

TEST REPORT

FOR

Thermory USA, LLC

1213 Wilmette Avenue, Suite 208
Wilmette, IL 60091

Standard Test Method for Surface Burning Characteristics of Building Materials ASTM E84 – 18b

Test Report No: FH-2978-1

Assignment No: H-1523

Test Date: 10/02/2020

Report Date: 10/12/2020

Subject Material: 0.79" x 7.3" T.M. Spruce Cladding – Natural & Platinum Finish and 0.79" x 5.5"
T.M. Scots Pine C19 Cladding

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TEST REPORT REVISION HISTORY:

DATE	SUMMARY
October 12, 2020	Original issue date. Original NGCTS report FH-2978-1.

INTRODUCTION:

This report presents the results of specimens tested in accordance with the requirements of ASTM E84-18b, Standard Test Method for Surface Burning Characteristics of Building Materials. This test method is also published under the designation UL 723.

The purpose of this test method is to determine the relative behavior of the material by observing the flame spread along the specimen. Flame spread and smoke developed indexes are reported. However, there is not necessarily a relationship between these two measurements.

This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled laboratory conditions. It should not alone be used for fire hazard or fire risk assessment of the materials, products, or assemblies under actual fire conditions.

TEST SPECIMENS:

Three different thermally modified wood cladding products were submitted for testing, directly to NGC Testing Services (NGCTS), by the client. The (3) test specimens, which were received by NGCTS on September 3, 2020, were identified by the client as:

- 0.79" x 7.3" T.M. Spruce Cladding, Natural**
- 0.79" x 7.3" T.M. Spruce Cladding, Platinum Finish**
- 0.79" x 5.5" T.M. Scots Pine C19 Cladding**

Each submitted test specimen consisted of multiple boards of thermally modified wood cladding. Upon receipt, the submitted thermally modified wood cladding boards were placed in a conditioning room, with an atmosphere of $73.4 \pm 5^{\circ}\text{F}$ and $50 \pm 5\%$ relative humidity, to condition to equilibrium for 29 days prior to testing.

From the boards submitted, NGCTS personnel constructed three test specimen decks of each test specimen per Standard Practice ASTM E2579. Each constructed test specimen deck was one board long and 3 or 4 boards wide, resulting in total deck sizes of nominally 21 in. wide by 96 in. long.

Three trimmed sections from each test specimen were taken, and the average moisture content was determined using the secondary oven-drying method (method B) in ASTM D4442, Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials. The calculated average moisture contents of the test specimens were determined to be 4% (Spruce, Natural), 5% (Spruce, Platinum), and 3% (Pine).

MOUNTING METHOD:

For each test, the (3) respective test specimen decks were placed directly on the tunnel ledges and butted tightly together, achieving the required specimen size. No additional support was required.

Non-combustible, fiber-reinforced cement board (1/4 in. thick) was placed over the back (i.e., unexposed) side of the panels as lid protection.

TEST RESULTS:

The test results, computed based on observed flame front advancement and electronic smoke density measurements, are presented in the following tables.

The reported flame spread and smoke developed indexes are the computed comparison to the standard calibration materials – mineral fiber-reinforced cement board and select grade red oak flooring. The mineral fiber-reinforced cement board is used to establish relative 0 values for flame spread and smoke developed; the select grade red oak flooring is used to establish relative 100 values for flame spread and smoke developed.

Test Specimen	Flame Spread Index (FSI)	Smoke Developed Index (SDI)
0.79" x 7.3" T.M. Spruce Cladding, Natural	55	60
0.79" x 7.3" T.M. Spruce Cladding, Platinum Finish	45	45
0.79" x 5.5" T.M. Scots Pine C19 Cladding	65	150

<u>TEST NO.</u>	<u>MATERIAL TESTED</u>	<u>SIDE EXPOSED</u>	<u>SUPPORT</u>	<u>CALCULATED FLAME SPREAD</u>	<u>CALCULATED SMOKE DEVELOPED</u>
1	0.79" x 7.3" T.M. Spruce Cladding, Natural	Brushed	Self-Supporting	53.32	62.29
2	0.79" x 7.3" T.M. Spruce Cladding, Platinum	Painted, Brushed	Self-Supporting	43.09	46.21
3	0.79" x 5.5" T.M. Scots Pine C19 Cladding	Smooth	Self-Supporting	64.93	148.59
	<u>MATERIAL TESTED</u>	<u>SIDE EXPOSED</u>	<u>SUPPORT</u>	<u>FLAME SPREAD INDEX (FSI)*</u>	<u>SMOKE DEVELOPED INDEX (SDI)*</u>
	RED OAK FLOORING	FINISHED	SELF-SUPPORTING	100	100
	REINFORCED CEMENT BOARD	SYMMETRICAL	SELF-SUPPORTING	0	0
1	0.79" x 7.3" T.M. Spruce Cladding, Natural	Brushed	Self-Supporting	55	60
2	0.79" x 7.3" T.M. Spruce Cladding, Platinum	Painted, Brushed	Self-Supporting	45	45
3	0.79" x 5.5" T.M. Scots Pine C19 Cladding	Smooth	Self-Supporting	65	150
			<u>CLASSIFICATION</u>	<u>FSI</u>	<u>SDI</u>
* Flame Spread / Smoke Developed Index is the result (or the average of the results of multiple tests), rounded to the nearest multiple of 5. Smoke developed results in excess of 200 are rounded to the nearest multiple of 50.			CLASS A	0 - 25	0 - 450
			CLASS B	26 - 75	0 - 450
			CLASS C	76 - 200	0 - 450

T.M. Spruce Cladding, Natural: The test specimen exhibited steady ignition at 00:30 (min:sec). The resulting flame front advanced to 12.13 feet at 04:25 (min:sec) before receding to 8.75 feet by the end of the test. Observed some residual flaming of the test specimen at the conclusion of the test. After the test specimen was removed from the furnace, it was observed to have a char length of 10 feet and was discolored to 24 feet.

T.M. Spruce Cladding, Platinum Finish: The test specimen exhibited steady ignition at 00:15 (min:sec). The resulting flame front advanced to 9.07 feet at 02:40 (min:sec) before receding to 6.95 feet by the end of the test. Observed some residual flaming of the test specimen at the conclusion of the test. After the test specimen was removed from the furnace, it was observed to have a char length of 8 feet and was discolored to 24 feet.

T.M. Scots Pine C19 Cladding: The test specimen exhibited steady ignition at 00:19 (min:sec). The resulting flame front advanced to 16.96 feet at 09:36 (min:sec). Observed some residual flaming of the test specimen at the conclusion of the test. After the test specimen was removed from the furnace, it was observed to have a char length of 12 feet and was discolored to 24 feet.

ADC DRAFT (IN. H2O) 0.080
 GAS PRESS. (IN. H2O) 0.279
 GAS VOL (CF) 49.55
 BTU/cf 1010
 SHUTTER (IN.) 3.00
 TEMP. 13' BURIED 109 F

Flame Spread: 53.32
 Area under Flame Curve (ft-min): 103.10

TEST#: FH-2978-1 DATE: 10/2/2020

TEST METHOD: ASTM E84-18b

CLIENT: Thermory USA

PROJECT#: H-1523

SAMPLE: 0.79" x 7.3" T.M. Spruce
 Cladding, Natural

MATERIAL: (3) 21" x 96" decks

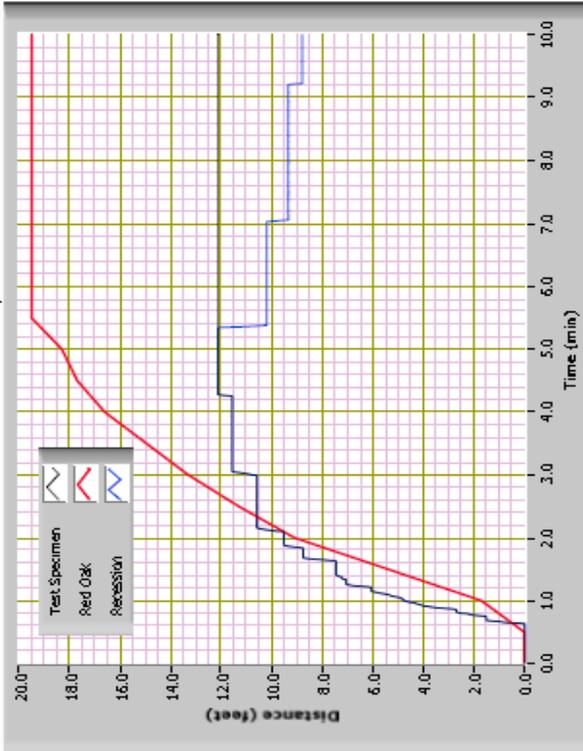
SUPPORT: self supporting

REMARKS: Ignition Time: 0:30

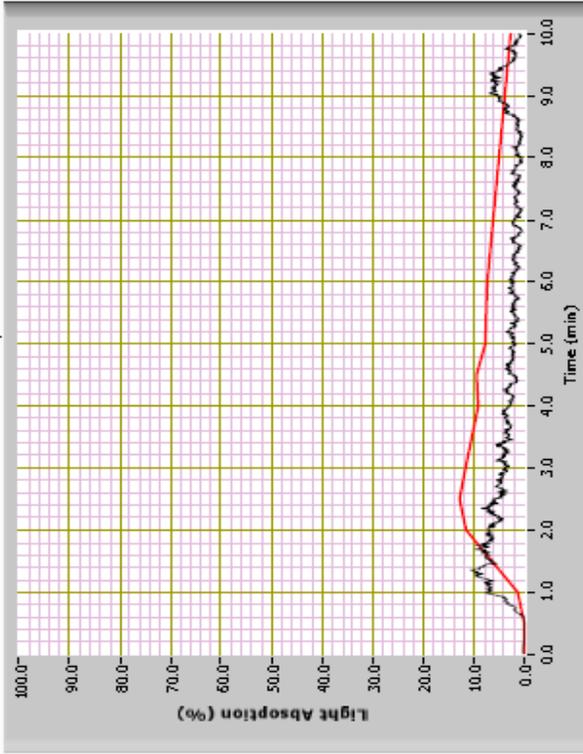
Max Flame Front: 12.13 FT. @ 4:25

Smoke Developed: 62.29
 Area under Smoke Curve (%A-min): 31.30

Flame Spread



Smoke Developed



The following data sheets are actual printouts of the computerized data system which monitors the tunnel furnace. The data sheets contain all calibration and specimen data needed to calculate the test results.

TEST#: FH-2978-2 DATE: 10/2/2020

TEST METHOD: ASTM E84-18b

CLIENT: Thermory USA

PROJECT#: H-1523

SAMPLE: 0.79" x 7.3" T.M. Spruce
Cladding, Platinum Finish

MATERIAL: (3) 21" x 96" decks

SUPPORT: self-supporting

REMARKS: Ignition Time: 0:15

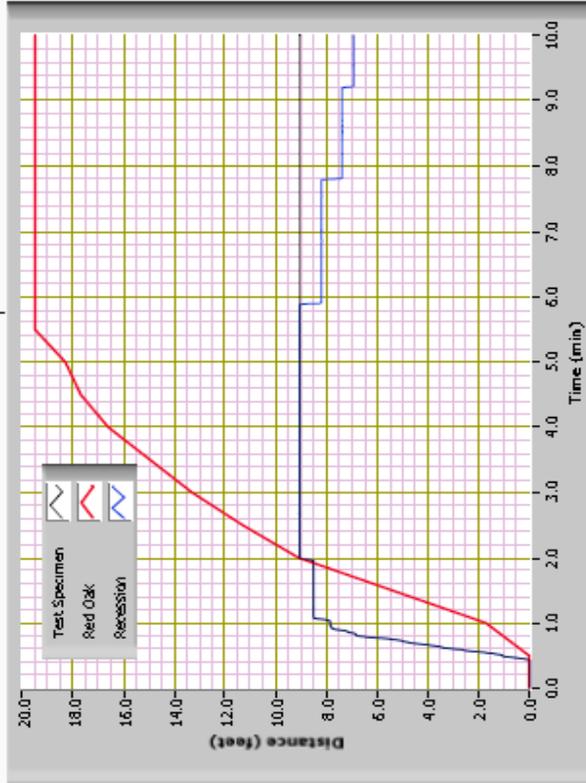
Max Flame Front: 9.07 FT. @ 2:40

ADC DRAFT (IN. H2O) 0.080
GAS PRESS. (IN. H2O) 0.284
GAS VOL (CF) 49.88
BTU/cf 1009
SHUTTER (IN.) 3.00
TEMP. 13' BURIED 110 F

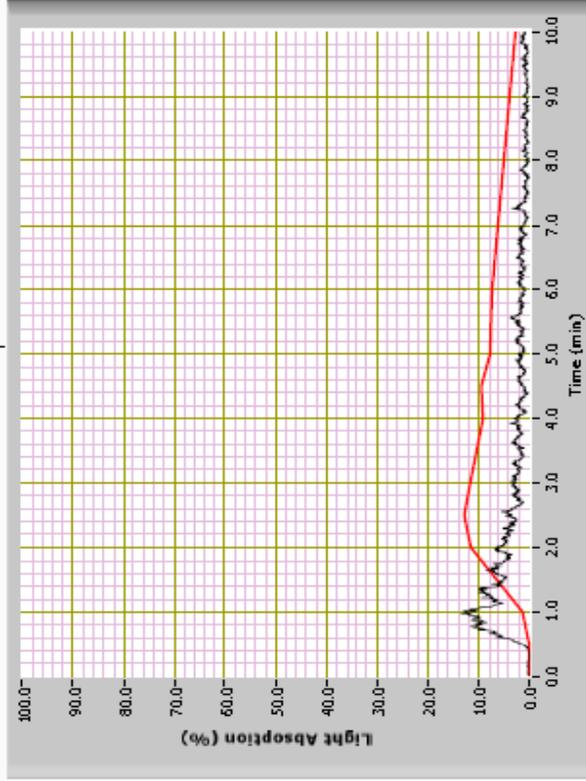
Flame Spread: 43.09
Area under Flame Curve (ft-min): 83.67

Smoke Developed: 46.21
Area under smoke curve (%A-min): 23.22

Flame Spread



Smoke Developed



ADC DRAFT (IN, H2O) 0.080
 GAS PRESS. (IN, H2O) 0.281
 GAS VOL (CF) 49.38
 BTU/cf 1005
 SHUTTER (IN.) 3.00
 TEMP. 13' BURIED 110 F

Flame Spread: 64.93
 Area under Flame Curve (ft-min): 119.53

TEST#: FH-2978-3 DATE: 10/2/2020

TEST METHOD: ASTM E84-18b

CLIENT: Thermory USA

PROJECT#: H-1523

SAMPLE: 0.79" x 5.5" T.M. Scots Pine
C19 Cladding

MATERIAL: (3) 21" x 96" decks

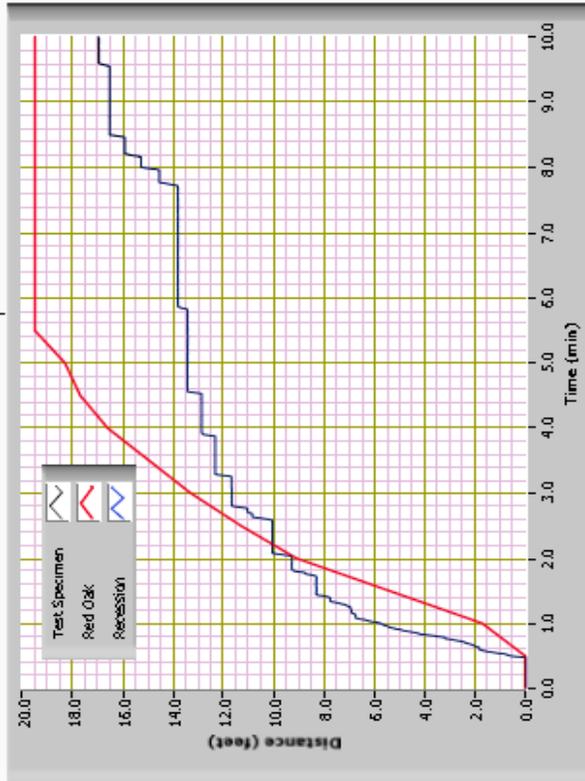
SUPPORT: Self-Supporting

REMARKS: Ignition Time: 0:19

Max Flame Front: 16.96 FT. @ 9:36

Smoke Developed: 148.59
 Area under smoke Curve (%A-min): 74.67

Flame Spread



Smoke Developed

