

**ASTM E84-91a  
SURFACE BURNING  
CHARACTERISTICS**

**GLASBORD 4oz. FRI**

Report No. 9013 - 96884

April 6, 1994

Prepared For:

Crane/Kemlite  
4050 Channahon Road  
Joliet, IL 60436, U.S.A.

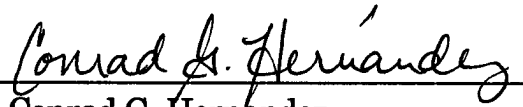


### ABSTRACT


Test Material:	GLASBORD 4oz. FRI		
Test Standard:	ASTM E84-91a Standard Test Method for SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS (ANSI 2.5, NFPA 255,		
Test Date:	April 4, 1994		
Test Sponsor:	Crane/Kemlite		
Test Results:	FLAME SPREAD INDEX	=	15
	SMOKE DEVELOPED INDEX	=	310

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.

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The test specimen identification is as provided by the client and Omega Point Laboratories accepts no responsibility for any inaccuracies therein.**

  
Conrad G. Hernandez  
Test Engineer

Date: April 6, 1994

  
William E. Fitch, P.E. No. 55296  
Executive Vice President

Date: April 6, 1994



## I. INTRODUCTION

This report describes the results of the ASTM E84-91a Standard Test Method for SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS (1), 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 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.***

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(1) American Society for Testing and Materials (ASTM), Committee E-5 on Fire Standards



## II. PURPOSE

The ASTM E84-91a (25 foot tunnel) test method is intended to compare the surface flame spread and smoke developed measurements to those obtained from tests of mineral 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. Mineral fiber cement board forms the zero point, while the red oak flooring flame spread and smoke developed ratings are set as 100.

## III. DESCRIPTION OF TEST SPECIMENS

Specimen Identification: GLASBORD 4oz. FRI

Date Received: 3/25/94  
Date Prepared: March 25, 1994  
Conditioning (73°F & 50% R.H.): 10 days  
Specimen Width (in): 24  
Specimen Length (ft): 24  
Specimen Thickness: ~0.115"  
Material Weight: N/A oz./sq. yd.  
Total Specimen Weight: 44.83 lbs.  
Adhesive or coating application rate: N/A

### Mounting Method:

The self-supporting sample was laid directly on the tunnel ledges.

### Specimen Description:

The test sample consisted of (6) pieces, measuring 24" x 48" x ~0.115". The panels were marked as "K-940321-1" up to "K-940321-6".



#### IV. 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.

*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	Flame Spread Index	Smoke Developed
Mineral Fiber Cement Board	0	0
Red Oak Flooring	n/a	100
<b>GLASBORD 4oz. FRI</b>	<b>15</b>	<b>310</b>

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

#### V. OBSERVATIONS

Sample ignition occurred at 1:06 (min:sec), with the surface becoming discolored at 1:30 (min:sec). The flames were noticed to increase at 2:00 (min:sec), followed with the surface turning black and the smoke and fire increasing by 2:40 (min:sec). The maximum flame spread of 3.8' occurred at 8:17 (min:sec). After the burner flames were extinguished, the sample continued flaming for 20 seconds.

After cooling and removal from the tunnel, the specimen was observed as follows: The sample was covered with soot to 24'. However, to 15', the facer lining was consumed, allowing the underlying surface to be charred. Also, the sample was warped slightly to 7'.



# APPENDIX

## DATA SHEETS



ASTM E84

DATA SHEET

Client: Kemlite Company  
 Date: 15:03:36 04-04-1994  
 Test Number: 1  
 Project Number: 14780-96884  
 Operator: CGH/SR  
 Material ID:

GLASBORD 4 oz. FRI  
 6 pieces @ 24" x 48" x "0.115"  
 Panels marked with "K-940321-1" up to "K-940321-6".

TEST RESULTS:

FLAMESPREAD INDEX = 15  
 SMOKE DEVELOPED INDEX = 310

SPECIMEN DATA . . .

Time to Ignition = 01:06 (Min:Sec)  
 Time to Max FS = 08:17 (Min:Sec)  
 Maximum FS = 3.8 (Feet)  
 Time To 980 F = 980 F Not Reached  
 Max Temp = 596 (deg F)  
 Time To Max Temp = 09:21 (Min:Sec)  
 Total Fuel Burned = 48.94 (cubic feet)

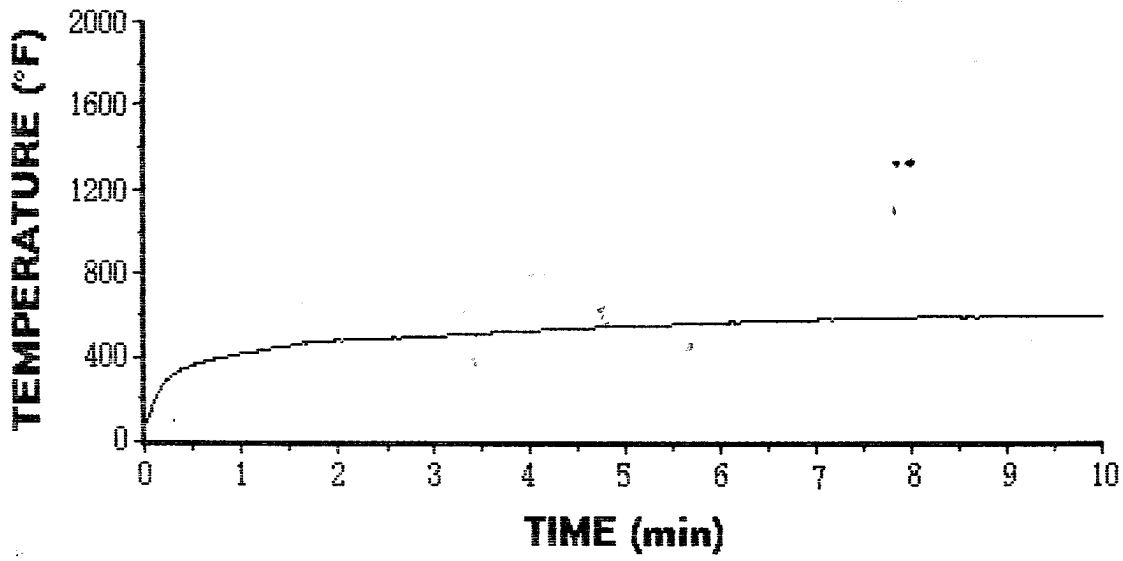
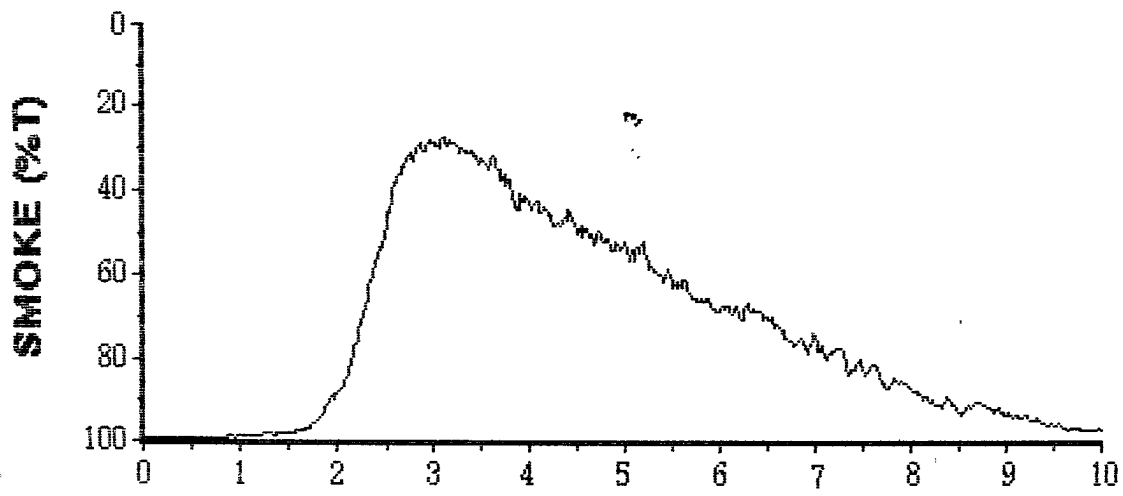
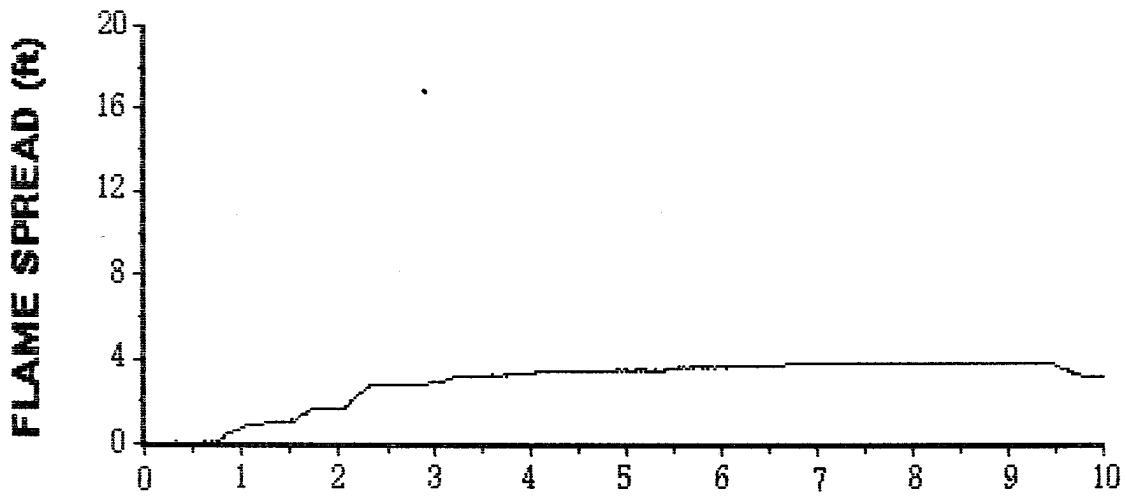
FS\*Time Area = 28.8 (Ft\*Min)  
 Smoke Area = 255.8 (%T\*Min)  
 Fuel Area = 5141.5 ( F\*Min)  
 Fuel Contributed Value = 0  
 Unrounded FSI = 14.8539

CALIBRATION DATA . . .

Time to Ignition of Last Red Oak = 00:38 (Min:Sec)  
 Red Oak Smoke Area = 82.40 (%T\*Min)  
 Red Oak Fuel Area = 9132 ( F\*Min)  
 Glass Fiber Board Fuel Area = 5145 ( F\*Min)

PROJECT NO: 14780-96884

Time & Date: 15:03:36 04-04-1994



**TIME (min)**