OMEGA POINT LABORATORIES

TEST REPORT

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ASTM E84-03

SURFACE BURNING CHARACTERISTICS

Report No. 8902 - 117347

Reynobond FR 4mm Laminate (ZCM) With Updated FR Core

February 9, 2004

Prepared for:
Alcoa Cladding Systems/Reynolds Metals
100 Industrial Blvd
1 Industrial Park
Eastman, GA 31023

ACCREDITED
No. 0689-01

ABSTRACT

Test Specimen: **Reynobond FR 4mm Laminate (ZCM) With Updated FR Core**

Test Standard: **ASTM E84-03**

Test Date: **February 05, 2004**

Test Sponsor: **Alcoa Cladding Systems/Reynolds Metals**

Test Results:

FLAME SPREAD INDEX	=	25
SMOKE DEVELOPED INDEX	=	60

Guy A. Haby — February 9, 2004
Manager, Tunnel & Furniture Testing Service

Reviewed and approved:

William E Fitch PE No. 55296 — February 9, 2004

I INTRODUCTION

This report describes the results of the ASTM E84-03 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 E84-03 (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 sur-face (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 den-sity 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 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:	Reynobond FR 4mm Laminate (ZCM) With Updated FR Core
Date Received:	1/22/2004
Date Prepared:	1/22/2004
Conditioning (73°F & 50% R.H.):	14 days
Specimen Width (in):	24
Specimen Length (ft):	24
Specimen Thickness:	0.150-in.
Material Weight:	oz./sq. yd
Total Specimen Weight:	131.40-lbs.
Adhesive or coating application rate:	

Mounting Method:

The specimen was supported on 1/4 in steel rods and 2 inch galvanized hexagonal wire mesh.

Specimen Description:

The Test specimen was described by the client as the "Reynobond FR 4mm Laminate (ZCM) With Updated FR Core, 4mm Thick Composite Laminate Made Up Of Two 0.028" Thick Zinc Skins And An FR Core." The specimen consisted of (3) 24" wide x 8' long x 0.150" thick composite panels. The panels were composed of a white core material with gray zink skins one either side. The production of the specimen was witnessed by an OPL inspector. The samples were stamped with the OPL logo.

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 Index
Mineral Fiber Cement Board	0	0
Red Oak Flooring	n/a	100
Reynobond FR 4mm Laminate (ZCM) With Updated FR Core	25	60

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

During the test, the specimen was observed to behave in the following manner: The zinc skin began to melt near the test burners at 3:51 (min:sec) and the core material ignited. The test continued for the 10:00 duration.

After the test the specimen was observed to be damaged as follows:
The specimen was consumed from 0-ft - 3-ft. The exposed zinc skin was melted and the core material was charred from 3-ft. - 17-ft. The specimen had a black discoloration from 17-ft. - 24-ft.

APPENDIX

E84 Data Sheets

ASTM E84 DATASHEETS

Client:	ALCOA ARCHITECTURAL PRODUCTS
Date:	2/5/04
Time:	2:51 PM
Test Number:	3
Project Number:	8902-117347
Operator:	CH/EH
Specimen ID:	"REYNOBOND FR 4MM LAMINATE (ZCM) WITH UPDATED FR CORE, 4MM THICK COMPOSITE LAMINATE MADE UP OF TWO 0.028" THICK ZINC SKINS AND AN FR CORE". THE SPECIMEN WAS SUPPORTED BY RODS & WIRE AS REQUESTED BY THE CLIENT. THE SPECIMEN WAS WITNESSED IN PRODUCTION BY AN L& L INSPECTOR.

TEST RESULTS

FLAMESPREAD INDEX:	**25**
SMOKE DEVELOPED INDEX:	**60**

SPECIMEN DATA . . .

Time to Ignition (sec):	231
Time to Max FS (sec):	574
Maximum FS (feet):	14.0
Time to 980 °F (sec):	Never Reached
Max Temperature (°F):	900
Time to Max Temperature (sec):	575
Total Fuel Burned (cubic feet):	41.75

FS*Time Area (ft*min):	48.2
Smoke Area (%A*min):	62.9
Fuel Area (°F*min):	5576.9
Fuel Contributed Value:	17
Unrounded FSI:	24.8

CALIBRATION DATA . . .

Time to Ignition of Last Red Oak (sec):	49
Red Oak Smoke Area (%A*min):	101.60
Red Oak Fuel Area (°F*min):	8153
Glass Fiber Board Fuel Area (°F*min):	5040

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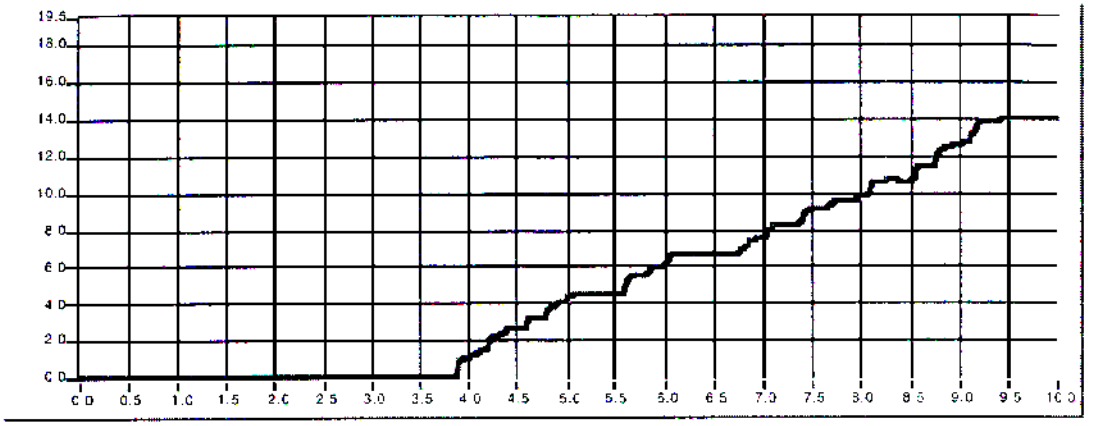
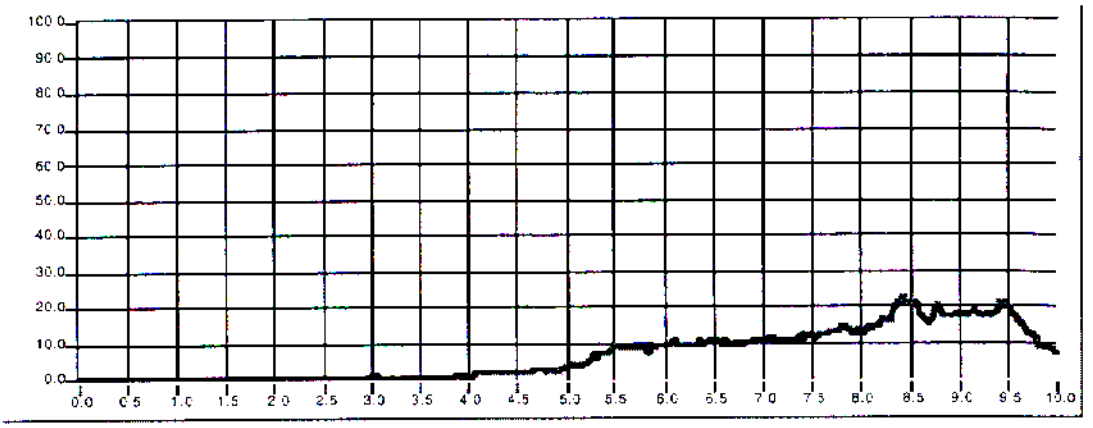
Project No: 8902-117347

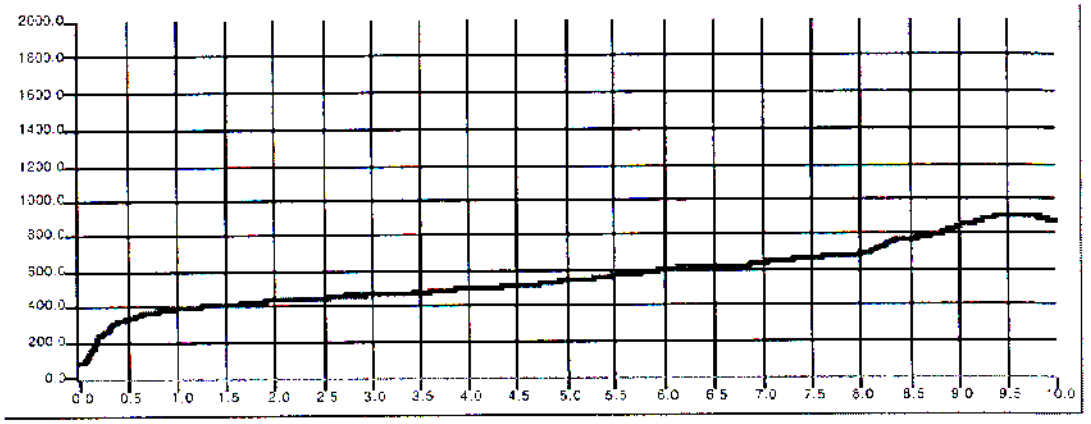
FLAME SPREAD (ft)



Smoke (%A)



Temperature (°F)



Time (min)

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