



APPLIED TEXTILES LAB SERVICES

# **Standard Method of Test for Surface Burning Characteristics of Building Materials ASTM E84 - 07 ADHERED**

**7884 hAZE**

**REPORT NO. 25110**

**December 3, 2007**

**Prepared For:  
Carnegie**

This test is certified for ASTM E84 by the Southern Building Code Congress International (SBCCI) as a testing laboratory for Fire and Materials testing, Evaluation Report Number TL-9606 (Commercial Testing), and by the United States Department of Commerce, National Institute of Standards and Technology (NIST), through the National Voluntary Laboratory Accreditation Program (NVLAP) for compliance with criteria set forth in NIST Handbook 150:2001, all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994.

This report is provided for the exclusive use of the client to whom it is addressed. It may be used in its entirety to gain product acceptance from daily-constituted authorities. The test results presented in this report apply only to the samples tested and are not necessarily indicative of apparent identical or similar materials. The client provided sample selection and identification. A sampling plan, if described in the referenced test procedure, was not necessarily followed. This report shall not be used under any circumstance in advertising to the general public.

## **INTRODUCTION**

This report is a presentation of results of a surface flammability test on a material submitted by client.

A TEXTILE TESTING COMPANY  
555 76<sup>TH</sup> STREET SW, BYRON CENTER, MICHIGAN 49315  
TELEPHONE 616.559.6123 FACSIMILE 616.559.6119



## APPLIED TEXTILES LAB SERVICES

The test was conducted in accordance with the American Society for test and Materials fire test response standard E-84-07, Surface Burning Characteristics of Building Materials, sometimes referred to as the Steiner Tunnel test. This test is applicable to exposed surfaces such as walls and ceilings. The test is conducted with the specimen in the ceiling position with the surface to be evaluated exposed face down to the ignition source. The method, which is similar to NFPA No. 255 and UL No. 723, is an American National (ANSI) Standard and has been approved for use by agencies of the Department of Defense for listing in the DoD Index of Specifications and Standards.

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 materials, products, or assemblies under actual fire conditions.

The purpose of the test is to provide only the comparative measurements of surface flame spread and smoke development of materials with that of select grade red oak and reinforced cement board under specific fire exposure conditions. The test exposes a nominal 24-foot long by 20-inch wide test specimen to a controlled airflow and flaming fire adjusted to spread the flame along the entire length of a red oak specimen in 5.50 minutes. During the ten-minute test duration, flame spread over the specimen surface and density of the resulting smoke are measured and recorded. Test results are calculated relative to red oak, which has an arbitrary rating of 100, and reinforced cement board, which has a rating of 0.

The test results are expressed as Flame Spread Index and Smoke Developed Index. The Flame Spread Index is defined in ASTM E 176 as a number or classification indicating a comparative measure derived from observations made during the progress of the boundary of a zone of flame under defined test conditions. The Smoke Developed Index, a term specific to ASTM E-84, is defined as a number or classification indicating a comparative measure derived from smoke obscuration data collected during the test for surface burning characteristics. There is not necessarily a relationship between the two measurements.

The method does not provide for measurement of heat transmission through the surface tested, the effect of aggravated flame spread behavior of an assembly resulting from the proximity of combustible walls and ceilings, or classifying a material as noncombustible solely by means of a Flame Spread Index.

The zero reference and other parameters critical to furnace operation are verified on the day of the test by conducting a 10-minute test using 1/4-inch reinforced cement board. Periodic tests using NOFMA certified 23/32-inch select grade red oak flooring provide data for the 100 reference.

### **TEST SAMPLE**

The test sample, selected by the client was tested using three test panels, each measuring two feet wide by eight feet in length, were prepared by adhering the material to a 1/4-inch thick reinforced cement board using Sarimix 7 High temperature Bonding Mortar. The adhesive was applied to the smooth side of the cement board, the material placed into the adhesive, and smoothed with a brush and roller. After dead-stacking overnight, the prepared panels were transferred to storage racks and conditioned to equilibrium in an atmosphere with the temperature maintained at 71 +/- 2°F and the relative humidity at 50 +/- 5 percent. For testing, the panels were placed end-to-end on the ledges of the tunnel furnace and tested with no auxiliary support mechanism. This method of sample preparation is described in appendix X1 of the E-84 standard, Guide to Mounting Methods, Section X1.10.1 for Heavy Textile Materials.

### **TEST RESULTS**

The test results, calculated on the basis of observed flame propagation and the integrated area under the recorded smoke density curve, are presented below. The Flame Spread Index obtained in E-84 is rounded to the nearest number divisible by five. Smoke Developed Indices are rounded to the nearest number divisible by five unless the Index is greater than 200. In that case, the Smoke Developed Index is rounded to the nearest 50 points. Flame spread and smoke development data are presented graphically in the computer printout at the end of this report.



APPLIED TEXTILES LAB SERVICES

Test Specimen	Flame Spread Index	Smoke Developed
Reinforced Cement Board	0	0
Red Oak Flooring	100	100
<b>7884</b>	<b>15</b>	<b>100</b>

**SPECIMEN DATA**

TIME TO IGNITION	00.04 (MIN)
MAXIMUM FS	02.88 (FEET)
TIME TO MAX FS	00.50 (MIN)

**According to the standard classification system cited by building codes, this fabric is:**

**Class 1 or A**

Code officials frequently use the Flame Spread Index and Smoke Developed Index values obtained by the ASTM E-84 test and regulatory agencies in the acceptance of interior finish materials for various applications. The most widely accepted classification system is described in the National Fire Protection Association publication NFPA 101 Life Safety Code, where:

**Standard Classification System:**

<u>Class</u>	<u>Flame Spread Index</u>	<u>Smoke Development Rating</u>
1 or A	0 - 25	0 - 450 maximum
2 or B	26 - 75	0 - 450 maximum
3 or C	76 - 200	0 - 450 maximum

Class A, B and C corresponds to Type I, II, and III respectively in other codes such as SBCCI, BOCA, and ICBO. They do not preclude a material being otherwise classified by the authority of jurisdiction.

The description of the test procedure and specimen evaluated, as well as the observations and results obtained, contained herein are true and accurate within the limits of sound engineering practice. These test results were obtained from an outside source. A copy of the original document is kept on file at Applied Textiles.