

U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE  
CENTER FOR DISEASE CONTROL  
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH  
CINCINNATI, OHIO 45202

HEALTH HAZARD EVALUATION DETERMINATION  
REPORT NO. 79-57-642

AMERICAN GYPSUM COMPANY  
ALBUQUERQUE, NEW MEXICO

December, 1979

I. TOXICITY DETERMINATION

The following determinations have been based upon the: (a) results of environmental air samples collected on March 7, 1979; (b) personal observation by the NIOSH investigator; (c) available toxicity information; and (d) employee interviews.

Results of five (5) personal breathing-zone and five (5) general area samples showed workroom concentrations of fibrous glass to be well below the NIOSH recommended standard of 3.0 fibers per cubic centimeter of air sampled for fibers having a diameter equal to or less than 3.5 micrometers and a length equal to or greater than ten (10) micrometers.

Results of another five (5) personal breathing-zone samples showed workroom concentrations to be below: (a) the NIOSH recommended standard for fibrous glass expressed as total weight; (b) the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) Committee recommendation for fibrous glass expressed as a nuisance dust; and (c) the Occupational Safety and Health Administration (OSHA) standard for fibrous glass, also expressed as a nuisance dust. (Note: These gravimetric results are reflective of not only fibrous glass, but other particulate matter as well).

An evaluation of ventilation within various areas of the board plant (glass cutter, bundler saw, etc.) revealed that exhaust velocities ranged from 200-300 feet per minute, and were thus considered adequate to collect potentially airborne fibrous glass particles from the applicable operation(s).

Employee interviews with five (5) persons performing duties in the board plant failed to identify definite work-related health conditions/problems in that specific work area.

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## II. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this Determination Report are currently available upon request from NIOSH, Division of Technical Services, Information and Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After ninety (90) days, the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia. Information regarding its availability through NTIS can be obtained from NIOSH, Publications Office, at the Cincinnati, Ohio, address. Copies have been sent to:

- a) American Gypsum Company, Albuquerque, New Mexico
- b) Authorized Representative of Employees
- c) U.S. Department of Labor, Region VI
- d) NIOSH, Region VI

For the purpose of informing the approximately forty-five (45) "affected employees", the employer shall "post" the Determination Report in a prominent place near where exposed employees work, for a period of thirty (30) calendar days.

## III. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) authorizes the Secretary of Health, Education and Welfare, following receipt of a written request from an employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

NIOSH received such a request from an authorized representative of employees (AFL/CIO United Cement, Lime and Gypsum International Union) regarding possible employee respiratory conditions resulting from the exposure of workers in the board plant to fibrous glass particles.

## IV. HEALTH HAZARD EVALUATION

### A. Description of Process - Conditions of Use

The American Gypsum Company, Albuquerque, New Mexico, commencing operations in 1960, currently employs a total of seventy-two (72) persons. Approximately eighteen (18) persons are employed in the specific area of the request for health hazard evaluation -- namely, the supply floor of the board plant.

Normal operations consist of the manufacture of gypsum wall board; however, approximately twice each month, the company produces fireproof wallboard -- necessitating that board plant employees be exposed to fibrous glass particles.

## B. Evaluation Design

### 1. Environmental/Employee Interviews

On March 7, 1979, an environmental evaluation of the facility was conducted by NIOSH representative, Mr. H.L. Markel, Jr., Regional Industrial Hygienist.

In order to more fully and adequately evaluate employee exposure to fibrous glass particles, environmental samples were collected from the supply floor of the board plant.

Although interviews were conducted with board plant employees in a non-directed manner, considerable difficulty was encountered because of the fact that employees in this area were of Vietnamese extraction and were unable to converse in the English language. It was, therefore, necessary to utilize the services of an interpreter. Conversations were also held with the plant manager, plant superintendent and local Union representative in an attempt to identify any known or existing employee medical conditions.

## C. Evaluation Methods

### 1. Environmental

#### Fibrous Glass

Ten (10) personal breathing-zone samples and five (5) general area samples were collected for the analysis/evaluation of fibrous glass exposure.

Of those samples, five (5) personal breathing-zone and five (5) general area samples were collected by using Mine Safety Appliance(a), Model G, battery-operated vacuum pumps with 0.8 micron pore size mixed cellulose ester membrane filters at a sampling rate of 1.7 liters per minute. The remaining five (5) personal breathing-zone samples were collected by using Mine Safety Appliance(a), Model G, battery-operated vacuum pumps with 0.8 micron pore size tared polyvinyl chloride membrane filters at a sampling rate of 2.0 liters per minute.

The mixed cellulose ester membrane filters were analyzed for fibrous glass (fiber count) according to NIOSH Physical and Chemical Analysis Branch Analytical Method #239 utilizing phase contrast microscopy. Fibers with a minimum length greater than 10 microns and minimum width of 3.5 microns were counted.

(a) Mention of commercial name(s) does not constitute NIOSH endorsement.

The tared polyvinyl chloride membrane filters were dried and ultimately weighed to obtain total particulate matter within the sample(s).

A (a)SIERRA Instruments Air Velocity Meter, Model 1555, Thermo Anemometer, was used to measure exhaust velocities at various locations within the board plant.

## 2. Employee Interviews

Interviews were conducted, in a non-directed manner, with five (5) board plant employees in an attempt to identify any workers with known respiratory conditions or other work-related health conditions/problems resulting from their exposure to fibrous glass in that specific work area.

## D. Evaluation Criteria

### 1. Environmental Standards

The environmental standards and criteria considered to be applicable to this evaluation are as follows:

- a. The Occupational Health Standards as promulgated by the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), Federal Register, May 28, 1975, Title 29, Chapter XVII, Subpart G, Table Z-3 (29 CFR Part 1910.1000).
- b. American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) Committee, 1977, and
- c. NIOSH Criteria Documents recommending occupational standards.

<u>Substance</u>	<u>8-hr. TWA,ACGIH TLV Committee</u>	<u>NIOSH,8 or 10-hr. TWA Recommended Standard</u>	<u>OSHA,8-hr. TWA Standard</u>
Fibrous Glass	xx	** 3 fibers/cc	xx
Fibrous Glass (total weight)	xx	* 5mg/M <sup>3</sup>	xx
Fibrous Glass (nuisance dust)	* 10mg/M <sup>3</sup>	xx	* 15mg/M <sup>3</sup>

\* Eight or ten-hour time-weighted-average concentration in milligrams of substance per cubic meter of air sampled.

\*\* Eight or ten-hour time-weighted-average concentration in fibers per cubic centimeter of air sampled.

(a) Mention of commercial name(s) does not constitute NIOSH endorsement.

Note: Occupational health exposure limits for individual substances have generally been established at levels designed to protect occupationally-exposed workers on an eight (8) hours per day, forty (40) hours per week basis over a normal working lifetime.

## 2. Toxic Effects

### Fibrous Glass

Different dimensions of fibrous glass will produce different biologic effects. Large diameter [greater than 3.5 micrometers ( $\mu\text{m}$ )] glass fibers have been found to cause skin, eye and upper respiratory tract irritation; a relatively low frequency of fibrotic changes; and a very slight indication of an excess mortality due to nonmalignant respiratory disease.

Smaller diameter [less than 3.5 micrometers ( $\mu\text{m}$ )] fibrous glass has not been conclusively related to health effects in humans but glass fibers of this dimension have been regularly produced only since the 1960's. Smaller diameter fibers have the ability to penetrate to the alveoli and this potential is cause for concern, and the primary reason that fibers 3.5  $\mu\text{m}$  or smaller are subject to special controls.

On the basis of available information, NIOSH does not consider fibrous glass to be a substance that produces cancer as a result of occupational exposure. The data on which to base this conclusion are limited. Fibrous glass does not appear to possess the same potential as asbestos for causing health hazard(s). Glass fibers are not usually of the fine submicron diameters as are asbestos fibrils and the concentrations of glass fibers in workplace air are generally orders of magnitude less than for asbestos.

## E. Evaluation Results and Discussion

### 1. Environmental

As can be seen in Table 1, results of five (5) personal breathing-zone and five (5) general area samples showed workroom concentrations of fibrous glass to be well below the NIOSH recommended standard of 3.0 fibers per cubic centimeter of air sampled. This recommended standard is applied to fibers having a diameter equal to or less than 3.5 micrometers and a length equal to or greater than 10 micrometers determined as a time-weighted average (TWA) concentration for up to a 10-hour work shift in a 40-hour workweek.

Similarly, Table 2 shows workroom concentrations of five (5) personal breathing-zone samples to be below: (a) the NIOSH recommended standard for fibrous glass expressed as total weight and shown as milligrams per cubic meter of air sampled (mg/M<sup>3</sup>); (b) the ACGIH, TLV Committee recommendation of 10 mg/M<sup>3</sup> for fibrous glass expressed as nuisance dust; and (c) the OSHA standard of 15 mg/M<sup>3</sup> for fibrous glass expressed as nuisance dust.

An evaluation of ventilation within various areas of the board plant (glass cutter, bundler saw, etc.) showed that exhaust velocities ranged from 200-300 feet per minute, and were thus considered adequate to collect potentially airborne fibrous glass particles from applicable operation(s) within the plant.

## 2. Medical

Employee interviews with five (5) persons performing duties in the board plant failed to identify definite work-related health conditions/problems in that specific work area.

## F. Conclusions

No concentrations in excess of the evaluation criteria used herein for this evaluation were found to exist in the work environment of the plant at the time the evaluation was performed.

## V. RECOMMENDATIONS

A. Workers subject to fibrous glass exposure should have comprehensive preplacement medical examinations with emphasis on skin susceptibility and prior exposure in dusty trades. Subsequent annual examinations should give attention to the skin and respiratory system with attention to pulmonary function.

## VI. REFERENCES

- A. National Institute for Occupational Safety and Health, U.S. Department of Health, Education and Welfare: Criteria for a Recommended Standard...Occupational Exposure to Fibrous Glass, Publication No. 77-152, U.S. Government Printing Office, Washington, D.C., 1977.
- B. National Institute for Occupational Safety and Health, U.S. Department of Health, Education and Welfare: Occupational Exposure to Fibrous Glass -- A Symposium, Publication No. 76-151, U.S. Government Printing Office, Washington, D.C., 1978.

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Table 1

## Fiber Count

American Gypsum Company  
Albuquerque, New Mexico

March 7, 1979

<u>Sample Number</u>	<u>*Type of Sample</u>	<u>Location</u>	<u>Sampling Period</u>	<u>Concentration (fibers/cubic centimeter)</u>
1	P	Glass Cutter	9:37A - 12:18P	< 0.02
2	P	Supply Man	9:40A - 12:17P	< 0.02
3	P	Mixer Man	9:43A - 12:26P	< 0.02
4	P	Wet End Lead Man	9:47A - 12:25P	< 0.02
5	P	Bundler Operator	9:53A - 12:30P	< 0.02
6	GA	Stacking Area	11:00A - 1:38P	< 0.02
7	GA	Bundling Area	11:01A - 1:37P	< 0.02
8	GA	Mixer Area	11:02A - 1:36P	< 0.02
9	GA	Land Plaster Area	11:03A - 1:45P	< 0.02
10	GA	Glass Cutter Area	11:04A - 1:46P	< 0.02

NIOSH Recommended Standard..... 3.00

\*P = Personal: GA = General Area

Table 2

Total Particulate Matter (Nuisance Dust - Fibrous Glass Plus Other Particulates)

American Gypsum Company  
Albuquerque, New Mexico

March 7, 1979

<u>Sample Number</u>	<u>*Type of Sample</u>	<u>Location</u>	<u>Sampling Period</u>	<u>**Concentration (mg/M<sup>3</sup>)</u>
7938	P	Bundler Operator	9:53A - 10:30A	1.9
7940	P	Wet End Lead Man	9:47A - 10:25A	1.8
7942	P	Mixer Man	9:43A - 10:18A	1.1
7943	P	Glass Cutter	9:37A - 10:21A	2.8
7944	P	Supply Man	9:40A - 10:20A	4.3

ACGIH, TLV Committee Recommendation (Nuisance Dust)..... 10.0  
OSHA Standard (Nuisance Dust)..... 15.0

\* P = Personal

\*\* mg/M<sup>3</sup> = milligrams of substance per cubic meter of air sampled