

November 16, 1972

TO: PLANT MANAGERS

Attached is a copy of the medical department bulletin on asbestos. Asbestos is, as you know, one of the five occupational hazards that the OSHA group is focusing on initially and is the only one at present for which a regulation has been published.

A copy of this has already been sent to your safety/medical group. I do not expect you to read all of it but I would suggest you start on page 6, which describes what must be done to meet the OSHA regulations. It is obvious that the most attractive thing to do would be to eliminate asbestos from your plant and, if this can be done, your difficulties will be minimized. Unfortunately, in most instances, this is not feasible and so we have to abide by the federal regulations.

In brief, these require monitoring of the area where asbestos is used or liberated, employee record keeping for exposure to asbestos and employee physical examinations. For monitoring I suggest you check for advice from our Industrial Hygiene Section. The record keeping is self-evident and the medical examination is practically what we do now in most of our plants with the exception of a yearly chest X-ray and the addition of a pulmonary function study. This latter is a test that can be done by a non-medical individual in the plant, providing the equipment is available. An electronic pulmonary function indicator is available from many firms. The one we have investigated and found most satisfactory is produced by the Chemetron Corporation through their National Cylinder Gas Division, 840 North Michigan, Chicago, Illinois 60611. It is very simple to read and weighs less than 10 lbs. The cost is \$875 and it would appear that only plants where a substantial number of individuals are to be tested would need one. On the other hand, these pulmonary function tests will probably cost \$25 each in a physician's office and usually only a chest specialist has this type of equipment. However, everyone regularly exposed to asbestos such as an insulator and probably those sporadically exposed such as in tearing down insulated pipe will fall under the OSHA requirement for such yearly testing and it wouldn't take very many cases to pay for the equipment. I will be happy to discuss this further with any plant manager who has a number of men involved.

Incidentally, the other four hazards in the wings are heat stress, noise, carbon monoxide and beryllium. When regulations appear, we will be in touch with you.



R. Emmet Kelly, M.D.

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
OCCUPATIONAL HEALTH

HYGIENIC INFORMATION GUIDE NO. 7

ASBESTOS

PROPERTIES

Asbestos is composed of a number of different minerals, which are silicates of variable composition, but basically are of a form of hydrous magnesium silicate. Their chief characteristic is a structure composed of long, parallel, flexible fibers, capable of repeated longitudinal subdivision. Many varieties are sufficiently flexible to be spun into yarn or woven on modified textile machinery. Manufacturing processes can cause this mineral to break up into many minute particles.

THRESHOLD LIMIT VALUE (acceptable atmospheric concentration for 8-hour work period):

5 fibers of greater than 5 microns in length per milliliter of air as determined by the membrane filter method at 400-450X magnification (4 mm objective) phase contrast illumination.

TOXIC EFFECTS:

Long continued inhalation of asbestos fibers will result in fibrosis of the lung, a condition known as asbestosis. Initially, the individual may have no complaints but, as the disease progresses, he will suffer from an irreversible disability with weakness, shortness of breath, cough, phlegm, etc. (chest x-ray of such individual would show extensive fibrosis and, frequently, pleural thickening and/or calcifications).

Lung function tests such as FVC (Forced Vital Capacity) and FEV (Forced Expiratory Volume) of the affected person would show reduced breathing capacity of various degrees. It has been well established that an asbestos worker has a greater chance of developing lung cancer and mesothelioma (cancer of the pleura) than the non-exposed, particularly if he is a smoker.

MEDICAL PROGRAM:

- a. *Preplacement examination:* Should include review of occupational history and chest symptoms, basic lung function tests and 14 x 17 inch x-ray.
- b. *Periodic examination:* A physical examination, together with a chest x-ray, lung function tests and review of chest symptoms should be made once a year. Cases where abnormalities have occurred should be medically followed-up and removed from dusty operations as directed by physician. Exposed workers should be advised to stop smoking, as smoking is known to augment the cancer producing character of asbestos.

EXPOSURE CONTROL:

- a. All wet-producing operations should be equipped with local exhaust ventilation. Where possible, isolation or segregation of the operation should be observed, together with the use of wet methods.

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Asbestos (Continued)

- b. Housekeeping should be maintained with a view to preventing any accumulation of deposited dust. Vacuum methods of cleaning are preferred, and should be performed "off-shift" or when least exposure to plant personnel would occur.
- c. Where other methods of control are not feasible, dust respirators, of a type approved by the U.S. Bureau of Mines for protection against pneumoconiosis-producing dusts, should be supplied to those employees subjected to the dusty atmosphere.
- d. A periodic determination of the dust levels of the plant atmosphere should be made to ascertain the efficiency of the control measures in use. Exempts from Chapter 204, Plans of Employment, Subchapter A, Threshold Limits, Section 204.11(b):

(b) When the limits of exposure to asbestos dust exceed those presented in Table II* of 3024.72 of this Title (relating to threshold limit values) and until engineering control is installed or proved not to be feasible, the following respiratory protection program shall be established:

- (1) For an atmosphere containing asbestos not more than 25 fibers per milliliter greater than 5 microns in length over an 8-hour average, or more than 30 fibers per milliliter greater than 5 microns in length over any period of 15 minutes, a suitable or disposable filter type respirator, operating with negative pressure during the laboratory phase of breathing, approved by the U.S. Bureau of Mines under the provision of 30 CFR Part 14 (Bureau of Mines Schedule 212), or a voluntary respirator providing equivalent protection shall be used.
- (2) For an atmosphere containing asbestos not more than 250 fibers per milliliter greater than 5 microns in length over an 8-hour average, or more than 300 fibers per milliliter greater than 5 microns in length over any period of 15 minutes, a powered filter positive pressure respirator approved by the U.S. Bureau of Mines under the provisions of 30 CFR Part 14 (Bureau of Mines Schedule 212) shall be used.
- (3) For an atmosphere containing asbestos more than 250 fibers per milliliter greater than 5 microns in length over an 8-hour average, a type C positive pressure supplied-air respirator approved by the U.S. Bureau of Mines under the provisions of 30 CFR Part 12 (Bureau of Mines Schedule 190) shall be used.

* Table II (with reference to asbestos only)

Asbestos (All Types) 5 fibers/ml >5μ in length (A)

The term (A) in Table II shall indicate a determination by the membrane filter method at 400-450 X magnification (4 mm objective) phase contrast illumination.

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF HEALTH
DIVISION OF OCCUPATIONAL HEALTH
HYGIENE INFORMATION GUIDE NO. 7

ASBESTOS

PROPERTIES:

Asbestos is composed of a number of different minerals which are silicates of variable composition, but basically are of a form of hydrous magnesium silicate. Their chief characteristic is a structure composed of long, parallel, flexible fibers, capable of repeated longitudinal subdivision. Many varieties are sufficiently flexible to be spun into yarn or woven on modified textile machinery. Manufacturing processes can cause this mineral to break up into many minute particles.

THRESHOLD LIMIT VALUE (acceptable atmospheric concentration for 8-hour work period):

5 million particles per cubic foot of air.

MEDICAL ASPECTS:

Long continued inhalation of asbestos dust may result in a form of pneumoconiosis known as asbestosis. The primary effect of such inhalation is a condition of pulmonary fibrosis. A characteristic finding of asbestosis is the presence of asbestos "bodies" in the lungs and sputum. Complete roentgenologic study of the chest and histopathological findings are necessary to establish the presence of this disease. The question of whether or not there is any relationship between the inhalation of asbestos dust and cancer of the lung is still under discussion but more and more evidence is accumulating that exposure to asbestos fibers may cause cancer of the lung.

PREVENTION:

- a. **Employment:** Occupational history is a necessity. A complete physical examination, including a chest x-ray, should be emphasized.
- b. **Periodic Examination:** A physical examination, together with a chest x-ray film, should be given about once a year. Cases whose pathologic lung changes have occurred should be released from employment in dusty operations.

EXPOSURE CONTROL:

- a. All dust-producing operations should be equipped with local exhaust ventilation. Where possible, isolation or segregation of the operation should be observed, together with the use of wet methods.
- b. Housekeeping should be maintained with a view to preventing any accumulation of deposited dust. Vacuum methods of cleaning are preferred, and should be performed "all-shift" or when least exposure to plant personnel would occur.
- c. Where other methods of control are not feasible, dust respirators, of a type approved by the U. S. Bureau of Mines for protection against pneumoconiosis-producing dusts, should be supplied to those employees subjected to the dusty atmosphere.

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- d. A periodic determination of the dust levels of the plant atmosphere should be made to ascertain the efficiency of the control measures in use.

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Southern

ASBESTOS COMPANY

P.O. BOX 10516 • CHARLOTTE NORTH CAROLINA 28237 • 704 372 1880

April 12, 1978

Mr. Jack Garrett
Manager Industrial Hygiene A2SA
Monsanto Company
800 N. Lindberg Boulevard
St. Louis, Missouri 63166

Dear Mr. Garrett:

For the past five (5) years Southern Asbestos Company has allotted the major portion of their Research and Development program to improve the quality and effectiveness of our Asbestos Textiles.

Our objective in all of these programs was to improve our treatments and manufacturing processes in order to provide the market with products which were clean and would keep dust levels within federal regulations during normal usage and handling.

Measuring devices were developed, field testing programs, and on the job tests all were conducted on our CLEANGARD, WELDGARD, and RWL treatments. Based on our tests and the monitoring of dust levels reported by our customers, it was evident that our CLEANGARD, WELDGARD, and RWL processes greatly inhibited the emission of Asbestos particles during normal usage.

Early last year, we contracted with United States Testing Company to conduct tests on these materials using their staff and measuring equipment. Their tests verified the findings of our engineers and our belief that manufacturing processes used on Asbestos materials such as our CLEANGARD, WELDGARD, and RWL significantly reduce and limit the emission of airborne Asbestos particles.

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Mr. Jack Garrett
Monsanto Company

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April 12 1978

We offer a copy of this report to you as a valued customer, and we are pleased to send this report along with a Safety Kit containing our brochure and other facts about our Gardian Line of Asbestos Materials. We look forward to continually serving your company with our line of Asbestos Textile Products.

Yours very truly,

SOUTHERN ASBESTOS COMPANY



Alexander Smith
Vice President-Sales

AS:ctg

Attachment

cc: R. M. Cooper

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SOUTHERN ASBESTOS MANUFACTURING CO.
CHARLOTTE, N.C.

TEST REPORT NO. T-729

DATE 10/10/77

SUBJECT: Heat aging and dust emission of CLEANGARD products

To determine the effect of heat aging on CLEANGARD products, samples were checked for dust emission by use of the Vibrator Tester. Samples were taken from 2.25 pound cloth in Underwriters, AA and AAA grades. Heat aging was conducted in accordance to ASTM Designation D-1573. Samples were checked for dust emission as received and after heat aging. Each sample was in the Vibrator Tester for a total of 100 minutes.

Test results indicates the CLEANGARD process is effective in locking-in fibers even after exposure to elevated temperatures. There was no significant increase in the emission of asbestos fibers from CLEANGARD products following heat aging up to 800°F.

<u>PRODUCT</u>	<u>FIBERS/cc</u>	<u>FIBERS/cc</u> <u>HEAT AGED 2 HRS.</u>
2.25 UNDERWRITERS CLEANGARD	.06	.14 @ 400°F
2.25 UNDERWRITERS CLEANGARD	.14	.14 @ 400°F
2.25 AA CLEANGARD	.03	.08 @ 600°F
2.25 AA CLEANGARD	.10	.03 @ 600°F
2.25 AAA CLEANGARD	.01	.06 @ 800°F
2.25 AAA CLEANGARD	.05	.05 @ 800°F

APPROVED BY


J.W. Echard

REPORTED BY

G.R. Gilchrist

cc: E.C. Bratt
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PRODUCT BULLETIN

Southern
JSC COMPANY

CLEANGARD® ASBESTOS

DESCRIPTION: CLEANGARD Asbestos fabrics have been chemically processed to:

1. Increase the abrasion resistance of the fabric.
2. Significantly reduce the number of airborne Asbestos fibers.

The uses of CLEANGARD Asbestos fabrics are numerous and all our Asbestos products are CLEANGARD Processed unless requested otherwise.

MODIFICATION: Combination of Asbestos and synthetic fibers that are held intact by our CLEANGARD Process. The CLEANGARD Process flameproofs the carrier content of the Asbestos fabrics and adds these outstanding features to the Asbestos fabric:

- (A) Increases abrasion resistance up to 79%.
- (B) Reduces airborne fibers more than 75%.
- (C) Increases tensile strength.

FINISH: White
PROPERTIES: Service temperature up to 7500 (depending on grade)
Flameproof (covered under patents #2,884,343 & 2,948,644)
Mildew resistant
Helps you meet requirements of OSHA

USABILITY: Flexible, drapable, easy to cut and stitch. Has excellent abrasion resistance and tensile strength.

WEIGHTS & DIMENSIONS:
Width: 1/2" - 10" tapes
4" - 60" cloths (standard) other widths available on request.
Thickness: .031 - 1.35

WEIGHTS & DIMENSIONS:
Tapes: 25, 50, and 100 feet (depending on size)
Cloths: 50-100 inch (depending on size)

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SALES BULLETIN

Southern
ASBESTOS COMPANY

March 20, 1973

PROPERTIES OF CLEANGARD ASBESTOS CLOTH

CLEANGARD Asbestos Cloth offers two primary advantages over a similar untreated fabric. These advantages are:

1. A significant reduction in the number of airborne Asbestos fibers.
2. An increase in the abrasion resistance of the fabric.

To determine the reduction in airborne Asbestos fibers, a laboratory testing device known as the "Vibrator Tester" was developed. This tester is a modification of the machine described for the vibration test in Military Specification MIL-I-15091C. A test specimen is mounted in an enclosed chamber and it is vibrated 700 times a minute, through a movement of one-half inch. The field monitor which contains the filter for collecting Asbestos fibers is also mounted inside the chamber. The monitor is attached by means of polyethylene tubing to the MSA sampling pump which is outside of the test chamber.

Normal sampling procedure is to test both treated and untreated fabrics of the same type with three different specimens tested from each sample. Each specimen is generally tested for thirty minutes and at the end of the specified time, the field monitor and the specimen are removed from the test chamber. The chamber is thoroughly cleaned and a new specimen and monitor installed. (1)

After all specimen have been tested the number of airborne Asbestos fibers emitted from each specimen can be determined. The procedure used is called the Membrane Filter Method and it is presently being used by the U. S. Public Health Service and OSHA personnel to determine the concentration of airborne Asbestos fibers in a given location.

Southern

Asbestos Textile Institute

To prepare a sample for counting, a section is removed from the filter inside the field monitor and it is mounted on a slide. Counting is done at 400 magnifications with phase contrast microscopy with twenty fields or one-hundred fibers being counted, whichever occurs first. After the slide has been counted, the number of airborne fibers per cubic centimeter can be calculated. Only fibers with a length greater than 5 microns are counted. A fiber is defined as any particle having a length to diameter ratio of 3 to 1 or greater. (2)

When CLEANGARD products were tested in this manner, fiber reductions of greater than 75% were recorded when compared to the similar untreated product. (3)

To determine the abrasion resistance of CLEANGARD Asbestos Cloth, samples of treated and untreated cloth were tested in the manner described in ASTM Method D-1175. A Taber rotary platform double head abrader was used. When compared to a similar untreated product, CLEANGARD products gave an increase in abrasion resistance of as much as 79%. (4)

In addition to reducing the number of Asbestos fibers and giving greater abrasion resistance, CLEANGARD products also offer the following advantages:

1. Flame retardancy.
2. Improved cutting and sewing properties for ease of fabrication.
3. Improved tensile strength.
4. Softer and fuller hand.
5. Whiter, more closed, and better appearing fabric.

REFERENCES

1. "Test Procedure for Lint Free Products," Project No. 70-03-002, final report dated September 10, 1970.
2. "Measurement of Airborne Asbestos Fiber by the Membrane Filter Method" published by the Asbestos Textile Institute, 1971.
3. "Safety Cloth" Project No. 71-03-004, Report Issue #2, January 28, 1972.
4. "Safety Cloth" Project No. 71-03-004, Report Issue #1, January 13, 1972.

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United States Testing Company, Inc.

1415 PARK AVENUE • HOBOKEN NEW JERSEY 07030 • 201-792 2400

REPORT OF TEST

SOUTHERN ASBESTOS COMPANY
P.O. BOX 10516
CHARLOTTE, NORTH CAROLINA 28237

April 14, 1977

TEST REPORT NO. 03238

SIGNED FOR THE COMPANY

BY

David L. Hansen

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EST. 1960

E. Rider/js

Laboratories in: New York • Chicago • Los Angeles • Houston • Tulsa • Memphis • Reading • Richland

OUR LETTERS AND REPORTS ARE FOR THE EXCLUSIVE USE OF THE CLIENT TO WHOM THEY ARE ADDRESSED AND THEY AND THE NAME OF THE UNITED STATES TESTING COMPANY, INC. OR ITS SEALS OR INSIGNIA ARE NOT TO BE USED UNDER ANY CIRCUMSTANCES IN ADVERTISING TO THE GENERAL PUBLIC AND MAY NOT BE USED IN ANY OTHER MANNER WITHOUT OUR PRIOR WRITTEN APPROVAL. SAMPLES NOT DESTROYED IN TESTING ARE RETAINED A MINIMUM OF THIRTY DAYS.

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United States Testing Company, Inc.

Subject:

A dual phase project involving the sampling of asbestos fiber emitted from treated and untreated asbestos products conducted by United States Testing Company, Inc. on February 22nd, 23rd, 24th and March 22, 1977.

Project:

Phase I of the project involved the simulation of the working condition encountered during the lagging of a ship's compartment. The test was conducted in your air compressor room located at 1000 Seaboard Street, Charlotte, North Carolina. Three days were required to accomplish this phase of the project which had three separate steps. The first step, conducted on February 22, 1977, involved the application of the primary pipe insulation material consisting primarily of calcium silicate known as Thermo 12 manufactured by Johns Manville Corporation and Quick Set Cement manufactured by 48 Insulations Company.

The second step, conducted on February 23, 1977, involved the application of the secondary insulating material, a treated asbestos lagging material AG-110 RWL Underwriters Lagging Cloth containing water activated adhesive manufactured by Southern Asbestos Company. The secondary insulation was then allowed to dry for a period of about one week, at which time it was painted with IC-102 manufactured by Insul-Caustics.

The third and final step, conducted on March 22, 1977, involved the tear-down and removal of all of the aforementioned insulating materials one month later.

Phase II of the project involved the shaking of various treated and untreated asbestos products manufactured by Southern Asbestos Company in your vibration tester #70-03-004. This phase was completed in approximately one and one half days, February 23, and February 24, 1977.

Procedure:

Sampling and evaluation procedures were performed in accordance with NIOSH (National Institute for Occupational Safety and Health) requirements.

Asbestos fibers were collected on Millipore type AA (37mm dia., 0.8u pore) Cellulose-ester membrane filters pre-mounted in three stage plastic field cassettes, which were sealed with cellulose bands.

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United States Testing Company, Inc.

Vacuum was provided by Bureau of Mines approved miniature battery-powered pumps previously calibrated to provide a flow rate of 2 liters per minute. The filter cassettes were connected to the vacuum source by Tygon tubing. Optimum sampling times were calculated as per NIOSH regulations.

During Phase I of the project, both area and personnel samples were collected. Area sampling involved setting-up samples in the work area; personnel sampling involved monitoring employees (at their breathing zone) actually performing the work. Personnel employed during the survey were Carl Smith and Jene Carter of the Porter Hayden Company of Charlotte, North Carolina.

Phase II of the project involved sampling within the enclosed area of Southern Asbestos' vibration tester #70-03-004. The filter cassette was placed inside the tester and was connected to a pump which was outside the tester via Tygon tubing. The tester was vacuumed out after each successive run to insure representative samples.

Results:

Phase I - Simulated Lagging of Ship's Compartment

<u>Sample Identification</u>	<u>Concentration of Asbestos in Fiber/cc</u>
Step 1 - Primary Insulation Installation*	
#1 Area sample collected 2/22/77 located on top of concrete support in center of the room. Total volume of sample 189 liters.	Primarily particulate material with some fibers present which was mostly fiberglass with a few asbestos fibers.
#2 Area sample collected 2/22/77 located on top of concrete support. Total volume 110 liters.	
#3 Area sample collected 2/22/77 located on top of concrete support. Total volume 210 liters.	

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*Note:

These samples could not be counted as per NIOSH requirements due to unusually heavy loading of non-asbestos material.

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United States Testing Company, Inc.

Results (Continued)

Phase 1 - Simulated Lagging of Ship's Compartment

<u>Sample Identification</u>	<u>Concentration of Asbestos in Fiber/cc</u>
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Step 2 - Secondary Insulation Installation

#1 Personnel sample collected 2/23/77 Employee - Carl Smith - Total volume 366 liters	0.09
#2 Personnel sample collected 2/23/77 Employee - Jene Carter - Total volume 364 liters	0.06
#3 Area sample collected 2/23/77 collected on concrete support - Total volume 362 liter	0.04
#4 Personnel sample collected 2/23/77 Employee - Carl Smith - Total volume 180 liters	0.17
#5 Personnel sample collected 2/23/77 Employee - Jene Carter - Total volume 180 liters	0.21
#6 Area sample collected 2/23/77 collected on concrete support Total volume 180 liters	0.10

Step 3 - Tear-Down and Removal

#1 Personnel sample collected 3/22/77 Employee - Jene Carter - Total volume 60 liters	0.13	
#2 Area sample collected 3/22/77 collected on concrete support Total volume - 60 liters	0.15	
#3 Personnel sample collected 3/22/77 Employee - Jene Carter - Total volume 120 liters	0.24	LAM021749
#4 Area sample collected 3/22/77 collected on concrete support Total volume 116 liters	0.09	6113 18808

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United States Testing Company, Inc.

Results (Continued)

Phase I - Simulated Lagging of Ship's Compartment

<u>Sample Identification</u>	<u>Concentration of Asbestos in Fiber/cc</u>
Step 3 - Tear-Down and Removal	
#5 Personnel sample collected 3/22/77 Employee - Jene Carter - Total volume 110 liters	0.26
#6 Area sample collected 3/22/77 collected on concrete support Total volume 88 liters	0.14

Phase II - Vibration Tester

<u>Sample Identification</u>	<u>Concentration of Asbestos in Fiber/cc</u>	
#1 8225 with CLEANGARD® collected 2/23/77 - Total volume 200 liters	0.01	
#2 8225 Commercial Grade with WELDGARD® - collected 2/23/77 Total volume 200 liters	0.02	
#3 8225 Commercial Grade - No Treatment collected 2/24/77 Total volume 200 liters	0.05	
#4 AG110 Underwriters Grade Rewettable Lagging collected 2/24/77 - Total volume 200 liters	0.02	
#5 AG110 Underwriters Grade No Treatment collected 2/24/77 Total volume 200 liters	0.01	
#6 160 Commercial Grade Tape, 2" CLEANGARD® collected 2/24/77 Total volume 200 liters	0.01	LAM021750
#7 160 Commercial Grade Tape, 2" No Treatment collected 2/24/77 Total volume 200 liters	0.01	6113 18809

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United States Testing Company Inc.

Conclusion:

Since the current TLV (Threshold Limit Value) for asbestos fibers is 2 fibers per cubic centimeter greater than 5 micrometers in length, all the concentrations determined are well within OSHA requirements.

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HYGIENIC GUIDE SERIES



AMERICAN

ASSOCIATION

Hygienic Guide Series

Asbestos

I. Hygienic Standards

A. RECOMMENDED MAXIMUM ATMOSPHERIC CONCENTRATION IS 5 million particles per cubic foot of air (MPPCF)

(1) Basis for Recommendation: Experience in industry, ¹ ² ³ ⁴ and animal experiments.

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 nondebilitating for many years, even without appreciable symptoms, as long as some other serious disease does not supervene to cause death.⁵ Chief symptoms of advanced asbestosis are variable cough, dyspnea, subternal 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.⁶ There have been reports of an increased incidence of lung cancer in persons with asbestosis.⁷

(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 Practices

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 fire-proofing 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,^{8,9} and dust counts made by the standard light field technique.¹⁰ 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-

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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 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 asbestotic 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: 284, 1957.

2. CARTIER, PAUL: *AMA Arch. of Ind. Health*, 11: 204, 1955.
3. DOLL, R.: *Brit J Ind. Med.*, 12: 8, 1955.
4. DREBBER, W. C., et al: Public Health Bulletin No. 241, Supt. of Doc., Washington, D. C., 1939.
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. KNOX, E. J., et al: *Thorax*, 1, p. 188, 1946.
8. LUTCH, K. M.: *AMA Arch. of Ind. Health*, 11: 185, 1955.
9. McPHERSON, S. B.: *J. Ind. Hyg. & Tox.*, 16: 229, 1934.
10. PARK, R. T. AND BLACKWELL, J. J.: *Pub. Health Repts.*, 50: 1713, 1937.
11. PATTY, FRANK A.: *Industrial Hygiene and Toxicology*, Vol. 1. Interscience Publishers, Inc., New York, 1958.
12. SHANN, K. W.: *AMA Arch. of Ind. Health*, 19: 193, 1959.
13. VERWALT, A. J., et al: *AMA Arch. Ind. Hyg. and Occup. Med.*, 8: 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.

HYGIENIC GUIDELINES COMMITTEE

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OSHA SAMPLING DATA SHEET #2

Substance:

Asbestos.

Standard: 29 CFR 1910.93a (a) of December 7, 1971

8-hour time-weighted average*: 5 fibers per milliliter greater than 5 microns in length.

Excursion limit*: 10 fibers per milliliter, up to 15 minutes in an hour for up to 5 hours per 8-hour day.

*Unprotected or improperly protected worker exposures.

Analytical Method:

Fibers counted at 400-450 magnification, using phase contrast illumination, with sample mounted in high-viscosity solution of membrane filter material.

Sampling Equipment:

Personal sampling pump plus Millipore type AA filter (37 mm, 0.8 μ pore size). Face cap is removed and filter used open face during sampling. Sampling rate: 2 l/m.

Sample Size:

Minimum period of 15 minutes for evaluation of excursion limit. Several samples of up to 4 hours for evaluation of 8-hour average. Samples with a visible deposit may be too heavy to count. Compare with a clean filter. Heavy concentrations of visible dust in the air (100 to 500 fibers/ml) may require short sampling periods of only 5 minutes, or less.

Blanks:

With each batch of samples submit two filters which are subjected to exactly the same handling as for the samples except that no air is drawn through them. Label these as blanks.

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OSHA SAMPLING DATA SHEET #2

Shipping:

The cassettes in which the samples are collected should be shipped in a suitable container, designed to prevent damage in transit.

Imminent Danger Situations:

Generally not applicable.

Serious Violation:

5.1 or more fibers per ml, greater than 5 μ in length, for an unprotected or improperly protected worker, for an 8-hour time-weighted average, except for certain proven excursions as noted in the emergency standard, which may raise the 8-hour time-weighted average to 5.8 fibers per ml.

Nonserious Violation:

Not applicable.

De Minimis Violation:

Not applicable.

ENVIRONMENTAL SURVEILLANCE PRODUCTS USED BY OSHA INSPECTORS

2. Asbestos MSA Portable Pump, Model G (P/N 456058)

SUGGESTED MSA RESPIRATORY PERSONAL PROTECTIVE PRODUCTS FOR TARGET HEALTH HAZARDS
(Selection must be based on exposure concentrations and conditions)

2. Asbestos

CONCENTRATION - Fibers/milliliter greater than 5 microns in length			
Exposure Time	Without Respiratory Protection	218 Approved Respirator Bustee 66 Bustee 77 Custom Camo E. S. A. M.	Type Continuous Flow Airline Respirator Constant Flow Airline
8 hours	Up to 5	Up to 25	Greater than 250
15 minutes per hour up to 5 hours in an 8 hour day	Up to 10	Up to 50	Greater than 250

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