

Secret

SUPPLEMENTAL INFORMATION
FOR
TESTIMONY CONCERNING
POSSIBLE CHANGES IN THE
HEALTH AND SAFETY CODE SECTION 25910
AS PERMITTED BY SB-1591

Airborne Asbestos Concentrations from the
Grinding of Thermoset Resins Containing
0.8-18% by Weight Chrysotile Asbestos

Prepared for the Occupational Safety
and Health Standards Board
Sacramento, California
November 15, 1978

Prepared By
Union Carbide Corporation
Metals Division
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A10353

SUMMARY

Union Carbide Corporation has published the results of a study of methods to detect chrysotile asbestos in the airborne dust generated during the grinding of thermosetting resins. As a part of this study, resin plaques containing 0.8 to 18% by weight of asbestos were abraded with a powered disc grinder. The operation was carried out in a closed, 8-1/2' x 8-1/2' x 8' room. Airborne dust samples were collected and counted by the standard NIOSH/OSHA procedure.

The personal samples showed concentrations ranging from 0.0-0.7 fiber/cc >5 μ and the area samples varied from 0.0-1.2 fiber/cc >5 μ . There was no relationship between the asbestos content of the plaque and the airborne asbestos content that resulted from grinding.

These data are a small part of an extensive study, the balance of which is not related to the Standards Board hearing. In order to provide convenient reference, the relevant portions of the paper have been assembled on the following page. A complete copy of the paper is also attached.

A10034

Detection of Chrysotile Asbestos in Airborne Dust from Thermosetting Resin Grinding

REFERENCE: Faulring, G. M., Forzeng, W. D., Kleber, E. J., and Rhodes, H. B., "Detection of Chrysotile Asbestos in Airborne Dust from Thermosetting Resin Grinding," *Journal of Testing and Evaluation*, JTEVA, Vol. 3, No. 6, Nov. 1975, pp. 482-490.

Sample Preparation and Description

Resin plaques containing 0.8 to 18% chrysotile were ground with a power-driven hand grinder equipped with a 7-in. (177.8-mm) diameter, 16-grit abrasive disk simulating the fabrication operations found in boat yards and the automobile industry. Compositions of the plaques are listed in Table 1. The grinding was carried out in a thoroughly cleaned, closed, 8½ by 8½ by 8-ft (2.6 by 2.6 by 2.4-m) room. The plaque, approximately ½-in. (12.7-mm) thick by 1 by 2 ft (0.3 by 0.6 m), was clamped to a bench 30 in. (76.2 mm) from the floor approximately in the center of the room. The edge was ground for a period of 4-5 min with the grinder rotating in a direction to throw the heavy particles toward the floor.

In addition, individual samples were collected before, during, and after each grinding operation by aspirating at the rate of 2 litres per min through Type AA membrane filters (0.8 µm pore size).

TABLE 1—Compositions of chrysotile-bearing plaques.

Sample No.	Resin		Chrysotile		Fiber Glass Weight, %	Sisal Weight, %	Limestone Weight, %	before	during	during*	after
	Type	Weight, %	Type*	Weight, %							
1	polyester	79.2	RG-244	0.8	20.0	...	...	0	0	0	0
2	polyester	99.2	RG-244	0.8	...	...	...	0.01	0	0	0
3	polyester	98.0	RG-244	2.0	...	...	...	0.01	0.2	0	0.01
4	polyester	98.0	RG-244	4.0	...	...	...	0.01	1.2	0.7	0.02
5	epoxy	76.0	RG-144	4.0	20.0	...	...	0.06	0.1	0.1	0.05
6	polyester	35.0	RG-110	5.0	10.0	10.0	40.0	0	1.2	0.6	0.02
7	polyester	35.0	RG-110	10.0	10.0	10.0	35.0	0	0	0	0
8	polyester	30.0	SG-200	18.0	...	2.0	50.0	0.03	0.9	0.3	0.06

* Types RG-110 and RG-144 are opened fibers; SG-200, pelletized; RG-244, silica coated (Union Carbide Corporation designations of refined California chrysotile, commercial products).



* Breathing zone.

A 10005

TABLE III

RESIN-BASED SYSTEMS

Sample Designation	Commercial Application	Date	Binder	Approximate Wt. % Asbestos ⁽¹⁾	Spray Gun Type	Operation	Sample Time (Min.)	Asbestos Airborne Concentration (Fibers/cc > 5µ)
<u>I - POLYESTER RESINS</u>								
<u>A. General Purpose Laminating Resins</u>								
69	Boat manufacture.	12/7/72	General purpose laminating resin.	0.5	Air-supported chopper.	Operator spraying molds with resin & chopped glass.	24	0.6
L-13	"	10/31/74	"	0.5	"	Operator spraying resin & chopped fiber glass. (Includes roll-out time.)	16	0.1
N-28	"	"	"	0.5	"	Operator spraying resin & chopped fiber glass.	5	0.4
N-30	"	"	"	0.5	"	Operator spraying resin & chopped fiber glass.	4	0.4
N-34	"	10/8/74	"	0.5	"	Operator spraying mold with resin. (No glass.)	55	0
N-40	"	"	"	0.5	"	"	53	0.03
I-12	"	"	"	0.5	"	"	35	0.1
<u>B. Chemical Resistant Resins</u>								
J-21	Fiber-glass pipe manufacture.	8/13/74	Chemical resistant resin.	1.4	Airless.	Operator adjacent to automatic spray machine coating 28' mandrels.	23	0.1
H-26	"	"	"	1.4	"	Operator wiping mandrels. In area near spraying.	14	0.4
J-5	Ship coating.	10/3/74	Chemical resistant resin + chopped fiber glass.	0.7	Air-supported wand.	Roll-out man. In spraying area about 1/4 of time.	65	0.4
J-7	"	"	"	0.7	"	Operator spraying ship hull in dry dock.	41	0.4
H-28	"	"	"	0.7	"	"	23	0

(1) Based on total formulation as sprayed.

A16036

TABLE III (continued)

RESIN BASED SYSTEMS

Sample Designation	Commercial Application	Date	Binder	Approximate ⁽¹⁾ Mt. % Asbestos	Spray Gun Type	Operation	Sample Time (Min.)	Asbestos Airborne Concentration (Fibers/cc air)
II - EPOXY RESINS								
A. Filled Epoxy								
K-3	Ship coating.	10/2/74	Epoxy primer.	1.5	Airless.	Operator spraying outside & under a ship.	33	0.2
K-10	"	"	"	1.5	"	"	8	0.2
M-10	"	"	High build epoxy.	0	Air supported.	Operator spraying side of ship from scaffold.	31	0.1
I-27	"	"	"	0	"	"	14	0.3
J-1	"	"	"	0	"	"	60	0.03
B. Epoxy - Coal Tar								
M-45	Coating dry dock.	10/1/74	Epoxy Coal-tar solvent.	1	Airless.	Operator spraying side of dry dock from suspended platform.	11	0.2
M-1	"	"	"	1	"	Operator spraying side of dry dock from fixed scaffold.	38	0
K-3	Coating pipe interiors.	"	"	1	Air-supported wand.	Operator spraying interior of 3", 6" and 12" diameter pipe.	37	0.1
III - ALKYD RESIN PAINT								
M-7	Painting building exterior.	10/6/74	Alkyd resin.	12	Airless gun.	Operator spraying building exterior wall.	9	0
M-35	"	"	"	12	"	"	5	0.06

(1) Based on total formulation as sprayed.

III. Resin-Based Systems

Binders:

Type: Polyester resins, alkyd resins, epoxy resin alone or in combination with coal tar or equivalent resin.

Content: Range from ~6% in zinc-rich primer to ~49% for heavily filled alkyd to 99+ for polyester laminating resins.

Main Uses: Fiber glass reinforced boats, pipes, shower stalls, and similar articles.

Maintenance coatings for steel and concrete.

Intumescent and zinc-rich paint.

Exterior alkyd paints.

Asbestos Range: Up to 12% by weight of the total formulation as sprayed.

Supporting Data: Table III.

A 100008

TABLE IV

ASPHALTIC AND COAL-TAR BASED SYSTEMS

Sample Identification	Commercial Application	Date	Binder	Approximate Wt. % Asbestos ⁽¹⁾	Spray Gun Type	Operation	Sample Time (Min.)	Airborne Asbestos Concentration (Fibers/cc) 54
M-42	Auto undercoating, (Sound deadener)	10/74	Cut back asphalt	15	Airless.	Operator spraying on auto body.	7	0.2
M-31	"	"	"	15	"	"	6	1.5
2	Fibrated Roof Coating.	9/26/74	"	8	Air supported.	Operator spraying against vertical steel surface.	-	0.02
2	"	10/11/74	"	8	"	" "	-	0.11
3	"	9/26/74	"	8	Airless	" "	-	0.03
3	"	10/11/74	"	8	"	" "	-	0.07
-	Emulsified asphalt fibrated roof coating.	12/18/74	Steam refined, emulsified asphalt.	3	Air supported	Operator spraying against vertical steel surface.	43	0.16
-	"	"	"	3	Airless	" "	23	0.17

(1) Based on total formulation as sprayed.

A160089

IV. Asphaltic and Coal-Tar Based Systems

Binders:

Type: Cutback and emulsified asphalt and coal-tar materials or equivalent.

Content: Typically~45%.

Main Uses: Automotive undercoating and sound deadener, roof coatings, foundation coatings.

Asbestos Content: Up to 15%.

Supporting Data: Table IV.

A 10 140



from the office of:

Senator HARRISON A. WILLIAMS Jr.
NEW JERSEY

352 Old Senate Office Building . Washington, D.C. 20510 . 225-4744

Wednesday, June 14

72-135

FOR RELEASE:

**WILLIAMS CRITICIZES DELAY IN ASBESTOS FIBER SAFETY
STANDARDS; QUESTIONS ENFORCEMENT PROCEDURES**

WASHINGTON, June 14 -- U. S. Senator Harrison A. Williams, Jr. (D-NJ) today criticized the recently announced delay in requiring the reduction of asbestos fiber content in industrial plants.

Sen. Williams is chairman of the Senate Labor and Public Welfare Committee and is the author of the Occupational Safety and Health Act.

The delay was announced last week by the Occupational Safety and Health Administration. There is an existing five-fiber per cubic centimeter of air standard. The four-year delay involves reducing that to a two-fiber standard.

Sen. Williams made his comments in a letter to George C. Guenther, Assistant Secretary for Occupational Safety and Health in the U. S. Department of Labor.

The text of the Senator's letter is:

"I was gratified to learn that the Occupational Safety and Health Administration has made a priority in dealing with the grave hazard that asbestos presents to the health of hundreds of thousands of our Nation's workers.

"However, this in itself is not nearly enough.

"I was most disappointed and am deeply concerned over the decision to allow a four-year delay before requiring a maximum TWA (time weighted average) concentration of two fibers per cubic centimeters of air.

"You previously have recognized that 'lives of employees are at stake' in the establishment of this standard. Therefore, I find this delay startling. I would most strongly urge ;you to review this decision and move this deadline up substantially in view of the seriousness of this problem. I think the workers of our nation deserve and expect this protection and we can not let them down.

"Apart from the question of these levels, I am also disturbed about basic enforcement procedures. I have been informed that air sampling for asbestos dust concentrations has been a rarity. In the absence of these inspections and stringent enforcement, no standard will have any real meaning in protecting workers.

"I would, therefore appreciate your advising me in detail with regard to the Occupational Health and Safety Administrations' present capability for enforcing an asbestos standard, and the nature of the enforcement effort you propose to undertake to deal with this hazard." # # #

A 10941