PLAINTIFF'S EXHIBIT
WRG-182

[redacted]
ZONOLITE DIVISION
W. R. GRACE & CO.
RESEARCH LABORATORY
4999 LAWNDALE AVENUE • SKOKIE, ILLINOIS
TELEPHONE 312 - 676-2000

PRELIMINARY STUDY OF EXCLUSION OF ASBESTOS FIBER FROM MONO-KOTE, MK-3

November 1, 1965

Test Report No. 1231

Laboratory Data Book No. 81, Pages 66, 69, 82 and 88

Work done by: R. J. Bragg, J. Wilson, W. R. Payment

Work requested by: E. L. Perrine

Purpose of Test: This investigation has been made to provide a base reference point for planned additional efforts to decrease the cost of Mono-Kote. This goal was formally expressed at the Vermiculite Institute Plaster Committee meeting on October 27, 1965.

Abstract: The exclusion of asbestos fiber from our Mono-Kote MK-3 formulation results in a product, which when compared with Mono-Kote, has the following properties:

a) 20.8% higher dry bulk density

b) 5.2% higher cured density

c) 10.0% shorter set time

d) 17.8% lower water requirement

e) 10.3% lower raw materials cost for producer

f) 5.2% higher raw materials cost for consumer

To express it a bit differently, we could save $.09 per bag in manufacturing costs by eliminating asbestos. The customer would lose $.10 per bag in reduced yield (i.e. @ $2.00 per bag selling price).

It was noted that this product provided a 6.3% shorter fire endurance time than regular Mono-Kote, but re-tests may show this to be within the range of experimental error.

It is sensed that some means should be taken to lower the density of such a mix as herein discussed; perhaps by use of the new D-16 No. 4 aggregate, more aggregate and/or more efficient air-entrainment mechanisms.

Procedure: Two batches of Mono-Kote were blended on 7-6-65 at Travelers Rest, S. C. Mix No. 81-66 is the control using the regular MK-3 formula. Mix No. 81-69 is identical with the exception that no asbestos fiber was used.

These batches were wet mixed and applied on 7-15-65 by the author. Mixing was done in a 6 cu. ft. mortar type mixer and application was with the electrically driven PDC Tri Coater with 50 ft. of 2" dia.; 15 ft. of 1½" dia. hose and 1/2" dia. orifice. Atomizing pressure was constant, at 18 psig, for both batches. In addition to small samples retained for dry density determination, each material was applied to a 4' x 4' panel of Robertson Section 3 steel deck for subsequent fire testing. Thickness of application was 1/2" following the contour of the fluted deck specimen.

After about 1½ months of curing (natural drying) these panels were fire tested on our pilot fire test furnace. Sand loading was used to simulate the normal high density concrete, in order to compress time.

Data:	MK-3 Control (Mix 81-66)	MK-3 Without Fiber (Mix 81-69)
No. 3 Domestic Vermiculite 6 c.f.	35.3 lbs.	35.0 lbs
7M Asbestos	17.7 lbs.	-
Gypsum	76.3 lbs.	76.3 lbs.
Duponal WA Dry	60.0 gram	60.0 gram
Total Weight	129.3 lbs	111.3 lbs.
Dry Bulk Density	20.2 pcf	24.4 pcf
Set time, hand mixed	4.1 hours	3.7 hours
Mix & Yield Data		
Lbs. material charged	75 lbs	108.0 lbs
Water requirement	125 lbs.	148.0 lbs
Mixer density	56.6 pcf	62.2 pcf
Nozzle density	63.4 pcf	63.7 pcf
Cu. Ft. per 50 lbs.	2.10	1.86
Bd. Ft. per 50 lbs.	25.2	22.3
Lbs. water per lb. of material	1.667	1.370
% water reduction		17.8
Dry density of cured product	26.8 pcf	28.2 pcf
Specimen Frame No.	28	31
Pilot Fire Test No.	14	17
Cure time	41 days	56 days
Elapsed time to failure (minutes)	211	189

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Data:

Cost Analyses	RMC/ Pound	Formula Costs MK-3 Control (Mix 81-66)	Formula Costs MK-3 Without Fiber (Mix 81-69)
No. 3 Domestic Vermiculite	$.0236	$.833	$.833
7 M Asbestos	.0290	.513	.000
Gypsum	.0110	.839	.839
Duponal WA Dry	.4800	.063	.063
Total Cost (RMC)		$2.248	$1.735
Batch Weight, lbs.		129.3	111.3
RMC/lb		$.0174	$.0156
RMC/50 lb. unit		$.870	$.78
Bd. Ft./50 lb. unit		25.2	22.3
RMC/Bd. Ft.		$.0345	$.0350

Respectfully submitted,

Ralph J Bragg

R. J. Bragg

Approved:

E. L. Pirrine
Manager
Skokie Laboratory

RJB:ej

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