
ASTM E2768 (Modified ASTM E84 - 30 Minute Tunnel Test) of "Mbrico Fire Rated Tile Decking"

A Report To:	Mbrico LLC PO Box 1108 Bettendorf, IA 52722 USA
Phone:	+1 (844) 449-9214
Attention:	Lukas DeWitt
E-mail:	lukas@mbricotiledecks.com
Submitted by:	Element Fire Testing
Report No.	25-002-092(B) 5 Pages
Date:	March 28, 2025

1.0 ACCREDITATION

ISO/IEC 17025 for a defined Scope of Testing by the American Association for Laboratory Accreditation (A2LA), Certificate Number: 6524.03.

2.0 SPECIFICATIONS OF ORDER

Determine the Flame Spread and Smoke Developed Indices, and the ability of a product to limit the surface flame spread when evaluated for 30 minutes, based upon a single test conducted in accordance with ASTM E2768-11 (Reapproved 2018) (Modified ASTM E84-24 - 30 Minute Tunnel Test), as per Element Quotation No. 25-002-643592 dated January 17, 2025.

2.1 History of Report Revision

This is the original.

3.0 SAMPLE IDENTIFICATION

Material Identification	"Mbrico Fire Rated Tile Decking"
Supplied Material Description	2cm porcelain deck tile reinforced with class A fire rated substrate.
Material Thickness	0.75 inch (19 mm)
Date of Material Receipt	2025-03-06
Element Sample Identification No.	25-002-S0092
Test Date	2025-03-28

4.0 TEST PROCEDURE

The method, designated as ASTM E2768-11 (Reapproved 2018) "*Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)*" is designed to determine the relative surface burning characteristics of materials under specific test conditions, where the material under test is mounted so that it forms the ceiling of a horizontal fire tunnel, in the manner specified in ASTM E84-24 "*Standard Method of Test for Surface Burning Characteristics of Building Materials*". In addition, ASTM E2768 assesses the ability of a product to limit the surface spread of flame when extended and evaluated for a total of 30 minutes (ASTM E84 is only a 10-minute test).

A specified airflow is introduced through the tunnel and a specified flame is applied to one end. Observations are then made regarding the rate of flame spread along the specimen. Results are expressed for the first ten minutes in terms of Flame Spread Index (FSI) and Smoke Developed Index (SDI) (optional). There is no established relationship between those two values. Additionally, the material is assessed for signs of "significant progressive combustion", as defined by ASTM E2768.

Although the procedure is applicable to materials, products and assemblies used in building construction for development of comparative surface spread of flame data, the test results may not reflect the relative surface burning characteristics of tested materials under all building fire conditions.

5.0 CONDITIONS OF CLASSIFICATION

In order for a material or product to be classified as meeting the requirements of ASTM E2768, the following criteria applies:

- 1) The Flame Spread Index (FSI) in the first 10 minutes of the test shall be 25 or less;
- 2) The flame front shall not progress more than 10.5 feet (3.2 m) beyond the centerline of the burners; and

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- 3) For materials or products that are not homogeneous or symmetrical about their longitudinal axis, only surfaces that have been individually tested shall be eligible to be classified and reported as meeting the conditions of classification in this test method.

6.0 SAMPLE PREPARATION

The test specimen consisted of a total of 12 prepared sections of material, each approximately 21 inches (533 mm) in width by 23.5 inches (597 mm) in length. The sections were butted together end-to-end to create the total specimen length. Prior to testing, the specimen was conditioned to constant weight at a temperature of $73 \pm 5^{\circ}\text{F}$ ($23 \pm 3^{\circ}\text{C}$) and a relative humidity of $50 \pm 5\%$. At the time of test initiation, the specimen was self-supporting.

7.0 SUMMARY OF TEST PROCEDURE

The tunnel is preheated to $150 \pm 5^{\circ}\text{F}$ ($66 \pm 2.8^{\circ}\text{C}$), as measured by the floor-embedded thermocouple located 23.25 feet (7087 mm) downstream of the burner ports, and is allowed to cool to $105 \pm 5^{\circ}\text{F}$ ($40.5 \pm 2.8^{\circ}\text{C}$), as measured by the floor-embedded thermocouple located 13 feet (3962 mm) from the burners. The tunnel lid is then raised and the test specimen is typically placed along the ledges of the tunnel so as to form a continuous ceiling 24 feet (7315 mm) long, approximately 12 inches (305 mm) above the floor. Three 8 foot (2438 mm) sections of 0.25 inch (6 mm) cement board are then placed on the back side of the specimen and the lid is then lowered into place.

Upon ignition of the gas burners, the flame spread distance is observed and recorded every second. Flame spread distance versus time is plotted. Calculations ignore all flame front recessions and Flame Spread Index (FSI) is determined by calculating the total area under the curve for the test sample in the first 10 minutes of the test. If the area under the curve (A) is less than or equal to 97.5 min·ft, then $\text{FSI} = 0.515 \cdot A$; if greater, $\text{FSI} = 4900 / (195 - A)$. FSI is then rounded to the nearest multiple of 5. Smoke Developed Index (SDI) (optional) for the first 10 minutes of the test, is determined by dividing the total area under the obscuration curve by that of liquid heptane, and multiplying by 100. SDI is then rounded to the nearest multiple of 5 if less than 200. SDI values over 200 are rounded to the nearest multiple of 50.

For ASTM E2768, exposure to the test burners is extended for an additional 20 minutes (30-minute total flame exposure time). During that time, observations are made regarding potential advancement of the flame front ("significant progressive combustion", as defined by ASTM E2768).

8.0 TEST RESULTS

SAMPLE: "Mbrico Fire Rated Tile Decking"

Approximate Time to Ignition (s)	Maximum Flame Front Distance (ASTM E2768)		Maximum Flame Front Distance (ASTM E84)		Time to Maximum Flame Front (s)	Flame Spread Index (FSI) (10 minutes)	Smoke Developed Index (SDI) (10 minutes)
79	(ft.):	7.3	(ft.):	2.8	306	10	450
	(m):	2.23	(m):	0.85			

8.1 Observations of Burning Characteristics

The material ignited approximately 79 seconds vafetr exposure to the test burner flame. Surface discoloration and cracking was also observed.

8.2 ASTM E84-24 (Modified):

Industry documents such as the International Building Code (IBC) or NFPA 101 Life Safety Code refer to 10 minute ASTM E84 (UL 723, NFPA 255) test results using the following material classification categories:

	Flame-Spread Index (FSI)	Smoke Developed Index (SDI)
Class 1 or Class A	0 - 25	450 Maximum
Class 2 or Class B	26 - 75	450 Maximum
Class 3 or Class C	76 - 200	450 Maximum
ASTM E84 Results Classification (if applicable):		Class 1 or Class A

8.3 ASTM E2768-11 (Reapproved 2018):

Evidence of "Significant Progressive Combustion"?	No
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8.3.1 Definition

* "Significant Progressive Combustion" is defined by ASTM E2768 (section 13.1.2) as the flame front progressing more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the 30 minute test period. Since the zero point in ASTM E84 testing is located 4.5 feet (1.37 m) beyond the centerline of the test burners, the critical distance for ASTM E2768 testing then becomes 6 feet (1.83 m) past the zero point.

9.0 CONCLUSIONS

The panel system identified in this report did not show significant progressive combustion and therefore meets the specified conditions to be classified as meeting the requirements of ASTM E2768.



Mateo Marra,
Technician.



Mel Garces,
Supervisor, Fire Testing.

Notes: This report is related only to the sample identified and shall not be reproduced, except in full, without approval. It is covered under Element Materials Technology Canada Inc. Standard Terms and Conditions of Contract, which are accessible at www.element.com, or by calling 1-866-263-9268. ASTM E84 and ASTM E2768 are well-established test methods that report data in the form of indices. As such, MU cannot be calculated. In the reporting instructions of ASTM E84, calculated values are rounded to the nearest multiple of 5 for FSI, and 5 or 50 for SDI, depending on the result. Since the rounding ranges establish precision and include potential uncertainty, by following the reporting instructions, the lab is considered to have satisfied the MU reporting requirements of ISO/IEC 17025.

ASTM E2768 (Modified ASTM E84) Test Charts

Sample: "Mbrico Fire Rated Tile Decking"

10.0 TEST CHARTS

Chart 1. Flame Spread
(ASTM E 2768 - 30 minutes)

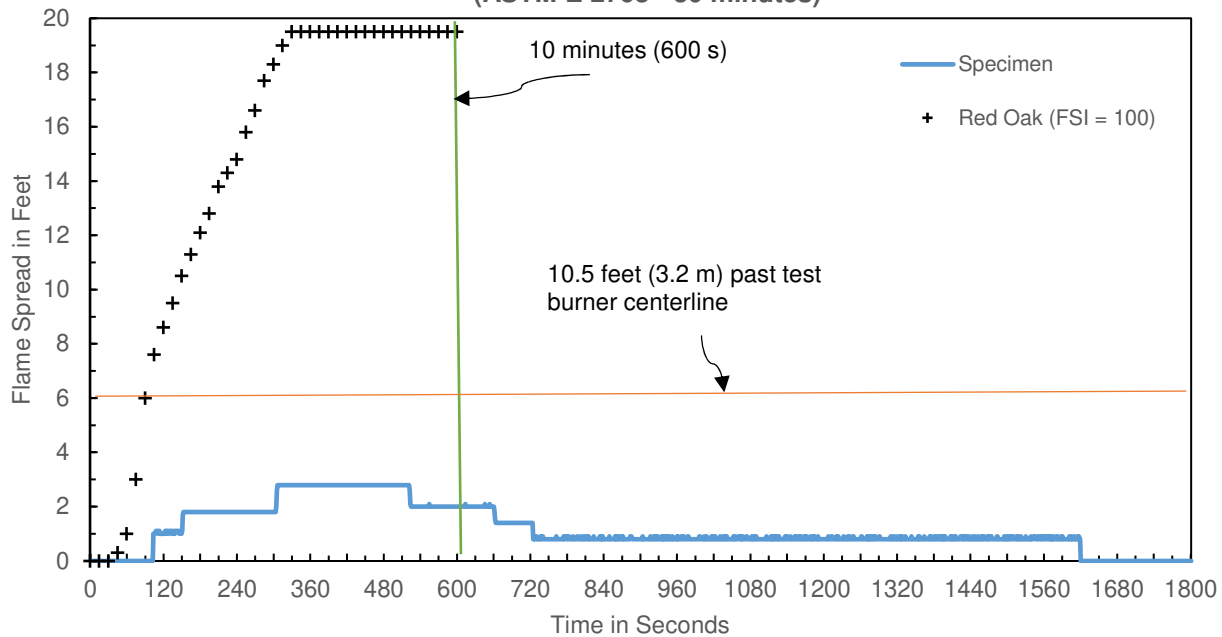
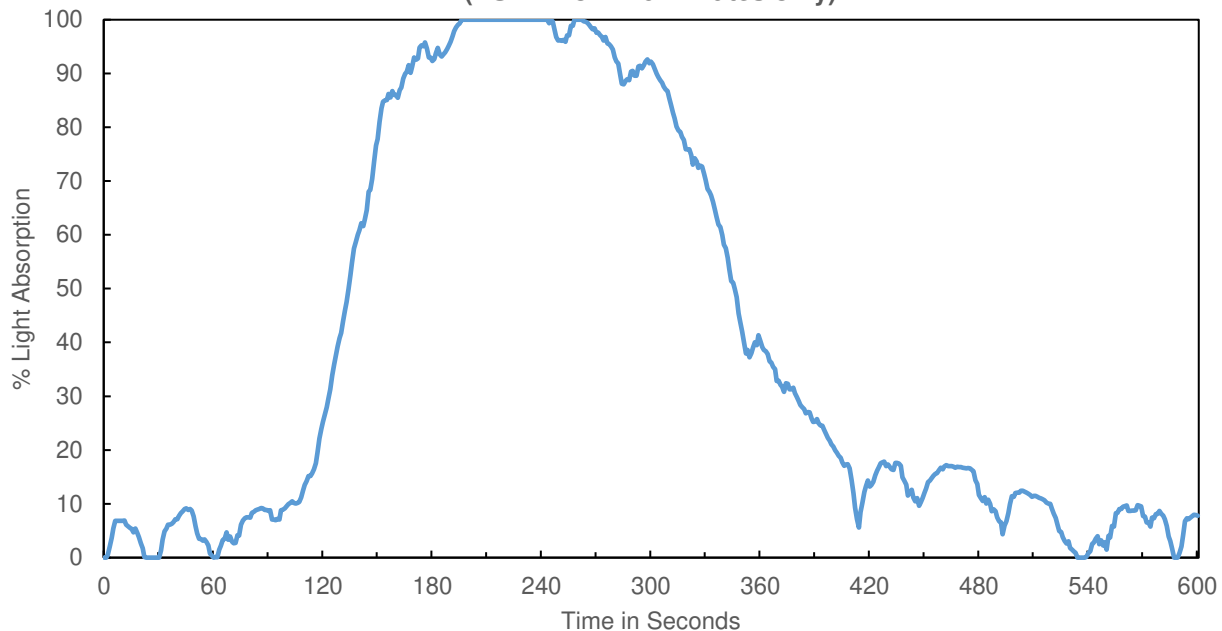


Chart 2. Smoke Developed
(ASTM E84 - 10 minutes only)



10 min. Calculated Flame Spread (ASTM E84 CFS)	10 min. Rounded Flame Spread Index (ASTM E84 FSI)	10 min. Calculated Smoke Developed (ASTM E84 CSD)	10 min. Rounded Smoke Developed Index (ASTM E84 SDI)	30 min. Maximum 23' Air Temperature (°F)
9.9	10	439.4	450	589

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