



Acoustical Surfaces, Inc.

SOUNDPROOFING, ACOUSTICS, NOISE & VIBRATION CONTROL SPECIALISTS

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RESEARCH REPORT

ASTM E-84 TEST RESULTS

Prepared For:

**Guilford of Maine, Inc.
120 Gilboa Street
East Douglas, MA, 01516**

PROJECT ID. 3006614-AO

CLASS 4820

DATE: 6/28/02

**Factory Mutual Research
1151 Boston-Providence Turnpike
P.O. Box 9102
Norwood, MA 02062**



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FACTORY MUTUAL RESEARCH
3006614-AO

RESEARCH REPORT ASTM E-84 TEST RESULTS
6/28/02

from

Guilford of Maine, Inc.
120 Gilboa Street
East Douglas, MA 01516

I. INTRODUCTION

1.1 This report details the results of a research test conducted on the submitted test sample described below.

1.2 This report may be reproduced only in its entirety and without modification.

1.3 **Standard:**

Title:	Standard Number	Date
Standard Test Method for Surface Burning Characteristics of Building Materials.	ASTM E84	2000

1.4 The purpose of this test was to determine the comparative surface burning characteristics of the submitted test sample.

1.5 The ASTM E84-00 test was conducted at Factory Mutual Research in Norwood, MA.

1.6 Unless otherwise indicated the material tested is not manufactured under the Factory Mutual Research follow-up inspection and re-examination program; therefore, the manufacturer cannot use the Factor Mutual Research name for marking or advertising the material.

1.7 **Listings:** There will not be any product recognition or listing as a result of this research test program.

II MATERIAL DESCRIPTION

A description of the tested material below:

Material:	2322-021 SWIZZLE STICK
Thickness	
Color:	
Density:	
Length:	24 ft.
Days Conditioned:	7
Joints:	None
Exposed Surface:	
Method of Support	Laid on Rods &

II EXAMINATION AND TEST

3.1 The sample was submitted for examination and testing as required by the Standard listed in Paragraph 1.3 above.

3.2 The test was conducted in accordance with the American Society for Testing and Materials (ASTM) E84-00(a) Standard Test Method for Surface Burning Characteristics of Building Materials. The results yield a Flame Spread Index (FSI) and a Smoke Density Index (SDI) for the test material during a 10 minute fire exposure.



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- 3.3 The purpose of this test is to determine the comparative surface burning characteristics of building materials by evaluating the flame spread performance Red Oak under identical conditions. The Flame Spread Index and Smoke Density Index of the material may be compared to that of inorganic reinforced cement board and Red Oak which have been arbitrarily established as 0 and 100, respectively.
- 3.4 Flame Spread Index Determination.
- 3.4.1 The flame spread distance versus time is plotted to establish a curve for the material tested. See the Appendix of this report. The total area under the flame spread distance versus time curve (A_t) is determined by ignoring any flame front recession. The flame spread index is the observed distance minus the 4-1/2 ft. (1.37 m) due to the ignition fire.
- 3.4.2 The Flame Spread Index (FSI) shall be determined as follows.
- 3.4.3 If the total area (A_t) is less than or equal to 97.5 ft/min., the Flame Spread Index shall be 0.515 times the total area (A_t); ($FSI = 0.515 (A_t)$).
- 3.4.4 If the total area (A_t) is greater than 97.5 ft/min., the Flame Spread Index shall be equal to 4900 divided by the difference of 195-the total area (A_t); ($FSI = 4900/(195-A_t)$).
- 3.5 Smoke Density Index Determination.
- 3.5.1 The smoke developed by the material during the test is indicated by the output of a photoelectric circuit mounted vertically across a horizontal section of the flue pipe. This output is recorded every 10 seconds for the duration of the test and yields a time absorption curve for the smoke density. See the Appendix of this report.
- 3.5.2 The value for the Smoke Density Index (SDI) shall be determined as follows:
- 3.5.3. $SDI = A_m (100)/A_{ro}$; where A_m = Area under curve for material tested, and A_{ro} = Average area under the curve for the last 10 Red Oak samples tested.
- 3.6 The ASTM E84-00 Test Results are as follows:
- | | |
|-------------------------------------|----------|
| FLAME SPREAD INDEX: | 12.481 |
| SMOKE DENSITY INDEX: | 51.253 |
| Min-Ft: | 24.236 |
| Max. Flame Spread Distance: | 7.000 |
| Time of Max. Flame Spread Distance: | 0.52 |
| MV-Min: | 44.250 |
| Red Oak MV-Min: | 86.337 |
| Time of Material Ignition: | 7 second |
| Delamination: | n/a |
| Sagging: | n/a |
| Fallout: | n/a |
| Burning at Floor, Time: | n/a |
| Burning at Floor, Distance: | n/a |
| Char Length: | n/a |
| Dept of Char @: | n/a |
| Cracking: | n/a |
| Severe Char: | 18' |
| Bubbling: | n/a |
| Comments: | |
- n/a = not observed
- 3.7 In accordance with the test method, FSI and SDI shall be rounded to the nearest interval of 5, with the exception of SDI results of 200 or more, which are rounded to the nearest 50.



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3.8 The numerical Flame Spread Index and Smoke Density Index do not define the hazards presented by this or any material under fire conditions.

IV. CONCLUSIONS

4.1 Under this program, the products of combustion were not analyzed nor is it required by the ASTM E84-00 test method.

4.2 Factory Mutual Research makes no judgement of product suitability for its intended end-use solely as a result of ASTM E84-00 tests. The decision is usually the prerogative of the local authority having jurisdiction.

4.3 Factory Mutual Research makes no judgement of product uniformity solely as a result of the ASTM E84-00 test performed. Product uniformity depends in part on product re-examination and manufacturing facilities and procedures which would be inspected under Factory Mutual Research's Facilities and Procedures Audit program.

4.4 The product cannot bear the Factory Mutual Research name in their advertising unless they are included in Factory Mutual Research's Facilities and Procedures Audit program as a result of one or more separate Approval or Specification Tested products test programs.

4.5 No Factory Mutual Research Approval or Specification Tested Products listing or recognition has resulted from this program and this report should not be construed as granting such recognition.

4.6 Caution - These Numerical Flame Spread and Smoke Density Indexes are not intended to reflect the hazards presented by this or any material under fire conditions.

4.7 The ASTM E84-00 Test Method subjects material to limited fire conditions when tested in a horizontal ceiling application over a noncombustible substrate (unless otherwise noted). The test results may not indicate the material's actual burning characteristics when field installed in a vertical position or when installed over an alternate substrate.

4.8 The sample mounting prescribed in this test method may not produce a fire behavior representative of actual building fire.

PRODUCT DATA RECORD: 3006614-AO

ATTACHMENTS: Flame Spread and Smoke Density Curves (2 pages)

TEST SUPERVISED AND REPORTED BY:

REPORT APPROVED BY: