

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

**Tufliner 8141**

Report No. 9013 - 96549

January 24, 1994

Prepared For:

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



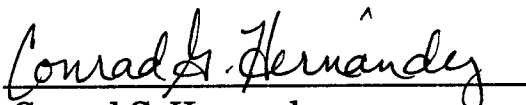
### ABSTRACT

Test Material:	Tufliner 8141		
Test Standard:	ASTM E84-91a Standard Test Method for SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS (ANSI 2.5, NFPA 255,		
Test Date:	January 24, 1994		
Test Sponsor:	Crane/Kemlite		
Test Results:	FLAME SPREAD INDEX	=	140
	SMOKE DEVELOPED INDEX	=	235

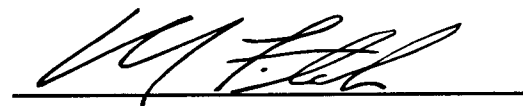
The description of the test procedure and specimen evaluated, as well as the observations and results obtained, contained herein are true and accurate within the limits of sound engineering practice.

**Omega Point Laboratories, Inc. authorizes the client named herein to reproduce this report only if reproduced in its entirety.**

**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: January 24, 1994

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

Date: January 24, 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.***

---

(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: Tuffliner 8141

Date Received: 12/30/93  
Date Prepared: December 30, 1993  
Conditioning (73°F & 50% R.H.): 25 days  
Specimen Width (in): 24  
Specimen Length (ft): 24  
Specimen Thickness: 0.120"  
Material Weight: N/A oz./sq. yd.  
Total Specimen Weight: 43.52 lbs.  
Adhesive or coating application rate: N/A

### Mounting Method:

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

### Specimen Description:

The specimen consisted of six, 4' lengths of fiberglass panels titled 8141 Tuffliner, which were 0.120" in thickness. The specimen was also designated as "J-931220-5".



#### 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>Tufliner 8141</b>	<b>140</b>	<b>235</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

The time to ignition was 0:56 (min:sec), with the flames continuing along the length of the sample, to the maximum flame spread of 19.5' at 2:30 (min:sec). The flames were noticed to decrease at 6:30 (min:sec). After extinguishing the burners, the sample stopped flaming immediately.

After cooling and removal from the tunnel, the specimen was observed as follows: Flame bleaching was noticed near the burners, and cracking was observed to 4'. The panels were brittle to 7.5', with small cracks noticed on the surface to 24'. Also, a surface char formed on the entire length of the specimen.



# APPENDIX

## DATA SHEETS



## ASTM E84

## DATA SHEET

Client: CRANE KEMLITE  
Date: 17:38:31 01-24-1994  
Test Number: 6  
Project Number: 96549  
Operator: CBH/SR  
Material ID:

J-931220-5  
8141 TUFLINER .120" THICK FIBERGLASS PANEL

## TEST RESULTS:

FLAMESPREAD INDEX = 140  
SMOKE DEVELOPED INDEX = 235

## SPECIMEN DATA . . .

Time to Ignition = 00:56 (Min:Sec)  
Time to Max FS = 02:30 (Min:Sec)  
Maximum FS = 19.5 (Feet)  
Time To 980 F = 03:59 (Min:Sec)  
Max Temp = 1100 (deg F)  
Time To Max Temp = 06:05 (Min:Sec)  
Total Fuel Burned = 50.23 (cubic feet)

FS\*Time Area = 159.9 (Ft\*Min)  
Smoke Area = 683.3 (%T\*Min)  
Fuel Area = 7683.5 ( F\*Min)  
Fuel Contributed Value = 64  
Unrounded FSI = 139.6834

## CALIBRATION DATA . . .

Time to Ignition of Last Red Oak = 00:36 (Min:Sec)  
Red Oak Smoke Area = 288.30 (%T\*Min)  
Red Oak Fuel Area = 9124 ( F\*Min)  
Glass Fiber Board Fuel Area = 5086 ( F\*Min)

