



CAPITAL TESTING AND CERTIFICATION SERVICES

42777 Trade West Drive • Sterling, VA 20166
(571) 300-7050 • www.capitaltesting.org

TEST REPORT

Test Method: ASTM E84-22, Surface Burning Characteristics of Building Materials

Rendered To: R&D Services, Inc.
209 Tennessee Blvd
Watertown, TN 37184

Product Description: Therma-Guard; Silver Side with simulated field joint

Report Number: T-16919

Original Issue Date: 11/28/2022

Test Date: 11/18/2022

Pages: 7



TL-224

The observations and test results in this report are relevant only to the sample(s) tested. Capital Testing and Certification Services (herein referred to as Capital Testing) does not verify information that is provided by the client. This test report in no way constitutes or implies product certification, approval or endorsement by Capital Testing. Capital Testing assumes no liability to any party, other than to the Client in accordance with the terms and conditions agreement, for any loss, expense or damage occasioned by the use of this report. This report, the Capital Testing name or any of its marks, shall not be used for the sale or advertisement of the tested material. This report shall not be reproduced, except in full, or modified in any way.



CAPITAL TESTING AND CERTIFICATION SERVICES

42777 Trade West Drive • Sterling, VA 20166

(571) 300-7050 • www.capitaltesting.org

I. SCOPE

This test report contains the results of a specimen tested in accordance with ASTM E84, *Surface Burning Characteristics of Building Materials*. The ASTM E84 test method is intended to provide comparative measurements of surface flame spread and smoke density measurements with that of select grade red oak and fiber-cement board surfaces under the specific fire exposure conditions. The results of ASTM E84 testing are commonly used by building code officials and regulatory agencies to determine whether interior finish materials are suitable for their intended application. This standard is often used interchangeably with UL 723, NFPA 255, and UBC 8-1.

II. TEST SPECIMENS

Test specimens should be representative of the material which the test is intended to examine. All test specimens should be 20 – 24 inches in width and 24 feet (+12 inches, - 6 inches) in length. The test specimen can be provided in a continuous, unbroken length or multiple sections that will be butted together. Prior to testing, the specimens are conditioned to a constant weight in an environment that is held at $73.4 \pm 5^{\circ}\text{F}$ and $50 \pm 5\%$ relative humidity.

TEST SPECIMEN INFORMATION	
Product Description	Therma-Guard; Manufactured by Dutch Tech, Inc; Product Type: Reflective-Poly Closed Cell Insulation; Dimensions (as sold): 24" x 30' roll.*
Samples Selected By	Client
Date Received	11/14/2022
Conditioning Time	4
Specimen Size (in.)	22 x 99; 22 x 94
Continuous / Sectioned	Sectioned
Number of Sections	3 sections: Two 99" in length and one 94" in length.
Total Weight (lbs.)	2.5
Average Thickness (in.)	0.123
Color	White Facing / Silver reflective *
Exposed Surface	Silver Side *
Mounting Method	Mounted in accordance with ASTM E2599-18 mounting method. Sample material was mounted onto three aluminum frames measuring 22-1/4" x 99". The aluminum frames provided a 2" air gap behind the sample material. Sample material was attached to the frames using 1-1/2" x 2-3/4" strips of aluminum tape. The aluminum tape strips were spaced approximately 18" apart on-center down the long edges of the sample/frame. A longitudinal slit was cut along the longitudinal centerline of each section. 3M VentureTape™ 1507 Reflective BOPP Tape was used to seal the joint between the two cut sections. The 3M VentureTape™ 1507 Reflective BOPP Tape was provided by the client.

* Information provided by the Client



CAPITAL TESTING AND CERTIFICATION SERVICES

42777 Trade West Drive • Sterling, VA 20166

(571) 300-7050 • www.capitaltesting.org

III. PROCEDURE

The tunnel is preheated to a minimum of 150°F as measured by a thermocouple embedded 1/8 inch below the tunnel floor and 23-1/4 feet downstream of the centerline of the burner. The tunnel is then cooled to 105 ± 5°F as measured by a thermocouple embedded 1/8" below the tunnel floor and 13 feet downstream of the centerline of the burner.

After the tunnel has cooled to required temperature range, the tunnel lid is lifted, and the test specimen is placed on the ledges of the tunnel. The specimen is mounted in a ceiling orientation with the side that will be exposed to the flame facing downward. A 1/4-inch fiber-cement board is placed on the backside of the specimens to protect the tunnel lid during testing.

Once the sample has been loaded into the test chamber, the lid is lowered, and a 240 ft/min airflow is established. The test specimen is preheated for approximately 2 minutes prior to applying the 88-kW burner. The burner is positioned at the front end of the tunnel. It has two ports that point upward toward the face of the specimen. After the 2-minute preheat, the burner is ignited, and it remains on for the duration of the 10-minute test. The flame is tracked by an observer, referred to as the Reader, as it progresses down the length of the tunnel. Smoke density is measured with the use of the photometer system on the exhaust duct. Temperature data is recorded throughout the test by a thermocouple probe that is 23 feet from the centerline of the burner and approximately 1 inch below the sample surface.

IV. CALCULATION OF RESULTS

The results of ASTM E84 testing are reported as Flame Spread Index (FSI) and Smoke Developed Index (SDI).

The Flame Spread Index is derived by plotting the flame spread distance versus time. Only progressive flame spread is plotted. The total area (A_T) under the flame spread distance-time plot is determined by ignoring any flame front recession. FSI values are rounded to the nearest multiple of 5. The calculation of FSI is described below:

$$\text{When } A_T \leq 97.5 \text{ ft}\cdot\text{min:} \quad \text{FSI} = 0.515 * A_T$$

$$\text{When } A_T > 97.5 \text{ ft}\cdot\text{min:} \quad \text{FSI} = 4900 / (195 - A_T)$$

The Smoke Developed Index is derived by plotting the photoelectric cell readings versus time. The area under the curve for the tested material is then divided by the area under the curve for heptane (the material used for smoke calibration). The resulting value is then multiplied by 100. SDI values that are less than 200 are rounded to the nearest multiple of 5. SDI values that are greater than 200 are rounded to the nearest multiple of 50.



CAPITAL TESTING AND CERTIFICATION SERVICES

42777 Trade West Drive • Sterling, VA 20166

(571) 300-7050 • www.capitaltesting.org

V. TEST RESULTS

FLAME SPREAD INDEX (FSI)	SMOKE DEVELOPED INDEX (SDI)
0	10

Test Date	11/18/2022
Equipment Operator	Chris Kaiser
Flame Spread Reader	Chris Palumbo
Ignition Time (sec)	13
FSI (unrounded)	0.0
SDI (unrounded)	12.3
Maximum Temperature (°F)	511.2
Time to Maximum Temperature (min)	9.723
Maximum Flame Spread Distance (ft)	0.0
Time to Maximum Distance (min)	0.0

VI. OBSERVATIONS

During testing: Ignition first occurred on the tape covering the simulated field joint. Melting and dripping of the sample material onto the tunnel floor. Melted material continued to burn on the tunnel floor. Sample material contacted the exposed thermocouple located 23' from the burner port starting at 180 seconds into the test.

After testing: Sample material melted onto the ground to 8'. Material fallout on the tunnel floor to 10'. Shrinking and melting of the sample material to the frame to 24'.

- Yes No Flames were present after the test concluded and the burner was extinguished.
- Yes No Smoldering/glowing was present after the test concluded and the burner was extinguished.

VII. REMARKS

The material contacting the exposed thermocouple caused lower than expected thermocouple readings temporarily during the test.

Note: Reported observation distances are relative to the entire length of the test specimen. Reported flame spread distances do not include the first 4-1/2 feet of material due to the length of the burner flame.



CAPITAL TESTING AND CERTIFICATION SERVICES

42777 Trade West Drive • Sterling, VA 20166

(571) 300-7050 • www.capitaltesting.org

VIII. DATA SHEET AND GRAPHS

Test Method Project # Date Time (Test Start) Test No.

Specimen ID

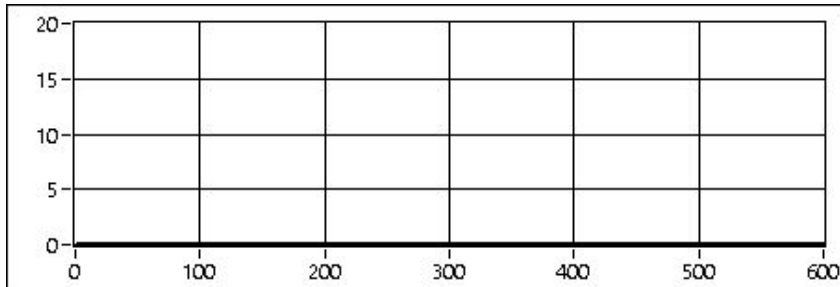
Specimen Description

Mounting Procedure

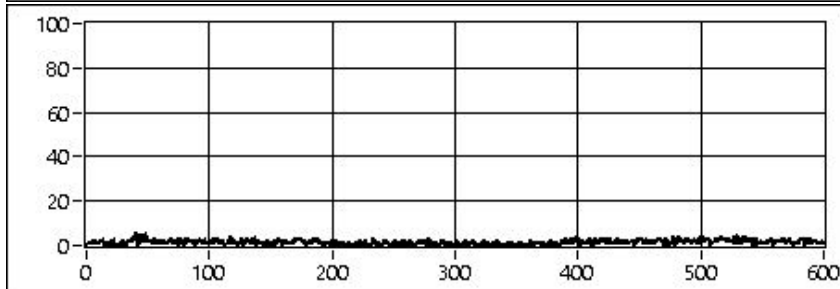
Fuel (CF) Time to 980F (min) Max Temp (F) Time to Max Temp (min)

FS Area Maximum FS MAX FS Time (min)

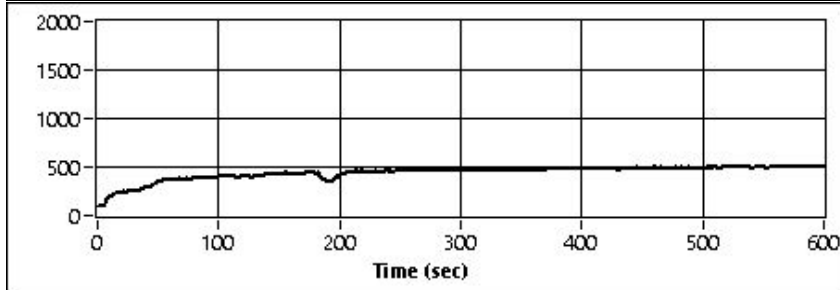
Smoke Area (%A min) Calibration Smoke Area Raw SD Raw FSI



FI Spread



Smoke (%A)



23 ft Temp

Final FSI Final SD

Test Room Temperature (°F): 70.8 Test Room Humidity (%RH): 48.6



CAPITAL TESTING AND CERTIFICATION SERVICES

42777 Trade West Drive • Sterling, VA 20166

(571) 300-7050 • www.capitaltesting.org

IX. DISCUSSION

ASTM E84 Standard Language and Disclaimers

The following language was taken directly from the ASTM E84 standard. It has been included for information purposes.

The purpose of this test method is to determine the relative burning behavior of the material by observing the flame spread along the specimen. Flame spread and smoke developed index are reported. However, there is not necessarily a relationship between these two measurements. – ASTM E84-22, Section 1.3

The use of supporting materials on the underside of the test specimen has the ability to lower the flame spread index from those which might be obtained if the specimen could be tested without such support. These test results do not necessarily relate to indices obtained by testing materials without such support. – ASTM E84-22, Section 1.4

Testing of materials that melt, drip, or delaminate to such a degree that the continuity of the flame front is destroyed, results in low flame spread indices that do not relate directly to indices obtained by testing materials that remain in place. – ASTM E84-22, Section 1.5

This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire-hazard or fire-risk assessment of the materials, products, or assemblies under actual fire conditions. – ASTM E84-22, Section 1.8

This test method does not provide for the following: Measurement of heat transmission through the tested surface; the effect of aggravated flame spread behavior of an assembly resulting from the proximity of combustible walls and ceilings; or classifying or defining a material as noncombustible, by means of a flame spread index by itself. – ASTM E84-22, Section 4.3

Classification

ASTM E84 results are frequently used by code officials and regulatory agencies to determine whether a product is suitable for its intended application. The test standard itself does not establish specific performance criteria or contain a classification system. The most commonly used classification system can be found in the International Code Council publication International Building Code (IBC), the National Fire Protection Association publication NFPA 101 (Life Safety Code), and the National Fire Protection Association publication NFPA 5000 (Building Construction and Safety Code).

Class	Flame Spread Index (FSI)	Smoke Developed Index (SDI)
A	0 - 25	0 - 450
B	26 - 75	0 - 450
C	76 - 200	0 - 450

Class A, B and C correspond to Type I, II, and II respectively in other codes such as SBCCI, BOCA and ICBO. The classifications above do not preclude a material being otherwise classified by the authority having jurisdiction (AHJ).



CAPITAL TESTING AND CERTIFICATION SERVICES

42777 Trade West Drive • Sterling, VA 20166
(571) 300-7050 • www.capitaltesting.org

X. AUTHORIZED SIGNATURES

Report Written By:

Chris Kaiser
Lab Technician II

11/21/2022

Date

Reviewed and Approved By:

Chris Palumbo
Sr. Manager of Product Testing

11/28/2022

Date

XI. REVISION HISTORY

Revision Number	Date	Summary
0	11/28/2022	Original Report Issued

XII. ACCREDITATION

Capital Testing and Certification Services is an ISO/IEC 17025 accredited testing laboratory whose scope includes ASTM E84. Accrediting Body: International Accreditation Service, Inc. (IAS). Testing Laboratory TL-224.