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REPORT

on

ENCAPSULANT MATERIALS APPLIED OVER A
SPRAYED FIBER AND A CEMENTITIOUS MIXTURE

International Protective Coatings Corp.
Ocean, NJ

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ASTM E-119

Encapsulant Materials - The three encapsulant materials, supplied in 5 gal containers, were of two types: "penetrating" and "bridging". The encapsulant materials were manufactured by International Protective Coatings Corp./Pyro-Tech under the observation of a representative of Underwriters Laboratories Inc. The encapsulant materials will be Classified by Underwriters Laboratories Inc. as "Encapsulant Materials" (CBUI) in the Fire Resistance Directory. The materials were identified as follows:

1. Serimastic - (Bridging)
2. Serpiflex - (Bridging)
3. Serpiloc - (Penetrating)

ERECTION OF TEST ASSEMBLIES:

The steel beam, steel deck with the stiffening angles, and the sand fill, were installed in the test frames by the technical staff of Underwriters Laboratories Inc.. The spray-applied materials and encapsulant materials were applied to the underside of the assembly by a representative of the sponsor under the observation of members of the technical staff of Underwriters Laboratories Inc.

For each assembly, the steel beam was placed on the beam support angles with enough clearance at its ends to allow for its thermal expansion during the fire test.

Four 36 in. wide units and two 13 in. wide units were placed in each span. The ends of the units in the south and north spans were butted against each other over the steel beam centerline as shown on ILL. 1. The average bearing of the units on the north and south supporting angles was 3-3/4 in.

The steel deck was fastened to the steel beam and to the supporting angles with 1 in. diameter puddle welds spaced 12 in. OC as shown on ILLS. 1 and 1A.

Adjacent sections of steel deck were secured together by means of 3/4 in. puddle welds spaced 12 in. OC as shown on ILL. 1.

The end closures were placed at the north and south ends of the assemblies and welded to every other crest of the steel deck. Stiffening angles were welded to each crest of the fluted units at each quarter point of each span as shown on ILLS. 1 and 1A.

The dry sand was then poured and screeded to a 2-1/2 in. thickness over the top plane of the steel deck as shown on ILLS. 1 and 1A.

The underside of the steel deck and the exposed surfaces of the steel beam were then washed clean to remove all contaminants.

The underside of Test Assembly No. 1 was sprayed with the fibrous material. During application of the sprayed fiber, the water to fiber ratio averaged 1.0 part water to 1.1 parts fiber by weight.

The underside of Test Assembly No. 2 was sprayed with the cementitious mixture. The dry mixture was blended with water and mixed for approximately 2 min. The dry mixture to water ratio was 1.0 part dry mixture to 1.76 parts of water.

The spray applied materials were applied to the contour of the beam and to the underside of the steel deck in a continuous manner until the desired thicknesses (as shown below) were obtained.

<u>Test Assembly No.</u>	<u>Area Covered</u>	<u>Actual Thickness, In.</u>	<u>Nominal Thickness, In.</u>	<u>Basis, No. Of Measurements</u>
1	Beam	1.917	1-15/16	16
1	NE Quadrant	0.398	3/8	36
1	NW Quadrant	0.398	3/8	36
1	SE Quadrant	0.399	3/8	36
1	SW Quadrant	0.396	3/8	36
2	Beam	2.102	2-1/8	16
2	NE Quadrant	0.389	3/8	36
2	NW Quadrant	0.384	3/8	36
2	SE Quadrant	0.385	3/8	36
2	SW Quadrant	0.391	3/8	36

The average air dry densities of 10.37 and 17.12 pcf were determined by weighing two 24 by 24 in. representative samples of the sprayed fiber and cementitious mixture, respectively, after weight equilibrium was reached.

On the north span of the assemblies the Serpimastic "bridging" type encapsulant was spray applied to the northeast quadrant and the northwest quadrant remained uncoated. The Serpimastic "bridging" type encapsulant was applied at a rate of 26 ft²/gal in Test Assembly No. 1 and at a rate of 31 ft²/gal in Test Assembly No. 2.

On the south span of the assemblies, the Serpiloc "penetrating" type encapsulant was applied to the southwest quadrant and the Serpiflex "bridging" type encapsulated was applied to the southeast quadrant. The Serpiloc "penetrating" type encapsulant was applied at a rate of 32 ft³/gal in Test Assembly No. 1 and at a rate of 109 ft³/gal in Test Assembly No. 2. The Serpiflex "bridging" type encapsulant was applied at a rate of 50 ft³/gal in Test Assembly No. 1 and at a rate of 97 ft³/gal in Test Assembly No. 2.

The rates at which the encapsulant materials were applied were the maximum coverage rates intended for 3/4 in. thick spray-applied material. This application resulted in the maximum amount of encapsulant material applied to the minimum thickness of spray-applied material. This application thus reduced the test samples by one-half as outlined in the ASTM Proposed Specification.

The appearance of the assemblies during construction are shown on ILLS. 2 and 3.

The exposed and unexposed surfaces of Test Assembly No. 1 prior to the fire test are shown on ILLS. 4 and 5, respectively.

The exposed surface of Test Assembly No. 2 prior to the fire test is shown on ILLS. 6. The photo of the unexposed surface of Test Assembly No. 2 prior to the fire test did not process correctly.

C O N C L U S I O N S

The following conclusions represent the judgement of Underwriters Laboratories Inc. based upon the examinations and tests presented in this Report as they relate to established principles and previously recorded data.

FIRE RESISTANCE PROPERTIES:

Sprayed Fiber

It is deemed that the Serpiflex, Serpiloc and Serpimastic encapsulant materials will not affect the fire-resistance rating of an assembly protected with a Classified sprayed fiber matrix:

No fall-off of encapsulated or unencapsulated spray fiber material occurred during the duration of the fire test.

The temperature end-point times of the steel deck protected with the encapsulated sprayed fiber were within 10 percent of the temperature end-point time of the steel deck protected with the unencapsulated sprayed fiber as specified in the ASTM Proposal P189.

Cementitious Mixture

It is deemed that the "Serpimastic" encapsulant material will not affect the fire-resistance rating of an assembly protected with a Classified cementitious mixture matrix.

No fall-off of the cementitious mixture encapsulated with the "Serpimastic" or unencapsulated cementitious mixture occurred during the test duration of the fire test.

The temperature end-point time of the steel deck protected with cementitious mixture encapsulated with the "Serpimastic" was within 10 percent of the temperature end-point time of the steel deck protected with the unencapsulated cementitious mixture as specified in the ASTM Proposal P189.

SURFACE BURNING CHARACTERISTICS:

The flame spread values for the "Serpimastic" and "Serpiflex" encapsulant over sprayed fiber were 33.24 and 9.76, respectively.

The flame spread values for the "Serpimastic" encapsulant material over cementitious mixture was 17.72.

The encapsulated matrices subject to this investigation met the Surface Burning Characteristics requirements of Underwriters Laboratories Inc. for fire resistive materials.

PRACTICABILITY:

The materials used in the test assemblies were readily installed by qualified workmen with equipment and methods commonly used for constructions of this nature.

Materials and procedures, in accordance with those described in this Report, are considered significant factors in the fire resistance of the construction.

CONFORMITY:

The assemblies, as described in this Report, were tested in accordance with the requirements in the Proposed Specification for Encapsulants for Friable Asbestos-Containing Building Materials, ASTM Proposal P189.

FOLLOW-UP PROGRAM:

The encapsulant materials, as described herein, will be placed under the Follow-Up Service of Underwriters Laboratories Inc. Under the Service, the manufacturer is authorized to use Underwriters Laboratories' Classification Marking on those products which comply with the Follow-Up Service Procedure, and any other applicable requirements of Underwriters Laboratories Inc. Only those products which properly bear the Laboratories' Classification Marking are considered as Classified by Underwriters Laboratories Inc.

The Classification Markings to be used on the encapsulant materials is illustrated below:

SERPIMASTIC:

ENCAPSULANT MATERIALS
CLASSIFIED BY
UNDERWRITERS LABORATORIES INC. (R)
AS TO FIRE RESISTANCE
FOR USE WITH CLASSIFIED
SPRAYED FIBER
AT AN APPLICATION RATE OF 25 ft²/gal
OR
FOR USE WITH CLASSIFIED
CEMENTITIOUS MIXTURES
AT AN APPLICATION RATE OF 30 ft²/gal

SERPILOC:

ENCAPSULANT MATERIALS
CLASSIFIED BY
UNDERWRITERS LABORATORIES INC. (R)
AS TO FIRE RESISTANCE
FOR USE WITH CLASSIFIED
SPRAYED FIBER
AT AN APPLICATION RATE OF 30 ft²/gal
ABILITY OF THIS MATERIAL TO ACT AS
A SEALANT HAS NOT BEEN INVESTIGATED
SEE UL FIRE RESISTANCE DIRECTORY

SERPIFLEX:

ENCAPSULANT MATERIALS
CLASSIFIED BY
UNDERWRITERS LABORATORIES INC. (R)
AS TO FIRE RESISTANCE
FOR USE WITH CLASSIFIED
SPRAYED FIBER
AT AN APPLICATION RATE OF 50 ft²/gal
ABILITY OF THIS MATERIAL TO ACT AS
A SEALANT HAS NOT BEEN INVESTIGATED
SEE UL FIRE RESISTANCE DIRECTORY

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