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REPORT

ON

SPECIAL SERVICES INVESTIGATION OF CEMENTITIOUS CEMENT AND PLASTER PRODUCTS "MK-6X WITH ACCELERATOR"

W. R. GRACE & COMPANY - CONN
CAMBRIDGE, MA 02140

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dedicated to public safety and
committed to quality service

NOMENCLATURE

HRR	-	Heat Release Rate (kW/m ²)
HR	-	Heat Released (MJ/m ²)
SRR	-	Smoke Release Rate (m ² /sec)
SR	-	Smoke Released (m ²)
HE	-	Horizontal with Edge Frame
m	-	meters
sec	-	seconds

GENERAL

PURPOSE:

The sole purpose of this investigation was to develop information and test data on the flammability of spray-applied fire resistive products. The test procedures are stated in ASTM E1354 -- *Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter* with respect to:

- a. Heat Release Rates
- b. Smoke Release Rates

No conclusions are to be made from the data obtained. The information obtained by this Investigation is only intended to be submitted to BOCA, ES, SBCCI, PST & ESI, ICBO ES, The State of New York, The State of New Jersey, The State of Wisconsin, The California State Fire Marshal, The City and County of Honolulu, King County, WA, The City of Los Angeles, The City of St. Louis, The City of Montreal and the Canadian Construction Materials Center for their use.

Information conveyed by this Report applies only to the samples actually involved in the tests. Underwriters Laboratories Inc. has established a factory Follow-Up Service Program to determine the conformance of subsequently produced material for the product category Spray-Applied Fire Resistive Materials (CHPX). The Classification Marking does not apply to the tests conducted in accordance with ASTM E1354 -- *Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*. No provisions been made to apply any registered mark of Underwriters Laboratories Inc. to such material for this series of tests.

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TEST SAMPLES

The product covered under this investigation consisted of one (1) Spray-Applied Fire Resistive Material, "MK-6X with Accelerator", which was sprayed in three-eighths (3/8) and two (2) inch thickness. The "MK-6X with Accelerator" was manufactured by W. R. Grace and Company and witnessed by Underwriters Laboratories Inc. The product evaluated under this investigation is under the Follow-Up Service of Underwriters Laboratories Inc., Product category CHPX, Spray-Applied Fireproofing Materials.

The "MK-6X with Accelerator" material was spray applied on May 8, 1997 at Underwriters Laboratories Inc. Northbrook, IL testing facility. The "MK-6X with Accelerator" was spray applied by two W. R. Grace & Company representatives. The "MK-6X with Accelerator" was spray applied to two 24 inch by 24 inch plastic coated density plates at the minimum and maximum thickness of the products use in the field, 3/8 inch and 2 inch respectively.

Prior to testing, the specimens were conditioned under ambient conditions until an equilibrium was obtained. Weights were measured and recorded weekly to confirm that equilibrium was obtained. The calculated density for the "MK-6X with Accelerator" samples were as follows:

Sample Identification	Sample Density (lbs/ft ³)
MK-6X with Accelerator : 3/8"	21.5
MK-6X with Accelerator: 2"	16.1

Portions of the "MK-6X with Accelerator" material were removed from the plastic coated density plates and then saw cut into 4 inch by 4 inch specimens as required in ASTM E1354.

TEST RECORD

ASTM E1354 TEST:

The tests were conducted in accordance with test method ASTM E1354 -- *Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*.

The tests were conducted in the horizontal orientation at an external radiant heat flux exposure of 75 kW/m² for a 600 second test duration at the request of the test sponsor. Each test had a spark pilot ignition source and an initial exhaust mass flow rate of 30 g/sec. The three-eighths (3/8) inch sample tests were conducted using a retainer frame as specified in ASTM E1354. The two (2) inch test samples were placed in horizontal edge frame with the addition of pins through the samples. The pins were added to mount the sample within the confines of the frame.

An oxygen consumption technique was employed to calculate the rate of heat release. Instantaneous measurements of weight loss and smoke obscuration were recorded. Data was collected for the 600 seconds test duration. Observations regarding ignition time and physical changes to the sample (i.e. melting, swelling, or cracking) were also noted.

A total of six (6) tests were conducted. Triplicate tests were conducted for each set of testing parameters.

R E S U L T S

The data obtained included heat and smoke release information, ignition time, average effective heat of combustion, average specific extinction coefficient, and sample weight loss. The results obtained for the tests are summarized in Table 1. Table 1 also depicts the average values calculated from the replicate tests. Plots of Heat Release Rates (HRR, kW/m²) versus Time (seconds) are presented as Charts # 1 - 6 in Appendix A. The plots for Smoke Release Rate (SRR, m²/sec) versus Time (seconds) are presented on the floppy disk attached.

Table 1: ASTM E1354 Cone Calorimeter Data

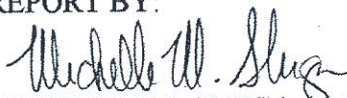
Sample Description	Test Number	Test Code	Orientation	Heat Flux (kW/m ²)	Ignition Time (sec)	Peak HRR (kW/m ²)	Time to Peak HRR (min:sec)	HRR Average 180s after Ignition (kW/m ²)	Total Heat Released (MJ/m ²)
MK-6X with Accelerator: 3/8"	49	6259714	HE	75	280	17.5	0:27	7.4	4.6
MK-6X with Accelerator: 3/8"	50	6259715	HE	75	185	25.7	3:23	16.4	7.7
MK-6X with Accelerator: 3/8"	51	6259716	HE	75	275	20.5	0:27	13.8	7.6
Average					247	21.2	1:26	12.5	6.6
MK-6X with Accelerator: 2"	52	6259717	HE	75	**	[17.9]	0:29	[13.2]	[6.0]
MK-6X with Accelerator: 2"	53	6259718	HE	75	**	[20.3]	0:43	[14.9]	[6.8]
MK-6X with Accelerator: 2"	54	6259719	HE	75	**	[17.8]	0:25	[12.9]	[5.4]
Average					**	[18.7]	0:32	[13.7]	[6.1]

NOTES:

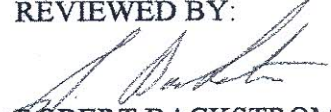
** Indicates that the sample did not ignite as defined in paragraph 13.1.14 Note 6 of the ASTM E1354 test method -- "Certain specimens do not show visible, sustained flaming, but do indicate non-zero rate of heat release values."

[] Indicates data provided is for informational purposes only, for the sample did not ignite as defined in ASTM E1354.

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