



Product Flammability Information

After a material is subjected to the ASTM E-84 test, it is given a rating based on its performance during the test. Materials are classified into one of three groups based on their tested flame spread characteristics. These groups and their flame spread indexes are listed below:

Class Flame Spread Index

- I (A) 0-25
- II (B) 26-75
- III (C) 76-200

Class I or (A) rating means it is the most fire resistant category that NFPA recognizes as necessary for interior wall and ceiling finish materials. It will be acceptable in any building in any locality that models its building code after NFPA 101 for wall or ceiling materials.

NFPA 101 is a code that provides minimum requirements for the design, operation and maintenance of building and structures for safety to life from fire and similar emergencies. The requirements differ depending on the type of building.

Many building codes require a smoke developed rating of 450 or less for building materials. The 3M™ Scotchcal™ Graphic Film3470 meets the requirements of Class I (A) and the smoke developed rating of less than or equal to 450.

If you have any questions about the features or performance of this 3M product, please call Commercial Graphics Division Technical Service at 1-800-328-3908.

Sincerely,
3M Commercial Graphics Product Responsibility

**ASTM E84-95
SURFACE BURNING
CHARACTERISTICS OF
BUILDING MATERIALS**

**3M™ Scotchcal™ *Plus*
Graphic Marking Film Series 3470***

Supplement to:

Report No. 15300-100598

January 4, 1999

Prepared for:

3M Company
Commercial Graphics Division
3M Center
207-1W-22
St. Paul, MN 55144


**When originally tested the client identified the materials as "3M™ Scotchcal™ Plus Series 3470 Film" but now certifies that the materials are being marketed under the above name.*



ABSTRACT

Test Material:	3M™ Scotchcal™ Plus Graphic Marking Film Series 3470 and originally identified as 3M™ Scotchcal™ Plus Series 3470 Film		
Test Standard:	ASTM E 84-95 Standard Test Method for SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS (ANSI 2.5, NFPA 255, UBC 42-1, UL 723)		
Test Date:	October 10, 1996		
Test Sponsor:	3M Commercial Graphics Division		
Test Results:	FLAME SPREAD INDEX	=	5
	SMOKE DEVELOPED INDEX	=	5

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Date: 1/15/99

Reviewed and approved by:



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

Date: 1/15/99



I. INTRODUCTION

This report describes the results of the ASTM E84-95 Standard Test Method for SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS¹, 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 E84-95 (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:	3M™ Scotchcal™ Plus Graphic Marking Film Series 3470
Date Received:	10/07/96
Date Prepared:	October 7, 1996
Conditioning (73°F & 50% r.h.):	3 days
Specimen Width (in):	24
Specimen Length (ft):	24
Specimen Thickness:	0.05 in
Material Weight:	N/A oz./sq. yd.
Total Specimen Weight:	115.66
Adhesive or coating application rate:	N/A

Mounting Method:

The specimen was self-adhered to GRC board and placed directly on the tunnel ledges.

Specimen Description:

This test specimen is described by the client as 3M™ Scotchcal™ Plus Graphic Marking Film Series 3470 – an opaque 4 mil vinyl film with a pressure sensitive adhesive.



IV. TEST RESULTS & OBSERVATIONS

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 Index
Mineral Fiber Cement Board	0	0
Red Oak Flooring	n/a	100
3M™ Scotchcal™ Plus Graphic Marking Film Series 3470	5	5

The data sheets are included in Appendix A. 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

During the test, the specimen was observed to behave in the following manner: Blisters forming at 0:07 (min:sec), discoloration at 1:55, spotty ignition at 2:20, ignition at 2:36, flaming droplets falling at 2:50.

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

Blistered to 24 ft. charred/consumed to 10 ft., consumed to 5 ft.

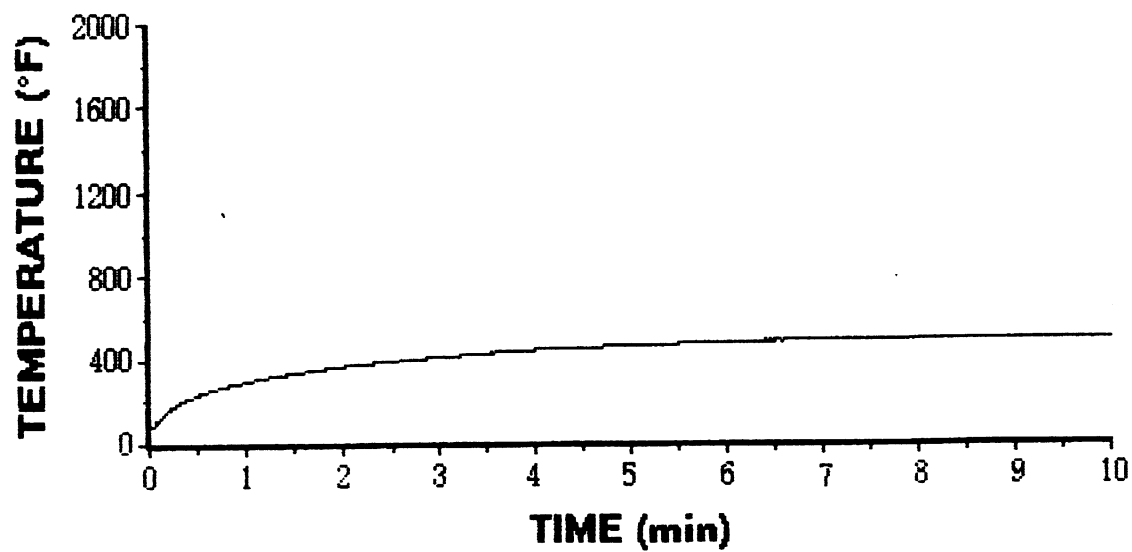
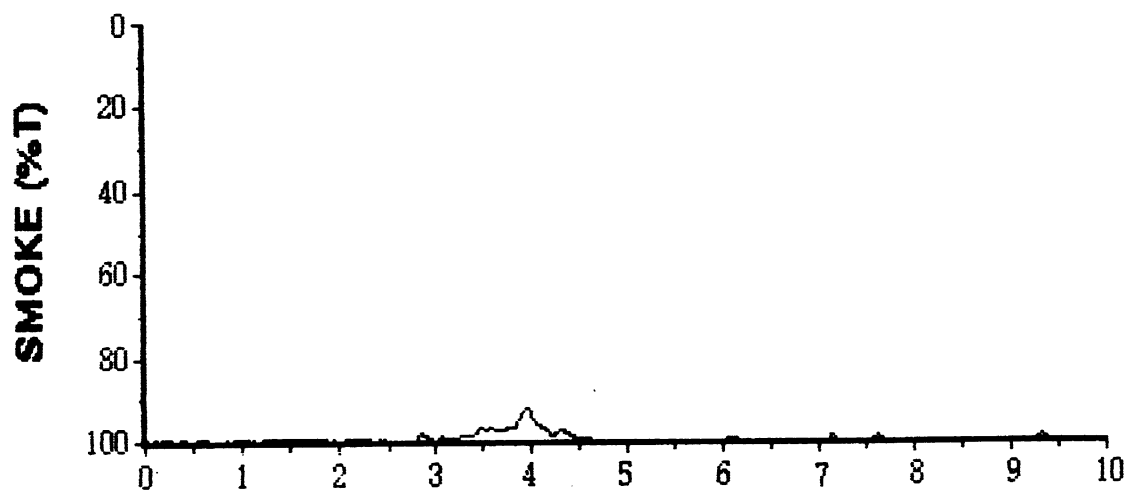
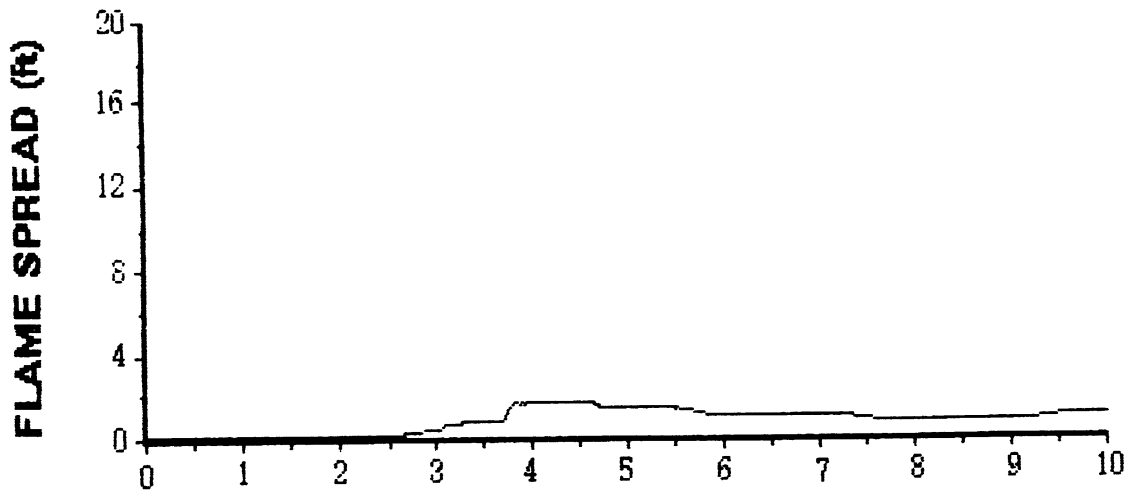


APPENDIX

ASTM E84

DATA SHEETS





DATA SHEET

Client: 3M COMMERCIAL GRAPHICS
 Date: 08:14:30 10-10-1996
 Test Number: 1
 Project Number: 15300-100598
 Operator: CH/DL
 Material ID:

3M SCOTCHCAL (TM) PLUS SERIES 3470 FILM
 SELF ADHERED TO GRC BOARD

TEST RESULTS:

FLAMESPREAD INDEX = 5
 SMOKE DEVELOPED INDEX = 5

SPECIMEN DATA . . .

Time to Ignition = 02:35 (Min:Sec)
 Time to Max FS = 04:01 (Min:Sec)
 Maximum FS = 1.6 (Feet)
 Time To 980 F = 980 F Not Reached
 Max Temp = 494 (deg F)
 Time To Max Temp = 09:53 (Min:Sec)
 Total Fuel Burned = 47.94 (cubic feet)

FS*Time Area = 10.7 (Ft*Min)
 Smoke Area = 3.7 (%A*Min)
 Fuel Area = 4149.4 (F*Min)
 Fuel Contributed Value = 0
 Unrounded FSI = 5.5058

CALIBRATION DATA . . .

Time to Ignition of Last Red Oak = 00:47 (Min:Sec)
 Red Oak Smoke Area = 109.90 (%A*Min)
 Red Oak Fuel Area = 8345 (F*Min)
 Glass Fiber Board Fuel Area = 4668 (F*Min)