



# TEST REPORT

ASTM E84-05

## SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS

Report No. 3120110SAT-013

Mountain Fiber Insulation; Hyrum, Utah

April 5, 2007

Prepared for:  
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*ABSTRACT*

Test Specimen: Mountain Fiber Insulation; Hyrum, Utah

Test Standard: ASTM E84-05

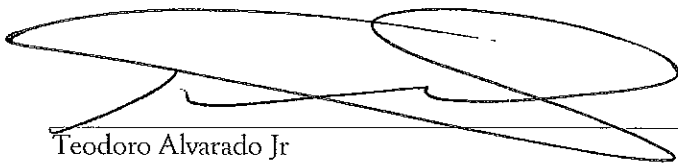
Test Date: April 05, 2007

Test Sponsor: R &amp; D Services, Inc.

Test Results:

FLAME SPREAD INDEX	=	5
SMOKE DEVELOPED INDEX	=	35
	=	N/A ft. Beyond Burners Centerline

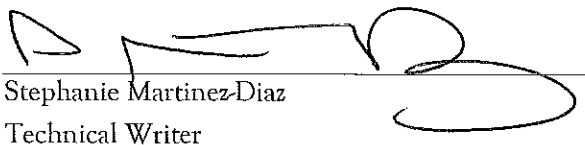
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Teodoro Alvarado Jr  
E84 Operator

April 5, 2007

Reviewed and approved:



Stephanie Martinez-Diaz  
Technical Writer

April 5, 2007

## I INTRODUCTION

This report describes the results of the ASTM E84-05 Standard Test Method for SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS, a method for determining the comparative surface burning behavior of building materials,. This test is applicable to exposed surfaces, such as ceilings or walls, provided that the material or assembly of materials, by its own structural quality or the manner in which it is tested and intended for use, is capable of supporting itself in position or being supported during the test period.

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

“The use of supporting materials on the underside of the test specimen may lower the flame spread index from that which might be obtained if the specimen could be tested without such support. This method may not be appropriate for obtaining comparative surface burning behavior of some cellular plastic materials. 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.”

This test method is also published under the following designations:

ANSI 2.5  
NFPA 255  
UBC 8-1 (42-1)  
UL 723

*This standard should be used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use.*

## II PURPOSE

The ASTM E84-05 (25 foot tunnel) test method is intended to compare the surface flame spread and smoke developed measurements to those obtained from tests of fiber cement board and select grade red oak flooring. The test specimen surface (18 inches wide and 24 feet long) is exposed to a flaming fire exposure during the 10 minute test duration, while flame spread over its surface and density of the resulting smoke are measured and recorded. Test results are presented as the computed comparisons to the standard calibration materials.

The furnace is considered under calibration when a 10 minute test of red oak decking will pass flame out the end of the tunnel in five minutes, 30 seconds, plus or minus 15 seconds. Fiber cement board forms the zero point for both flame spread and smoke developed indexes, while the red oak flooring smoke developed index is set as 100.

## III DESCRIPTION OF TEST SPECIMEN

Specimen Identification:	Mountain Fiber Insulation; Hyrum, Utah
Date Received:	3/27/2007
Date Prepared:	3/27/2007
Conditioning (73°F & 50% R.H.):	9 days
Specimen Width (in):	24
Specimen Length (ft):	24
Specimen Thickness:	4.0485-in.
Material Weight:	N/A oz./sq. yd
Total Specimen Weight:	204.0-lbs.
Adhesive or coating application rate:	N/A

### Mounting Method:

The specimen was supported on 1/4 inch Steel rods spaced every 2 ft down the length of the apparatus.

### Specimen Description:

The test specimen was described by the client as the "Mountain Fiber Insulation; Cellulose insulation." The specimen consisted of (4) 6-ft. long x 24-in. wide x 4.0485-in. thick, gray, cellulose insulation sprayed into a simulated wall cavity. The cellulose insulation was a nominal 3.5-in. thick. The reported density of the cellulose insulation was 2.3 (PCF). The specimen was identified by the client as "Mountain Fiber Insulation; Hyrum, Utah" The product was received by our personnel in good condition.

#### IV TEST PROCEDURE

The tests were conducted in accordance with the procedures outlined in the American Society for Testing and Materials ASTM E84-05. The self-supporting specimens were placed directly on the tunnel ledges. As required by the standard, one or more layers of 0.25 inch thick reinforced concrete board was placed on top of the test sample between the sample and the tunnel lid. After the tests, the samples were removed from the tunnel, examined and disposed of.

The test was conducted on 4/5/2007, and witnessed by Ron Graves / Monty Millspaugh of R & D Services, Inc..

#### V TEST RESULTS

The test results, computed on the basis of observed flame front advance and electronic smoke density measurements are presented in the following table. In recognition of possible variations and limitations of the test method, the results are computed to the nearest number divisible by five, as outlined in the test method for smoke developed index results greater than 200 the calculated value is rounded to the nearest 50 points.

*While no longer a part of this standard test method, the Fuel Contributed Value has been computed, and may be found on the computer printout sheet in the Appendix.*

Test Specimen	E84 (10 Minute) Flame Spread Index	E84 (10 Minute) Smoke Developed Index	NFPA 703 (30Minute) ft
Fiber Cement Board	0	0	N/A
Red Oak Flooring		100	N/A
Mountain Fiber Insulation; Hyrum, Utah	5	35	N/A

The data sheets are included in the Appendix. These sheets are actual print-outs of the computerized data system which monitors the ASTM E84-05 apparatus, and contain all calibration and specimen data needed to calculate the test results.

## VI OBSERVATIONS

During the test, the specimen was observed to behave in the following manner: The cellulose insulation ignited at 0:05 (min:sec.). The test continued for the 10:00 duration.

After the test the specimen was observed to be damaged as follows:

The cellulose insulation was charred from 0-ft. - 9-ft. Black discoloration was observed to the cellulose insulation from 9-ft. - 24-ft.

# **APPENDIX**

## **ASTM E84-05**

### **Data Sheets**

Client: R & D SERVICES, INC.

Date: 4/5/2007

Project Number: 3120110SAT-013

Test Number: 2

Operator: TA/EA

Specimen ID: "MOUNTAIN FIBER INSULATION; HYRUM, UTAH CELLULOSE INSULATION". THE SPECIMEN WAS SUPPORTED WITH RODS. THE TEST WAS WITNESSED BY RON GRAVES FROM R & D SERVICES, INC.

## TEST RESULTS

**FLAMESPREAD**            5

**SMOKE DEVELOPED INDEX:** 35

## SPECIMEN DATA . . .

Time to Ignition (sec): 5

Time to Max FS (sec): 29

Maximum FS (feet): 1.0

Time to 980 F (sec): Never Reached

Time to End of Tunnel (sec): Never Reached

Max Temperature (F): 558

Time to Max Temperature (sec): 600

Total Fuel Burned (cubic feet): 49.34

FS\*Time Area (ft\*min): 10.3

Smoke Area (%A\*min): 38.0

Unrounded FSI: 5.3

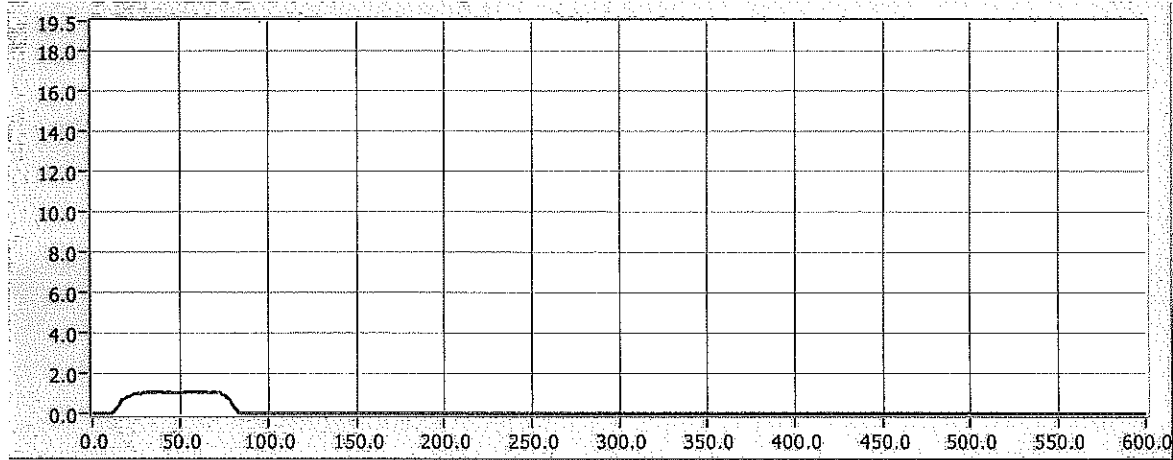
## CALIBRATION DATA . . .

Time to Ignition of Last Red Oak (Sec): 42.0

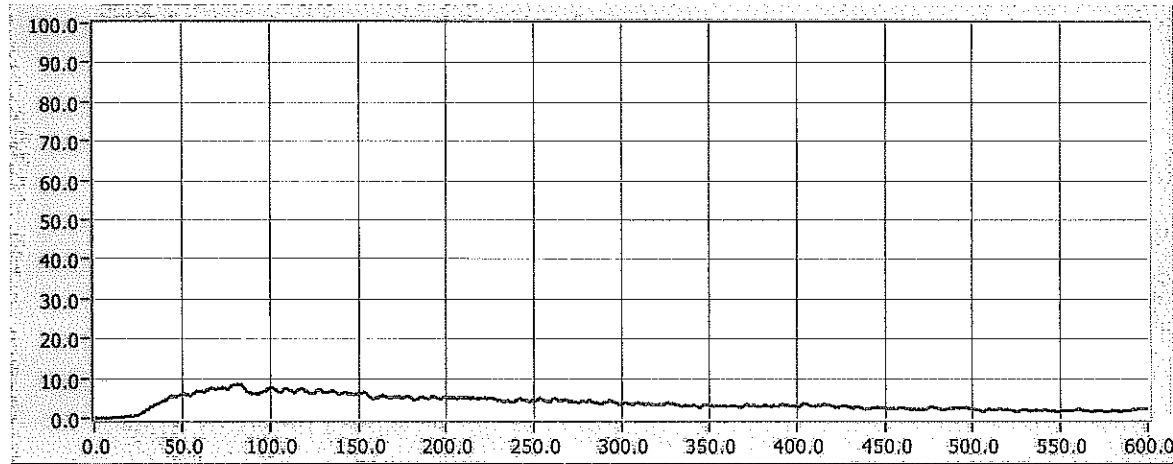
Red Oak Smoke Area (%A\*min): 111.0



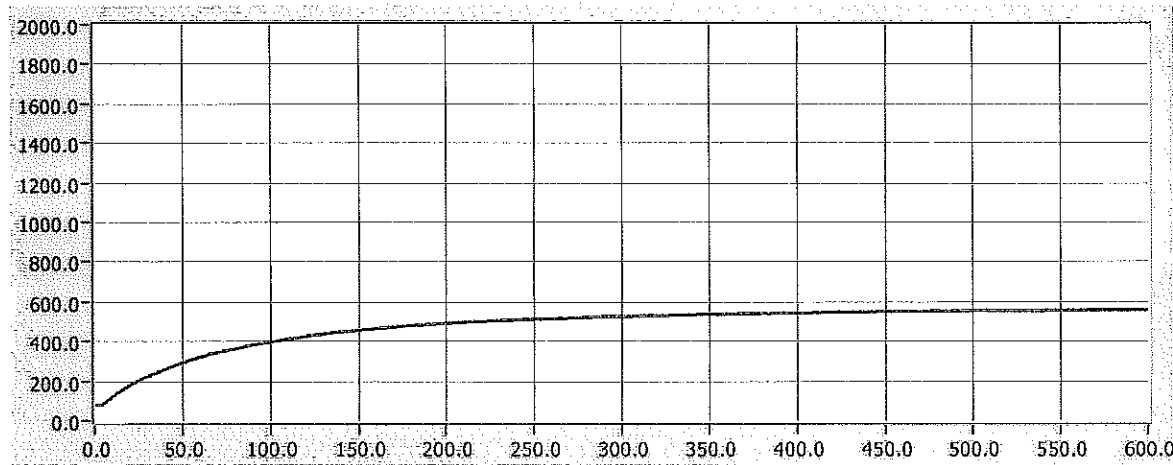
### FLAME SPREAD (ft)



### Smoke (%A)



### Temperature (°F)



Time (sec)

600