

FIRE RATING



INDEX

ASTM E 84 Surface Burning Characteristics of "Altispace Acoustic Beams and Shapes"	Pages 2 to 5
ASTM E 84 Surface Burning Characteristics of "Altispace Beams and Shapes"	Pages 6 to 9
ASTM E 84 Surface Burning Characteristics of "Altispace Laminate Beams and Shapes - FR"	Pages 10 to 13

ASTM E 84 Surface Burning Characteristics of "Altispace Acoustic Beams and Shapes"

A Report To: **Altispace Inc.**
61 Townline Road
Tillsonburg, ON, Canada
N4G 2R5

Phone: +1 519-788-2859

Attention: Ian McPhail
E-mail: ianm@altispace.com

Submitted by: Element Fire Testing

Report No. 20-002-447(B)
4 Pages

Date: October 5, 2020

1.0 ACCREDITATION To ISO/IEC 17025 for a defined Scope of Testing by the International Accreditation Service

2.0 SPECIFICATIONS OF ORDER

Determine the Flame Spread and Smoke Developed Indices based upon a single test conducted in accordance with ASTM E 84-20, as per Element Quotation No. 20-002-156622 REV2 dated September 16, 2020.

2.1 History of Revision

This is the original.

3.0 SAMPLE IDENTIFICATION (Element sample identification number 20-002-S0447-2)

Composite panel system described as, "Acoustic beams and shapes made from fingerjoint pine and particle board frame faced with PET acoustic board", and identified as:

"Altispace Acoustic Beams and Shapes"

4.0 TEST PROCEDURE

The method, designated as ASTM E 84-20 "*Standard Method of Test for Surface Burning Characteristics of Building Materials*", 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. 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 in terms of Flame Spread Index (FSI) and Smoke Developed Index (SDI). There is no established relationship between those two values.

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 SAMPLE PREPARATION

The test specimen consisted of a total of four sections of material, each approximately 2 inches (50 mm) in thickness by 21 inches (533 mm) in width by 72 inches (1829 mm) in length. The sections were butted together to create the 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.

The testing was performed on: 2020-10-02

6.0 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 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.

6.0 SUMMARY OF TEST PROCEDURE (continued)

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. If the area under the curve (A) is less than or equal to 97.5 min·ft, then $FSI = 0.515 \cdot A$; if greater, $FSI = 4900 / (195 - A)$. FSI is then rounded to the nearest multiple of 5.

Smoke Developed Index (SDI) is determined by dividing the total area under the obscuration curve by that established for 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.

7.0 TEST RESULTS

SAMPLE: "Altispace Acoustic Beams and Shapes"

Approx. Time to Ignition (s)	Maximum Flame Front Distance	Time to Maximum Flame Front (s)	Flame Spread Index (FSI)	Smoke Developed Index (SDI)
34	(ft.): 7.9 (m): 2.41	432	25	250

7.1 Observations of Burning Characteristics

The specimen ignited approximately 34 seconds after exposure to the test flame. Melting, dripping, and flaming dripping behaviour was observed. Material that dripped to the floor of the apparatus also ignited (at approximately 98 seconds).

8.0 INTERPRETATION OF RESULTS

Industry documents such as the International Building Code (IBC) or NFPA 101 Life Safety Code refer to ASTM E 84 (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
Results Classification (if applicable):		Class 1 or Class A

8.1 Measurement Uncertainty (MU)

In ASTM E 84 testing, data is reported in the form of indices. As such, MU cannot be specifically calculated. In the reporting instructions, rounding of calculated values is required, implying inherent uncertainty of 5 for FSI, and 5 or 50 for SDI, depending on the result. By following those reporting instructions of the standard, the lab is considered to have met the uncertainty reporting requirements of ISO/IEC 17025 (section 5.4.6.2 (Note 2)).



Francis Williams,
Technician.



Ian Smith,
Technical Manager.

9.0 TEST CHARTS

ASTM E 84-20

Sample: "Altispace Acoustic Beams and Shapes"

Chart 1. FLAME SPREAD

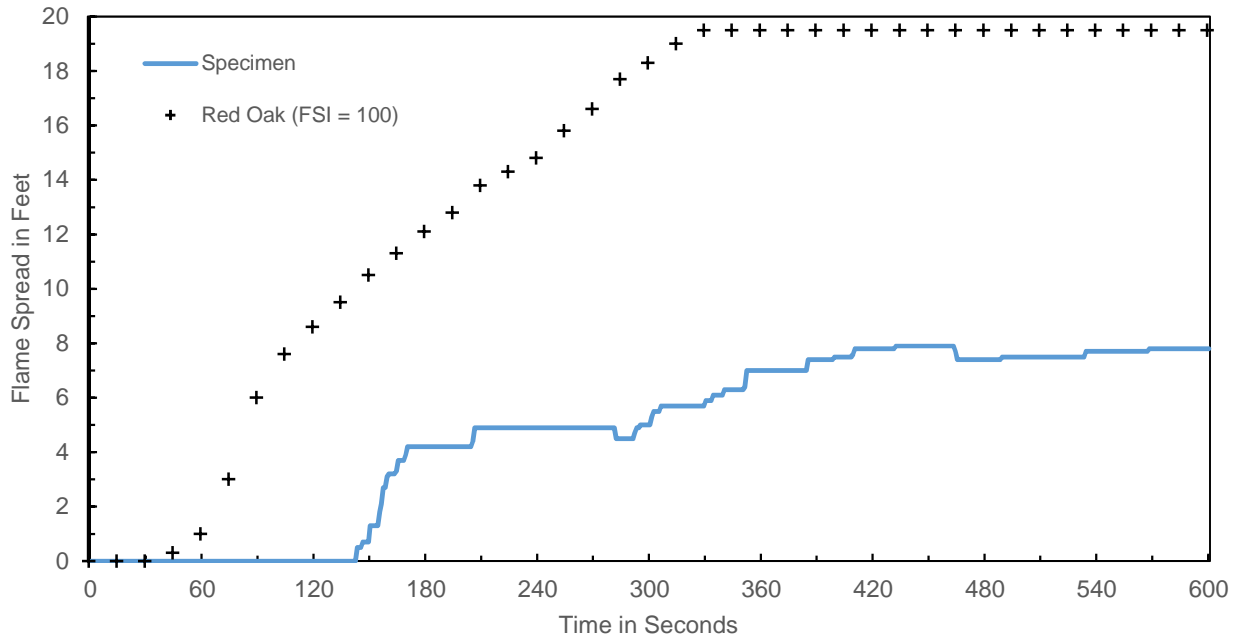
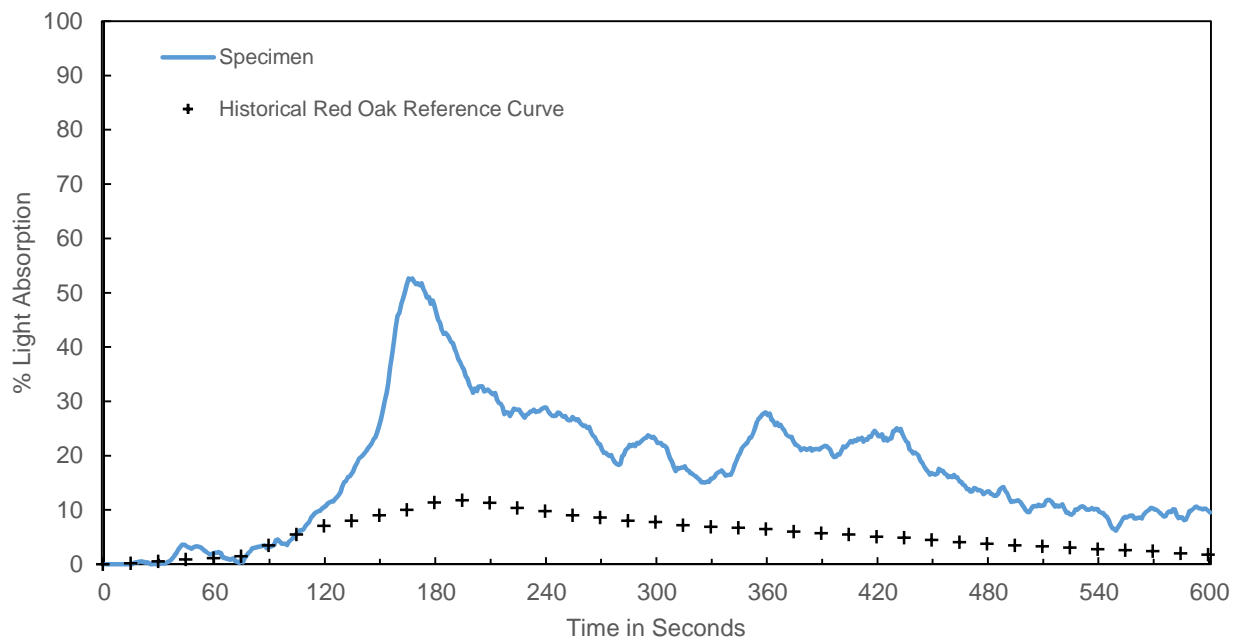


Chart 2. SMOKE DEVELOPED



Calculated Flame Spread (CFS)	Rounded Flame Spread Index (FSI)	Calculated Smoke Developed (CSD)	Rounded Smoke Developed Index (SDI)	Maximum 23' Air Temperature (°F)
24.9	25	256.1	250	544

ASTM E 84 Surface Burning Characteristics of "Altispace Beams and Shapes"

A Report To: **Altispace Inc.**
61 Townline Road
Tillsonburg, ON, Canada
N4G 2R5

Phone: +1 519-788-2859

Attention: Ian McPhail
E-mail: ianm@altispace.com

Submitted by: Element Fire Testing

Report No. 20-002-447(A)
4 Pages

Date: October 5, 2020

1.0 ACCREDITATION To ISO/IEC 17025 for a defined Scope of Testing by the International Accreditation Service

2.0 SPECIFICATIONS OF ORDER

Determine the Flame Spread and Smoke Developed Indices based upon a single test conducted in accordance with ASTM E 84-20, as per Element Quotation No. 20-002-156622 REV2 dated September 16, 2020.

2.1 History of Revision

This is the original.

3.0 SAMPLE IDENTIFICATION (Element sample identification number 20-002-S0447-1)

Composite panel system described as, "Beams and shapes manufactured using lightweight panel construction - high pressure laminate, hdf skin, fingerjoint pine frame, hollow core", and identified as: "Altispace Beams and Shapes"

4.0 TEST PROCEDURE

The method, designated as ASTM E 84-20 "*Standard Method of Test for Surface Burning Characteristics of Building Materials*", 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. 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 in terms of Flame Spread Index (FSI) and Smoke Developed Index (SDI). There is no established relationship between those two values.

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 SAMPLE PREPARATION

The test specimen consisted of a total of nine sections of material, each approximately 1.5 inches (38 mm) in total thickness by 21 inches (533 mm) in width by 32 inches (813 mm) in length. The sections were butted together to create the 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.

The testing was performed on: 2020-10-01

6.0 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 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.

6.0 SUMMARY OF TEST PROCEDURE (continued)

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. If the area under the curve (A) is less than or equal to 97.5 min·ft, then $FSI = 0.515 \cdot A$; if greater, $FSI = 4900 / (195 - A)$. FSI is then rounded to the nearest multiple of 5.

Smoke Developed Index (SDI) is determined by dividing the total area under the obscuration curve by that established for 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.

7.0 TEST RESULTS

SAMPLE: "Altispace Beams and Shapes"

Approx. Time to Ignition (s)	Maximum Flame Front Distance	Time to Maximum Flame Front (s)	Flame Spread Index (FSI)	Smoke Developed Index (SDI)
45	(ft.): 19.5 (m): 5.94	275	70	50

7.1 Observations of Burning Characteristics

The specimen ignited approximately 45 seconds after exposure to the test flame. Audible spalling was observed prior to surface ignition. Partial collapse was observed, beginning at approximately 334 seconds.

8.0 INTERPRETATION OF RESULTS

Industry documents such as the International Building Code (IBC) or NFPA 101 Life Safety Code refer to ASTM E 84 (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
Results Classification (if applicable):		Class 2 or Class B

8.1 Measurement Uncertainty (MU)

In ASTM E 84 testing, data is reported in the form of indices. As such, MU cannot be specifically calculated. In the reporting instructions, rounding of calculated values is required, implying inherent uncertainty of 5 for FSI, and 5 or 50 for SDI, depending on the result. By following those reporting instructions of the standard, the lab is considered to have met the uncertainty reporting requirements of ISO/IEC 17025 (section 5.4.6.2 (Note 2)).



Francis Williams,
Technician.



Ian Smith,
Technical Manager.

Note: This report and service are covered under Element Materials Technology Canada Inc. Standard Terms and Conditions of Contract which may be found on our company's website at www.element.com, or by calling 1-866-263-9268.

9.0 TEST CHARTS

ASTM E 84-20

Sample: "Altispace Beams and Shapes"

Chart 1. FLAME SPREAD

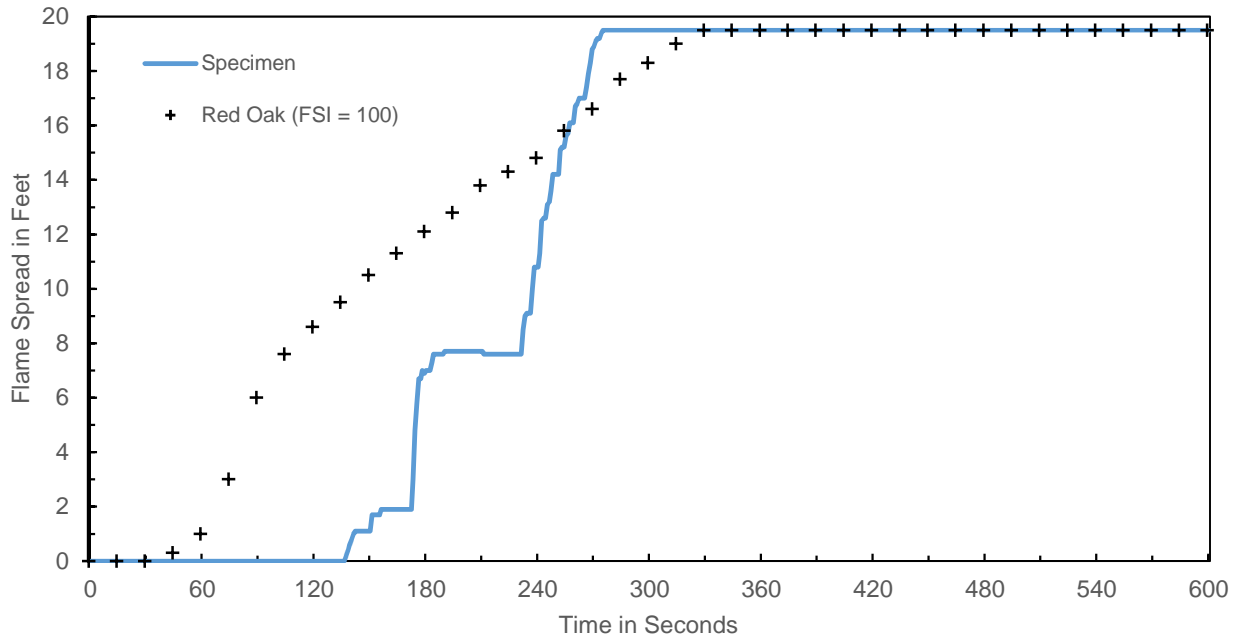
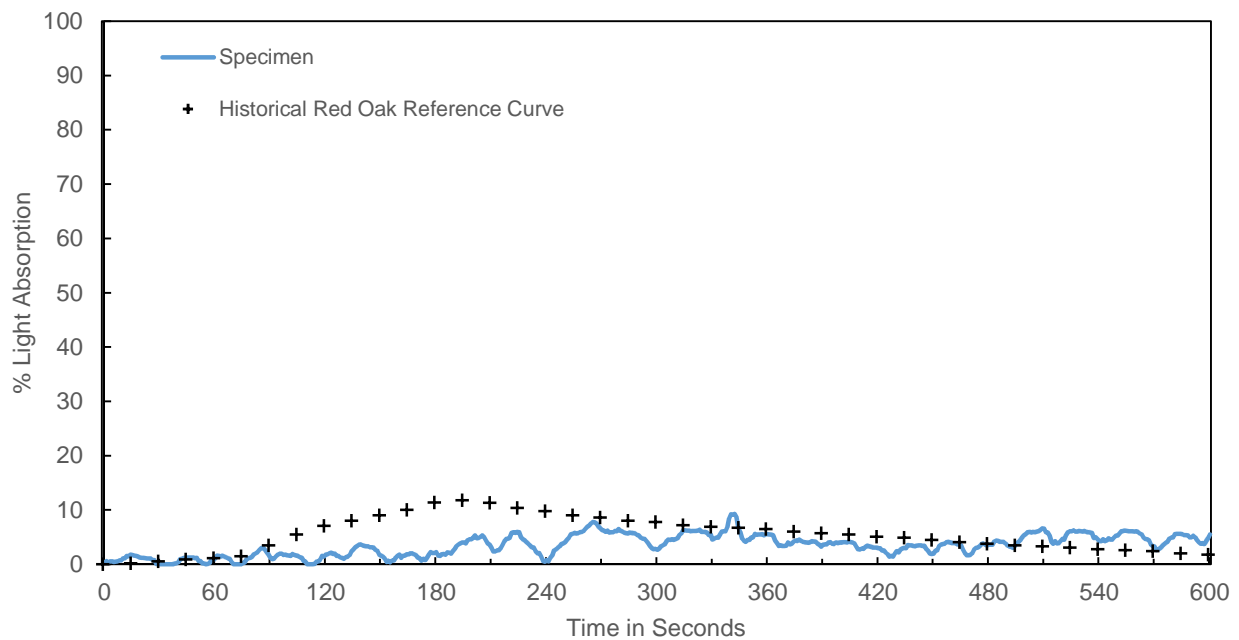


Chart 2. SMOKE DEVELOPED



Calculated Flame Spread (CFS)	Rounded Flame Spread Index (FSI)	Calculated Smoke Developed (CSD)	Rounded Smoke Developed Index (SDI)	Maximum 23' Air Temperature (°F)
69.5	70	51.1	50	1509

ASTM E 84 Surface Burning Characteristics of "Altispace Laminate Beams and Shapes - FR"

A Report To: **Altispace Inc.**
61 Townline Road
Tillsonburg, ON, Canada
N4G 2R5

Phone: +1 519-788-2859

Attention: Ian McPhail
E-mail: ianm@altispace.com

Submitted by: Element Fire Testing

Report No. 20-002-484
4 Pages

Date: October 27, 2020

1.0 ACCREDITATION To ISO/IEC 17025 for a defined Scope of Testing by the International Accreditation Service

2.0 SPECIFICATIONS OF ORDER

Determine the Flame Spread and Smoke Developed Indices based upon a single test conducted in accordance with ASTM E 84-20, as per Element Quotation No. 20-002-206485 dated October 6, 2020.

3.0 SAMPLE IDENTIFICATION (Element sample identification number 20-002-S0484)

Panel system described as, "Beams and shapes manufactured using lightweight panel construction - high pressure laminate, FR HDF/MDF skin, FR frame, FR honeycomb core", and identified as: "Altispace Laminate Beams and Shapes - FR"

4.0 TEST PROCEDURE

The method, designated as ASTM E 84-20 "*Standard Method of Test for Surface Burning Characteristics of Building Materials*", 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. 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 in terms of Flame Spread Index (FSI) and Smoke Developed Index (SDI). There is no established relationship between those two values.

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 SAMPLE PREPARATION

The test specimen consisted of a total of nine sections of material, each approximately 1.75 inches (45 mm) in total thickness by 21 inches (533 mm) in width by 32 inches (813 mm) in length. The sections were butted together to create the 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.

The testing was performed on: 2020-10-26

6.0 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 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.

6.0 SUMMARY OF TEST PROCEDURE (continued)

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. If the area under the curve (A) is less than or equal to 97.5 min-ft, then $FSI = 0.515 \cdot A$; if greater, $FSI = 4900 / (195 - A)$. FSI is then rounded to the nearest multiple of 5.

Smoke Developed Index (SDI) is determined by dividing the total area under the obscuration curve by that established for 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.

7.0 TEST RESULTS

SAMPLE: "Altispace Laminate Beams and Shapes - FR"

Approx. Time to Ignition (s)	Maximum Flame Front Distance	Time to Maximum Flame Front (s)	Flame Spread Index (FSI)	Smoke Developed Index (SDI)
70	(ft.): 10.4 (m): 3.17	547	20	20

7.1 Observations of Burning Characteristics

The specimen ignited approximately 70 seconds after exposure to the test flame. Delamination was observed, beginning at approximately 34 seconds.

8.0 INTERPRETATION OF RESULTS

Industry documents such as the International Building Code (IBC) or NFPA 101 Life Safety Code refer to ASTM E 84 (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
Results Classification (if applicable):		Class 1 or Class A

8.1 Measurement Uncertainty (MU)

ASTM E 84 is a well-established test method that reports data in the form of indices. As such, MU cannot be calculated. In the reporting instructions, 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 (section 5.4.6.2 (Note 2)).



Francis Williams,
Technician.



Ian Smith,
Technical Manager.

9.0 TEST CHARTS

ASTM E 84-20

Sample: "Altispace Laminate Beams and Shapes - FR"

Chart 1. FLAME SPREAD

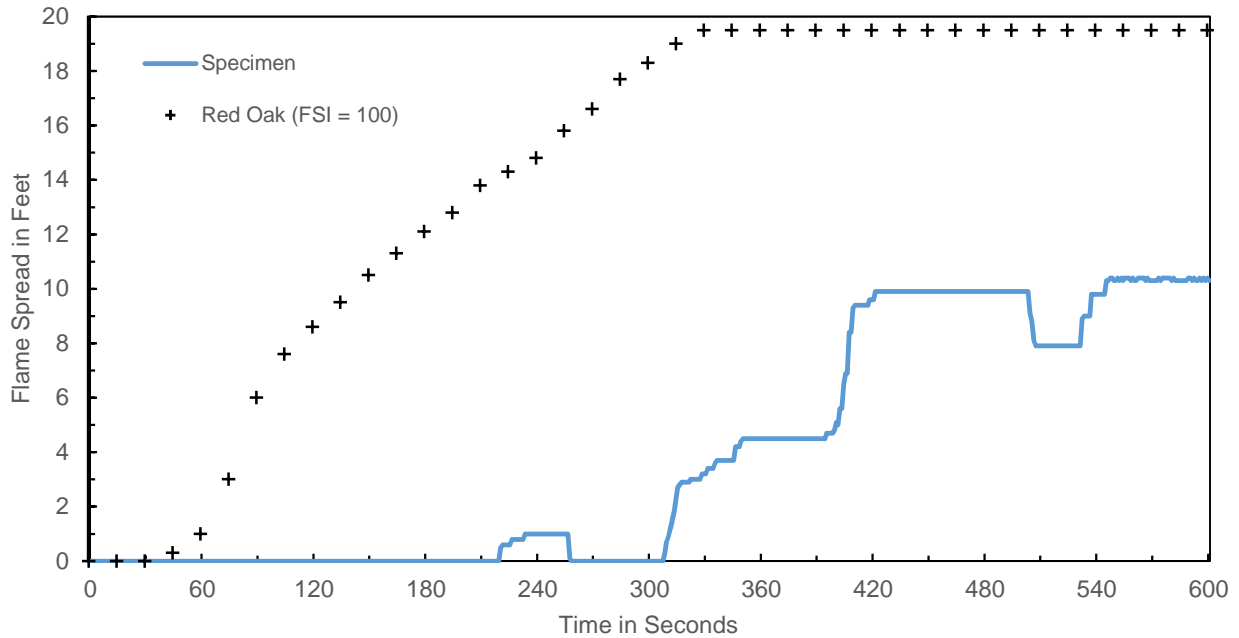
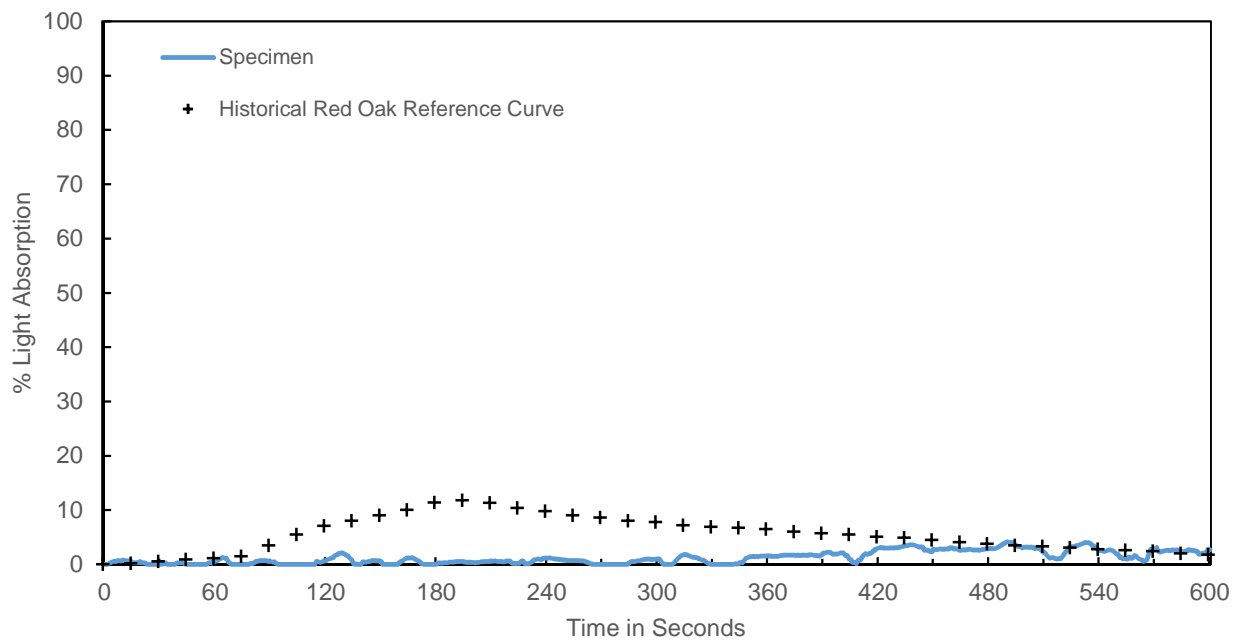


Chart 2. SMOKE DEVELOPED



Calculated Flame Spread (CFS)	Rounded Flame Spread Index (FSI)	Calculated Smoke Developed (CSD)	Rounded Smoke Developed Index (SDI)	Maximum 23' Air Temperature (°F)
20.7	20	18.5	20	489