

**PLAINTIFF'S
EXHIBIT
WRG-452**

MDQ014

Ref. # 12-9

Manufactured by Portland Cement Co. of S. C. at Greenville, South Carolina. The composition had been applied by Field Type Equipment and Methods to a 2:0' x 12:0' section of H. H. Robertson Steel Deck, 18/16 ga. RK, at a thickness of 0.75 inch. After normal curing the section was uniformly loaded as hereinafter described until deflection greater than one-one-hundred twentieth ($1/120$) of the span or 1.2 inches, was obtained, without occurrence of cracking, flaking, or delamination.

Applicable Specifications

The test was performed in accordance with the Government Services Administration, Washington, D. C., Specifications 65-17206, Page 29-2, Title "Deflection." The specification reads as follows: "Deflection: Material shall not crack or delaminate when the backing to which applied is subjected to downward deflection of $1/120$ of the span."

Preparation of Test Specimen

A single panel of H. H. Robertson section RK Steel Deck 18 ga/16 ga., 2.0 feet wide by 14.0 feet long was suspended 2.5 feet above the floor on firm supports with a clear span of 12.0 feet. Two bags of dry MK were mixed with water at the rate of 11.0 gallons per bag. Mixing was done in a conventional 6-8 Mortar Mixer for a period of three to five minutes after which the mixed material was placed in the hopper of a STUPE-

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onto the undersill of the test panel at a rate of ...
foot per minute. Spraying was done in two applications of
approximately 3/8" each, both courses following the contour of
the steel. There was a lapse of time between courses of about
2.5 hours. Slight smoothing by trowel was necessary after
spraying. Specimens were also made for tests for density out
of the same batch of material as the spray coats.

The application of MK was made on July 9, 1965 inside a
steel building at daytime room temperature of 88° F. The panel
was left in place to cure until September 9, 1965.

The dry weight of the cured Monokote (MK) was determined
and found to be 24.0 pounds per cubic foot.

Deflection Test of Specimen

Uniform loads were applied to the panel by means of pre-
weighed iron pigs weighing 20 pounds each. Loads were applied
in increments as shown below. Deflection was measured at the
center of the panel with a Micro-Dial reading to 0.001 inches.
The dial was secured to a reference bar supported independently
of the rest of the assembly. Each load increment was allowed
to remain in place until there was no further movement of the
dial. The deflections were then recorded and the next increment
applied. Loading was continued until deflection greater than
1.2 inches was obtained. After the deflection reached 0.5 inch
the panel was examined with a magnifying glass for cracks and

1. The specimen was tested in accordance with the following:

The load was applied in steps, and observations for cracking and

No trace either of delamination or cracking was observed

found during loading or after full deflection had been reached.

The load deflection results as tabulated below were also

plotted on a chart which is included in this report.

Total Load lbs.	Uniform Load PSF	Deflection Inches	Remarks
0	0	0	
280	11.7	.013	Immediate Deflection
520	21.7	.105	Deflection complete in 5-min.
960	40.0	.279	Deflection complete in 5-min.
1440	60.0	.468	Deflection complete in 5-min.
1880	78.4	.638	Deflection complete in 5-min.
2400	100.0	.833	Deflection complete in 7-min.
2880	120.1	1.000	Deflection complete in 7-min.
3240	135.1	1.138	Deflection complete in 10-min.
3472	144.8	1.239	Deflection complete in 10-min.

Recovery was not measured by dial gage but by sight appeared to be complete recovery. There were no visible cracks on the underside nor delaminations when examined with magnifying glass during and after loading.

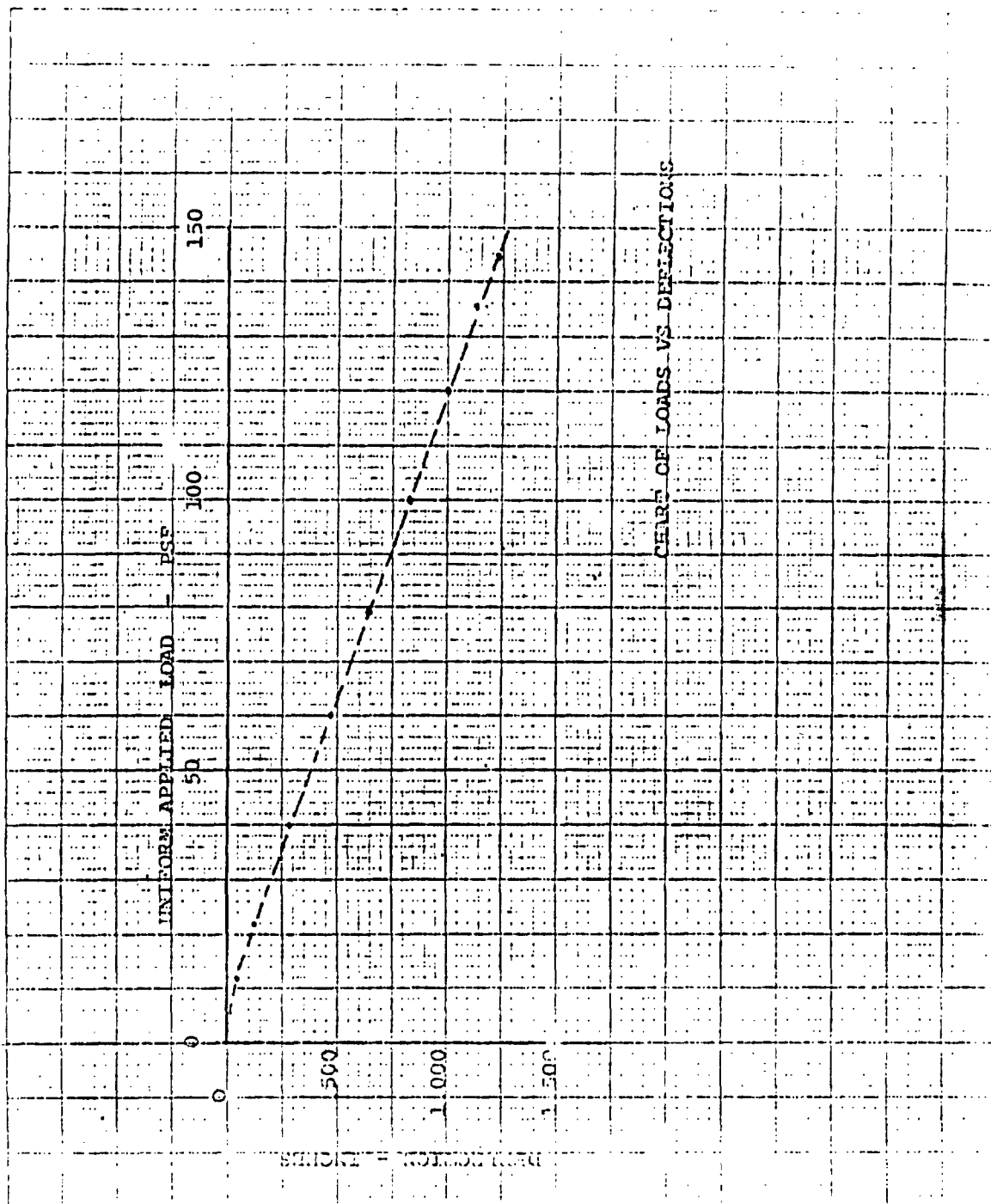
In conclusion, test results show that the specimen meets requirements of the GSA Specification 65-17206 for Type I materials, unit weight, and deflection. There was no visible cracking or delamination nor any change in appearance of the specimen after testing.

Respectfully submitted,

FROEHLING & ROBERTSON, INC.

Madison H. Woodward

Madison H. Woodward, Manager





Report No. 2
GN 6712-9

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REPORT OF
DELAMINATION AND CRACKING TESTS
OF
SPRAYED-ON FIRE PROTECTION
TYPE MK
UNDER DEFLECTION

Made For
ZONOLITE DIVISION
W. R. GRACE & COMPANY

By
 Froehling & Robertson, Inc., Greenville, S. C.
 September, 1965

Madison H. Woodward, RE 490, S. C.
Branch Manager

Abstract

The test was performed on Type MK Fireproofing Composition Manufactured by Zonolite Division of W. R. Grace & Company, at Travelers Rest, South Carolina. The composition had been applied by Field Type Equipment and Methods to a 2:0' x 12.0' section of H. H. Robertson Steel Deck, 18/16 ga. RK, at a thickness of 0.75 inch. After normal curing the section was uniformly loaded as hereinafter described until deflection greater than one-one-hundred twentieth ($1/120$) of the span or 1.2 inches, was obtained, without occurrence of cracking, flaking, or delamination.

Applicable Specifications

The test was performed in accordance with the Government Services Administration, Washington, D. C., Specifications 65-17206, Page 29-2, Title "Deflection." The specification reads as follows: "Deflection: Material shall not crack or delaminate when the backing to which applied is subjected to downward deflection of $1/120$ of the span."

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6-S Mortar Mixer for a period of three to five minutes after which the mixed material was placed in the hopper of a STEDIFLO TRICOATER piston type plaster pump, and was then sprayed onto the underside of the test panel at the rate of 1.0 cubic foot per minute. Spraying was done in two applications of approximately 3/8" each, both courses following the contour of the steel. There was a lapse of time between courses of about 2.5 hours. Slight smoothing by trowel was necessary after spraying. Specimens were also made for tests for density out of the same batch of material as the spray coats.

The application of MK was made on July 9, 1965 inside a steel building at daytime room temperature of 88° F. The panel was left in place to cure until September 9, 1965.

The dry weight of the cured Monokote (MK) was determined and found to be 24.0 pounds per cubic foot.

Deflection Test of Specimen

Uniform loads were applied to the panel by means of pre-weighed iron pigs weighing 20 pounds each. Loads were applied in increments as shown below. Deflection was measured at the center of the panel with a Micro-Dial reading to 0.001 inches. The dial was secured to a reference bar supported independently of the rest of the assembly. Each load increment was allowed to remain in place until there was no further movement of the dial. The deflections were then recorded and the next increment

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applied. Loading was continued until deflection greater than 1.2 inches was obtained. After the deflection reached 0.5 inch the panel was examined with a magnifying glass for cracks and delamination after each increment until the test was complete. The load was then removed and observation for recovery made.

No trace either of delamination or cracking could be found during loading or after full deflection had been reached.

The load deflection results as tabulated below were also plotted on a chart which is included in this report.

Total Load lbs.	Uniform Load PSF	Deflection Inches	Remarks
0	0	0	
280	11.7	.013	Immediate Deflection
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In conclusion, test results show that the specimen meets requirements of the CSA Specification 65-17206 for Type I materials, unit weight, and deflection. There was no visible cracking or delamination nor any change in appearance of the specimen after testing.

Respectfully submitted,

FROEHLING & ROBERTSON, INC.

Madison H. Woodward

Madison H. Woodward, Manager

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