Architectural Testing

PERFORMANCE EVALUATION TEST REPORT

Rendered to:

TUV RHEINLAND VIETNAM CO., LTD.

PRODUCT: **Fiber-Cement Sheet Product**

Report No: **B4284.01-106-31**
Report Date: **01/23/12**
Expiration Date: **12/09/15**

130 Derry Court
York, PA 17406-8405
phone: 717-764-7700
fax: 717-764-4129
www.archtest.com

Architectural Testing

PERFORMANCE EVALUATION TEST REPORT

Rendered to:

TUV RHEINLAND VIETNAM CO., LTD.
Unit 805-806, Centrepoint Building 106 Nguyen Van Troi Street,
Ward 8, Phu Nhuan District
Ho Chi Minh City, (Vietnam)

Report No:	B4284.01-106.31
Test Dates:	11/09/11
Through:	12/09/11
Report Date:	01/23/12
Expiration Date:	12/09/15

Product: Fiber-Cement Sheet Product

Project Summary: Architectural Testing, Inc. was contracted by TUV Rheinland Vietnam Co., Ltd. to provide testing per ASTM C 1185 (Sections 5, 6, 7, 8, 9, 10), ASTM E 84, and evaluation services per ASTM C 1186 for their fiber-cement sheet product. The cement sheet product satisfied the minimum performance criteria presented in ASTM C 1186 for a Type B classification for all properties evaluated.

Test Methods: The test specimens were evaluated in accordance with the following:

ASTM C 1185-08, *Standard Test Methods for Sampling and Testing Non-Asbestos Fiber-Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards.*

ASTM C 1186-08, *Standard Specification for Flat Fiber-Cement Sheets.*

ASTM E 84-11a, *Standard Test Method for Surface Burning Characteristics of Building Materials.*

Test Procedures: Evaluations were performed on full panel specimens and on specimens prepared from full panels in accordance with the procedures detailed in ASTM C 1185 by Architectural Testing personnel. Full panel specimens manufactured at a nominal 0.25-inch thickness and provided by TUV Rheinland Vietnam Co., Ltd. for testing.

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Test Procedures: (Continued)

ASTM C 1185, Section 5 - Flexural Strength (Modulus of Rupture)
A total of six 12.0 inch by 6.0 inch specimens (one lengthwise with fiber lay and one against the fiber lay sampled from each of three sheets of fiber reinforced cement board product) were evaluated for equilibrium condition flexural strength. Upon completion of conditioning (minimum four days at 23 ±2º C, 50 ±5% RH), the specimens were individually placed lengthwise upon a test fixture with 0.5-inch diameter support rods providing a test span of 10.0 inches. Compressive load was applied to the specimen along the midspan through a 0.5 inch diameter loading rod at a rate of 0.5 in./min. until failure of the specimen was observed (between 5 and 30 seconds from initial application of load as per Section 5.2.4.). Failure load (lbf) and deflection at failure load (in.) were documented for each specimen and averaged for each test series. Specimen thickness at break was measured as per the procedures detailed in Section 5.2.4.1. Flexural strength was calculated per Section 5.3 and averaged for the two specimens sampled from each sheet of product and the entire test series for evaluation against the performance criteria presented in ASTM C 1186, Table 1 for a Grade II classification. Handleability index, breaking moment and modulus of elasticity were calculated as per Sections 5.3.2, 5.3.3 and 5.4 and averaged for each test series.

ASTM C 1185, Section 6 - Density
A total of six 12.0 inch by 6.0 inch specimens were evaluated for density as per the procedures detailed in Section 6. The dimensions of each specimen was verified with digital calipers (4722) prior to conditioning at 90 ±2 ºC until a constant mass was obtained. Mass measurements were performed using a Mettler Toledo digital balance (004473). The density of each oven-dry specimen was calculated as detailed in Section 6.3 and averaged for the test series.

ASTM C 1185, Section 7 - Dimensional Measurements
Two full size sheets (nominal dimensions 96.0 in. x 48.0 in. x 0.25 in.) were conditioned as detailed in ASTM C 1185, Section 7.2 and measured in accordance with Section 7.3 - 7.6 (Thickness, Squareness, Edge Straightness, Length and Width) using a Mitutoyo digital tape measure (62048) and a 12-inch (x0.001 in.) digital caliper (004722). The results were averaged and evaluated against the performance criteria presented in ASTM C 1186, Sections 7.3 - 7.7 and Table 2.

Test Procedures: (Continued)

ASTM C 1185, Section 8 - Moisture Movement
A total of two 12.0 inch by 3.0 inch specimens (one lengthwise with fiber lay and one against the fiber lay) were conditioned at 23 ±2º C, 30 ±2% RH until a practical equilibrium state was obtained (≤0.1% weight change in a 24-hour period). The length of the conditioned specimens was measured with digital calipers (ICN 4722) and the conditioning environment adjusted to 23 ±3º C, 90 ±5% RH for re-conditioning of the specimens to a new a practical equilibrium state. The length of the re-conditioned specimens was measured and the percent linear change calculated as per Section 8.5, averaged for the series and presented as percentage change in length based on a relative humidity change from 30% - 90% as called for in ASTM C 1186, Section S2.

ASTM C 1185, Section 9 - Water Absorption
A total of three 4.0 inch by 4.0 inch specimens were conditioned at 90 ±2º C until a constant mass was obtained, cooled to ambient lab temperature and weighed. The oven-dry specimens were then submerged in clean water for 48 hours at 23 ±4º C. Upon completion of the submersion period, the specimens were individually removed from the saturation bath, surface dried with a damp cloth and re-weighed. The absorption was determined for each specimen, averaged for the series and presented as percentage by weight as called for in ASTM C 1186, Section S3.

ASTM C 1185, Section 10 - Moisture Content
A total of six 12.0 inch by 6.0 inch specimens were conditioned for seven days at 23 ±2º C, 50 ±5% RH prior to initial equilibrium mass determinations on a Mettler Toledo digital balance (004473). The specimens were then oven conditioned 90 ±2º C until a constant mass was obtained. Upon achieving constant mass, the specimens were allowed to cool to ambient temperature and oven-dry mass determined. The moisture content of each specimen was determined as per Section 10.3, averaged for the test series and presented as called for in ASTM C 1186, Section S4.

ASTM E 84 - Surface Burning Characteristics
The surface burning properties evaluation was conducted in accordance with the procedures detailed in ASTM E 84-11a *Standard Test Method for Surface Burning Characteristics of Building Materials*. Both the Flame Spread and Smoke Developed Indices were evaluated against ASTM C 1186 supplementary requirements as presented in Section S6. A complete accounting of the ASTM E 84 Surface Burning Evaluation is located in Appendix C of this report.

Test Results: The results are summarized in the following tables.

ASTM C 1185, Section 5 - Flexural Evaluation

Equilibrium Conditioning (Dry) Series					
Sample Sheet	**Mean Dimensions (in)**			**Mean Peak Load (lbf)**	**Mean Flexural Strength MoR (psi)**
	Test Span	**Mean Depth**	**Width**		
1	10.0	0.240	6.004	34.2	1,485
2	10.0	0.243	5.948	36.7	1,567
3	10.0	0.236	6.034	34.8	1,543
				Series Mean Flexural Strength (psi)	**1,532**
				ASTM C 1186 Grade II Requirements	Mean Flexural Strength ≥ 1450 psi
				Result	**Pass - Grade II**

Direction of Fiber Lay	**Mean Handleability Index (in-lb/in)**	**Mean Breaking Moment ($ft\text{-}lb_f/ft$)**	**Mean Flexural Modulus of Elasticity (psi)**
Lengthwise Mean	14.0	16.7	1,229,341
Crosswise Mean	5.6	12.7	1,329,132
Series Mean	9.8	14.7	1,279,236

ASTM C 1185, Section 6 - Density Determination

Mean Dimensions (in)			**Mean Volume (in^3)**	**Mean Oven Dry Mass (g)**	**Mean Density**	
Length	**Width**	**Depth**			**lb/ft^3**	**kg/m^3**
12.06	6.00	0.24	17.32	377.5	83.0	1330.1

Test Results: (Continued)

ASTM C 1185, Section 7 - Dimensional Measurement

Dimensional Property			Measurement (in)	ASTM C 1186 Requirement	Result
Length	**Nominal Length**		96.0	0.25 in. Maximum variation form nominal dimension	**Pass**
	Mean Measured Dimension		96.03		
	Maximum Variation		**0.06**		
Width	**Nominal Width**		48.0		**Pass**
	Mean Measured Dimension		48.01		
	Maximum Variation		**0.03**		
Thickness	**Nominal Thickness**		0.250	≤ 15% variation between extreme measurements of maximum measured value ≤ 0.04 in. Variation between sheets	**Pass**
	Sheet 1	**Mean Dimension**	0.240		
		Measured Variation (%)	**0.84 %**		
	Sheet 2	**Mean Dimension**	**0.228**		
		Measured Variation (%)	**0.88 %**		
	Variation Between Sheets		**0.013**		

ASTM C 1185, Section 7 - Dimensional Measurement (Continued)

Dimensional Property			Measurement (in)	ASTM C 1186 Requirement	Result
Squareness	**Diagonal**	**1**	107.31	Length of diagonals shall not vary by more than 0.03125 in./ft. of sheet length (0.25 in.) Opposite sides of sheet shall not vary by more than 0.03125 in/ft. (Width: 0.125 in., Length: 0.25 in.)	**Pass**
		2	107.25		
	Variation		**0.06**		
	Widthwise Edge	**1**	48.00		**Pass**
		2	48.03		
	Variation		**0.03**		
	Lengthwise Edge	**1**	96.00		
		2	96.06		
	Variation		**0.06**		
Edge Straightness	**Edge Variation - Length**	**1**	0.0	Edges shall be within 0.03125 in/ft. of length or width (Width: 0.125 in., Length: 0.25 in.)	**Pass**
		2	0.0		
	Edge Variation - Width	**1**	0.0		
		2	0.0		

Test Results: (Continued)

ASTM C 1185, Section 8 - Moisture Movement

Equilibrium Condition (23 ±2 °C, 30 ±2% RH)				Humidity Condition (23 ±3 °C, 90 ±5% RH)				Mean Linear Change (%)
Mean Mass (g)			Mean Length (in)	Mean Mass (g)			Mean Length (in)	
Initial	End	% Diff.		Initial	End	% Diff.		
190.1	190.1	0.0	12.038	196.6	196.6	0.0	12.044	0.06

ASTM C 1185, Section 9 - Water Absorption

Mean Oven Dry Mass (g)	Mean Saturated Mass (g)	Mean Mass Gain (g)	Mean Water Absorption (%)
77.5	104.3	26.8	34.6

ASTM C 1185, Section 10 - Moisture Content

Mean Equilibrium Mass (g)	Mean Oven Dry Mass (g)	Mean Mass Loss (g)	Mean Moisture Content (%)
401.0	377.5	23.5	6.2

ASTM C 1186, Section S6 - Surface Burning Characteristics

Evaluation Property	Flame Spread Index	Smoke Development Index
	0	5
ASTM C 1186, *Supplementary* Requirements	0	≤ 5
Result	**Pass**	**Pass**

Data sheets, representative samples of test specimens, a copy of this test report will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period such materials shall be discarded without notice and the service life of this report by Architectural Testing will expire. Results obtained are tested values and were secured using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimens tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.:

Scott D. Scallorn - Technician I
Components / Materials Testing

Gary Hartman, P.E. - Director
Components / Materials Testing

SDS:sds/nlb

Attachments (pages) This report is complete only when all attachments listed are included.
Appendix A - Datasheets (4)
Appendix B - Photographs (2)
Appendix C - ASTM E 84 Full Report (9)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	01/23/12	N/A	Original report issue.

APPENDIX A

Data Tables

ASTM C 1185, Section 5 - Flexural Evaluation

Equilibrium Conditioning (Dry) Series						
Specimen		**Dimensions (in)**			**Peak Load (lbf)**	**Flexural Strength MoR (psi)**
No.	**Direction**	**Test Span**	**Mean Depth**	**Width**		
1	Lengthwise	10.0	0.241	6.073	39.1	1,664
	Crosswise		0.238	5.936	29.3	1,307
Specimen Mean			**0.240**	**6.004**	**34.2**	**1,485**
2	Lengthwise	10.0	0.244	5.949	40.1	1,698
	Crosswise		0.242	5.947	33.3	1,436
Specimen Mean			**0.243**	**5.948**	**36.7**	**1,567**
3	Lengthwise	10.0	0.239	6.107	41.7	1,794
	Crosswise		0.233	5.960	27.9	1,292
Specimen Mean			**0.236**	**6.034**	**34.8**	**1,543**
Series Mean Flexural Strength (psi)						**1,532**
ASTM C 1186 Grade II Requirements						Mean Flexural Strength ≥ 1,450 psi
Result						**Pass - Grade II**

Specimen		**Handleability Index (in-lb/in)**	**Breaking Moment (ft-lb$_f$/ft)**	**Flexural Modulus of Elasticity (psi)**
No.	**Direction**			
1-L	Lengthwise	17.7	16.1	687,415
2-L		11.2	16.9	1,486,088
3-L		13.2	17.1	1,514,521
Direction Mean		**14.0**	**16.7**	**1,229,341**
1-C	Crosswise	5.2	12.3	1,260,117
2-C		5.6	14.0	1,440,872
3-C		6.2	11.7	1,286,406
Direction Mean		**5.6**	**12.7**	**1,329,132**
Series Mean		**9.8**	**14.7**	**1,279,236**

ASTM C 1185, Section 6 - Density Determination

Sample	Dimensions (in)			Volume (in^3)	Oven Dry Mass (g)	Density	
	Length	Width	Depth			lb/ft^3	kg/m^3
1	12.07	6.07	0.24	17.67	390.3	84.1	1347.8
2	12.10	5.94	0.24	17.09	367.2	81.8	1310.8
3	12.06	5.95	0.24	17.51	381.2	82.9	1328.5
4	12.08	5.95	0.24	17.38	383.0	83.9	1344.7
5	12.00	6.11	0.24	17.51	387.1	84.1	1348.8
6	12.04	5.96	0.23	16.72	356.2	81.1	1300.1
Mean	**12.06**	**6.00**	**0.24**	**17.32**	**377.5**	**83.0**	**1330.1**

ASTM C 1185, Section 7 - Dimensional Measurement

Dimensional Property			Measurement (in)	ASTM C 1186 Requirement	Result
Length	**Nominal Length**		96.0	0.25 in. Maximum variation form nominal dimension	**Pass**
	Length Measurements		96, 96.03, 96.06		
	Maximum Variation		**0.06**		
Width	**Nominal Width**		48.0		**Pass**
	Width Measurements		48, 48, 48.03		
	Maximum Variation		**0.03**		
Thickness	**Nominal Thickness**		0.25	≤ 15% variation between extreme measurements of maximum measured value ≤ 0.04 in. Variation between sheets	**Pass**
	Sheet 1	**Measurements**	0.241, 0.240, 0.239, 0.241		
		Measured Variation	**0.84%**		
	Sheet 2	**Measurements**	0.227, 0.227, 0.229, 0.228		
		Measured Variation	**0.88%**		
	Variation Between Sheets		**0.013**		

ASTM C 1185, Section 7 - Dimensional Measurement (Continued)

Dimensional Property			Measurement (in)	ASTM C 1186 Requirement	Result
Squareness	Diagonal	1	107.31	Length of diagonals shall not vary by more than 0.03125 in./ft. of sheet length (0.25") Opposite sides of sheet shall not vary by more than 0.03125 in/ft. (Width: 0.125", Length: 0.25")	Pass
		2	107.25		
	Variation		0.06		
	Widthwise Edge	1	48.00		Pass
		2	48.03		
	Variation		0.03		
	Lengthwise Edge	1	96.00		Pass
		2	96.06		
	Variation		0.06		
Edge Straightness	Edge Variation - Length	1	0.0	Edges shall be within 0.03125 in/ft. of length or width (Width: 0.125", Length: 0.25")	Pass
		2	0.0		
	Edge Variation - Width	1	0.0		
		2	0.0		

ASTM C 1185, Section 8 - Moisture Movement

Sample	Equilibrium Condition (23 ±2 °C, 30 ±2% RH)				Humidity Condition (23 ±3 °C, 90 ±5% RH)				Linear Change (%)
	Mass (g)			Length (in)	Mass (g)			Length (in)	
	Initial	End	% Diff.		Initial	End	% Diff.		
1 (M)	190.1	190.1	0.0	12.022	196.7	196.7	0.0	12.029	0.06
				12.034				12.041	
				12.028				**12.035**	
2 (C)	190.0	190.0	0.0	12.047	196.4	196.4	0.0	12.053	0.05
				12.047				12.054	
				12.047				**12.054**	
Mean	**190.1**	**190.1**	**0.0**	**12.038**	**196.6**	**196.6**	**0.0**	**12.044**	**0.06**

ASTM C 1185, Section 9 - Water Absorption

Sample	Oven Dry Mass (g)	Saturated Mass (g)	Mass Gain (g)	Water Absorption (%)
1	76.7	103.4	26.7	34.8
2	78.6	105.7	27.1	34.5
3	77.1	103.7	26.6	34.5
Mean	**77.5**	**104.3**	**26.8**	**34.6**

ASTM C 1185, Section 10 - Moisture Content

Sample	Equilibrium Mass (g)	Oven Dry Mass (g)	Mass Loss (g)	Moisture Content (%)
1	416.2	390.3	25.9	6.6
2	391.3	367.2	24.1	6.6
3	404.9	381.2	23.7	6.2
4	407.9	383.0	24.9	6.5
5	410.0	387.1	22.9	5.9
6	375.9	356.2	19.7	5.5
Mean	**401.0**	**377.5**	**23.5**	**6.2**

ASTM E 84 - Surface Burning Characteristics

Flame Spread Index	Smoke Development Index	Result
0	5	Pass

APPENDIX B

Photographs

Photo No. 1
Flexural Evaluation Test Setup

Photo No. 3
Moisture Movement Specimens

Photo No. 4
Absorption Test Setup

APPENDIX C

ASTM E 84 - Surface Burning Characteristics
(Full Report)

Architectural Testing

TEST REPORT

Report No.: B4284.03-121-24

Rendered to:

TUV RHEINLAND VIETNAM CO., LTD.
Ho Chi Minh City, Vietnam

PRODUCT TYPE: Fiber-Cement Board
SERIES/MODEL: N/A

TEST METHOD: ASTM E 84-11a, *Standard Test Method for Surface Burning Characteristics of Building Materials*

Summary of ASTM E 84 Test Results	
Flame Spread Index	**Smoke Developed Index**
0	5

This report contains in its entirety:

Cover Page: 1 page
Report Body: 6 pages
Graphs: 1 page

Reference must be made to Architectural Testing, Inc. Report No. B4284.03-121-24 for complete test specimen descriptions.

1.0 Report Issued To: TUV Rheinland Vietnam Co., Ltd.
Unit 805-806, Centrepoint Building
106 Nguyen Van Troi Street, Ward 8, Phu Nhuan District
Ho Chi Minh City, Vietnam

2.0 Test laboratory: Architectural Testing, Inc.
130 Derry Court
York, Pennsylvania 17406-8405
717-764-7700

3.0 Introduction:

The Steiner Tunnel test apparatus is used to evaluate the surface burning characteristics and smoke development of building materials. The tunnel is considered to be under calibrated conditions when the flame front reaches the end of the tunnel within 5 minutes and 30 seconds (plus or minus 15 seconds) during a red oak test. An initial preheat of the tunnel is performed and the test specimen is installed when the tunnel temperature drops to 105°F. When the test is initiated, the 88 KW dual burner and 240 feet per second air current creates a flame that extends 4.5 feet down the tunnel. The flame progression is tracked from this point to the exhaust end of the tunnel which is 19.5 feet downstream. An observer simultaneously notes any test specimen anomalies such as melting, dripping, sagging, delamination, fall-out, etc. The smoke that is generated during the test is measured by a photometer. The flame spread and smoke developed data are automatically logged and graphed versus time by a data acquisition and computer system. The Flame Spread Index (FSI) and the Smoke Developed Index (SDI) are based on an area under the curve calculation and the red oak flooring calibration data.

4.0 Project Summary:

4.1 Product Type: Fiber-Cement Board

4.2 Series/Model: N/A

4.3 Compliance Statement: Results obtained are tested values and were secured by using the designated test method(s). The specimen(s) were tested to evaluate the flame spread and smoke developed properties. A summary of the results is listed in the Test Results section and the complete graphical test data is included in Appendix A of this report.

4.4 Test Date: 1/19/2012

4.5 Test Location: Architectural Testing, Inc. test facility in York, Pennsylvania.

4.6 Test Sample Source: The test specimen was provided by the client. Representative samples of the test specimen will be retained by Architectural Testing for a minimum of four years from the test completion date.

4.0 Project Summary: (Continued)

4.7 List of Official Observers:

Name	Company
Scott Scallorn	Architectural Testing, Inc.
Russell Clark	Architectural Testing, Inc.
Ben Eveler	Architectural Testing, Inc.

5.0 Test Method(s), Practices and/or Classifications:

ASTM E 84-11a, *Standard Test Method for Surface Burning Characteristics of Building Materials*

6.0 Test Specimen Description:

Date Tested:	1/19/2012
Manufacturer*:	TUV Rheinland Vietnam Co., Ltd.
Product Type:	Fiber-Cement Board
Series/Model:	N/A
Composition*:	Fiberglass/Cement Mixture
Conditioning Time:	72 hrs.
Specimen Size:	24 in. x 96 in.
Thickness:	1/4 in.
Specimen Sections:	3
Total Weight:	30 lbs. per section
Color:	Gray
Side to Flame:	No orientation specified
Support Used*:	Self-supported
Substrate Used*:	None
Cement Board:	The cement board was placed on top of the sample.

*From the client's material description and/or instructions

Note: Specimens were conditioned as per the requirements of Section 6.4 of ASTM E84-11a *Standard Test Method for Surface Burning Characteristics of Building Materials*

7.0 Test Results: The test results are tabulated as follows:

Test Results	
Flame Spread Index (FSI):	0
Smoke Developed Index (SDI):	5
Test Operator:	Russell Clark
Red Oak Calibration (% * Min):	111.2

Test Data	
FSI (unrounded):	0.5
SDI (unrounded):	4.2
FS * Time Area (Ft * Min):	1.0
Smoke Area (% * Min):	4.7
Fuel Area (°F * Min):	4658.4

Observations	
Ignition Time:	00:00 (Min:Sec)
Max Flame Front Advance:	0.0 Feet
Time to Max Flame Front:	00:00 (Min:Sec)
Max Temp At Exposed T/C:	532.4°F
Time To Max Temp:	09:47 (Min:Sec)
Dripping Observed:	No
Flaming On Floor Observed:	No
After Flame Top Observed:	No
After Flame Floor Observed:	No
Sagging Observed:	No
Delamination Observed:	No
Shrinkage Observed:	No
Fallout Observed:	No
Cracking Observed:	01:23 (Min:Sec)
Observations After the Test:	None

Reference Appendix A for graphs.

7.0 Test Results: (Continued)

In Accordance with ASTM E 84-11a the use of supporting materials on the underside of the test specimen has the ability to lower the flame spread index from those which might be obtained if the specimen could be tested without such support. These test results do not necessarily relate to indices obtained by testing materials without such support (E84-11a, 1.3).

This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire-hazard or fire-risk assessment of the materials, products, or assemblies under actual fire condition s (E84-11a, 1.7).

This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the sole responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use (E84-11a, 1.8).

8.0 Codes and Regulations:

The 2009 International Building Code® (Chapter 8 Interior Finishes, Section 803 Wall and Ceiling Finishes) and NFPA 5000, (Chapter 10 Interior Wall or Ceiling Finish Testing and Classification) classify materials based on their Flame Spread and Smoke Developed indices. The classification criteria are listed below:

Classification	Flame Spread Index	Smoke Developed Index
A	0-25	0-450
B	26-75	0-450
C	76-200	0-450

9.0 Test Equipment Used:

Device	Asset No.
Sick DT50 Distance Sensor	63086
Almar RVA501 Air Velocity Meter	63192
Moisture Meter	63199
Temp/Humidity Transmitter (Con. Room)	63242
Temp/Humidity Transmitter (Lab Room)	63306
Specimen Scale	63272
Floor Start Thermocouple	63340
Air Thermocouple	63341
Floor Exit Thermocouple	63343

The service life of this report will expire on the stated Test Record Retention End Date, at which time such materials as drawings, data sheets, samples of test specimens, copies of this report, and any other pertinent project documentation, shall be discarded without notice.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.

Digitally Signed by: Russell Clark

Russell W. Clark
Technician

Digitally Signed by: Brady W. McNaughton

Brady W. McNaughton
Program Manager – Fire Testing

RWC:ddr

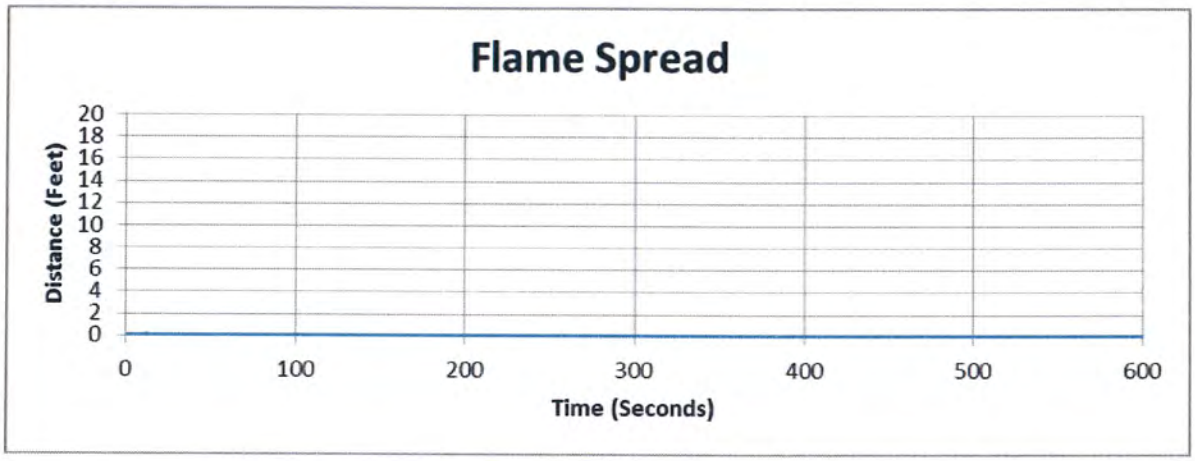
Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Graphs (1)

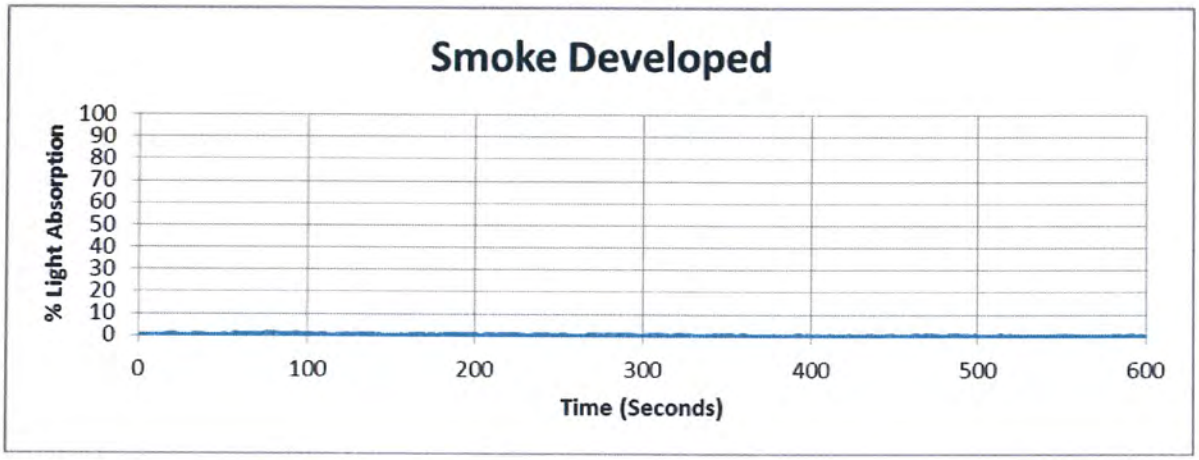
Revision Log

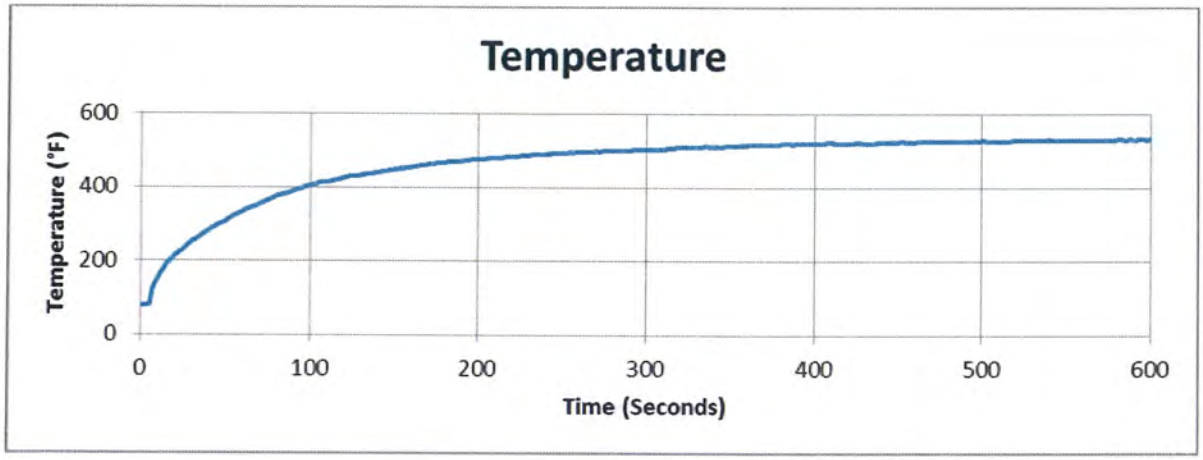
Rev. #	Date	Page(s)	Revision(s)
0	1/19/2012	N/A	Original Report Issue

Appendix A

Graphs


Flame Spread
Distance (Feet)
20
18
16
14
12
10
8
6
4
2
0
0
100
200
300
400
500
600
Time (Seconds)


Smoke Developed
% Light Absorption
100
90
80
70
60
50
40
30
20
10
0
0
100
200
300
400
500
600
Time (Seconds)


Temperature
Temperature (°F)
600
400
200
0
0
100
200
300
400
500
600
Time (Seconds)