TEST REPORT

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EVALUATION CENTER
Intertek Testing Services NA Inc.
16015 Shady Falls Road
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RENDERED TO

Nantong Machs Composite Material Co., Ltd
Room 405, Yuejiang Building 103, Yuejiang Road
Nantong City 226005, Jiangsu, China

Report of Testing "FRP pultruded grating" for compliance with the applicable requirements of the following criteria: ASTM E84-13a TEST FOR SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS (UL 723, UBC 8-1, NFPA 255)

ABSTRACT

Specimen I. D.	**"**FRP pultruded grating**"**
Test Standard:	ASTM E84-13a TEST FOR SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS (UL 723, UBC 8-1, NFPA 255)
Test Date:	January 7, 2014
Client:	Nantong Machs Composite Material Co., Ltd
Test Results:	

FLAME SPREAD INDEX	**20**
SMOKE DEVELOPED INDEX	**700**

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Darrell Gonzales — January 15, 2014
Technician II

Reviewed and approved:

Servando Romo — January 16, 2014
Project Manager

I. INTRODUCTION

Samples were randomly selected on December 25, 2013 by American Bureau of Shipping representative Yang Yan, at Nantong Machs Composite Material Co., Ltd manufacturing facility, located at Groups 18, Maqiao Village, Jiuhua Town, Rugao City, Jiangsu Province, China

This report describes the results of the ASTM E84-13a TEST 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:

NFPA 255
UL 723
UBC 8-1

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 (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. The fiber cement board which complies with Annex A3 of the ASTM E 84 standard 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. TEST PROCEDURE

The tests were conducted in accordance with the procedures outlined in the ASTM E84. The specimens are placed directly on the tunnel ledges. As required by the standard, one or more layers of 0.25 inch thick reinforced concrete board are placed on top of the test sample between the sample and the tunnel lid. After the test, the samples are removed from the tunnel, examined and disposed of.

IV. REVISION SUMMARY

DATE	SUMMARY
January 15, 2014	Original

V. DESCRIPTION OF TEST SPECIMENS

Date Received:	12/30/13
Date placed in the conditioning room:	12/30/13
Conditioning (73°F & 50% R.H.):	8 days
Specimen Width (in):	24
Specimen Length (ft):	24
Specimen Thickness (in):	1.5
Material Weight (lbs):	140

Specimen Description:
The specimen was described by the client as “Isophthalic polyester resin I6015, Thickness: 38mm”.

The 24-ft. long test specimen consisted of four 6-ft. long sections pultruded grating.

The product was received by our personnel in good condition and given an identification number of SAT1312301328-001.

Mounting Method:
The specimen was self-supporting. The specimen was the same on both sides.

VI. 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.

Test Specimen	Flame Spread Index	Smoke Developed Index
"FRP pultruded grating**"**	20	700

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

VII. OBSERVATIONS

During the test, the specimen was observed to behave in the following manner.

Time (min:sec)	Observations
0:00	The test burners were turned on.
0:48	Steady ignition was observed.
10:00	The test burners were shut off.

After the burners were turned off, a 60+ second after flame was observed.

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

Distance (FEET)	Damage Descriptions
0 - 9	The specimen was heavily charred.
9 - 15	The specimen was lightly charred.
15 - 24	The specimen was heavily discolored and covered with soot.

APPENDIX A
ASTM E84
DATA SHEETS

TEST RESULTS

FLAMESPREAD INDEX: 20

SMOKE DEVELOPED INDEX: 700

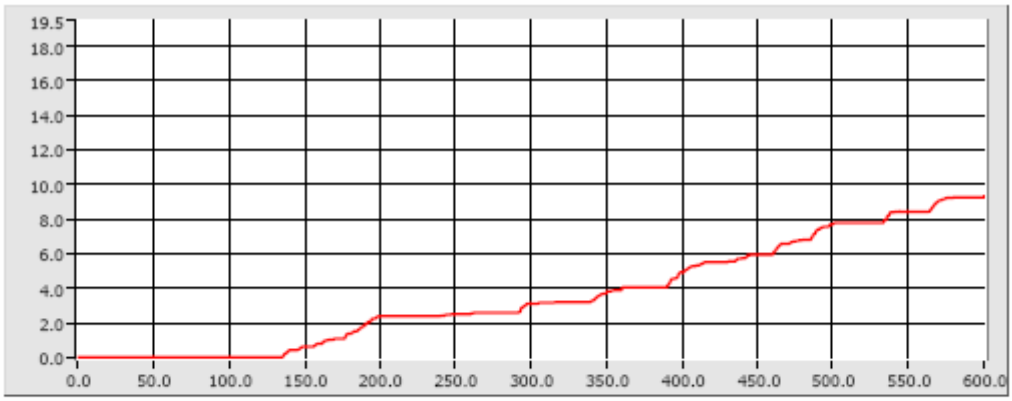
SPECIMEN DATA . . .

Time to Ignition (sec):	48
Time to Max FS (sec):	581
Maximum FS (feet):	9.3
Time to 980 F (sec):	Never Reached
Time to End of Tunnel (sec):	Never Reached
Max Temperature (F):	528
Time to Max Temperature (sec):	599
Total Fuel Burned (cubic feet):	42.99
FS*Time Area (ft*min):	35.7
Smoke Area (%A*min):	544.1
Unrounded FSI:	18.4

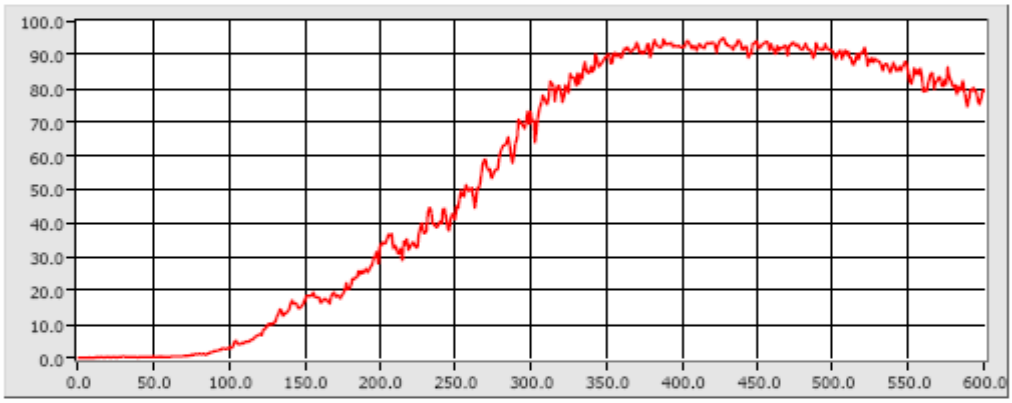
CALIBRATION DATA . . .

Time to Ignition of Last Red Oak (Sec):	60.0
Red Oak Smoke Area (%A*min):	79.7

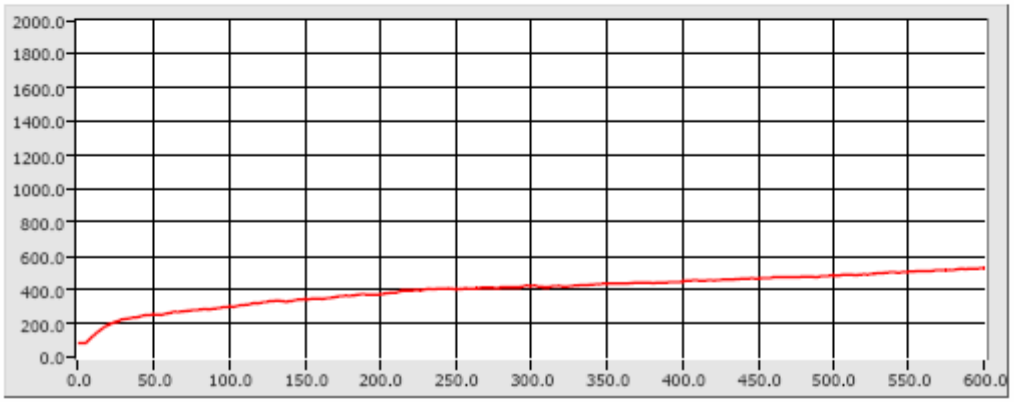
FLAME SPREAD (ft)



Smoke (%A)



Temperature (℉)



Time (sec)

600