPOSURES. Asbestos dust may be sampled with the electrostatic precipitator or by the impinger method using alcohol or alcohol and water, as the collecting medium,[1,6] and dust counts made by the standard light field technique.[1] The recommended maximum atmospheric concentration of 5 MPPCF is based upon the impinger sampling procedure.

C. RECOMMENDED CONTROL PROCEDURES: Prevention of asbestosis depends entirely upon preventing exposure to concentrations of dust suffi-

ciently high to produce the characteristic reaction. Enclosure or local exhaust ventilation are the principal means of dust control. U. S Bureau of Mines approved dust respirators may be worn as protection for some operations.

IV. Specific Procedures

A. FIRST AID: None.

B. SPECIAL MEDICAL PROCEDURES:

(1) Preplacement: Clinical and radiographic chest examinations prior to job assignment.

(2) Periodic: Exposed personnel should have periodic clinical examinations for signs and symptoms of asbestosis. These should include examination of the sputum for asbestosis bodies, and chest x-rays of good quality.

(3) Treatment: No satisfactory treatment other than removal from exposure and therapy for any complicating infection.

V. Literature References

1. American Conference of Governmental Industrial Hygienists: *AMA Arch. of Ind. Health, 16:* 201, 1957.
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3. Doll, R.: *Brit. J. Ind. Med., 12:* 8, 1955.
4. Dreesen, W. C., et al: Public Health Bulletin No. 241, Supt. of Doc., Washington, D. C., 1938.
5. Drinker, P. and Hatch, T.: Industrial Dust. McGraw-Hill Book Co., Inc., New York, 1954.
6. Fairhall, Lawrence T.: Industrial Toxicology. The Williams & Wilkins Co., Baltimore, Md., 1957.
7. King, E. J., et al: Thorax I, p. 288, 1946.
8. Lynch, K. M.: *AMA Arch. of Ind. Health, 11:* 185, 1955.
9. McPheeters, S. B.: *J. Ind. Hyg. & Tox., 18:* 229, 1936.
10. Page, R. T. and Bloomfield, J. J.: *Pub. Health Repts. 52:* 1713, 1937.
11. Patty, Frank A.: Industrial Hygiene and Toxicology, Vol. 1. Interscience Publishers, Inc., New York, 1948.
12. Smith, K. W., *AMA Arch. of Ind. Health, 15:* 195, 1955.
13. Vorwald, A. J., et al: *AMA Arch. Ind. Hyg and Occup. Med. 3:* 1, 1951.

Because of space limitations, it is impossible to list all methods of exposure evaluation. The selections have been made on the basis of current usage, reliability, and applicability to the usual industrial type of exposure. Any specific evaluation, and/or control problem will involve professional judgment. This can best be done by professional industrial hygiene personnel.

Respiratory protective devices are commercially available. Their use, however, should be confined to emergency or intermittent exposures and not relied upon as primary means of hazard control.

A relative scale is used for rating the severity of hazards: nil, low, moderate, high, and extra hazardous.

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