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ASTM E 84 Surface Burning Characteristics of "ECOMESH"

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Submitted by:	Element Fire Testing
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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 Saint Clair Textiles reference Purchase Order No. AC43360 and Element Quotation No. 20-002-223721 REV1 dated December 16, 2020.

2.1 History of Revision

This is the original.

3.0 SAMPLE IDENTIFICATION (Element sample identification number 21-002-S0015-2)

Material described as, "Polyester fabric with fire retardants in mass, with an acrylic/polyurethane coating on both sides - White color - 320 µm ± 10% - 215 g/m^2 ± 10%", and identified as:
"ECOMESH"

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 three sections of material, each approximately 0.013 inches (0.3 mm) in material thickness by 21 inches (533 mm) in width by 96 inches (2438 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 ± 5°F (23 ± 3°C) and a relative humidity of 50 ± 5%. During testing, the specimen was supported over its full surface area by 2 inch (50 mm) hexagonal wire mesh and was further supported across the width by 0.25 inch (6 mm) steel rods spaced nominally at 24 inch (610 mm) intervals.

The testing was performed on: 2021-01-26

6.0 SUMMARY OF TEST PROCEDURE

The tunnel is preheated to 150 ± 5°F (66 ± 2.8°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 ± 5°F (40.5 ± 2.8°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.

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·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: "ECOMESH"

Approx. Time to Ignition (s)	Maximum Flame Front Distance	Time to Maximum Flame Front (s)	Flame Spread Index (FSI)	Smoke Developed Index (SDI)
10	(ft.): 0.6 (m): 0.18	35	**5**	**300**

7.1 Observations of Burning Characteristics

The specimen ignited approximately 10 seconds after exposure to the test flame. Melting, dripping, and flaming dripping behaviour was observed.

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**

Francis Williams,
Technician.

Ian Smith,
Technical Manager.

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 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)).

9.0 TEST CHARTS

ASTM E 84-20

Sample: "ECOMESH"

Chart 1. FLAME SPREAD

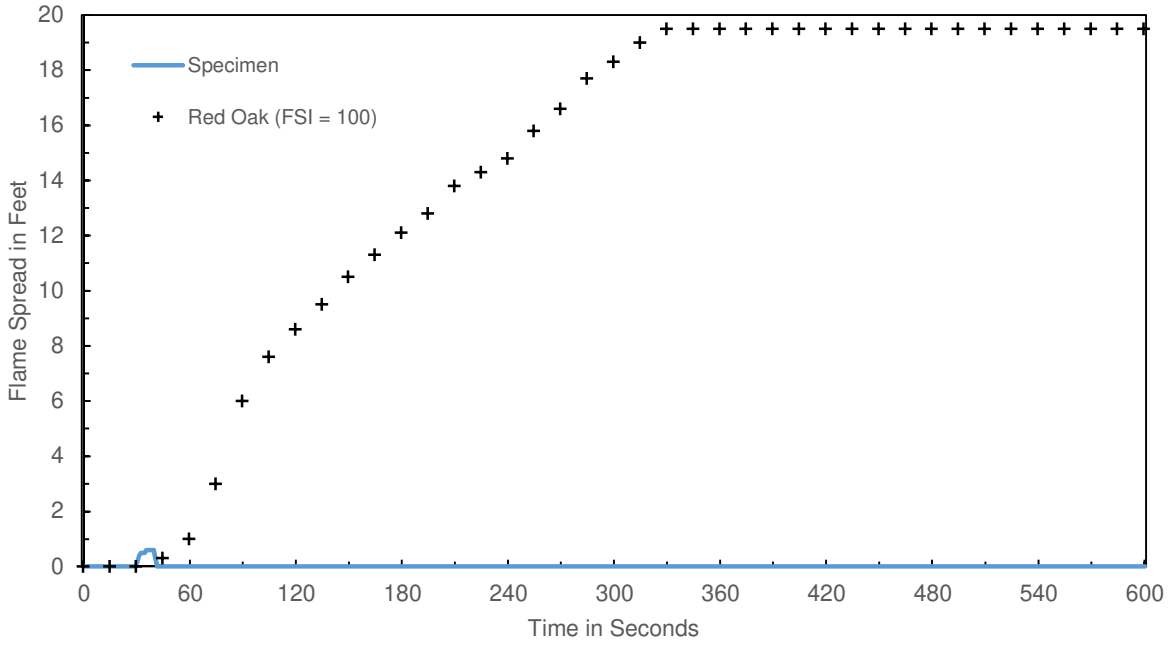
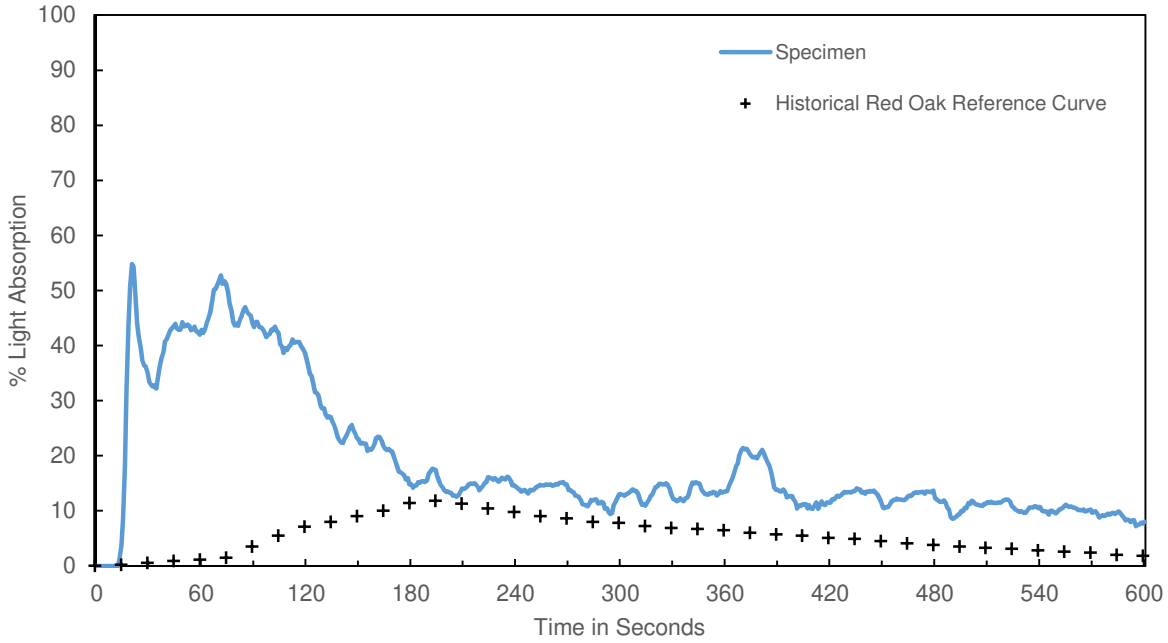


Chart 2. SMOKE DEVELOPED



Calculated Flame Spread (CFS)	Rounded Flame Spread Index (**FSI**)	Calculated Smoke Developed (CSD)	Rounded Smoke Developed Index (**SDI**)	Maximum 23' Air Temperature (°F)
2.9	**5**	276.6	**300**	434