

CERTIFICATE OF COMPLIANCE



Crane Composites, Inc.

Sequentia | FRP Wall & Ceiling Panels

15957-420

Certificate Number

01/12/2016 - 04/28/2021

Certificate Period

Certified

Status

UL 2818 - 2013 Gold Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Wall finishes are determined compliant in accordance with California Department of Public Health (CDPH) Standard Method V1.2-2017 using a Classroom Environment with an air change of 0.82 hr^{-1} and a loading of 94.60 m^2 ; and Wall finishes are determined compliant in accordance with California Department of Public Health (CDPH) Standard Method V1.2-2017 using an Office Environment with an air change of 0.68 hr^{-1} and a loading of 33.40 m^2 .

Product tested in accordance with UL 2821 test method to show compliance to emission limits on UL 2818. Section 7.1 and 7.2.



UL investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Mark for the identified Product(s) manufactured at the production site(s) covered by the UL Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

GREENGUARD Gold Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC ^(A)	-	0.22	mg/m ³
Formaldehyde	50-00-0	9 (7.3 ppb)	µg/m ³
Total Aldehydes ^(B)	-	0.043	ppm
4-Phenylcyclohexene	4994-16-5	6.5	µg/m ³
Particle Matter less than 10 µm ^(C)	-	20	µg/m ³
1-Methyl-2-pyrrolidinone ^(D)	872-50-4	160	µg/m ³
Individual VOCs ^(E)	-	1/2 CREL or 1/100th TLV	-

- (A) Defined to be the total response of measured VOCs falling within the C₆ – C₁₆ range, with responses calibrated to a toluene surrogate. Maximum allowable predicted TVOC concentrations for GREENGUARD Gold (0.22 mg/m³) fall in the range of 0.5 mg/m³ or less, as specified in CDPH Standard Method v1.2.
- (B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.
- (C) Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.
- (D) Based on the CA Prop 65 Maximum Allowable Dose Level for inhalation of 3,200 µg/day and an inhalation rate of 20 m³/day
- (E) Allowable levels for chemicals not listed are derived from the lower of 1/2 the California Office of Environmental Health Hazard Assessment (OEHHA) Chronic Reference Exposure Level (CREL) as required per the CDPH/EHLB/Standard Method v1.2 and BIFMA level credit 7.6.2 and 1/100th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).



CERTIFICATE OF COMPLIANCE



Crane Composites, Inc.

DESIGNS | Innovative Finishes
FRP Panel

16350-410
Certificate Number

04/29/2011 - 04/28/2021
Certificate Period

Certified
Status

UL 2818 - 2013 Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Wall finishes are determined compliant using an Office Environment with an air change of 0.68 hr^{-1} and a loading of 33.40 m^2 .
Products tested in accordance with UL 2821 test method to show compliance to emission limits in UL 2818, Section 7.1.



UL investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Mark for the identified Product(s) manufactured at the production site(s) covered by the UL Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

GREENGUARD Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC ^(A)	-	0.50	mg/m ³
Formaldehyde	50-00-0	61.3 (50 ppb)	µg/m ³
Total Aldehydes ^(B)	-	0.10	ppm
Particle Matter less than 10 µm ^(C)	-	50	µg/m ³
4-Phenylcyclohexene	4994-16-5	6.5	µg/m ³
Individual VOCs ^(D)	-	1/10th TLV	-

- (A) Defined to be the total response of measured VOCs falling within the C₆ – C₁₆ range, with responses calibrated to a toluene surrogate. Maximum allowable predicted TVOC concentrations for GREENGUARD (0.50 mg/m³) fall in the range of 0.5 mg/m³ or less, as specified in CDPH Standard Method v1.1.
- (B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.
- (C) Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.
- (D) Allowable levels for chemicals not listed are derived from 1/10th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).



CLIENT: CRANE COMPOSITES
Attn: Michelle Bauer
8015 Dixon Dr.
Florence KY 41042

Test Report No: TJ1898-2	Date: February 19, 2014
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SAMPLE ID: The Client submitted and identified the following test material as "IPSA .075."

SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

DATE OF RECEIPT: Samples were received at QAI facilities on January 30, 2014

TESTING PERIOD: February 5, 2014

AUTHORIZATION: Proposal FB-2014-012003 signed by Michelle Bauer on January 20, 2014

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM Designation E84-12, "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.

TEST RESULTS:

<u>Flame Spread</u>	<u>Smoke Developed</u>
25	170

CLASSIFICATION: The material tested resulted in a Class A. Detailed test results are presented in the subsequent pages of this report

Prepared By


Jeff Foster
Fire Test Technician

**Signed for and on behalf of
QAI Laboratories, Inc.**


J. Brian McDonald
Operations Manager



PREPARATION AND CONDITIONING: The sample was submitted in six panels that were 4 feet long cut to measure 24 inches wide and approximately .0690 inches thick. The sample material was placed into conditioning at 73°F (±5°F) and 50% (±5%) relative humidity until day of testing.

E 84 TEST DATA SHEET:

MOUNTING METHOD: The sample was supported during testing by 2" hexagonal mesh poultry netting running the length of the test chamber and ¼" round metal rods placed at 2' intervals across the width of the test chamber.

CLIENT: Crane Composites **DATE:** February 7, 2014

SAMPLE: IPSA.075

IGNITION: 1 minutes, 50 seconds

FLAME FRONT: 7 feet maximum

TIME TO MAXIMUM SPREAD: 4 minute, 30 seconds

TEST DURATION: 10 minutes, 00 seconds

SUMMARY: **FLAME SPREAD:** 25 (26.9 unrounded) **SMOKE DEVELOPED:** 170 (172 unrounded)

OBSERVATIONS:

Audible crackling could be heard 38 seconds into test. Blistering and bubbling began at 1 minute 01 seconds, followed by charring at 1 minute 04 seconds. Sustained ignition began at 1 minute 50 seconds. Steady fire spread increase throughout test until 8 minutes 30 seconds. Test concluded at 10 minutes with after burn.

CALIBRATION DATA:

Time to Ignition of Last Red Oak (sec):	57
Red Oak Smoke Area (%A* Min):	111
Total Fuel Burned (ft ³)	59.68



SUMMARY OF ASTM E84 RESULTS:

Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

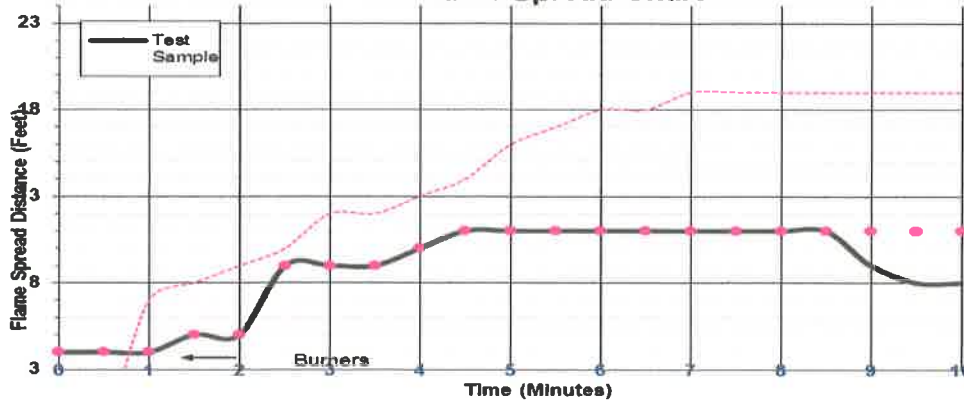
In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

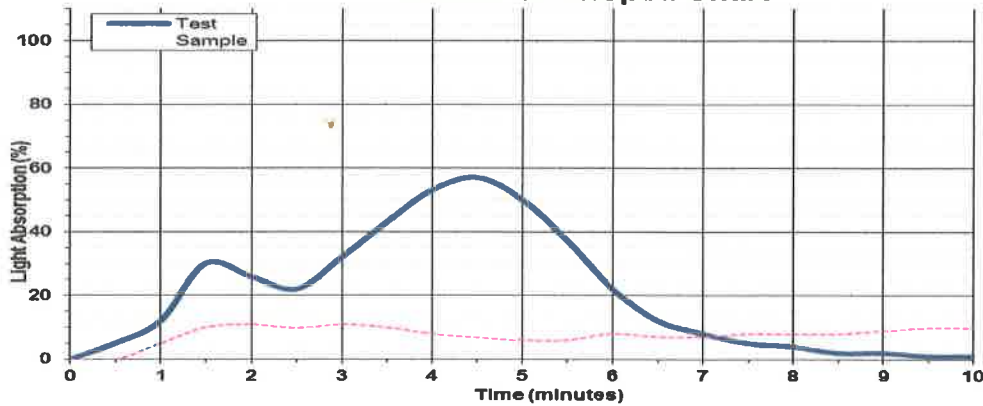
BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.

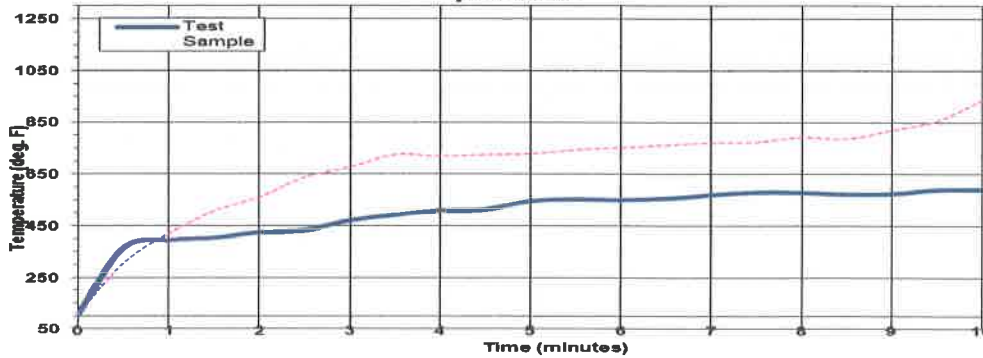
Flame Spread Chart



Smoke Developed Chart



Temperature - Time Curve



END OF REPORT

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

CLIENT: CRANE COMPOSITES
Attn: Michelle Bauer
8015 Dixon Dr.
Florence KY 41042

Test Report No: TJ1898-1

Date: February 19, 2014

SAMPLE ID: The Client submitted and identified the following test material as "IPSC .075."
SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.
DATE OF RECEIPT: Samples were received at QAI facilities on January 30, 2014
TESTING PERIOD: February 5, 2014
AUTHORIZATION: Proposal FB-2014-012003 signed by Michelle Bauer on January 20, 2014
TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM Designation E84-12, "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.

TEST RESULTS:	<u>Flame Spread</u>	<u>Smoke Developed</u>
	70	200

CLASSIFICATION: The material tested resulted in a Class B. Detailed test results are presented in the subsequent pages of this report

Prepared By


Jeff Foster
Fire Test Technician

**Signed for and on behalf of
QAI Laboratories, Inc.**


J. Brian McDonald
Operations Manager



PREPARATION AND CONDITIONING: The sample was submitted in six panels that were 4 feet long cut to measure 24 inches wide and approximately .0690 inches thick. The sample material was placed into conditioning at 73°F (±5°F) and 50% (±5%) relative humidity until day of testing.

E 84 TEST DATA SHEET:

MOUNTING METHOD: The sample was supported during testing by 2" hexagonal mesh poultry netting running the length of the test chamber and ¼" round metal rods placed at 2' intervals across the width of the test chamber.

CLIENT: Crane Composites **DATE:** February 7, 2014

SAMPLE: IPSC.075

IGNITION: 0 minutes, 43 seconds

FLAME FRONT: 15 feet maximum

TIME TO MAXIMUM SPREAD: 2 minute, 30 seconds

TEST DURATION: 10 minutes, 00 seconds

SUMMARY: **FLAME SPREAD:** 70 (70.4 unrounded) **SMOKE DEVELOPED:** 200 (217 unrounded)

OBSERVATIONS:

Audible crackling could be heard 40 seconds into test. Sustained ignition and charring both occurred at 43 seconds. Significant flame spread increase of the product up to window 15. Product burn slowly decreased down, no significant changes through remainder of test. Test concluded at 10 minutes with no after burn.

CALIBRATION DATA:

Time to Ignition of Last Red Oak (sec):	57
Red Oak Smoke Area (%A* Min):	111
Total Fuel Burned (ft ³)	59.68



SUMMARY OF ASTM E84 RESULTS:

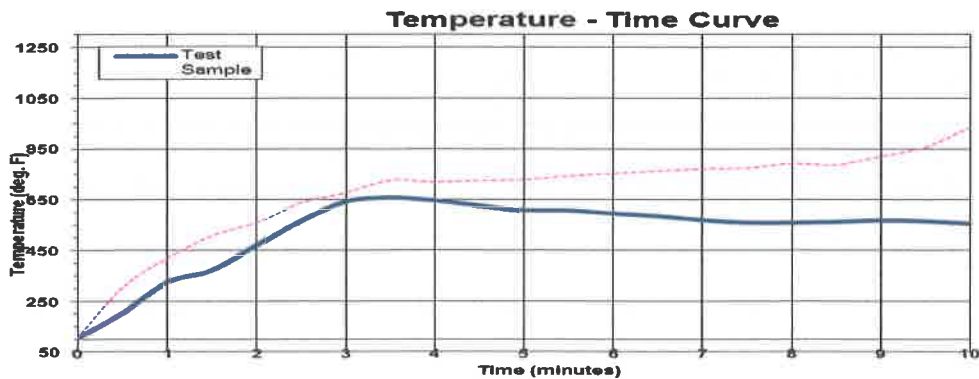
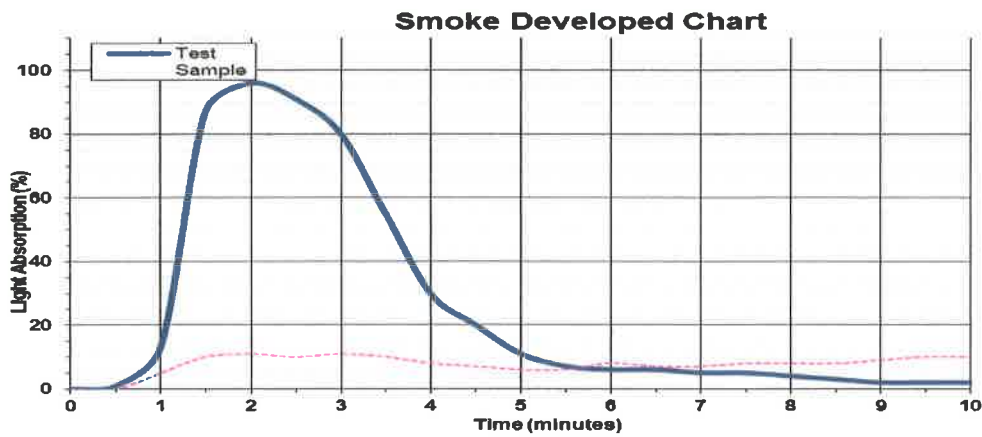
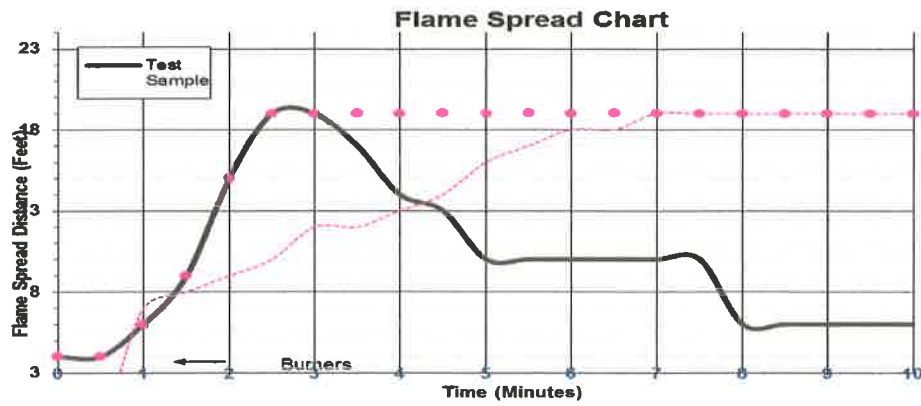
Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.



END OF REPORT

CERTIFICATE OF COMPLIANCE



Crane Composites, Inc.

Glasbord® | Wall and Ceiling
Panels with Surfaseal® Finish

15955-410

Certificate Number

04/29/2011 - 04/28/2021

Certificate Period

Certified

Status

UL 2818 - 2013 Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Wall finishes are determined compliant using an Office Environment with an air change of 0.68 hr^{-1} and a loading of 33.40 m^2 .

Products tested in accordance with UL 2821 test method to show compliance to emission limits in UL 2818, Section 7.1.



UL investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Mark for the identified Product(s) manufactured at the production site(s) covered by the UL Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

GREENGUARD Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC ^(A)	-	0.50	mg/m ³
Formaldehyde	50-00-0	61.3 (50 ppb)	µg/m ³
Total Aldehydes ^(B)	-	0.10	ppm
Particle Matter less than 10 µm ^(C)	-	50	µg/m ³
4-Phenylcyclohexene	4994-16-5	6.5	µg/m ³
Individual VOCs ^(D)	-	1/10th TLV	-

- (A) Defined to be the total response of measured VOCs falling within the C₆ – C₁₆ range, with responses calibrated to a toluene surrogate. Maximum allowable predicted TVOC concentrations for GREENGUARD (0.50 mg/m³) fall in the range of 0.5 mg/m³ or less, as specified in CDPH Standard Method v1.1.
- (B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.
- (C) Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.
- (D) Allowable levels for chemicals not listed are derived from 1/10th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).



CERTIFICATE OF COMPLIANCE



Crane Composites, Inc.

Glasbord® | Factory Mutual
Approved Wall Panels with
Surfaseal® Finish

15956-420

Certificate Number

01/12/2016 - 04/28/2021

Certificate Period

Certified

Status

UL 2818 - 2013 Gold Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Wall finishes are determined compliant in accordance with California Department of Public Health (CDPH) Standard Method V1.2-2017 using a Classroom Environment with an air change of 0.82 hr^{-1} and a loading of 94.60 m^2 ; and Wall finishes are determined compliant in accordance with California Department of Public Health (CDPH) Standard Method V1.2-2017 using an Office Environment with an air change of 0.68 hr^{-1} and a loading of 33.40 m^2 .

Product tested in accordance with UL 2821 test method to show compliance to emission limits on UL 2818. Section 7.1 and 7.2.



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TVOC ^(A)	-	0.22	mg/m ³
Formaldehyde	50-00-0	9 (7.3 ppb)	µg/m ³
Total Aldehydes ^(B)	-	0.043	ppm
4-Phenylcyclohexene	4994-16-5	6.5	µg/m ³
Particle Matter less than 10 µm ^(C)	-	20	µg/m ³
1-Methyl-2-pyrrolidinone ^(D)	872-50-4	160	µg/m ³
Individual VOCs ^(E)	-	1/2 CREL or 1/100th TLV	-

- (A) Defined to be the total response of measured VOCs falling within the C₆ – C₁₆ range, with responses calibrated to a toluene surrogate. Maximum allowable predicted TVOC concentrations for GREENGUARD Gold (0.22 mg/m³) fall in the range of 0.5 mg/m³ or less, as specified in CDPH Standard Method v1.2.
- (B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.
- (C) Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.
- (D) Based on the CA Prop 65 Maximum Allowable Dose Level for inhalation of 3,200 µg/day and an inhalation rate of 20 m³/day
- (E) Allowable levels for chemicals not listed are derived from the lower of 1/2 the California Office of Environmental Health Hazard Assessment (OEHHA) Chronic Reference Exposure Level (CREL) as required per the CDPH/EHLB/Standard Method v1.2 and BIFMA level credit 7.6.2 and 1/100th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).



LEED® Letter for Glasbord Products

Monday, July 20, 2015

This letter certifies that Crane composites, Inc. manufactures Glasbord® frp wall and ceiling panels which are sold in the United States at facilities located in the United States of America.

Glasbord materials contain zero (0) % post consumer / pre consumer recycled content. This product does not satisfy LEED MR Credits 4.1 (Recycled Content, 10% (post-consumer + 1/2 pre-consumer) nor 4.2 (Recycled Content, 20% (post-consumer + 1/2 pre-consumer).

Glasbord materials can contribute up to 6 LEED points towards the Green Building Rating System for Commercial Interiors.

Tenant Space, Long Term Commitment: Glasbord frp has a 10 year limited warranty against defects and workmanship issues. The wall panels need not be replaced generally for the life of the building. Glasbord frp will not mold or mildew and never needs painting. LEED V2.0 awards 1 point if the occupant commits to remain in the same location for not less than 10 years. This contributes to Credit 1.1 of the "Materials & Resources" area.

Building Reuse: The surface finish of Glasbord frp provides maximum durability and exceptional cleanability. Glasbord frp has a Surfaseal® finish for additional protection. Surfaseal is a sealed protective finish that makes Glasbord up to 10 times easier to clean and up to 6 times more stain resistant than other frp panels. This unique finish ensures a wall panel that will stand up to harsh conditions while maintaining a sanitary surface that looks like new. This extends the life of the panel 10+ years. LEED V2.0 awards 1 point if the building owner maintains at least 40% by area of the existing non-shell, non-structure components (walls, flooring and ceiling systems) and 1 point if the building owner maintains at least 60% by area of the existing non-shell, non-structure components (walls, flooring and ceiling systems). This contributes to Credit 1.2 of the "Materials and Resources" area.

Regional Materials: CCI's manufacturing facilities are located in Channahon Illinois and in Florence Kentucky. LEED V2.1 awards 1 point if 20% of the building materials are manufactured (final assembly) regionally within 500 miles of the project site. This contributes to Credit 5.1 of the "Materials & Resources" area.

Low-Emitting Materials: The VOC content of Glasbord frp wall panels is insignificant in measure. LEED V2.2 awards 1 point (Credits 4.1 and 4.2 of "Indoor Environmental Quality area) if the VOC content is less than the current limits specified in SCAQMD Rule # 1145 (Plastic, Rubber, Leather, and Glass Coatings) for Low-Emitting Materials, Paints and Coatings. CCI recommends the use of CRANE® Fast Grab Adhesive which is VOC compliant. LEED V2.2 awards 1 point if the VOC content is less than the current limits specified in SCAQMD Rule # 1168 (Adhesive and Sealant Applications) for Low-Emitting Materials, Adhesives and Sealants. CRANE Fast Grab Adhesive meets GreenSeal GS-36 specifications.

Respectfully,



Karen A. Nebe
Product Manager, Building Products
Crane Composites Inc.



CLIENT: CRANE COMPOSITES
Attn: Mike Buhr
23525 W. Eames Street
Channahon, IL 60410

Test Report No: TJ1706

Date: November 19, 2013

SAMPLE ID: The Client submitted and identified the following test material as "Glasbord FM 09".

SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

DATE OF RECEIPT: Samples were received at QAI facilities on October 15, 2013

TESTING PERIOD: November 8, 2013

AUTHORIZATION: Proposal FB050213-1 R1 approved on October 10, 2013

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM Designation E84-12, "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.

TEST RESULTS:	<u>Flame Spread</u>	<u>Smoke Developed</u>
	20	170

CLASSIFICATION: The material tested resulted in a Class A. Detailed test results are presented in the subsequent pages of this report

Prepared By

**Signed for and on behalf of
QAI Laboratories, Inc.**



Christopher Clark
Fire Test Technician



J. Brian McDonald
Operations Manager



PREPARATION AND CONDITIONING: The sample was submitted in six 4 foot long panels measuring 24 inches wide and approximately 1/8 of an inch thick. The sample material was placed into conditioning at 73°F (±5°F) and 50% (±5%) relative humidity until day of testing.

E 84 TEST DATA SHEET:

MOUNTING METHOD: The sample was self-supporting and placed along the ledges of the tunnel during testing. No additional mounting method was used

CLIENT: Crane Composites **DATE:** November 8, 2013

SAMPLE: Glasbord FM 09

IGNITION: 0 minutes, 35 seconds

FLAME FRONT: 8 feet maximum

TIME TO MAXIMUM SPREAD: 9 minutes, 00 seconds

TEST DURATION: 10 minutes, 00 seconds

SUMMARY: FLAME SPREAD: 20 (20.0 unrounded) **SMOKE DEVELOPED:** 170 (168 unrounded)

OBSERVATIONS:

Sample initially started to discolor and warp prior to ignition. Soon following ignition sample displayed signs of charring, flaking, and shrinking away from flame. Steady flame spread to window 8 and stayed for duration of test. Minimal afterflame was noted at test completion.

CALIBRATION DATA:

Time to Ignition of Last Red Oak (sec):	57
Red Oak Smoke Area (%A * Min):	111
Total Fuel Burned (ft ³)	59.68



SUMMARY OF ASTM E84 RESULTS:

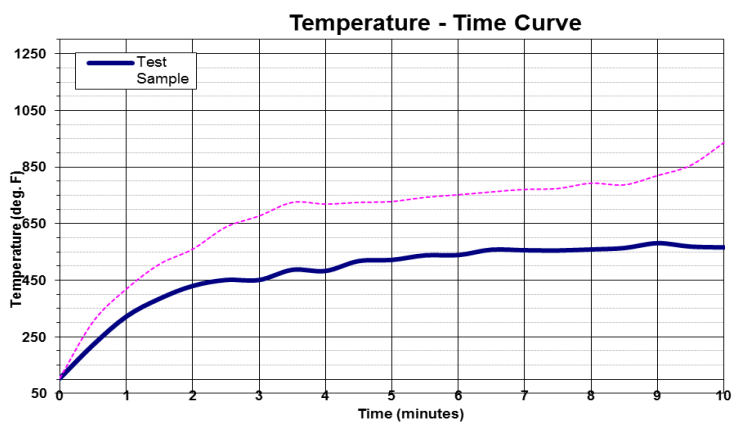
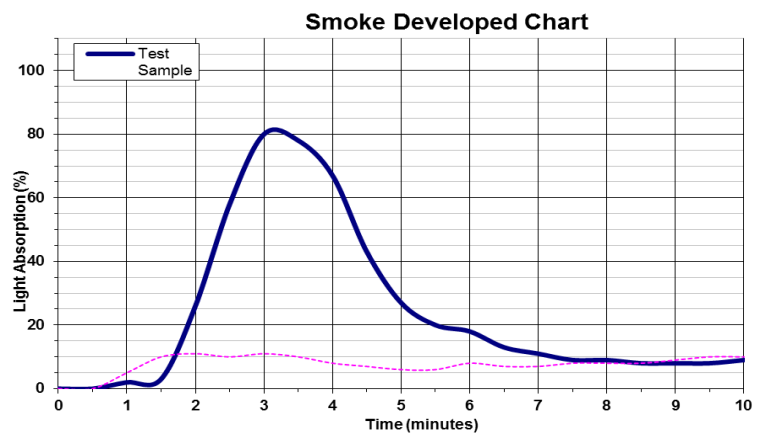
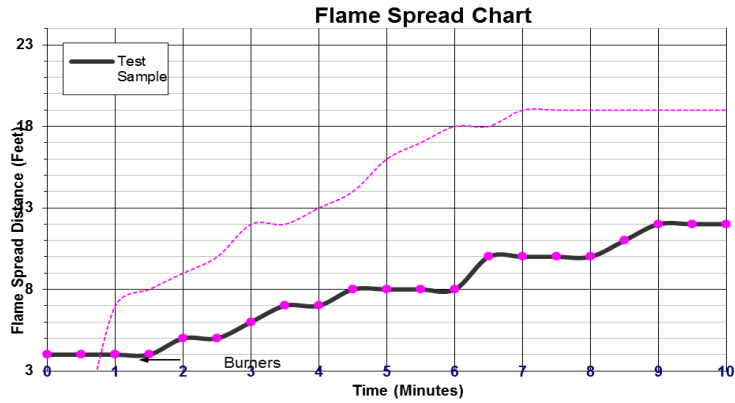
Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.



END OF REPORT

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

APPROVAL REPORT

FIRE-X GLASBORD FM AS CLASS 1 INTERIOR FINISH MATERIALS

Prepared for

KEMLITE COMPANY, INC.
23525 WEST EAMES STREET
CHANNAHON, IL 60410

2B2A2.AM
CLASS 4880
DATE December 20, 1999

FACTORY MUTUAL

Factory Mutual Research
1151 Boston-Providence Turnpike
P.O. Box 9102
Norwood, MA 0206



FACTORY MUTUAL

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



2B2A2.AM
(Factory Mutual Research Class 4880)

December 20, 1999

FIRE-X GLASBORD FM AS CLASS 1 INTERIOR FINISH MATERIALS

from

KEMLITE COMPANY, INC.
23525 WEST EAMES STREET
CHANNAHON, IL 60410

I INTRODUCTION

1.1 Kemlite Company, Inc. submitted their Fire-X Glasbord FM interior finish materials to determine if they meet the Factory Mutual Research Standard 4880 Approval requirements for Class 1 fire classification of interior finish materials to a maximum height of 30 ft (9.1 m).

1.2 Examination included flammability characterization testing using the Factory Mutual Research 50 kW Scale Flammability Apparatus and a Uniform Building Code Standard No. 17-5 (26-3) room fire test of the interior finish materials.

1.3 Tests show that Kemlite Company, Inc. Fire-X Glasbord FM as tested meets the Factory Mutual Research Standard 4880 Approval requirements for Class 1 fire classification to a maximum height of 30 ft (9.1 m) when installed as specified in the CONCLUSIONS of this report.

II MATERIALS TESTED

2.1 Fire-X Glasbord FM interior finish panels are flat, opaque glass fiber reinforced plastic panels with an embossed, pebble-like finish. The panels are nominal 0.090 in. (2.3 mm) thick and are supplied in 4 ft by 8 ft (1.2 m by 2.4 m) sheets.

2.2 A representative of Factory Mutual Research witnessed the sample panel fabrication on April 19, 1999 at the Kemlite Company, Inc. manufacturing facility in Channahon, IL.

2.3 The proprietary formulation is on file at Factory Mutual Research.

III TESTS AND PROCEDURES

3.1 Tests conducted were as required to qualify the Fire-X Glasbord FM interior finish materials for Class 1 fire classification to a maximum height of 30 ft (9.1 m) under Factory Mutual Research Standard 4880.

3.2 Flammability Characterization

3.2.1 A series of measurements were made in the Factory Mutual Research 50 kW Scale Flammability Apparatus to determine the material flammability properties of the interior finish materials.

3.2.2 The critical heat flux for ignition (q''_{cr}) and the thermal response parameter (TRP) were determined by exposing the coated surfaces of several specimens to known radiant heat fluxes and recording the time to piloted ignition. The inverse square root of the time to ignition was plotted against the applied external radiant heat flux. The intercept on the applied heat flux axis is defined as the critical heat flux for ignition (the value of the external heat flux at or below which the sample can no longer achieve piloted ignition during the 15 minute exposure). The inverse of the slope at large external heat fluxes is the thermal response parameter (a measure of the thermal inertia of the material).

3.2.3 The chemical heat of combustion (ΔH_{ch}) and the effective heat of gasification (L_e) were determined by measuring the sample mass loss and heat generation rate history during exposure of a specimen to an external heat flux of 50 kW/m². The chemical heat of combustion was obtained by measuring the chemical heat release rate by CO/CO₂ generation at the applied external heat flux, time integrating to obtain the total energy released, and dividing by the total mass lost. The effective heat of gasification was obtained from the chemical heat release rate, the chemical heat of combustion, and the net heat flux, which was assumed to be the difference between external heat flux and the critical heat flux for ignition.

3.2.4 The convective flame spread parameter (FSP_c) was determined from the chemical heat of combustion, effective heat of gasification, net heat flux, and the thermal response parameter.

3.2.5 The convective flame spread parameter (FSP_c) for the Fire-X Glasbord FM interior finish material was compared to the convective flame spread parameter (FSP_c) of the Fire-X Glasbord interior finish material that was successfully tested in the Factory Mutual Research 25 ft (7.6 m) High Corner Test to determine if further full-scale fire testing is necessary.

3.3 Room Fire Test

3.3.1 A room fire test was conducted in accordance with Uniform Building Code Standard No. 17-5 (26-3) "Room Fire Test Standard for Interior of Foam Plastic Systems".

3.3.2 The room fire test was conducted in a room sheathed on the ceiling and all four walls with glass fiber faced gypsum board secured to wood framing. A 2 ft 6 in. (760 mm) wide by 7 ft 0 in. (2135 mm) high door was located in one 8 by 8 ft (2440 by 2440 mm) wall (front).

3.3.2.1 Sample interior finish panels were installed vertically on the 8 by 8 ft (2440 by 2440 mm) wall opposite the door (back) and the first 8 ft (2440 mm) of the adjacent 12 by 8 ft (3660 by 2440 mm) wall (left). Sample ceiling panels were installed on the first 8 ft (2440 mm) of the 8 ft (2440 mm) high ceiling adjacent to the left and back walls parallel to the 8 ft (2440 mm) dimension. Test panels were mechanically fastened to the gypsum sheathing. Panel joints were covered with molding.

3.3.2.2 The finished interior of the room after sample installation was 12 ft (3660 mm) long by 8 ft (2440 mm) wide by 8 ft (2440 mm) high. Factory Mutual Research personnel installed all test panels and trim.

3.3.3 The exposure fire was a 15 by 15 in. (380 by 380 mm) crib of 1½ in. (38 mm) square Douglas fir sticks placed at the intersection of the sample covered walls 1 in. (25 mm) from the interior of the sample panels and 3 in. (76 mm) above the noncombustible floor. The crib weighed 30.1 lb. (13.7 kg) and it was conditioned to a moisture content of 7.7%. The exposure fire was ignited using 1 lb. (0.45 kg) of shredded wood excelsior and 4 oz. (0.12 L) of ethanol.

3.3.4 The exposure fire was removed from the corner location 15 minutes after ignition and extinguished with water. Flaming on sample panel surfaces or at sample panel joints was extinguished with a fine water spray after the exposure fire was extinguished.

3.3.5 A video tape of the room fire test was taken through the door opposite the exposure fire. Temperature readings were taken at 15 second intervals using thermocouples located 3, 5 and 7 ft (915, 1525 and 2135 mm) above the floor 3 in. (76 mm) from the adjacent interior wall surfaces above the exposure fire and 1 in. below the ceiling at the center of the 8 by 8 ft (2440 by 2440 mm) sample ceiling area.

3.3.6 Performance in the room fire test is satisfactory if there is no evidence of the panels burning at the outer extremities of the test area within 15 minutes of the ignition of the excelsior and smoke levels generated during the test are not excessive.

IV TEST SAMPLES

4.1 Flammability Characterization Test Specimen

A Fire-X Glasbord FM sheet was cut into 4 in. by 4 in. (102 mm by 102 mm) test specimens. Each specimen was coated with a high absorptivity selective black coating prior to placement in the sample holder of the Factory Mutual Research 50 kW Scale Flammability Apparatus.

4.2 Room Fire Test Sample

Sample Fire-X Glasbord FM sheet as described in 2.1 above were supplied.

4.2.1 Two 48 in. by 96 in. (1.2 m by 2.4 m) sheets were secured to the ceiling of the test room. The sheets were installed parallel to the back wall.

4.2.2 Two 48 in. by 96 in. (1.2 m by 2.4 m) sheets were secured to the left wall of the test room. And two 48 in. by 96 in. (1.2 m by 2.4 m) sheets were secured to the back wall of the test room.

4.2.3 The panel joints on the walls and ceiling were covered with PVC molding. When installed the sheets are inserted into the molding. The sheets were mechanically fastened to the gypsum sheathing of the room structure with AMIFasteners nylon, pin-drive rivets spaced 16 in. (406 mm) o.c., horizontally and vertically.

V RESULTS

5.1 Flammability Characterization

The material flammability properties of the test specimens described in 4.1 above are given below along with the values obtained for the currently Approved Fire-X Glasbord.

		<u>Fire-X Glasbord FM</u>	<u>Fire-X Glasbord*</u>
ΔH_{ch}	(kJ/g)	6.5	14.2
L_e	(kJ/g)	0.9	2.8
q''_{cr}	(kW/m ²)	15	15
TRP	(kW/m ² s ^{-1/2})	644	562
FSP _c	(s ^{-1/2})	0.16	0.16

*Testing was completed in the Approval examination (Factory Mutual Research J.I. 1V5A9.AM) sponsored by Kemlite Company, Inc.

5.2 Room Fire Tests

5.2.1 Visual observations during the test period were as follows:

Time(min:sec) Observation

0:00	Ignition of exposure fire.
1:50	Sustained burning of left and rear walls at the corner to approximately 2 ft (0.6 m) high.
3:10	Sustained burning of left and rear walls at the corner to approximately 4 ft (1.2 m) high; wall panels at the corner beginning to ripple
5:10	Sustained burning of left and rear walls at the corner to approximately 5 ft (1.5 m) high. Grey smoke exiting door at a height of 2 ft (0.6 m) below top of opening.
5:40	Sustained burning of left and rear walls at the corner to approximately 6 ft (1.8 m) high with flames intermittently extending to ceiling and along eaves to about 3 ft – 4 ft (0.9 m – 1.2 m) from the corner.
6:15	Sustained burning of panels at the wall – ceiling intersection at left and rear walls to approximately 2 ft (0.6 m) from the corner.
7:10	Whitish-grey smoke exiting door.
7:20	Flames at the wall – ceiling intersection at left and rear walls extending to 4 ft – 5 ft (1.2 m – 1.5 m) from the corner.
7:45	Left side of rear ceiling panel falls and hangs from ceiling.
8:10	Flames at the wall – ceiling intersection at left wall continues as previously noted.
9:25	Flames at the wall – ceiling intersection at left wall intermittently extends to 4 ft – 5 ft (1.2 m – 1.5 m) from the corner and approximately 1 ft (0.3 m) from ceiling.
10:50	Ceiling panel near door is beginning to sag along the left wall.
11:35	Sustained burning along left wall limited to the corner.
12:20	Fallen portion of the rear ceiling panel extends to 6 ft (1.8 m) and continues to burn.
13:00	Left wall panel no longer burning; sustained burning along rear wall limited to the corner to approximately 4 ft (1.2 m) high.
13:50	Rear wall panel no longer burning; intermittent burning along left wall limited to the corner to 3 ft - 4 ft (0.9 m - 1.2 m) high.
15:00	Test terminated, fire extinguished.

5.2.2 Upon examination of the test panels after the room fire test, there was no evidence of the panels burning at the extremities of the test panel area.

5.2.3 Smoke levels generated by the test panels during the test period were not considered excessive.

5.2.4 See Appendix A for a record of temperatures recorded at the thermocouple locations outlined in 3.3.5 above.

5.2.5 A videotape (8 mm format) is on file under J.I. 2B2A2.AM in the Technical Information Center at Factory Mutual Research.

VI CONCLUSIONS

6.1 Test results from this program indicate that Kemlite Company, Inc. Fire-X Glasbord FM interior finish materials meet the Factory Mutual Research Approval Standard 4880 requirements for Class 1 interior finish materials when installed to the maximum installed height of 30 ft (9.1 m).

6.2 The sheets shall be mechanically fastened to gypsum sheathing with AMIFasteners nylon, pin-drive rivets spaced 16 in. (406 mm) o.c., horizontally and vertically.

6.3 The panel joints on the walls and ceiling shall be covered with PVC molding, supplied by Kemlite.

6.4 Tests show 1) that the panels in and of themselves would not create a need for automatic sprinklers and 2) that the panels would be acceptable in a combustible occupancy protected by automatic sprinklers as defined by Factory Mutual Research Loss Prevention Standards.

6.5 The tested constructions meet the Factory Mutual Research Approval criteria and when Approval is effective will be listed in the Factory Mutual Research Approval Guide.

6.6 Approval is effective when the Approval Agreement is signed and received by Factory Mutual Research.

6.7 Continued Approval is based upon the fabrication of the Approved product in accordance with this Approval Report, satisfactory field experience, and continued use of acceptable quality control procedures as determined by Facilities and Procedures Audits.

6.8 The interior finish materials have not been evaluated for the toxicity of the products of combustion.

VII MARKING

7.1 The manufacturer shall mark each panel or packing container with the manufacturer's name and the product trade name. In addition, the panel or packing container must be marked with the Factory Mutual Research Approval Mark and the words "Subject to the conditions of Approval as a Class 1 interior finish material when installed as described in the current edition of the Factory Mutual Research Approval Guide".

7.2 Markings denoting Factory Mutual Research Approval shall be applied by the manufacturer only within and on the premises of manufacturing locations that are under Factory Mutual Research's Facilities and Procedures Audit Program.

7.3 The manufacturer agrees that use of the Factory Mutual Research name or Approval Mark is subject to the conditions and limitations of the Factory Mutual Research Approval. Such conditions and limitations must be included in all references to Factory Mutual Research Approval.

VIII MANUFACTURER'S RESPONSIBILITIES

8.1 To assure compliance with the CONCLUSIONS of this report, the manufacturer shall supply to the installer or building owner such necessary instructions or assistance required to produce the desired performance achieved in the tests.

8.2 The manufacturer shall notify Factory Mutual Research of any planned change in the Approved product prior to general sale or distribution. All requests for changes shall be made and agreed to in writing, utilizing Factory Mutual Research Form 797, Approval Product-Revision Report.

IX QUALITY AUDIT INSPECTION AND RE-EXAMINATION

9.1 Re-examination and manufacturing inspections will be conducted periodically on the Approved interior finish materials at the Kemlite Company, Inc. manufacturing facility in Channahon, IL to determine that the quality and uniformity of the Approved insulated panels and foam system have been maintained and will provide the same level of performance as originally Approved.

9.2 Re-examination of the Approved insulated wall and ceiling panels may be required to assess formulation changes to the foam insulation system, panel configuration changes or changes in field installation procedures or end-use.

**TECHNICAL SUPERVISION OF
CONSTRUCTION, FIRE TESTS
AND REPORT BY:**

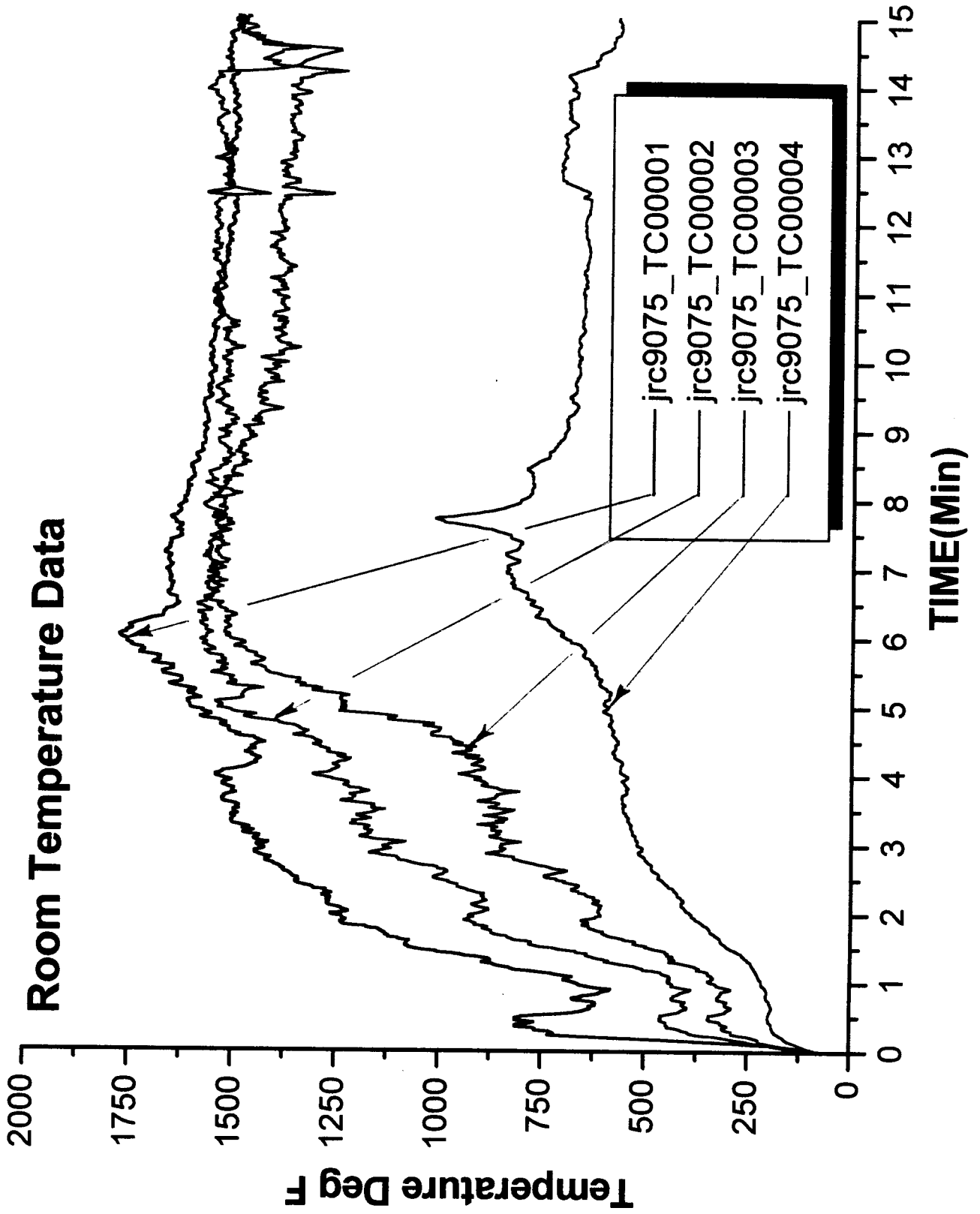
D. K. Tanaka
Project Engineer

REPORT APPROVED BY:

P. J. Smith
Senior Engineer
Materials Section – Approvals

Appendices: Appendix A - Thermocouple Graph
Appendix B – Thermocouple Information

Test #02 Kemlite Room 832-6232-66 09-01-1999
Job Index # 2b2a2.am
1107 Scans



Thermocouple Information

<u>Designation (corresponding to Appendix A)</u>	<u>Location</u>
jrc9075_TC00001	3 ft (915 mm) above floor in corner
jrc9075_TC00002	5 ft (1525 mm) above floor in corner
jrc9075_TC00003	7 ft (2135 mm) above floor in corner
jrc9075_TC00004	center of ceiling

1151 Boston-Providence Turnpike
P.O. Box 9102 Norwood, MA 02062 USA
T: 781 762 4300 F: 781 762 9375 www.fmglobal.com

March 28, 2002

Mr. Bob Barney
Kemlite Co.
P.O. Box 2429
Joliet, IL 60434

Subject: Factory Mutual Research Approval of Fire-X Glasbord FM as Class 1 Interior Finish Materials in accordance with Factory Mutual Research Approval Standard 4880

Dear Bob:

I am writing to confirm the changes that will take place in an upcoming edition of the Factory Mutual Research Approval Guide. As requested in your Revision Report (form 797) we are extending Approval to include suspended ceiling grid installations. Additionally, we are revising the original Approval to include noncombustible substrates (originally gypsum core boards) and to redefine the fasteners for mechanically fastening the panels at the ceiling. I discussed the above issues with your Mr. Mike Burr and Mr. Chris Patterson on March 22, 2002.

The Kemlite listing in the Factory Mutual Research Approval Guide will be revised to read as follows:

Fire-X Glasbord FM. Flat panels, 4 ft (1.2 m) wide, nominal 0.09 in. (2.3 mm) thick. Installed over noncombustible substrate and mechanically fastened with stainless steel or aluminum screws. Alternatively, AMIFasteners nylon, pin-drive rivets may be used on walls only. All fasteners are spaced at 16 in. (0.4 m) o.c., vertically and horizontally. PVC batten strip joint treatment. Alternatively, the panels, 2 ft by 4 ft (610 mm by 1220 mm) or 2 ft by 2 ft (610 mm by 610 mm) in size, are installed in metal suspended ceiling grid system, with optional plastic or metal hold-down clips.

Please advise if you have any questions or require further information. I can be reached by phone at 781-255-4642, by fax at 781-762-9375, and by e-mail at David.Tanaka@FMGlobal.com.

Very truly yours,



David K. Tanaka, P.E.
Senior Engineer
Materials Section

DKT/

cc: TIC - Class File 4880
DKT

CLIENT: CRANE COMPOSITES
Mike Buhr
23525 W. Eames Street
Channahon, IL 60410

Test Report No: TJ0764

Date: August 22, 2012

SAMPLE ID: The Client submitted and identified the following test material as "Glasbord FSFM 075"

SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

DATE OF RECEIPT: Samples were received at QAI on August 9 2012

TESTING PERIOD: August 13 2012

AUTHORIZATION: Signed Work Order by Tim Ngo of Crane. PO # 85657

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM Designation E84-12, "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.

TEST RESULTS:	<u>Flame Spread</u>	<u>Smoke Developed</u>
	0	250

Detailed test results are presented in the subsequent pages of this report

Prepared By

**Signed for and on behalf of
QAI Laboratories, Inc.**



Gregory Ertel
Fire Test Technician



J. Brian McDonald
Operations Manager



PREPARATION AND CONDITIONING: The sample material was submitted in sufficient quantity to form a specimen 21" wide by 24' long. The sample was supported during testing by 2" hexagonal mesh poultry netting running the length of the test chamber and 1/4" round metal rods placed at two foot intervals across the width of the test chamber.

E 84 TEST DATA SHEET:

CLIENT: Crane Composites **DATE:** August 13, 2012

SAMPLE: Glasbord FSFM 075

FLAME SPREAD:

IGNITION: 0 minutes, 38 seconds

FLAME FRONT: 0 feet maximum

TIME TO MAXIMUM SPREAD: 0 minutes, 00 seconds

TEST DURATION: 10 minutes, 00 seconds

SUMMARY: FLAME SPREAD: 0 (0.0)

SMOKE DEVELOPED: 250 (226)

SUMMARY OF ASTM E84 RESULTS: Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

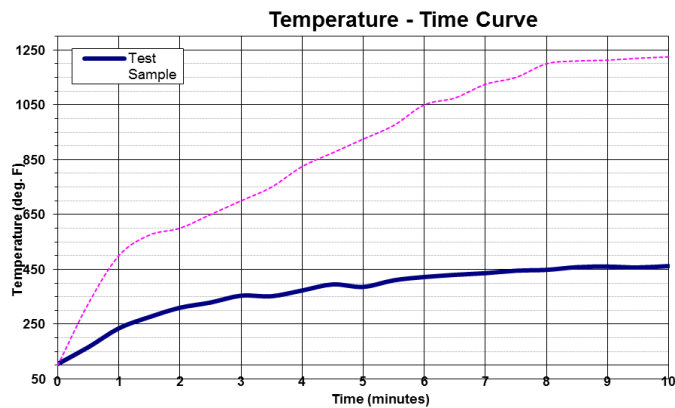
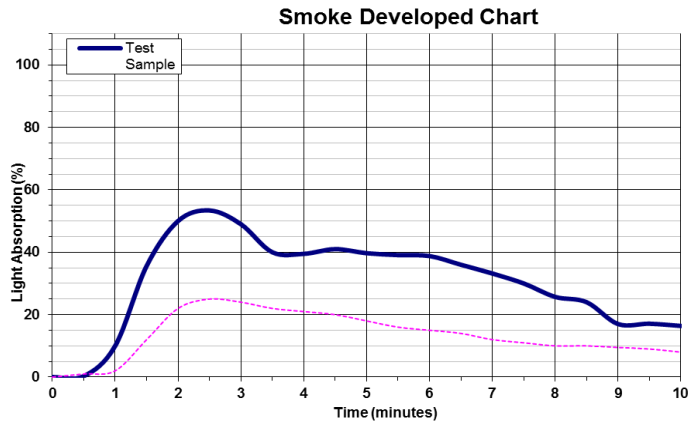
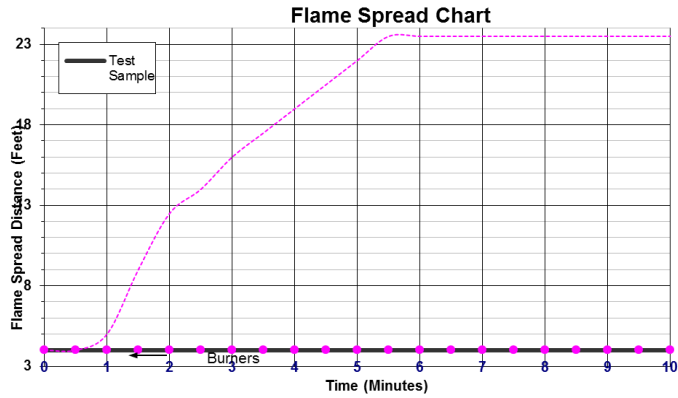
In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.



END OF REPORT

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APPROVAL REPORT

FIRE-X GLASBORD FM AS CLASS 1 INTERIOR FINISH MATERIALS

Prepared for

KEMLITE COMPANY, INC.
23525 WEST EAMES STREET
CHANNAHON, IL 60410

2B2A2.AM
CLASS 4880
DATE December 20, 1999

FACTORY MUTUAL

Factory Mutual Research
1151 Boston-Providence Turnpike
P.O. Box 9102
Norwood, MA 0206



FACTORY MUTUAL

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



2B2A2.AM
(Factory Mutual Research Class 4880)

December 20, 1999

FIRE-X GLASBORD FM AS CLASS 1 INTERIOR FINISH MATERIALS

from

KEMLITE COMPANY, INC.
23525 WEST EAMES STREET
CHANNAHON, IL 60410

I INTRODUCTION

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5.2.1 Visual observations during the test period were as follows:

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0:00	Ignition of exposure fire.
1:50	Sustained burning of left and rear walls at the corner to approximately 2 ft (0.6 m) high.
3:10	Sustained burning of left and rear walls at the corner to approximately 4 ft (1.2 m) high; wall panels at the corner beginning to ripple
5:10	Sustained burning of left and rear walls at the corner to approximately 5 ft (1.5 m) high. Grey smoke exiting door at a height of 2 ft (0.6 m) below top of opening.
5:40	Sustained burning of left and rear walls at the corner to approximately 6 ft (1.8 m) high with flames intermittently extending to ceiling and along eaves to about 3 ft – 4 ft (0.9 m – 1.2 m) from the corner.
6:15	Sustained burning of panels at the wall – ceiling intersection at left and rear walls to approximately 2 ft (0.6 m) from the corner.
7:10	Whitish-grey smoke exiting door.
7:20	Flames at the wall – ceiling intersection at left and rear walls extending to 4 ft – 5 ft (1.2 m – 1.5 m) from the corner.
7:45	Left side of rear ceiling panel falls and hangs from ceiling.
8:10	Flames at the wall – ceiling intersection at left wall continues as previously noted.
9:25	Flames at the wall – ceiling intersection at left wall intermittently extends to 4 ft – 5 ft (1.2 m – 1.5 m) from the corner and approximately 1 ft (0.3 m) from ceiling.
10:50	Ceiling panel near door is beginning to sag along the left wall.
11:35	Sustained burning along left wall limited to the corner.
12:20	Fallen portion of the rear ceiling panel extends to 6 ft (1.8 m) and continues to burn.
13:00	Left wall panel no longer burning; sustained burning along rear wall limited to the corner to approximately 4 ft (1.2 m) high.
13:50	Rear wall panel no longer burning; intermittent burning along left wall limited to the corner to 3 ft - 4 ft (0.9 m - 1.2 m) high.
15:00	Test terminated, fire extinguished.

5.2.2 Upon examination of the test panels after the room fire test, there was no evidence of the panels burning at the extremities of the test panel area.

5.2.3 Smoke levels generated by the test panels during the test period were not considered excessive.

5.2.4 See Appendix A for a record of temperatures recorded at the thermocouple locations outlined in 3.3.5 above.

5.2.5 A videotape (8 mm format) is on file under J.I. 2B2A2.AM in the Technical Information Center at Factory Mutual Research.

VI CONCLUSIONS

6.1 Test results from this program indicate that Kemlite Company, Inc. Fire-X Glasbord FM interior finish materials meet the Factory Mutual Research Approval Standard 4880 requirements for Class 1 interior finish materials when installed to the maximum installed height of 30 ft (9.1 m).

6.2 The sheets shall be mechanically fastened to gypsum sheathing with AMIFasteners nylon, pin-drive rivets spaced 16 in. (406 mm) o.c., horizontally and vertically.

6.3 The panel joints on the walls and ceiling shall be covered with PVC molding, supplied by Kemlite.

6.4 Tests show 1) that the panels in and of themselves would not create a need for automatic sprinklers and 2) that the panels would be acceptable in a combustible occupancy protected by automatic sprinklers as defined by Factory Mutual Research Loss Prevention Standards.

6.5 The tested constructions meet the Factory Mutual Research Approval criteria and when Approval is effective will be listed in the Factory Mutual Research Approval Guide.

6.6 Approval is effective when the Approval Agreement is signed and received by Factory Mutual Research.

6.7 Continued Approval is based upon the fabrication of the Approved product in accordance with this Approval Report, satisfactory field experience, and continued use of acceptable quality control procedures as determined by Facilities and Procedures Audits.

6.8 The interior finish materials have not been evaluated for the toxicity of the products of combustion.

VII MARKING

7.1 The manufacturer shall mark each panel or packing container with the manufacturer's name and the product trade name. In addition, the panel or packing container must be marked with the Factory Mutual Research Approval Mark and the words "Subject to the conditions of Approval as a Class 1 interior finish material when installed as described in the current edition of the Factory Mutual Research Approval Guide".

7.2 Markings denoting Factory Mutual Research Approval shall be applied by the manufacturer only within and on the premises of manufacturing locations that are under Factory Mutual Research's Facilities and Procedures Audit Program.

7.3 The manufacturer agrees that use of the Factory Mutual Research name or Approval Mark is subject to the conditions and limitations of the Factory Mutual Research Approval. Such conditions and limitations must be included in all references to Factory Mutual Research Approval.

VIII MANUFACTURER'S RESPONSIBILITIES

8.1 To assure compliance with the CONCLUSIONS of this report, the manufacturer shall supply to the installer or building owner such necessary instructions or assistance required to produce the desired performance achieved in the tests.

8.2 The manufacturer shall notify Factory Mutual Research of any planned change in the Approved product prior to general sale or distribution. All requests for changes shall be made and agreed to in writing, utilizing Factory Mutual Research Form 797, Approval Product-Revision Report.

IX QUALITY AUDIT INSPECTION AND RE-EXAMINATION

9.1 Re-examination and manufacturing inspections will be conducted periodically on the Approved interior finish materials at the Kemlite Company, Inc. manufacturing facility in Channahon, IL to determine that the quality and uniformity of the Approved insulated panels and foam system have been maintained and will provide the same level of performance as originally Approved.

9.2 Re-examination of the Approved insulated wall and ceiling panels may be required to assess formulation changes to the foam insulation system, panel configuration changes or changes in field installation procedures or end-use.

**TECHNICAL SUPERVISION OF
CONSTRUCTION, FIRE TESTS
AND REPORT BY:**

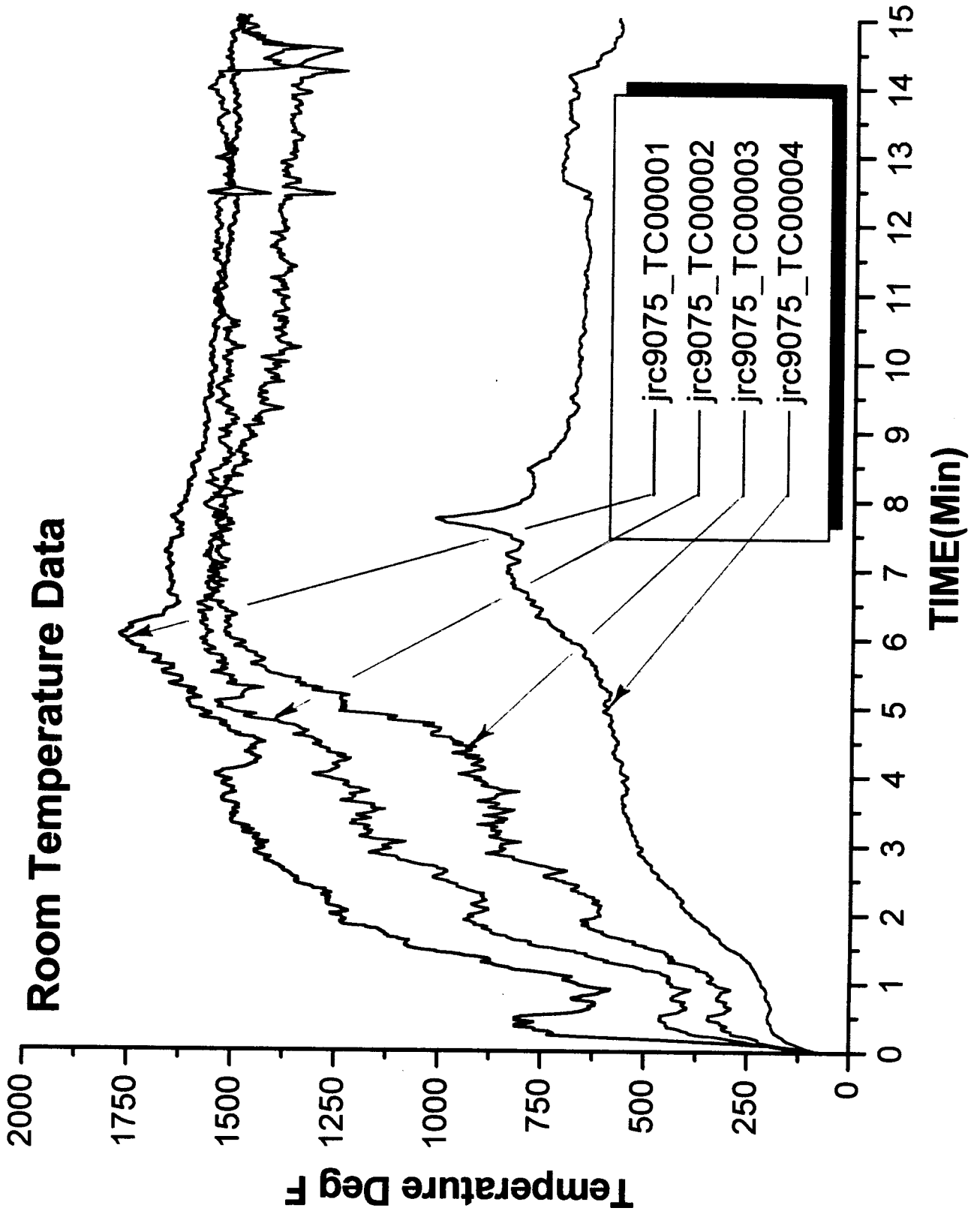
D. K. Tanaka
Project Engineer

REPORT APPROVED BY:

P. J. Smith
Senior Engineer
Materials Section – Approvals

Appendices: Appendix A - Thermocouple Graph
Appendix B – Thermocouple Information

Test #02 Kemlite Room 832-6232-66 09-01-1999
Job Index # 2b2a2.am
1107 Scans



Thermocouple Information

<u>Designation (corresponding to Appendix A)</u>	<u>Location</u>
jrc9075_TC00001	3 ft (915 mm) above floor in corner
jrc9075_TC00002	5 ft (1525 mm) above floor in corner
jrc9075_TC00003	7 ft (2135 mm) above floor in corner
jrc9075_TC00004	center of ceiling

1151 Boston-Providence Turnpike
P.O. Box 9102 Norwood, MA 02062 USA
T: 781 762 4300 F: 781 762 9375 www.fmglobal.com

March 28, 2002

Mr. Bob Barney
Kemlite Co.
P.O. Box 2429
Joliet, IL 60434

Subject: Factory Mutual Research Approval of Fire-X Glasbord FM as Class 1 Interior Finish Materials in accordance with Factory Mutual Research Approval Standard 4880

Dear Bob:

I am writing to confirm the changes that will take place in an upcoming edition of the Factory Mutual Research Approval Guide. As requested in your Revision Report (form 797) we are extending Approval to include suspended ceiling grid installations. Additionally, we are revising the original Approval to include noncombustible substrates (originally gypsum core boards) and to redefine the fasteners for mechanically fastening the panels at the ceiling. I discussed the above issues with your Mr. Mike Burr and Mr. Chris Patterson on March 22, 2002.

The Kemlite listing in the Factory Mutual Research Approval Guide will be revised to read as follows:

Fire-X Glasbord FM. Flat panels, 4 ft (1.2 m) wide, nominal 0.09 in. (2.3 mm) thick. Installed over noncombustible substrate and mechanically fastened with stainless steel or aluminum screws. Alternatively, AMIFasteners nylon, pin-drive rivets may be used on walls only. All fasteners are spaced at 16 in. (0.4 m) o.c., vertically and horizontally. PVC batten strip joint treatment. Alternatively, the panels, 2 ft by 4 ft (610 mm by 1220 mm) or 2 ft by 2 ft (610 mm by 610 mm) in size, are installed in metal suspended ceiling grid system, with optional plastic or metal hold-down clips.

Please advise if you have any questions or require further information. I can be reached by phone at 781-255-4642, by fax at 781-762-9375, and by e-mail at David.Tanaka@FMGlobal.com.

Very truly yours,



David K. Tanaka, P.E.
Senior Engineer
Materials Section

DKT/

cc: TIC - Class File 4880
DKT

CLIENT: CRANE COMPOSITES INC
Attn: Mike Buhr
23525 W. Eames Street
Channahon IL., 60410

Test Report No: TJ1847-2	Date: January 17, 2014
---------------------------------	-------------------------------

SAMPLE ID: The Client submitted and identified the following test material as “**Glasbord FX 06**”
SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

DATE OF RECEIPT: Samples were received at QAI facilities on December 30, 2013

TESTING PERIOD: January 15, 2014

AUTHORIZATION: Proposal FB-2013-103001 signed by Matt Bennett on December 16, 2013

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM Designation E84-12, "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.

TEST RESULTS:	<u>Flame Spread</u>	<u>Smoke Developed</u>
	20	40

CLASSIFICATION: The material tested resulted in a Class A. Detailed test results are presented in the subsequent pages of this report

Prepared By

**Signed for and on behalf of
QAI Laboratories, Inc.**



Jeff Foster
Fire Test Technician



J. Brian McDonald
Operations Manager



PREPARATION AND CONDITIONING: The sample was submitted in six 4 foot long panels cut to measure 24 1/2 inches wide and approximately .0485 mm thick. The sample material was placed into conditioning at 73°F (±5°F) and 50% (±5%) relative humidity until day of testing.

E 84 TEST DATA SHEET:

MOUNTING METHOD: The sample was supported during testing by 2" hexagonal mesh poultry netting running the length of the test chamber and 1/4" round metal rods placed at 2' intervals across the width of the test chamber.

CLIENT: Crane Composites Inc. **DATE:** January 15, 2014

SAMPLE: Glasbord FX 06

IGNITION: 0 minutes, 34 seconds

FLAME FRONT: 5 feet maximum

TIME TO MAXIMUM SPREAD: 3 minute, 00 seconds

TEST DURATION: 10 minutes, 00 seconds

SUMMARY: FLAME SPREAD: 20 (20.0 unrounded) **SMOKE DEVELOPED:** 38 (40 unrounded)

OBSERVATIONS:

Sustained ignition was at 34 seconds. Incipient phase showed minimal growth, with uneventful first minute. Charring was visible at 1 minute 45 seconds. There was a spike and growth/spread around the 3 to 5 minute mark, with heavy smoke at this time. Decay phase was observed at 6 minutes into the test. Test completed at 10 minutes with no after burn.

CALIBRATION DATA:

Time to Ignition of Last Red Oak (sec):	57
Red Oak Smoke Area (%A* Min):	111
Total Fuel Burned (ft ³)	59.68



SUMMARY OF ASTM E84 RESULTS:

Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

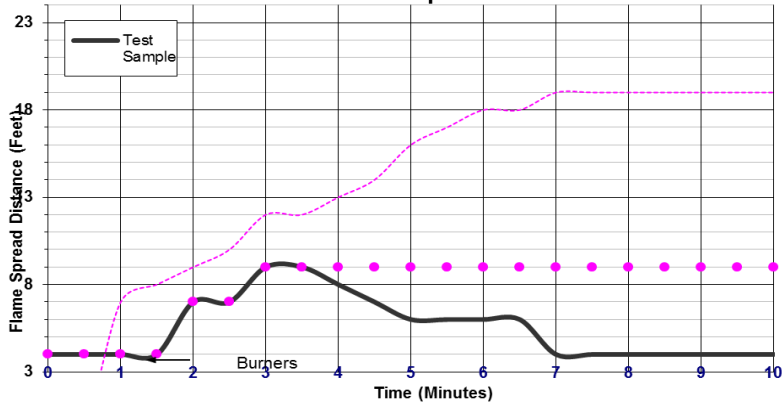
In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

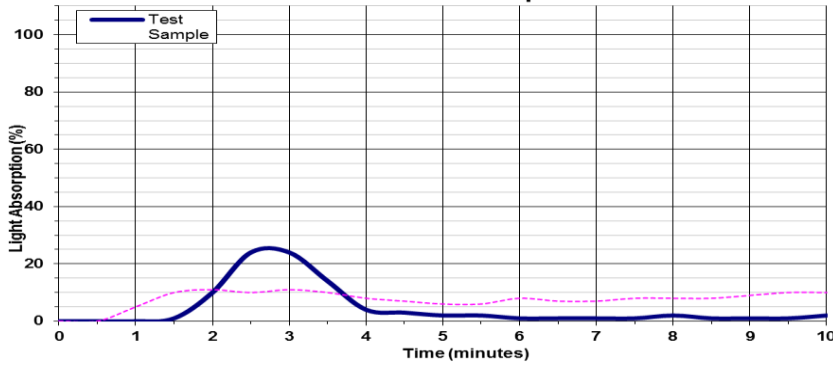
BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.

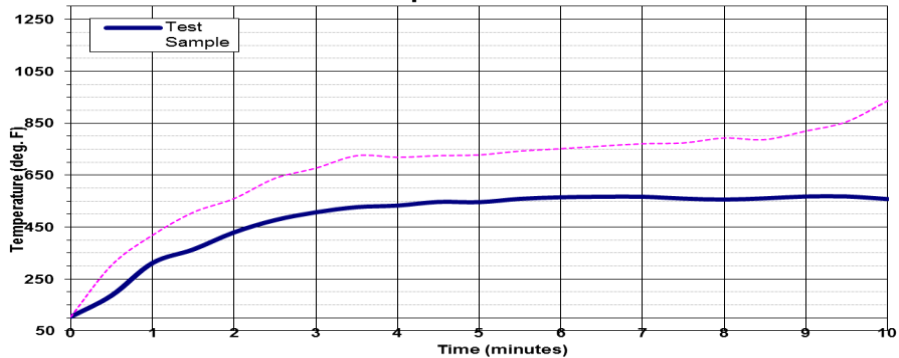
Flame Spread Chart



Smoke Developed Chart



Temperature - Time Curve



END OF REPORT

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CLIENT: CRANE COMPOSITES
Attn: Mike Buhr
23525 W. Eames Street
Channahon, IL 60410

Test Report No: TJ1104-R	Date: November 17, 2013
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SAMPLE ID: The Client submitted and identified the following test material as “**Glasbord FX .09 / StructoGlas FRFRJ .09.**”

SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

DATE OF RECEIPT: Samples were received at QAI facilities on February 12, 2013

TESTING PERIOD: February 20, 2013

AUTHORIZATION: Proposal FB020413-1 signed by Mike Buhr on February 5, 2013

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM Designation E84-12, "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.

TEST RESULTS:	<u>Flame Spread</u>	<u>Smoke Developed</u>
	20	110

Detailed test results are presented in the subsequent pages of this report

REVISION: Sample identification was changed

Prepared By


David Bauchmoyer
Fire Test Technician

**Signed for and on behalf of
QAI Laboratories, Inc.**


J. Brian McDonald
Operations Manager



PREPARATION AND CONDITIONING: The sample was submitted in six 4 foot long panels cut to measure 21 inches wide and approximately 0.102 inches thick. The sample material was placed into conditioning at 73°F (±5°F) and 50% (±5%) relative humidity until day of testing.

E 84 TEST DATA SHEET:

MOUNTING METHOD: The sample was supported during testing by 2" hexagonal mesh poultry netting running the length of the test chamber and ¼" round metal rods placed at 2' intervals across the width of the test chamber.

CLIENT: Crane Composites **DATE:** February 20, 2013

SAMPLE: Glasbord FX .09 / StructoGlas FRFRJ .09

IGNITION: 0 minutes, 16 seconds

FLAME FRONT: 6 feet maximum

TIME TO MAXIMUM SPREAD: 9 minutes, 00 seconds

TEST DURATION: 10 minutes, 00 seconds

SUMMARY: FLAME SPREAD: 20 (18.1 unrounded) **SMOKE DEVELOPED:** 110 (109 unrounded)

OBSERVATIONS:

Steady ignition occurred at 16 seconds after ignition. Soon after ignition, dripping and floor burning were visible. At one minute and 40 seconds into test, charring was visible on test sample. At conclusion of test, sample showed no flaming.

CALIBRATION DATA:

Time to Ignition of Last Red Oak (sec):	45
Red Oak Smoke Area (%A*Min):	112
Maximum Temperature (°F):	530
Time to Maximum Temperature (min:sec):	7:00
Total Fuel Burned (ft ³)	55.7



SUMMARY OF ASTM E84 RESULTS:

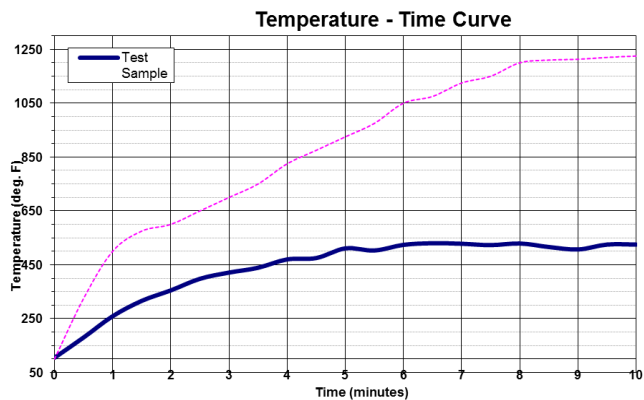
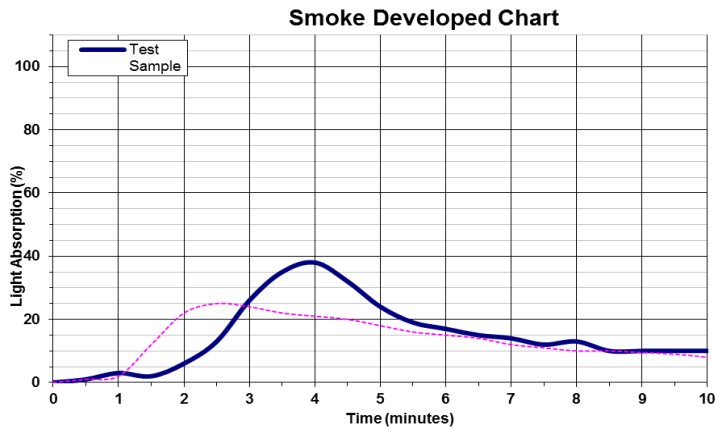
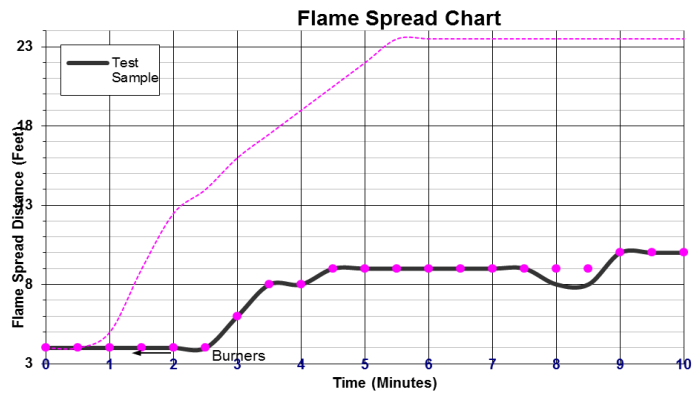
Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.



END OF REPORT

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CLIENT: CRANE COMPOSITES
Attn: Mike Buhr
23525 W. Eames Street
Channahon, IL 60410

Test Report No: TJ1722-4-R	Date: November 27, 2013
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SAMPLE ID: The Client submitted and identified the following test material as "Glasbord FX .10".

SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

DATE OF RECEIPT: Samples were received at QAI facilities on November 14, 2013

TESTING PERIOD: November 18, 2013

AUTHORIZATION: Retested Samples

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM Designation E84-12, "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.

TEST RESULTS:	<u>Flame Spread</u>	<u>Smoke Developed</u>
	15	70


CLASSIFICATION: The material tested resulted in a Class A. Detailed test results are presented in the subsequent pages of this report

REVISION: The sample identification was changed on page 1 and 2. The thickness of the tested sample was corrected on page 2.

Prepared By


Christopher Clark
Fire Test Technician

**Signed for and on behalf of
QAI Laboratories, Inc.**


J. Brian McDonald
Operations Manager



PREPARATION AND CONDITIONING: The sample was submitted in six 4 foot long panels measuring 24 inches wide and approximately 0.100 inches thick. The sample material was placed into conditioning at 73°F (±5°F) and 50% (±5%) relative humidity until day of testing.

E 84 TEST DATA SHEET:

MOUNTING METHOD: The sample was supported during testing by 2" hexagonal mesh poultry netting running the length of the test chamber and ¼" round metal rods placed at 2' intervals across the width of the test chamber.

CLIENT: Crane Composites **DATE:** November 18, 2013

SAMPLE: Glasbord FX .10

IGNITION: 0 minutes, 47 seconds

FLAME FRONT: 4 feet maximum

TIME TO MAXIMUM SPREAD: 4 minutes, 00 seconds

TEST DURATION: 10 minutes, 00 seconds

SUMMARY: FLAME SPREAD: 15 (13.9 unrounded) **SMOKE DEVELOPED:** 70 (72 unrounded)

OBSERVATIONS:

Sample initially started to discolor and warp prior to ignition. Soon following ignition sample displayed signs of charring, flaking, and shrinking away from flame. Steady flame spread to window 4 steadily throughout the test. Minimal afterflame was noted at test completion.

CALIBRATION DATA:

Time to Ignition of Last Red Oak (sec):	57
Red Oak Smoke Area (%A*Min):	111
Total Fuel Burned (ft ³)	59.68



SUMMARY OF ASTM E84 RESULTS:

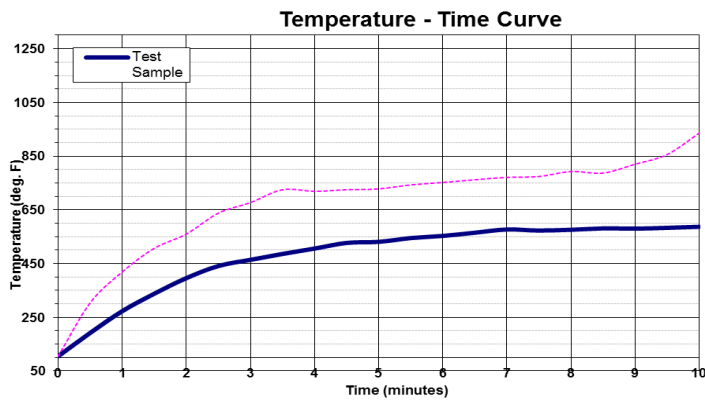
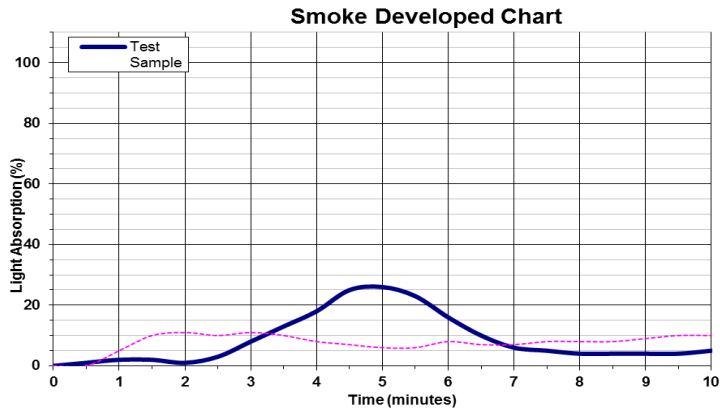
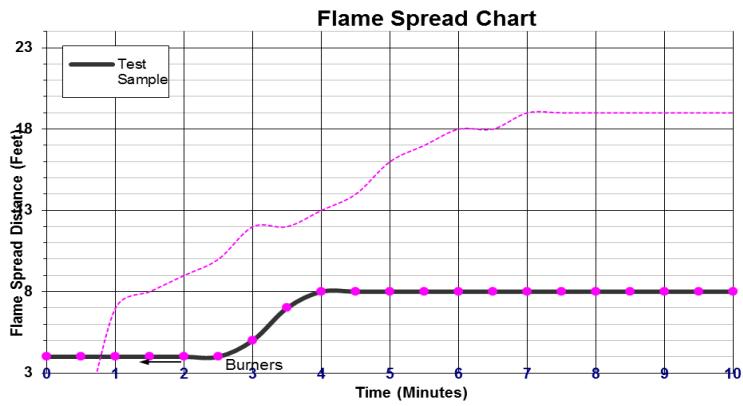
Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.



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CLIENT: CRANE COMPOSITES
Attn: Mike Buhr
23525 W. Eames Street
Channahon, IL 60410

Test Report No: TJ1722-3-R	Date: November 27, 2013
-----------------------------------	--------------------------------

SAMPLE ID: The Client submitted and identified the following test material as “**Glasbord FX .12**”.

SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

DATE OF RECEIPT: Samples were received at QAI facilities on October 31, 2013

TESTING PERIOD: November 5, 2013

AUTHORIZATION: Retested Samples

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM Designation E84-12, "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.

TEST RESULTS:	<u>Flame Spread</u>	<u>Smoke Developed</u>
	10	115

CLASSIFICATION: The material tested resulted in a Class A. Detailed test results are presented in the subsequent pages of this report

REVISION: The sample identification was changed on page 1 and 2.

Prepared By

**Signed for and on behalf of
QAI Laboratories, Inc.**



Christopher Clark
Fire Test Technician



J. Brian McDonald
Operations Manager



PREPARATION AND CONDITIONING: The sample was submitted in six 4 foot long panels measuring 24 inches wide and approximately 0.120 of an inch thick. The sample material was placed into conditioning at 73°F (±5°F) and 50% (±5%) relative humidity until day of testing.

E 84 TEST DATA SHEET:

MOUNTING METHOD: The sample was self-supporting and placed along the ledges of the tunnel during testing. No additional mounting method was used

CLIENT: Crane Composites **DATE:** November 5, 2013

SAMPLE: Glasbord .12

IGNITION: 0 minutes, 49 seconds

FLAME FRONT: 4 feet maximum

TIME TO MAXIMUM SPREAD: 7 minutes, 30 seconds

TEST DURATION: 10 minutes, 00 seconds

SUMMARY: FLAME SPREAD: 10 (10.8 unrounded) **SMOKE DEVELOPED:** 115 (113 unrounded)

OBSERVATIONS:

Sample initially started to discolor and warp prior to ignition. Soon following ignition sample displayed signs of charring, flaking, and shrinking away from flame. Steady flame spread to window 4 steadily throughout the test. Minimal afterflame was noted at test completion.

CALIBRATION DATA:

Time to Ignition of Last Red Oak (sec):	57
Red Oak Smoke Area (%A*Min):	111
Total Fuel Burned (ft ³)	59.68



SUMMARY OF ASTM E84 RESULTS:

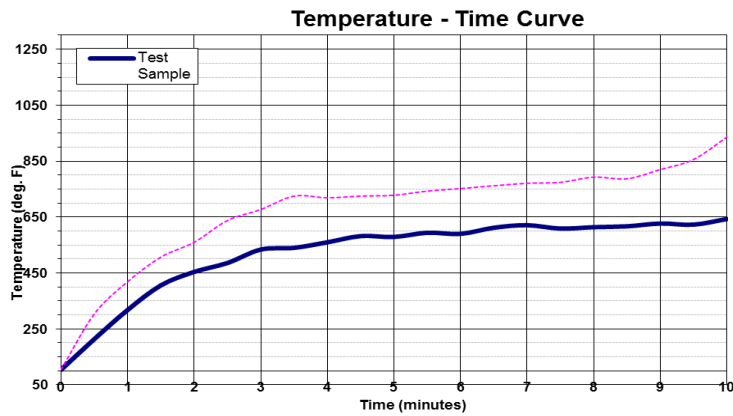
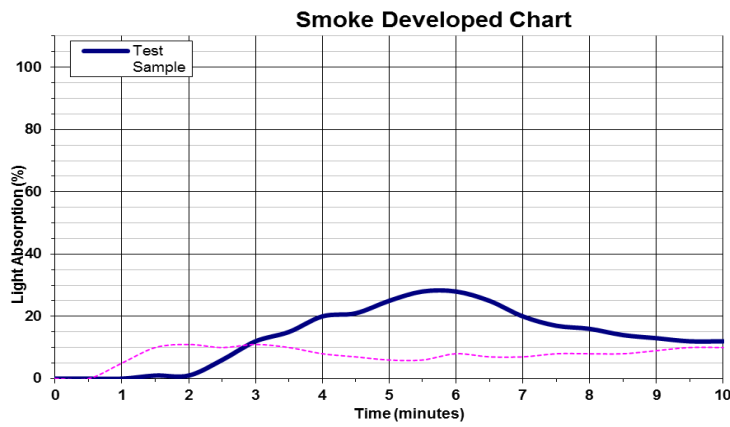
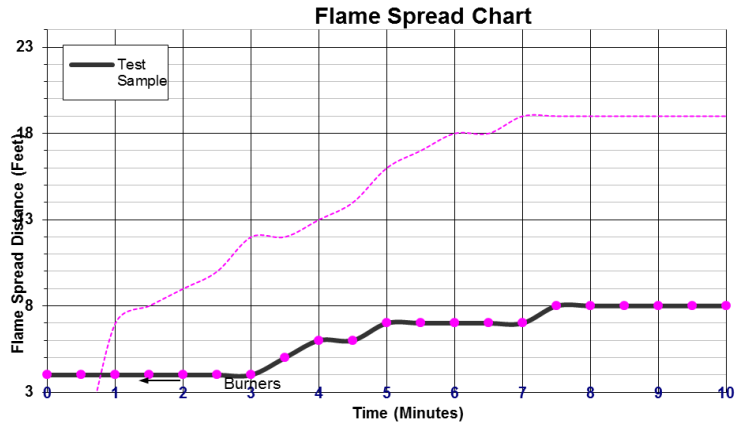
Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.



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CLIENT: CRANE COMPOSITES
Attn: Mike Buhr
23525 W. Eames Street
Channahon, IL 60410

Test Report No: TJ1568-3	Date: October 3, 2013
---------------------------------	------------------------------

SAMPLE ID: The Client submitted and identified the following test material as "Glasbord FSI .075".

SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

DATE OF RECEIPT: Samples were received at QAI facilities on September 18, 2013

TESTING PERIOD: September 24, 2013

AUTHORIZATION: Proposal FB-2013-090901 approved on September 11, 2013

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM Designation E84-12, "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.

TEST RESULTS:	<u>Flame Spread</u>	<u>Smoke Developed</u>
	25	75

CLASSIFICATION: The material tested resulted in a Class A. Detailed test results are presented in the subsequent pages of this report

Prepared By



Jared Weise
Fire Test Technician

**Signed for and on behalf of
QAI Laboratories, Inc.**



J. Brian McDonald
Operations Manager



PREPARATION AND CONDITIONING: The sample was submitted in six 4 foot long panels measuring 24 inches wide and approximately 0.075 inches thick. The sample material was placed into conditioning at 73°F (±5°F) and 50% (±5%) relative humidity until day of testing.

E 84 TEST DATA SHEET:

MOUNTING METHOD: The sample was self-supporting and placed along the ledges of the tunnel during testing. No additional mounting method was used

CLIENT: Crane Composites **DATE:** September 24, 2013

SAMPLE: Glasbord FSI .075

IGNITION: 0 minutes, 33 seconds

FLAME FRONT: 6 feet maximum

TIME TO MAXIMUM SPREAD: 5 minutes, 00 seconds

TEST DURATION: 10 minutes, 00 seconds

SUMMARY: FLAME SPREAD: 25 (25.1 unrounded) **SMOKE DEVELOPED:** 75 (74 unrounded)

OBSERVATIONS:

Sample initially started to discolor and warp prior to ignition. Soon following ignition sample displayed signs of charring, flaking, and shrinking away from flame. Steady flame spread and smoke generation noted for duration of test. Some afterflame was noted at test completion.

CALIBRATION DATA:

Time to Ignition of Last Red Oak (sec):	57
Red Oak Smoke Area (%A*Min):	111
Total Fuel Burned (ft ³)	59.68



SUMMARY OF ASTM E84 RESULTS:

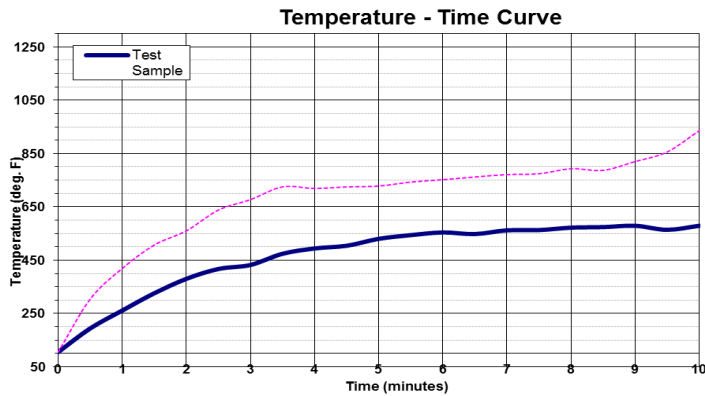
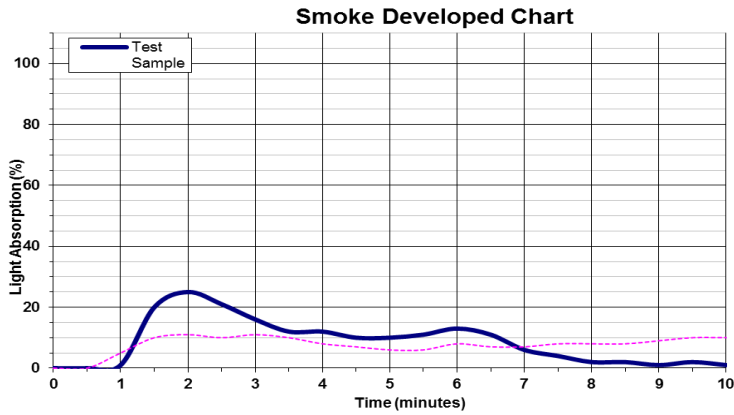
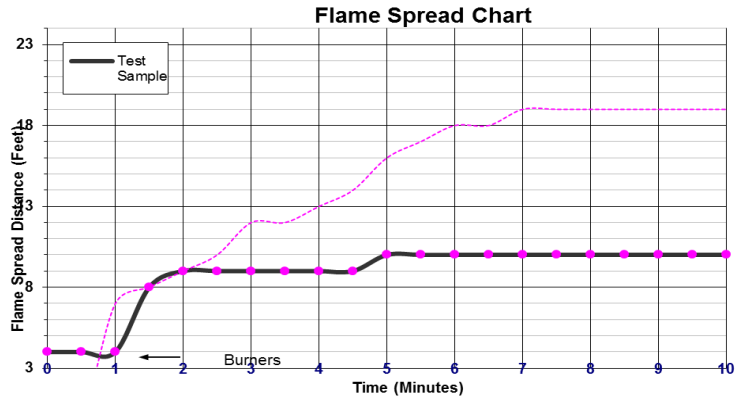
Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.



END OF REPORT

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291 Fairfield Avenue
Fairfield, NJ 07004
Tel: 973-575-5252
Fax: 973 575-0799

REPORT NUMBER: 131121
REF. #: 519295
DATE: October 6, 1999
PAGE: 1 of 2

CLIENT: Crane Kemlite
23525 W. Eames Street
Channahon, IL 60410

Attn: Molly Dickerman

AUTHORIZATION: Letter of authorization received from Molly Dickerman of Crane Kemlite.

SAMPLE DESCRIPTION: One (1) sample received from the client on September 27, 1999. Client identified the sample as: 2585 FSI.

TEST PROCEDURE: The submitted sample was tested for Flammability according to the procedures outlined in FMVSS-302.

TEST DATES: October 5, 1999.

RESULTS: Continued on Page 2.

PREPARED BY:

Linda Kinderman
Technician - Flammability
Textile Services

mh

SIGNED FOR COMPANY BY:

Edward McCarthy
Supervisor Flammability
Textile Services

Member of the SGS Group

ANALYTICAL SERVICES • PERFORMANCE TESTING • STANDARDS EVALUATION • CERTIFICATION SERVICES

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REPORT OF TEST

REPORT NUMBER: 131121
REF. #: 519295
DATE: October 6, 1999
PAGE: 2 of 2

CLIENT: Crane Kemlite

RESULTS:

Flammability of Interior Materials
 FMVSS 302-1992

REPORT OF TEST

<u>Burn Time (secs)</u>		<u>Burn Distance (in)</u>		<u>Burn Rate (in/min)</u>	
<u>MD</u>	<u>XMD</u>	<u>MD</u>	<u>XMD</u>	<u>MD</u>	<u>XMD</u>
DNI	DNI	-	-	-	-
DNI	DNI	-	-	-	-
DNI	DNI	-	-	-	-

DNI = Does Not Ignite

Requirements:

The material shall not burn or transmit a flame front across its surface, at a rate of more than 4 inches per minute. However, if a material stops burning before it has burned for 60 seconds from the start of timing and has not burned more than 2 inches from the point where timing was started, it shall be considered to meet this requirement.

Conclusion:

The submitted sample meets the requirement of the Department of Transportation Motor Vehicle Safety Standard 302 "Flammability of Interior Materials".

 End of Report

CLIENT: CRANE COMPOSITES Inc.
23525 W Eames Street
Channahon, IL 60410

Test Report No: TJ2124

Date: June 6, 2014

SAMPLE ID: The Client submitted and identified the following test material as “GLASBORD PIF 09”

SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

DATE OF RECEIPT: Samples were received at QAI facilities on May 7, 2014

TESTING PERIOD: May 27, 2014

AUTHORIZATION: Signed work order by Tim Ngo on April 25, 2014

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM Designation E84-13, "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.

TEST RESULTS:	<u>Flame Spread</u>	<u>Smoke Developed</u>
	40	235

CLASSIFICATION: The material resulted in a Class B. Detailed test results are presented in the subsequent pages of this report

Prepared By

**Signed for and on behalf of
QAI Laboratories, Inc.**



Jeff Foster
Fire Test Technician



J. Brian McDonald
Operations Manager

PREPARATION AND CONDITIONING: The sample was submitted in six panels that were each 4 feet long measuring 24 inches wide and approximately 1.82 mm thick. The sample material was placed into conditioning at 73°F (±5°F) and 50% (±5%) relative humidity until day of testing.

E 84 TEST DATA SHEET:

MOUNTING METHOD: The sample was supported during testing by 2" hexagonal mesh poultry netting running the length of the test chamber and ¼" round metal rods placed at 2' intervals across the width of the test chamber, with cement board place between the sample and tunnel lid..

CLIENT: CRANE COMPOSITES Inc. **DATE:** June 6, 2014

SAMPLE: GLASBORD PIF 09

IGNITION: 0 minutes, 54 seconds

FLAME FRONT: 9 feet maximum

TIME TO MAXIMUM SPREAD: 3 minute, 00 seconds

TEST DURATION: 10 minutes, 00 seconds

SUMMARY: FLAME SPREAD: 40 (37.4 unrounded) **SMOKE DEVELOPED:** 235 (235 unrounded)

OBSERVATIONS:

The sample began to crackle at 29 seconds, followed by sustained ignition at 54 seconds. At 1 minute 32 seconds the sample could be seen sagging. At the conclusion of the 10 minute test, after burn was witnessed and extinguished by fire tech.

CALIBRATION DATA:

Time to Ignition of Last Red Oak (sec):	57
Red Oak Smoke Area (%A* Min):	111
Total Fuel Burned (ft ³)	59.68



SUMMARY OF ASTM E84 RESULTS:

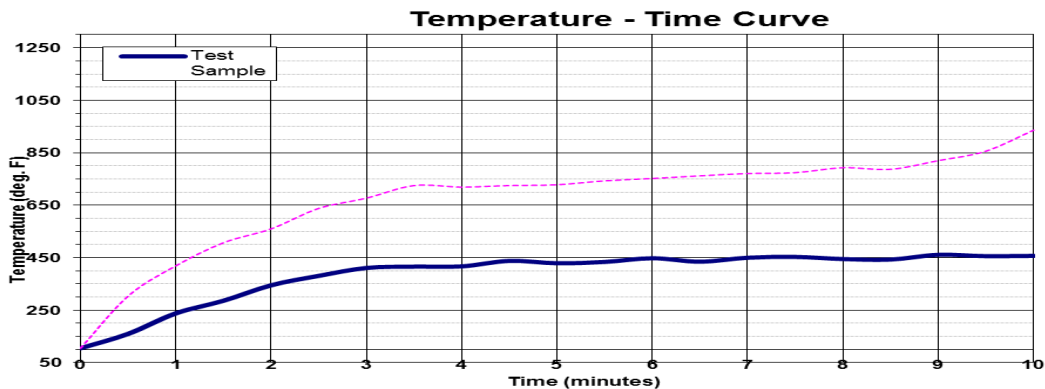
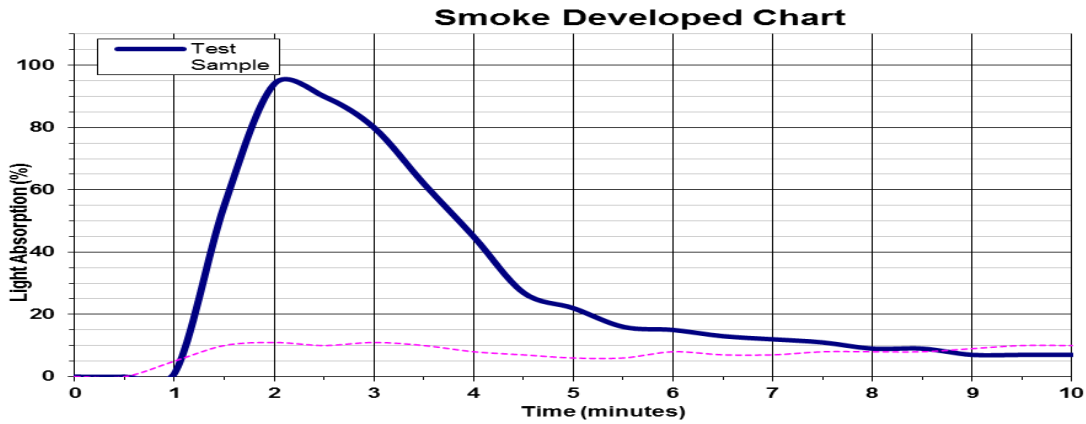
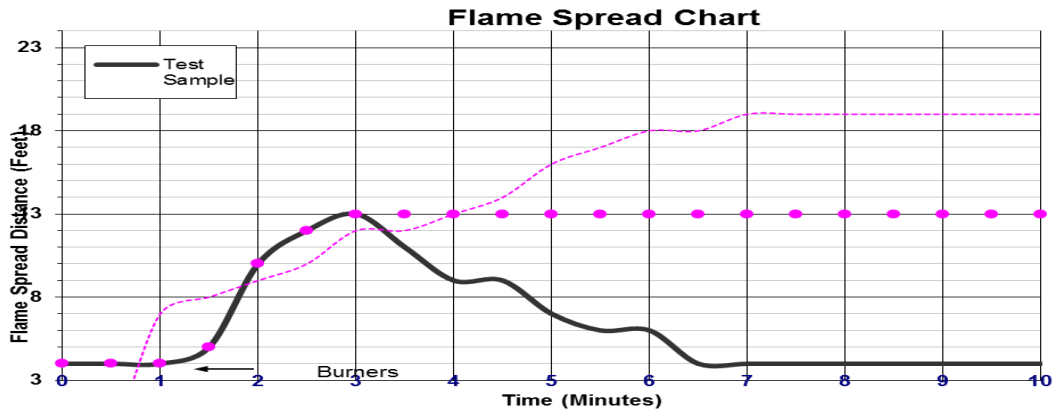
Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.



END OF REPORT

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SGS U.S. Testing Company Inc.

291 Fairfield Avenue • Fairfield, NJ 07004-3833 • Tel: 973-575-5252 • Fax: 973-575-0799

CLIENT: Crane Kemlite
23525 W. Eames Street
Channahon, IL 60410

Attn.: Molly Dickerman

Test Report No: 164736 Date: January 14, 2002

SAMPLES SUBMITTED BY CLIENT AS: K020107-1 & 2 09 PIF MD & CMD
K020104-1 & 2 09 PWI MD & CMD

DATE OF RECEIPT: January 10, 2002

TESTING PERIOD: January 14, 2002

TEST REQUESTED: FMVSS 302

TEST RESULTS: Please refer to page 2

CONCLUSION: The submitted samples meet the requirement of the Department of Transportation Motor Vehicle Safety Standard 302 "Flammability of Interior Materials".

PREPARED BY:

Eduardo E. Rodriguez
Technician - Flammability
Textiles

SIGNED FOR AND ON BEHALF OF
SGS U.S. TESTING COMPANY INC.

Linda Kinderman
Supervisor - Flammability
Textiles

db

Page 1 of 2

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SGS U.S. Testing Company Inc.

US-D-0FS-04-03-Y

Report No.: 164736
Date: 01/14/02
Page: 2 of 2

CLIENT: Crane Kemlite

TEST RESULTS

Flammability of Interior Materials
FMVSS 302-1992

Sample ID: K020107-1 & 2 09 PIF MD & CMD

<u>Burn Time *</u> (secs)		<u>Burn Distance</u> (in)		<u>Burn Rate</u> (in/min)	
<u>MD</u>	<u>CMD</u>	<u>MD</u>	<u>CMD</u>	<u>MD</u>	<u>CMD</u>
300.0	300.0	1.9	2.2	0.4	0.4
300.0	300.0	2.2	1.5	0.4	0.3
300.0	300.0	2.7	1.6	0.5	0.3

Sample ID: K020104-1 & 2 09 PWI MD & CMD

300.0	300.0	3.0	2.4	0.6	0.5
300.0	300.0	2.6	2.0	0.5	0.4
300.0	300.0	2.9	2.6	0.6	0.5

* The test was discontinued after 5 minutes.

Requirements : The material shall not burn or transmit a flame front across its surface, at a rate of more than 4 inches per minute. However, if a material stops burning before it has burned for 60 seconds from the start of timing and has not burned more than 2 inches from the point where timing was started, it shall be considered to meet this requirement.

****End of Report****



Fire Testing Laboratory



TEST REPORT for

Crane Composites, Inc

8015 Dixon Drive
Florence, KY 41042

Surface Burning Characteristics of Building Materials

ASTM E-84-08

Test Report No: FH-1902-1

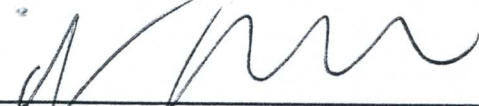
Assignment No: H-581

Test Date: 2/16/2009

Report Date: 10/12/2009

Subject Material: FTSTF

Prepared by: 
Richard A. Costolnick
Senior Test Engineer

Reviewed by: 
Robert J. Menchetti
Director, Laboratory Facilities
and Testing Services

The results reported in this document apply to specific samples submitted for measurement. No responsibility is assumed for performance of any other specimen. This report may not be reproduced, except in full, without the written approval of the laboratory. The laboratory's test reports in no way constitutes or implies product certification, approval or endorsement by this laboratory.

MATERIAL TESTED:

Material submitted by Crane Composites, Inc., Florence, KY was identified and described by the client as:

0.090 in. thick FTSTF FRP

The material was provided 24 in. wide x 8 ft.

The tests were conducted by placing the material in the furnace end to end, and butted tightly together to achieve the required 24 lineal feet.

METHOD OF SUPPORT:

A continuous length of 2.0 in. hexagonal poultry netting was placed atop 1/4" dia. steel rods spaced 24 in. on center. The test samples were placed over the netting, end to end, and butted tightly together to achieve the required 24 lineal feet

LID PROTECTION:

1/4 in. thick non- combustible fiber reinforced cement board was placed over the test specimen as lid protection.

RESULTS:

The results can be found on page 3 of this report.

RESULTS:

<u>TEST NO.</u>	<u>MATERIAL TESTED</u>	<u>SIDE EXPOSED</u>	<u>SUPPORT</u>	<u>CALCULATED FLAME SPREAD</u>	<u>CALCULATED SMOKE DEVELOPED</u>
1	0.090 in. FTSTF FRP	SYMMETRICAL	WIRE & RODS	142.53	292.09



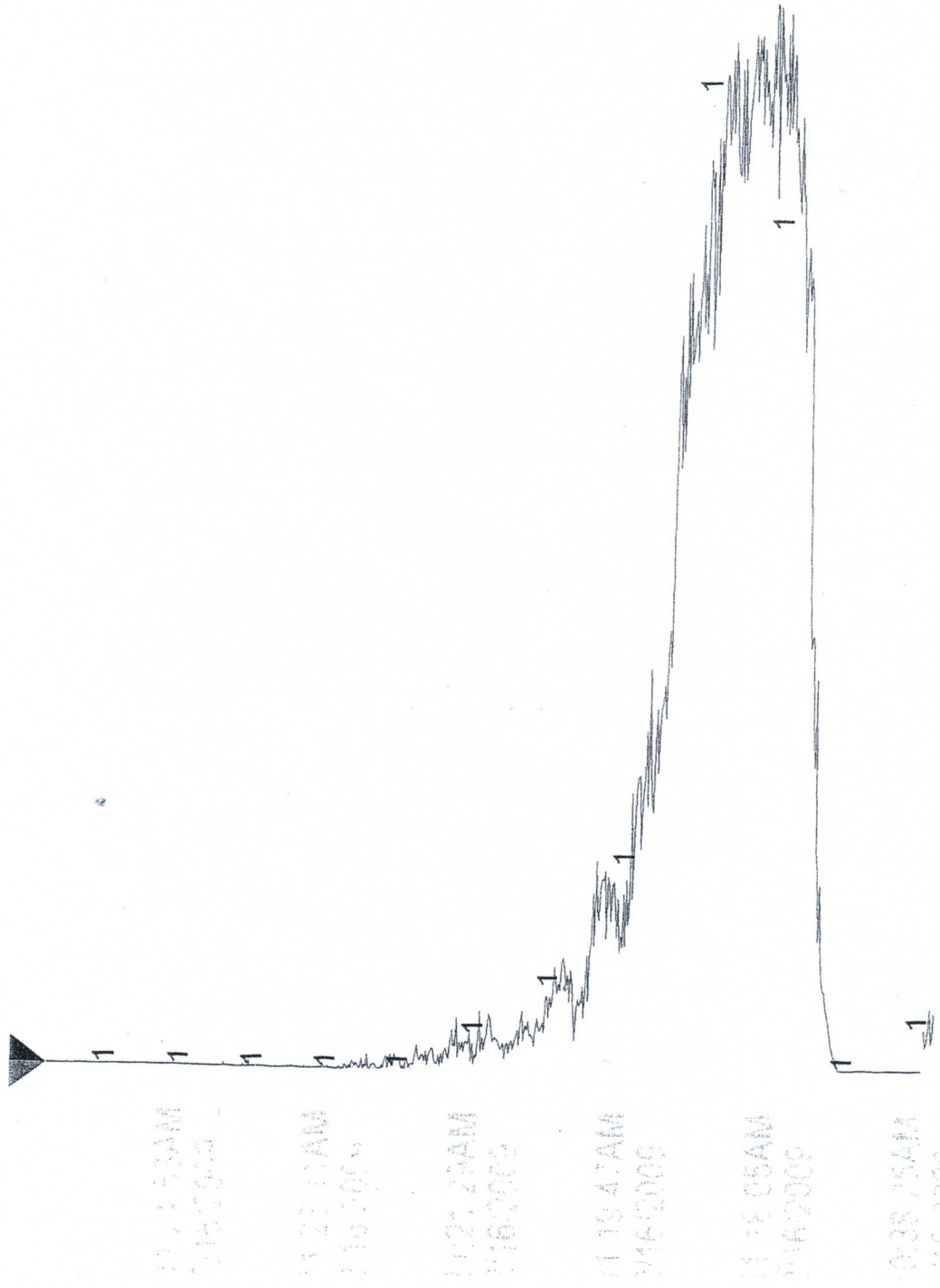
<u>MATERIAL TESTED</u>	<u>SIDE EXPOSED</u>	<u>SUPPORT</u>	<u>FLAME SPREAD INDEX*</u>	<u>SMOKE DEVELOPED INDEX*</u>
RED OAK FLOORING	FINISH	DECKS	100	100
REINFORCED CEMENT BOARD	SYMMETRICAL	SELF	0	0
0.090 in. FTSTF FRP	SYMMETRICAL	WIRE & RODS	145	300

CLASSIFICATION	FSI	SDI
CLASS "A"	<25	0-450
CLASS "B"	26-75	0-450
CLASS "C"	76-200	0-450

* Flame Spread/Smoke Developed Index is the result (or average of the results of multiple tests), rounded to the nearest multiple of 5. Smoke Developed in excess of 200, rounded to the nearest 50.

T1 INPUTOV

Analog In 1



FH-1902-1
 CRANE COMPOSITES
 0.090" FTSTF
 FRP
 RODS & WIRE

$A = 4.67 \text{ m}^2$
 $SD = 292.09$

FACE TAG INPUTOV UNITS MV DESCRIPTOR Analog In 1 HI-LIM 10.000 LO-LIM 0.0000



Fire Testing Laboratory

DATE: 2/16/2009

TEST #: FH-1902-1

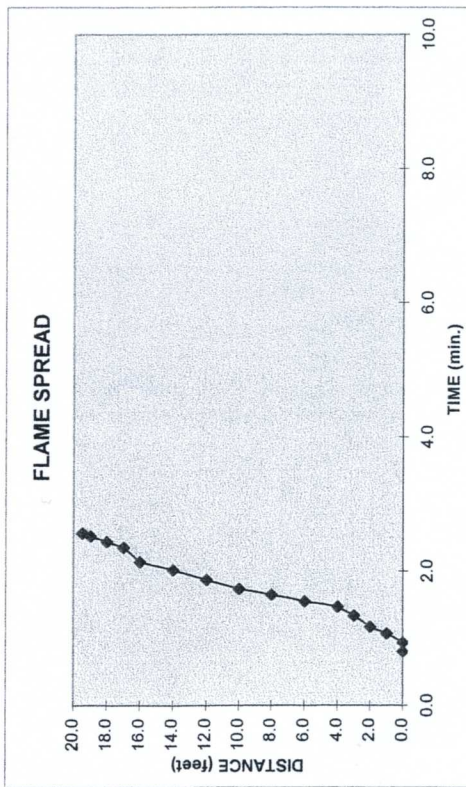
TEST METHOD: ASTM E-84-08

CLIENT: CRANE COMPOSITES

ADC DRAFT (IN. H2O) 0.082
 GAS PRESS. (IN. H2O) 0.290
 GAS VOL. (CF) 49.98
 BTU/cf 997
 SHUTTER 3"
 TEMP. 13' BURIED 105°F

PROJECT #: H-581
 SAMPLE: FRP
 MATERIAL: 0.090" FTSTF
 METHOD OF SUPPORT: RODS & WIRE
 REMARKS: IGNITION :48
 MAX. FLAME FRONT 19.5 FT. @2:34

FLAME SPREAD- 142.53
AREA UNDER THE CURVE (min.-ft.) 160.62
SMOKE DEVELOPED- 292.09



#	TIME (Min.)	TIME (Sec.)	DISTANCE (Ft.)
1	0	48	0.0
2	0	56	0.0
3	1	4	1.0
4	1	10	2.0
5	1	20	3.0
6	1	28	4.0
7	1	33	6.0
8	1	39	8.0
9	1	44	10.0
10	1	52	12.0
11	2	1	14.0
12	2	8	16.0
13	2	21	17.0
14	2	26	18.0
15	2	31	19.0
16	2	34	19.5
17			
18			
19			
20			

WITNESSED BY: *[Signature]*

1650 MILITARY ROAD, BUFFALO, 14217 TEL 716-873-9750 FAX 716-873-9753

E-MAIL ngctest@ngctestingservices.com



Fire Testing Laboratory



TEST REPORT for

Crane Composites, Inc

8015 Dixon Drive
Florence, KY 41042

Surface Burning Characteristics of Building Materials

ASTM E-84-08


Test Report No: FH-1907-1

Assignment No: H-587

Test Date: 2/26/2009

Report Date: 10/13/2009

Subject Material: 0.12" FTSTF FRP Panels

Prepared by: 
Richard A. Costolnick
Senior Test Engineer

Reviewed by: 
Robert J. Menchetti
Director, Laboratory Facilities
and Testing Services

The results reported in this document apply to specific samples submitted for measurement. No responsibility is assumed for performance of any other specimen. This report may not be reproduced, except in full, without the written approval of the laboratory. The laboratory's test reports in no way constitutes or implies product certification, approval or endorsement by this laboratory.



MATERIAL TESTED:

Material submitted by Crane Composites, Inc., Florence, KY was identified and described by the client as:

FRP Panels:

0.120 in. thick FTSTF

The material was provided 24 in. wide x 8 ft.. lengths.

The tests were conducted by placing the material in the furnace end to end, and butted tightly together to achieve the required 24 lineal feet.

METHOD OF SUPPORT:

A continuous length of 2.0 in. hexagonal poultry netting was placed atop 1/4" dia. steel rods spaced 24 in. on center. The test samples were placed over the netting, end to end, and butted tightly together to achieve the required 24 lineal feet

LID PROTECTION:

1/4 in. thick non- combustible fiber reinforced cement board was placed over the test specimen as lid protection.

RESULTS:

The results can be found on page 3 of this report.

RESULTS:

<u>TEST NO.</u>	<u>MATERIAL TESTED</u>	<u>SIDE EXPOSED</u>	<u>SUPPORT</u>	<u>CALCULATED FLAME SPREAD</u>	<u>CALCULATED SMOKE DEVELOPED</u>
1	0.120 in. FTSTF FRP	SYMMETRICAL	WIRE & RODS	116.78	471.70

<u>MATERIAL TESTED</u>	<u>SIDE EXPOSED</u>	<u>SUPPORT</u>	<u>FLAME SPREAD INDEX*</u>	<u>SMOKE DEVELOPED INDEX*</u>
RED OAK FLOORING	FINISH	DECKS	100	100
REINFORCED CEMENT BOARD	SYMMETRICAL	SELF	0	0
0.120 in. FTSTF FRP	SYMMETRICAL	WIRE & RODS	115	450

CLASSIFICATION	FSI	SDI
CLASS "A"	<25	0-450
CLASS "B"	26-75	0-450
CLASS "C"	76-200	0-450

* Flame Spread/Smoke Developed Index is the result (or average of the results of multiple tests), rounded to the nearest multiple of 5. Smoke Developed in excess of 200, rounded to the nearest 50.

Fire Testing Laboratory

DATE: 2/26/2009
 TEST #: FH-1907-1

TEST METHOD: ASTM E-84-08

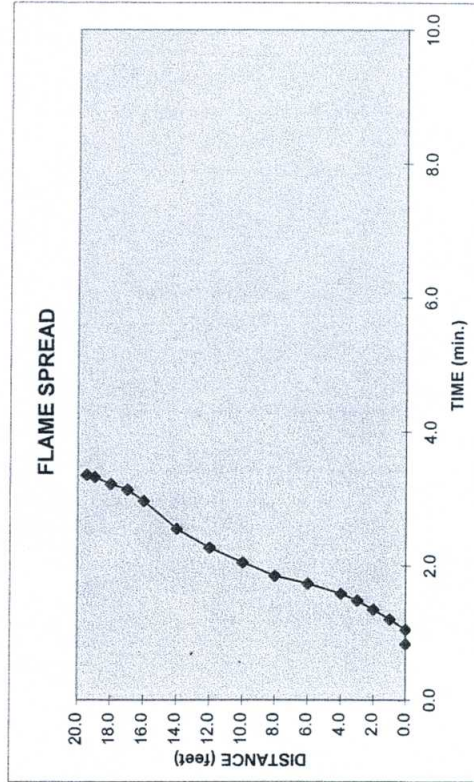
CLIENT: CRANE COMPOSITES

PROJECT #: H-587
 SAMPLE: FRP
 MATERIAL: 0.12" FTSTF
 METHOD OF SUPPORT: RODS & WIRE
 REMARKS: IGNITION :50
 MAX. FLAME FRONT 19.5 FT. @ 3:21

ADC DRAFT (IN. H2O) 0.082
 GAS PRESS. (IN. H2O) 0.289
 GAS VOL. (CF) 49.92
 BTU/cf 1002
 SHUTTER 3"
 TEMP. 13' BURIED 105 °F



FLAME SPREAD- 116.78
AREA UNDER THE CURVE (min.-ft.) 153.04
SMOKE DEVELOPED- 471.70



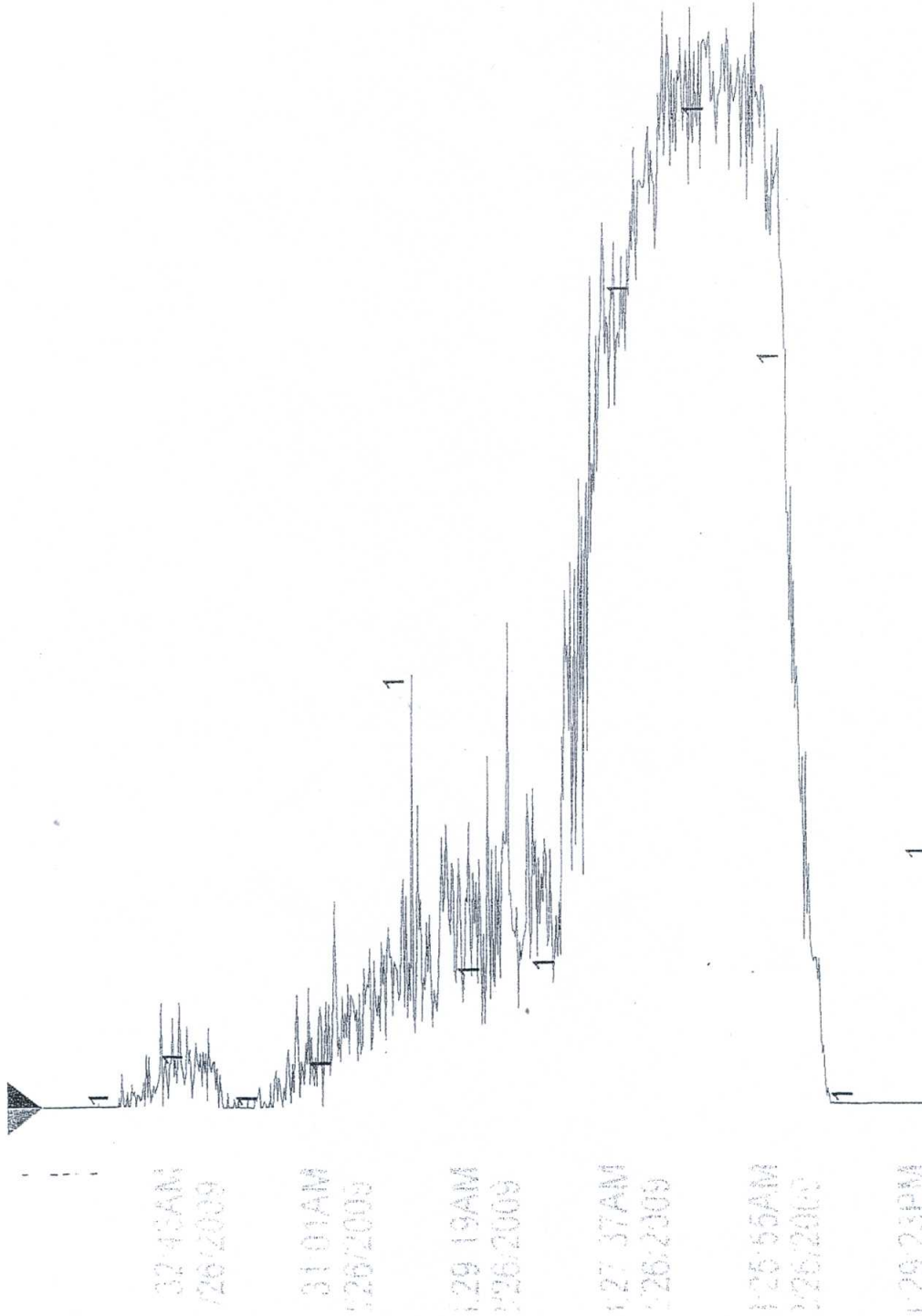
#	TIME (Min.)	TIME (Sec.)	DISTANCE (Ft.)
1	0	50	0.0
2	1	3	0.0
3	1	12	1.0
4	1	21	2.0
5	1	29	3.0
6	1	35	4.0
7	1	44	6.0
8	1	51	8.0
9	2	3	10.0
10	2	16	12.0
11	2	33	14.0
12	2	58	16.0
13	3	8	17.0
14	3	13	18.0
15	3	19	19.0
16	3	21	19.5
17			
18			
19			
20			

WITNESSED BY: *[Signature]*

E-MAIL: ngctest@ngctestingservices.com

1650 MILITARY ROAD, BUFFALO, 14217 TEL 716-873-9750 FAX 716-873-9753

INPUTOV Analog In 1



MV

10.000

2:4 24 AM 2/26/2009

FH-1907-1
 CRANE COMPOSITES
 .012" FTS TF
 FRP
 WIRE & RODS

5:19:59.01

$A = 7.55 \text{ m}^2$
 $SD = 471.70$

1:29 23 PM 2/26/2009

RACE TAG UNITS DESCRIPTOR HI-LIM LO-LIM
 INPUTOV MV Analog In 1 10.000 0.0000



Progressive Engineering Inc.

CRANE COMPOSITES

FMVSS and CMVSS 302
Flammability of Interior Materials Test

5/12/2014



This test report contains ten (10) pages, including the cover sheet. Any additions to, alterations of, or unauthorized use of excerpts from this report are expressly forbidden.

2014-772

1. TITLE

FMVSS and CMVSS 302 Flammability of Interior Materials Test

2. OBJECTIVE

To test the interior finish materials of the motor vehicle per the safety standards mentioned in Section 6 of this report.

This test report pertains only to the specimens tested. It remains the sole responsibility of the manufacturer to provide a product consistent to that which was tested.

3. TESTED FOR

Crane Composites
2424 E. Kercher Road
Goshen, IN 46526

4. TESTING ORGANIZATION

Progressive Engineering Inc.

58640 State Road 15
Goshen, IN 46528
www.p-e-i.com

See IAS Evaluation Report TL-178 for ISO 17025 Accreditation.

5. TESTING PERSONNEL

Director of Testing - Jason R. Holdeman
Technician - Todd Miller



6. REFERENCE STANDARDS

Federal Motor Vehicle Safety Standard (FMVSS) 302 - as stated in the Code of Regulations Title 49, Volume 5, Section S571.302 (10-1-12 Edition).

Canadian Motor Vehicle Safety Standards (CMVSS) Standard 302 - Date Modified: 2012-02-06

7. TEST EQUIPMENT

- A. Pre-Conditioning Room
- B. Burn Chamber (PEI No. 269)
- C. Stop Watch

8. TEST SPECIMEN

See attached data pages for specimen descriptions.

9. TEST SPECIMEN CONSTRUCTION

The test specimens were cut into a 4" x 14" x 1/2" thick (maximum) piece for testing. (Where ideal specimen size could not be attained, the closest matching specimen size was used or the actual shape of the finished product.)

10. TEST SPECIMEN CONDITIONING

The test specimens were conditioned at 70 °F and 50% RH for a minimum of twenty-four (24) hours prior to testing.

11. TEST PROCEDURE

- A. Test specimen is mounted in between matching "U" brackets.
- B. Test specimen is then placed in metal cabinet.
- C. Bunsen burner flame is then exposed to end of test sample for fifteen (15) seconds.
- D. The time required for the flame to travel from 1-1/2" in from the open end of the "U" bracket to 1-1/2" in from the closed end of the "U" bracket is measured and recorded.
- E. The rate of burn is then calculated and recorded.

12. TEST RESULTS

See the attached data sheets for test results.

Progressive Engineering Inc.
FMVSS & CMVSS 302 FLAMMABILITY TEST

Client: Crane Composites

Sample Description: FTSTF 090 skin material with an average measured thickness of 0.078". Specimen details provided by Marcus Ulmer of Crane Composites.

Samples Received on: 5/9/2014

PRECONDITIONING

	Date	Time	Temp.	Rel. Hum.
Start	5/9/2014	6:39	72deg.F.	52%
Stop	5/12/2014	1:05	72deg.F.	51%

TEST DATA

Date	Travel Time (s)	Travel Distance	Comments / Observations
5/12/2014	600.0 sec	5.4"	The specimen burned slowly producing lots of thick black smoke with no flaming drips.

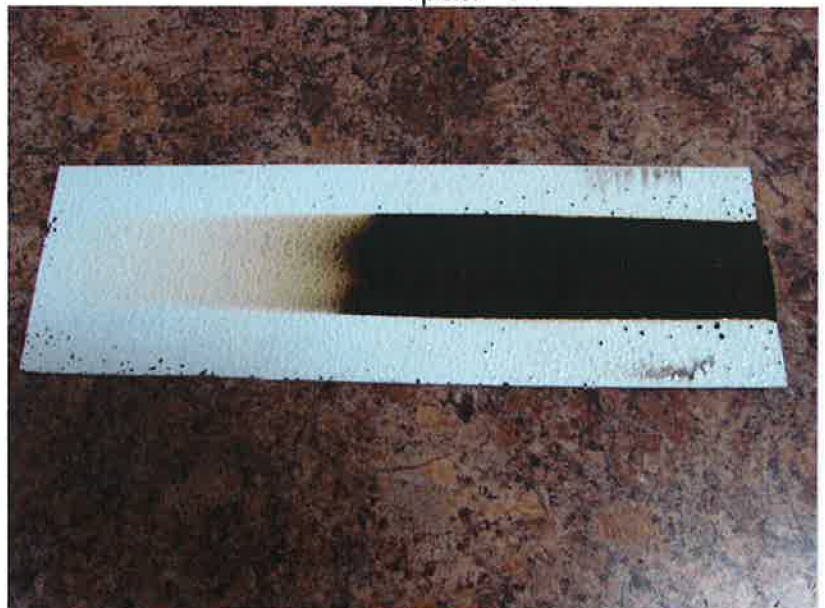
TEST RESULTS

Based on the data above the following Burn Rate (B_r) was obtained. Burn rate is defined as "Travel Distance" divided by the "Travel Time" (in minutes)

Burn Rate	Pass	Fail
0.54"/min	✓	

A PASS is considered a Burn Rate (B_r) of LESS than 4" per minute.

Tested Specimen



CLIENT: **CRANE COMPOSITES**
Attn. Michelle Bauer
8015 Dixon Dr
Florence, KY 410142

Test Report No: TJ0870

Date: October 15, 2012

SAMPLE ID: The Client submitted and identified the following test material as **"PSIF .075"**.

SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

DATE OF RECEIPT: Samples were received at QAI on **October 1, 2012**

TESTING PERIOD: October 9, 2012.

AUTHORIZATION: Proposal Number FB090512-3 submitted on September 26, 2012.

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM Designation E84-12, "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.

TEST RESULTS: Flame Spread Smoke Developed

115

165

Detailed test results are presented in the subsequent pages of this report

Prepared By

**Signed for and on behalf of
QAI Laboratories, Inc.**



Gregory Ertel
Fire Test Technician



J. Brian McDonald
Operations Manager



PREPARATION AND CONDITIONING: The sample material was submitted in sufficient quantity to form a specimen 21" wide by 24' long consisting of 6 four feet long pieces, with a nominal .075 inch thickness. The sample was supported during testing by 2" hexagonal mesh poultry netting running the length of the test chamber and 1/4" round metal rods placed at 2' intervals across the width of the test chamber.

E 84 TEST DATA SHEET:

CLIENT: CRANE COMPOSITES **DATE:** October 9, 2012

SAMPLE: PSIF .075

IGNITION: 0 minutes, 45 seconds

FLAME FRONT: 24 feet maximum

TIME TO MAXIMUM SPREAD: 3 minutes, 30 seconds

TEST DURATION: 10 minutes, 00 seconds

SUMMARY: FLAME SPREAD: 115 (117.1)

SMOKE DEVELOPED:165 (163)

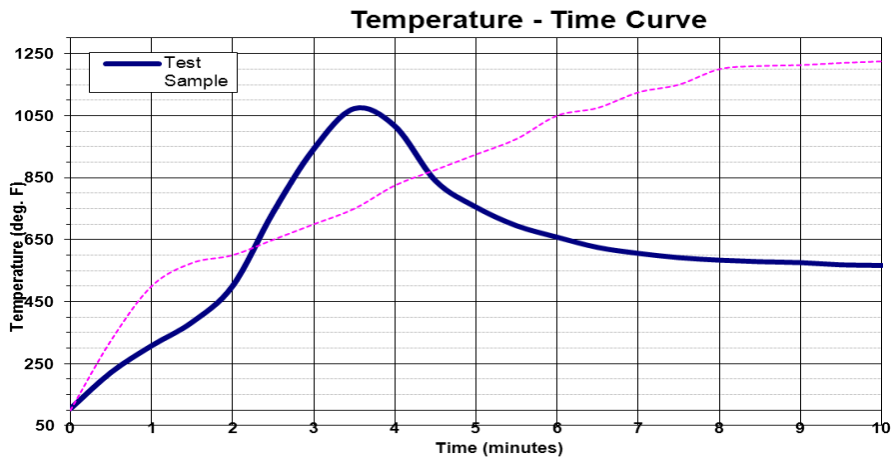
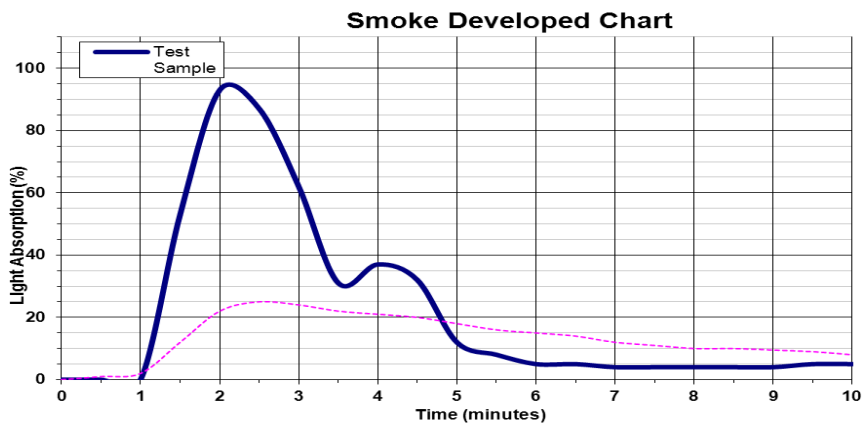
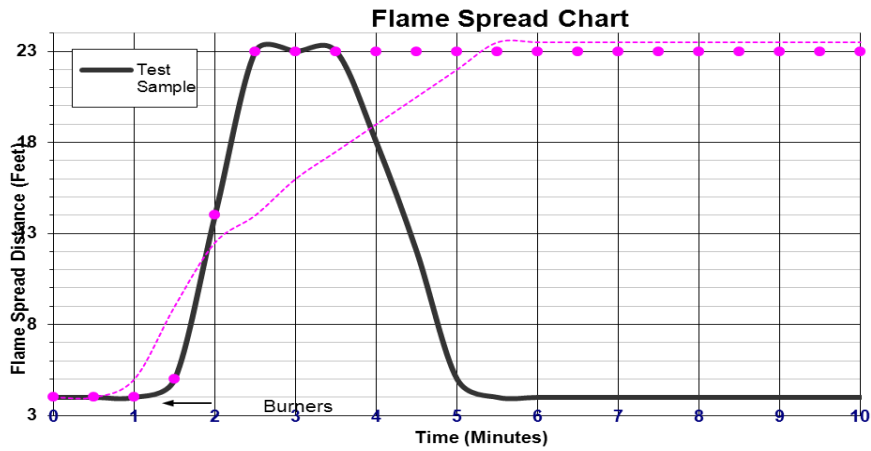
SUMMARY OF ASTM E84 RESULTS: Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.



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CLIENT: CRANE COMPOSITES
Attn: Mike Buhr
23525 W. Eames Street
Channahon, IL 60410

Test Report No: TJ1319-9	Date: October 3, 2013
---------------------------------	------------------------------

SAMPLE ID: The Client submitted and identified the following test material as “**Glasbord CGI .100**”.

SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

DATE OF RECEIPT: Samples were received at QAI facilities on September 18, 2013

TESTING PERIOD: September 24, 2013

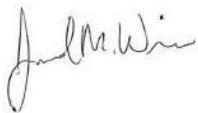
AUTHORIZATION: Proposal FB050213-1 R1 approved on September 11, 2013

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM Designation E84-12, "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.

TEST RESULTS:	<u>Flame Spread</u>	<u>Smoke Developed</u>
	85	250

CLASSIFICATION: The material tested resulted in a Class C. Detailed test results are presented in the subsequent pages of this report

Prepared By



Jared Weise
Fire Test Technician

**Signed for and on behalf of
QAI Laboratories, Inc.**



J. Brian McDonald
Operations Manager



PREPARATION AND CONDITIONING: The sample was submitted in six 4 foot long panels measuring 24 inches wide and approximately 0.05 inches thick. The sample material was placed into conditioning at 73°F (±5°F) and 50% (±5%) relative humidity until day of testing.

E 84 TEST DATA SHEET:

MOUNTING METHOD: The sample was self-supporting and placed along the ledges of the tunnel during testing. No additional mounting method was used

CLIENT: Crane Composites **DATE:** September 24, 2013

SAMPLE: Glasbord CGI .100

IGNITION: 0 minutes, 55 seconds

FLAME FRONT: 17 feet maximum

TIME TO MAXIMUM SPREAD: 3 minutes, 00 seconds

TEST DURATION: 10 minutes, 00 seconds

SUMMARY: FLAME SPREAD: 85 (84.6 unrounded) **SMOKE DEVELOPED:** 250 (265 unrounded)

OBSERVATIONS:

Sample initially started to discolor and warp prior to ignition. Soon following ignition sample displayed signs of charring, flaking, and shrinking away from flame. Steady flame spread to window 17 and subsequent recession of flame and smoke generation noted for duration of test. Moderate afterflame was noted at test completion.

CALIBRATION DATA:

Time to Ignition of Last Red Oak (sec):	57
Red Oak Smoke Area (%A*Min):	111
Total Fuel Burned (ft ³)	59.68



SUMMARY OF ASTM E84 RESULTS:

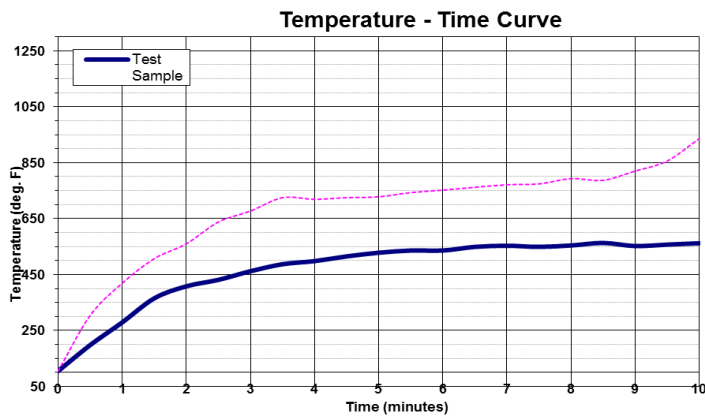
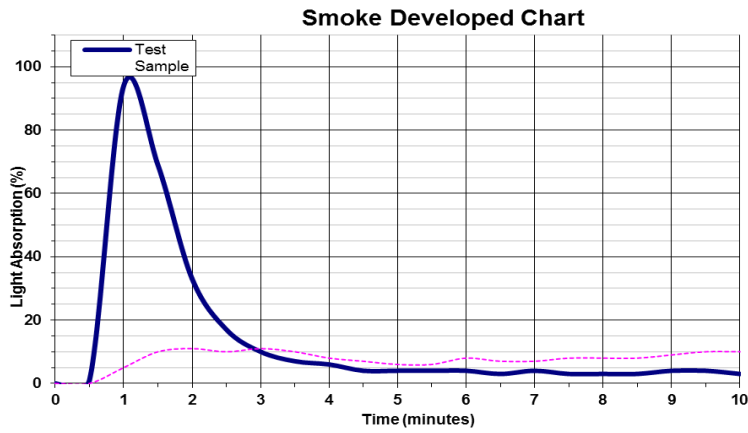
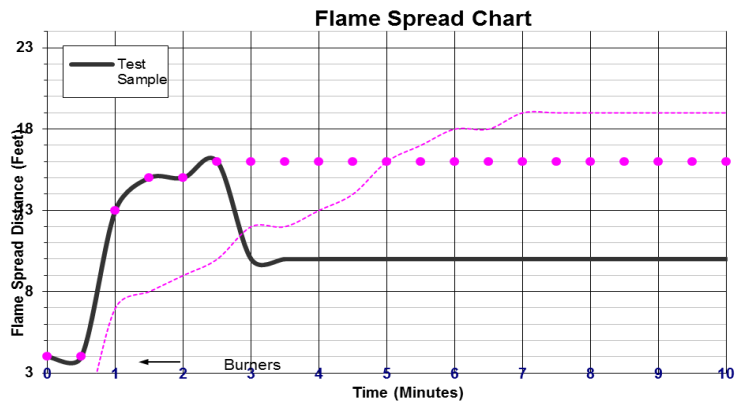
Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.



END OF REPORT

THIS REPORT IS THE CONFIDENTIAL PROPERTY OF THE CLIENT ADDRESSED. THE REPORT MAY ONLY BE REPRODUCED IN FULL. PUBLICATION OF EXTRACTS FROM THIS REPORT IS NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM QAI. ANY LIABILITY ATTACHED THERETO IS LIMITED TO THE FEE CHARGED FOR THE INDIVIDUAL PROJECT FILE REFERENCED. THE RESULTS OF THIS REPORT PERTAIN ONLY TO THE SPECIFIC SAMPLE(S) EVALUATED.

CLIENT: CRANE COMPOSITES
Attn: Mike Buhr
23525 W. Eames Street
Channahon, IL 60410

Test Report No: TJ1319-8	Date: October 3, 2013
---------------------------------	------------------------------

SAMPLE ID: The Client submitted and identified the following test material as "**Glasbord PWI .050**".

SAMPLING DETAIL: Test samples were submitted to the laboratory directly by the client. No special sampling conditions or sample preparation were observed by QAI.

DATE OF RECEIPT: Samples were received at QAI facilities on September 18, 2013

TESTING PERIOD: September 24, 2013

AUTHORIZATION: Proposal FB050213-1 R1 approved on September 11, 2013

TEST REQUESTED: Perform standard flame spread and smoke density developed classification tests on the sample supplied by the Client in accordance with ASTM Designation E84-12, "Standard Method of Test for Surface Burning Characteristics of Building Materials". The foregoing test procedure is comparable to UL 723, ANSI/NFPA No. 255, and UBC No. 8-1.

TEST RESULTS:	<u>Flame Spread</u>	<u>Smoke Developed</u>
	55	155

CLASSIFICATION: The material tested resulted in a Class B. Detailed test results are presented in the subsequent pages of this report

Prepared By



Jared Weise
Fire Test Technician

**Signed for and on behalf of
QAI Laboratories, Inc.**



J. Brian McDonald
Operations Manager



PREPARATION AND CONDITIONING: The sample was submitted in six 4 foot long panels measuring 24 inches wide and approximately 0.05 inches thick. The sample material was placed into conditioning at 73°F (±5°F) and 50% (±5%) relative humidity until day of testing.

E 84 TEST DATA SHEET:

MOUNTING METHOD: The sample was self-supporting and placed along the ledges of the tunnel during testing. No additional mounting method was used

CLIENT: Crane Composites **DATE:** September 24, 2013

SAMPLE: Glasbord PWI .050

IGNITION: 0 minutes, 29 seconds

FLAME FRONT: 6 feet maximum

TIME TO MAXIMUM SPREAD: 3 minutes, 00 seconds

TEST DURATION: 10 minutes, 00 seconds

SUMMARY: FLAME SPREAD: 55 (56.5 unrounded) **SMOKE DEVELOPED:** 105 (106 unrounded)

OBSERVATIONS:

Sample initially started to discolor and warp prior to ignition. Soon following ignition sample displayed signs of charring, flaking, and shrinking away from flame. Steady flame spread and smoke generation noted for duration of test. No afterflame was noted at test completion.

CALIBRATION DATA:

Time to Ignition of Last Red Oak (sec):	57
Red Oak Smoke Area (%A*Min):	111
Total Fuel Burned (ft ³)	59.68



SUMMARY OF ASTM E84 RESULTS:

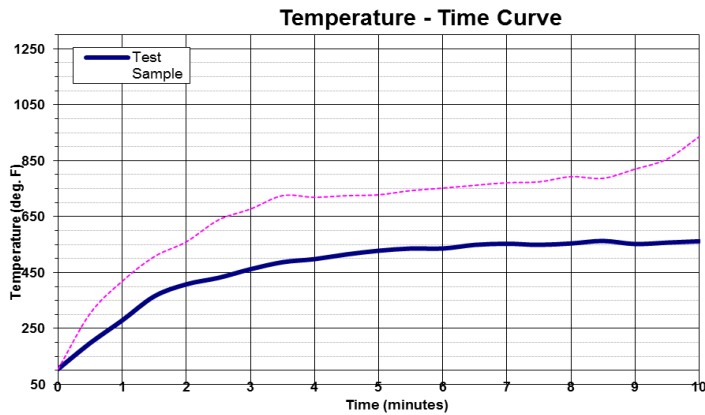
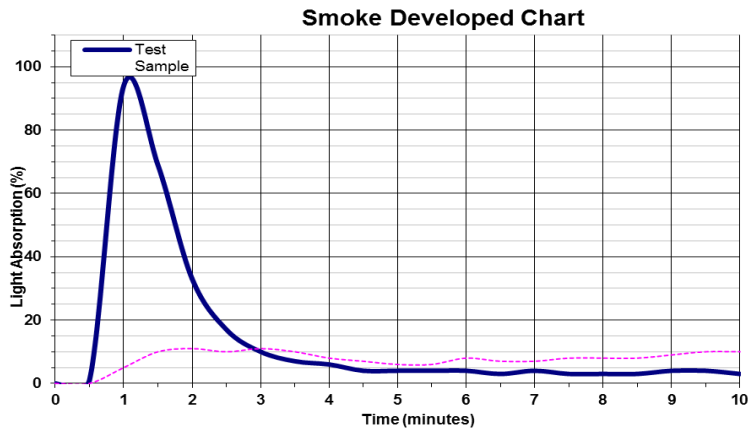
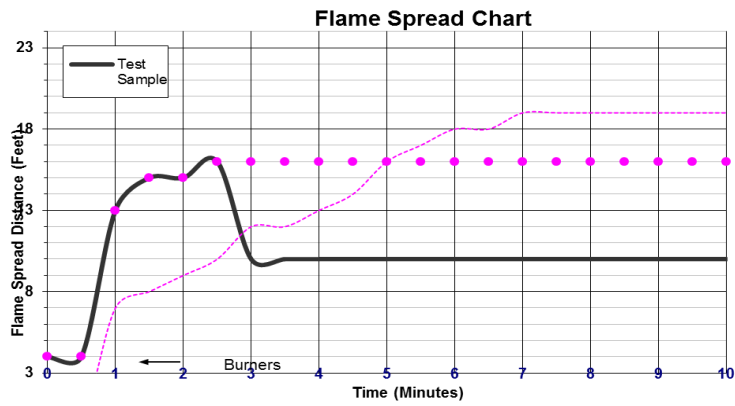
Because of the possible variations in reproducibility, the results are adjusted to the nearest figure divisible by 5. Smoke Density values over 200 are rounded to the nearest figure divisible by 50.

In order to obtain the Flame Spread Classification, the above results should be compared to the following table:

<u>NFPA CLASS</u>	<u>IBC CLASS</u>	<u>FLAME SPREAD</u>	<u>SMOKE DEVELOPED</u>
A	A	0 through 25	Less than or equal to 450
B	B	26 through 75	Less than or equal to 450
C	C	76 through 200	Less than or equal to 450

BUILDING CODES CITED:

1. National Fire Protection Association, ANSI/NFPA No. 101, "Life Safety Code", 2006 Edition.
2. International Building Code, 2006 Edition, Chapter 8, Interior Finishes, Section 803.



END OF REPORT

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ASTM E84-98
SURFACE BURNING
CHARACTERISTICS

Glasbord 090 PWI

Report No. 15844 - 105362

August 16, 1999

Prepared For:

Kemlite Company
23525 W. Eames Street
Channahan, IL 60410, U.S.A.

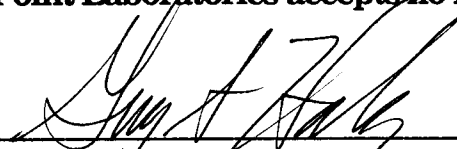


ABSTRACT

Test Material:	Glasbord 090 PWI		
Test Standard:	ASTM E84-98 Standard Test Method for SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS (ANSI 2.5, NFPA 255, UBC 8-1, UL 723)		
Test Date:	August 11, 1999		
Test Sponsor:	Kemlite Company		
Test Results:	FLAME SPREAD INDEX	=	150
	SMOKE DEVELOPED INDEX	=	250

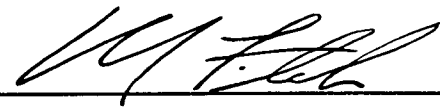
The description of the test procedure and specimen evaluated, as well as the observations and results obtained, contained herein are true and accurate within the limits of sound engineering practice. These results are valid only for the specimen(s) tested and may not represent the performance of other specimens from the same or other production lots.

Omega Point Laboratories, Inc. authorizes the client named herein to reproduce this report only if reproduced in its entirety. The test specimen identification is as provided by the client and Omega Point Laboratories accepts no responsibility for any inaccuracies therein.



Guy A. Haby
Fire Test Technologist

Date: August 16, 1999



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

Date: August 16, 1999



I. INTRODUCTION

This report describes the results of the ASTM E84-98 Standard Test Method for SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS (1), 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.

(1) American Society for Testing and Materials (ASTM), Committee E-5 on Fire Standards



II. PURPOSE

The ASTM E84-98 (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 for both flame spread and smoke developed indexes, while the red oak flooring smoke developed index is set as 100.

III. DESCRIPTION OF TEST SPECIMENS

Specimen Identification: Glasbord 090 PWI

Date Received: 8/6/99
Date Prepared: August 6, 1999
Conditioning (73°F & 50% R.H.): 5 days
Specimen Width (in): 24
Specimen Length (ft): 24
Specimen Thickness: 0.085 in.
Material Weight: N/A oz./sq. yd.
Total Specimen Weight: 31.97 lbs.
Adhesive or coating application rate: N/A

Mounting Method:

The specimen was self-supporting and was placed directly on the inner ledges on the tunnel.

Specimen Description:

The specimen was described by the client as the "Glasbord 090 PWI". The specimen consisted of (6) 24 in. wide x 48 in. long sections of white "Glasbord".



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
Glasbord 090 PWI	150	250

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 specimen began to discolor at 0:30 (min:sec). Transient ignition began at 0:42 and steady ignition began at 1:01. All flame on the specimen ceased at 7:15. The test continued for the 10:00 duration.

After the test, the specimen was observed to be damaged in the following manner: The specimen was flame bleached from 0 ft. - 4 ft. The specimen had a heavy black discoloration from 4 ft. - 24 ft.



APPENDIX

DATA SHEETS



ASTM E84 DATASHEETS

Client: KEMLITE

Date: 8/11/99

Time: 1:38 PM

Test Number: 3

Project Number: 15844-105362

Operator: CH/ES

Specimen ID: GLASBORD 090 PWI

THERE WERE SIX 4 FT. LONG X 2 FT. WIDE SECTIONS THAT WERE PLACED INTO THE TUNNEL FURNACE FOR TESTING
THE TEXTURED SIDE OF THE SPECIMEN WAS FACING THE TUNNEL FURNACE FLOOR DURING THE TEST

TEST RESULTS

FLAMESPREAD INDEX: 150

SMOKE DEVELOPED INDEX: 250

SPECIMEN DATA . . .

Time to Ignition (sec): 61

Time to Max FS (sec): 142

Maximum FS (feet): 19.5

Time to 980 °F (sec): 191

Max Temperature (°F): 1204

Time to Max Temperature (sec): 271

Total Fuel Burned (cubic feet): 45.30

FS*Time Area (ft*min): 162.1

Smoke Area (%A*min): 265.1

Fuel Area (°F*min): 7200.3

Fuel Contributed Value: 61

Unrounded FSI: 148.9

CALIBRATION DATA . . .

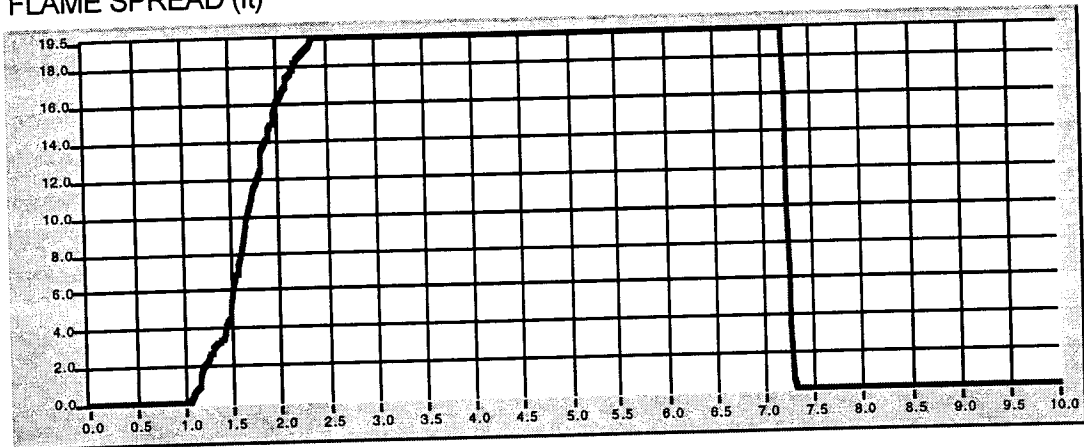
Time to Ignition of Last Red Oak (sec): 58

Red Oak Smoke Area (%A*min): 101.56

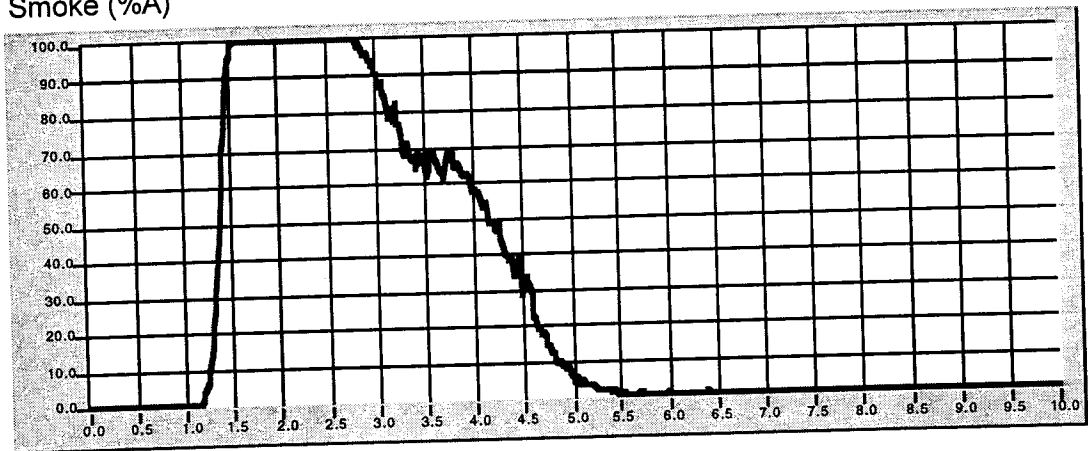
Red Oak Fuel Area (°F*min): 8715

Glass Fiber Board Fuel Area (°F*min): 4840

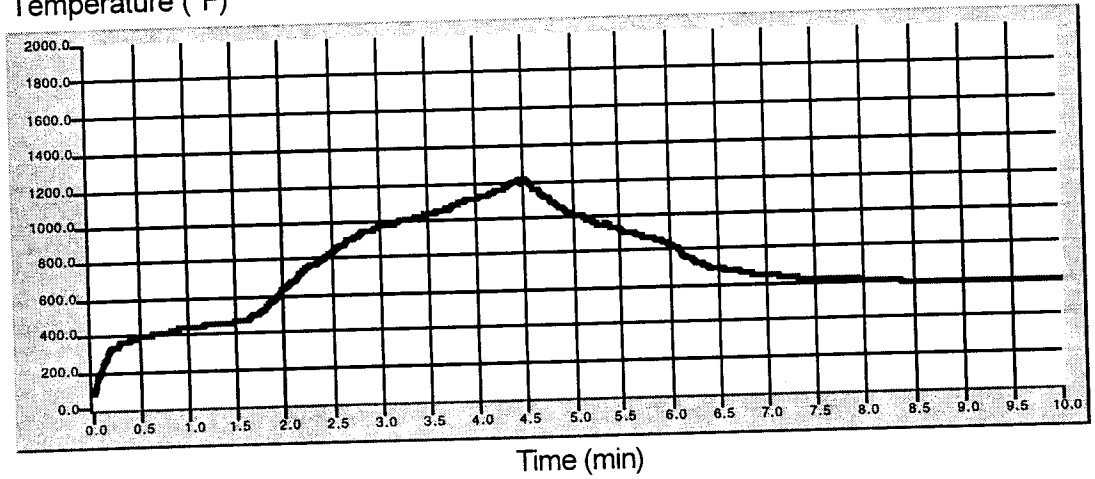
FLAME SPREAD (ft)



Smoke (%A)



Temperature (°F)





SGS U.S. Testing Company Inc.

291 Fairfield Avenue • Fairfield, NJ 07004-3833 • Tel: 973-575-5252 • Fax: 973-575-0799

CLIENT: Crane Kemlite
23525 W. Eames Street
Channahon, IL 60410
Attn.: Molly Dickerman

Test Report No: 164736 Date: January 14, 2002

SAMPLES SUBMITTED BY CLIENT AS: K020107-1 & 2 09 PIF MD & CMD
K020104-1 & 2 09 PWI MD & CMD

DATE OF RECEIPT: January 10, 2002

TESTING PERIOD: January 14, 2002

TEST REQUESTED: FMVSS 302

TEST RESULTS: Please refer to page 2

CONCLUSION: The submitted samples meet the requirement of the Department of Transportation Motor Vehicle Safety Standard 302 "Flammability of Interior Materials".

PREPARED BY:

Eduardo E. Rodriguez
Technician - Flammability
Textiles

SIGNED FOR AND ON BEHALF OF
SGS U.S. TESTING COMPANY INC.

Linda Kinderman
Supervisor - Flammability
Textiles

db

Page 1 of 2

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SGS U.S. Testing Company Inc.

US-D-0FS-04-03-Y

Report No.: 164736
Date: 01/14/02
Page: 2 of 2

CLIENT: Crane Kemlite

TEST RESULTS

Flammability of Interior Materials
FMVSS 302-1992

Sample ID: K020107-1 & 2 09 PIF MD & CMD

<u>Burn Time *</u> (secs)		<u>Burn Distance</u> (in)		<u>Burn Rate</u> (in/min)	
<u>MD</u>	<u>CMD</u>	<u>MD</u>	<u>CMD</u>	<u>MD</u>	<u>CMD</u>
300.0	300.0	1.9	2.2	0.4	0.4
300.0	300.0	2.2	1.5	0.4	0.3
300.0	300.0	2.7	1.6	0.5	0.3

Sample ID: K020104-1 & 2 09 PWI MD & CMD

300.0	300.0	3.0	2.4	0.6	0.5
300.0	300.0	2.6	2.0	0.5	0.4
300.0	300.0	2.9	2.6	0.6	0.5

* The test was discontinued after 5 minutes.

Requirements : The material shall not burn or transmit a flame front across its surface, at a rate of more than 4 inches per minute. However, if a material stops burning before it has burned for 60 seconds from the start of timing and has not burned more than 2 inches from the point where timing was started, it shall be considered to meet this requirement.

****End of Report****

ASTM E84-89a
SURFACE BURNING
CHARACTERISTICS

Glasbord 4 Ounce RE*, .120' Thick

Report No. 9013 - 90180

March 13, 1990

Prepared For:

Crane/Kemlite Company
P.O. Box 3849
Joliet, IL 60434



ABSTRACT

TEST MATERIAL:	Glasbord 4 Ounce RE*, .120' Thick
TEST METHOD:	ASTM E84-89a Standard Test Method for SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS (NFPA 255, UL 723, UBC 42-1)
TEST DATE:	March 13, 1990
TEST FOR:	Crane/Kemlite Company
TEST RESULT:	FLAME SPREAD INDEX = 145 SMOKE DEVELOPED INDEX = 345

The description of the test procedure and specimen evaluated, as well as the observations and results obtained, contained herein are true and accurate within the limits of sound engineering practice.

David M. Crouse

David M. Crouse
Manager, Listing Services

Date: March 13, 1990



I. INTRODUCTION

This report describes the results of the ASTM E84-89a 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 E84-89a (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 (adjusted to cause a 25 foot spread of flame along a red oak calibration specimen in 5.5 minutes) 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 mineral fiber cement board forms the zero point, while the red oak flooring is set as 100 for smoke measurements. The furnace conditions are 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. Thus, with a relative zero established by the non-combustible cement board, all test specimens are compared to select grade red oak flooring, and the results expressed as Flame Spread Index and Smoke Developed Index.

III. DESCRIPTION OF TEST SPECIMENS

Specimen Identification: Glasbord 4 Ounce RE*, .120" Thick

Project Number: 90180
Date Received: 3/13/90
Date Prepared: 3/13/90
Date Tested: 3/13/90
Conditioning (73°F & 50% R.H.): 0 days
Specimen Width (in): 24
Specimen Length (ft): 24
Specimen Thickness: .10"
Entire Specimen Weight: n/a
Application Rate: n/a

Mounting Method:

Panels were placed directly on the tunnel ledges for testing.

Specimen Description:

Specimens consisted of thin, fairly rigid plastic panels, and were described as Glasbord 4 Ounce RE*, .120" Thick.



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.

<u>TEST SPECIMEN</u>	<u>FLAME SPREAD INDEX</u>	<u>SMOKE DEVELOPED INDEX</u>
Mineral Fiber/Cement Board	0	0
Red Oak Flooring	n/a	100
<i>Glasbord 4 Ounce RE*, .120" Thick</i>	145	345

The data sheets are included in Appendix. These sheets are actual print-outs of the computerized data system which monitors the ASTM E84 furnace, and contain all calibration and specimen data needed to calculate the test results.

V. OBSERVATIONS

Steady ignition occurred on the face of the first panel at 1:00 min:sec. Maximum flame spread of 19.5 feet occurred at 2:29 min:sec. At the end of the test the sample was observed to be discolored to 24'. It was completely charred to 6', with moderate char to 14' 4".



APPENDIX

ASTM E84

DATA SHEETS



ASTM E84

DATA SHEET

Client: Crane-Kemlite
Date: 14:50:41 03-13-1990
Test Number: 5
Project Number: 9013-90180
Operator: DH/KH
Material ID:

4 oz. RE* K-900302-1 GLASBORD 4oz RE* (.120" Thickness)
6 @ 24"x48"x.10" Gray panels

TEST RESULTS:

FLAMESPREAD INDEX = 145
SMOKE DEVELOPED INDEX = 345

SPECIMEN DATA . . .

Time to Ignition = 01:00 (Min:Sec)
Time to Max FS = 02:29 (Min:Sec)
Maximum FS = 19.5 (Feet)
Time To 980 F = 03:50 (Min:Sec)
Max Temp = 1142 (deg F)
Time To Max Temp = 06:01 (Min:Sec)
Total Fuel Burned = 46.97 (cubic feet)

FS*Time Area = 161.1 (Ft*Min)
Smoke Area = 392.3 (%T*Min)
Fuel Area = 7296.0 (F*Min)
Unrounded FSI = 144.57

CALIBRATION DATA . . .

Time to Ignition of Last Red Oak = 00:48 (Min:Sec)
Red Oak Smoke Area = 114.30 (%T*Min)
Red Oak Fuel Area = 8536 (F*Min)
Glass Fiber Board Fuel Area = 4618 (F*Min)



SGS U.S. Testing Company Inc.

291 Fairfield Avenue
Fairfield, NJ 07004
Tel: 201-575-5252
Fax: 201-575-8271

REPORT NUMBER: 117144
DATE: February 8, 1996
PAGE 1 OF 6

CLIENT: Kemlite Company Inc.
P.O. Box 2429
Joliet, Illinois 60434

SUBJECT: Surface Burning Characteristics of Building Materials

AUTHORIZATION: Kemlite Company, Inc., Purchase Order Number 11797 dated January 12, 1996.

SAMPLE ID: One (1) sample of a suspended ceiling grid system was submitted and identified by the Client as: Kemlite Sanigrid[®] Tee Sample.

TEST PROCEDURE: The submitted sample was tested for Flammability in accordance with the procedures outlined in ASTM E-84-94.

TEST DATES: February 8, 1996, Sample Received January 19, 1996.

RESULTS: Continued on Page 2

PREPARED BY:

Steve Caldarola, Manager
Fire Technology

SIGNED FOR THE COMPANY BY:

Frank Pepe, Director
Performance Testing & Standards Evaluation

iv

Member of the SGS Group

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CLIENT: Kemlite Company Inc.

INTRODUCTION:

This report presents test results of Flame Spread and Smoke Developed Values per ASTM E-84-94. The report also includes Material Identification, Method of Preparation, Mounting and Conditioning of the specimens.

The tests were performed in accordance with the specifications set forth in ASTM E-84-94, "Standard Test Method for Surface Burning Characteristics of Building Materials", both as to equipment and test procedure. This test procedure is similar to UL-723, ANSI No. 2.5, NFPA No. 255 and UBC 42-1.

The test results cover two parameters: Flame Spread and Smoke Developed Values during a 10-minute fire exposure. Inorganic cement board and red oak flooring are used as comparative standards and their responses are assigned arbitrary values of 0 and 100, respectively.

PREPARATION AND CONDITIONING:

Main runner tees were placed 14 inches apart and butted to produce two (2) 24 foot long rails, with a cross tee every four (4) feet. The material was placed over a 2-inch galvanized hexagonal wire mesh supported by steel rods spanning the width of the tunnel. The tee dimensions were approximately 1" wide x 1-1/4" deep x 1/8" thick.

The sample was conditioned at 73° ± 5° Fahrenheit and 50 ± 5% relative humidity.

TEST PROCEDURE:

The tunnel was thoroughly pre-heated by burning natural gas. When the brick temperature, sensed by a floor thermocouple, had reached the prescribed 105° Fahrenheit ± 5° Fahrenheit level, the sample was inserted in the tunnel and test conducted in accordance with the standard ASTM E-84-94 procedures.

The operation of the tunnel was checked by performing a 10-minute test with inorganic board on the day of the test.

CLIENT: Kemlite Company Inc.

TEST RESULTS:

The test results, calculated in accordance with ASTM E-84-94 for Flame Spread and Smoke Developed Values are as follows:

Test Specimen	:	Kemlite Sanigrid [®] Tee Sample
Flame Spread Index*	:	10
Smoke Developed Value*	:	65

*Graphs of the Flame Spread, Smoke Developed and Time-Temperature are shown in Figures 1, 2 and 3 at the end of this report.

OBSERVATIONS:

Ignition was noted at 1 minute along with charring of the specimen directly exposed to the flame. The flamefront advanced a maximum distance of 3 feet at 5 minutes, 30 seconds. Afterburn was evident upon test completion.

RATING:

The National Fire Protection Association Life Safety Code 101, Section 6-5.3, "Interior Wall and Ceiling Finish Classification", has a means of classifying materials with respect to Flame Spread and Smoke Developed when tested in accordance with NFPA 255, "Method of Test of Surface Burning Characteristics of Building Materials", (ASTM E-84).

The classifications are as follows:

Class A Interior Wall & Ceiling Finish:	Flame Spread	-	0-25;
	Smoke Developed	-	0-450
Class B Interior Wall & Ceiling Finish:	Flame Spread	-	26-75;
	Smoke Developed	-	0-450
Class C Interior Wall & Ceiling Finish:	Flame Spread	-	76-200;
	Smoke Developed	-	0-450

Since the sample received a Flame Spread of 10 and a Smoke Developed Value of 65, it would fall into the Class A Interior Wall & Ceiling Finish Category.

End of Report

REPORT OF TEST

REPORT OF TEST

United States Testing Company, Inc.



FLAME SPREAD

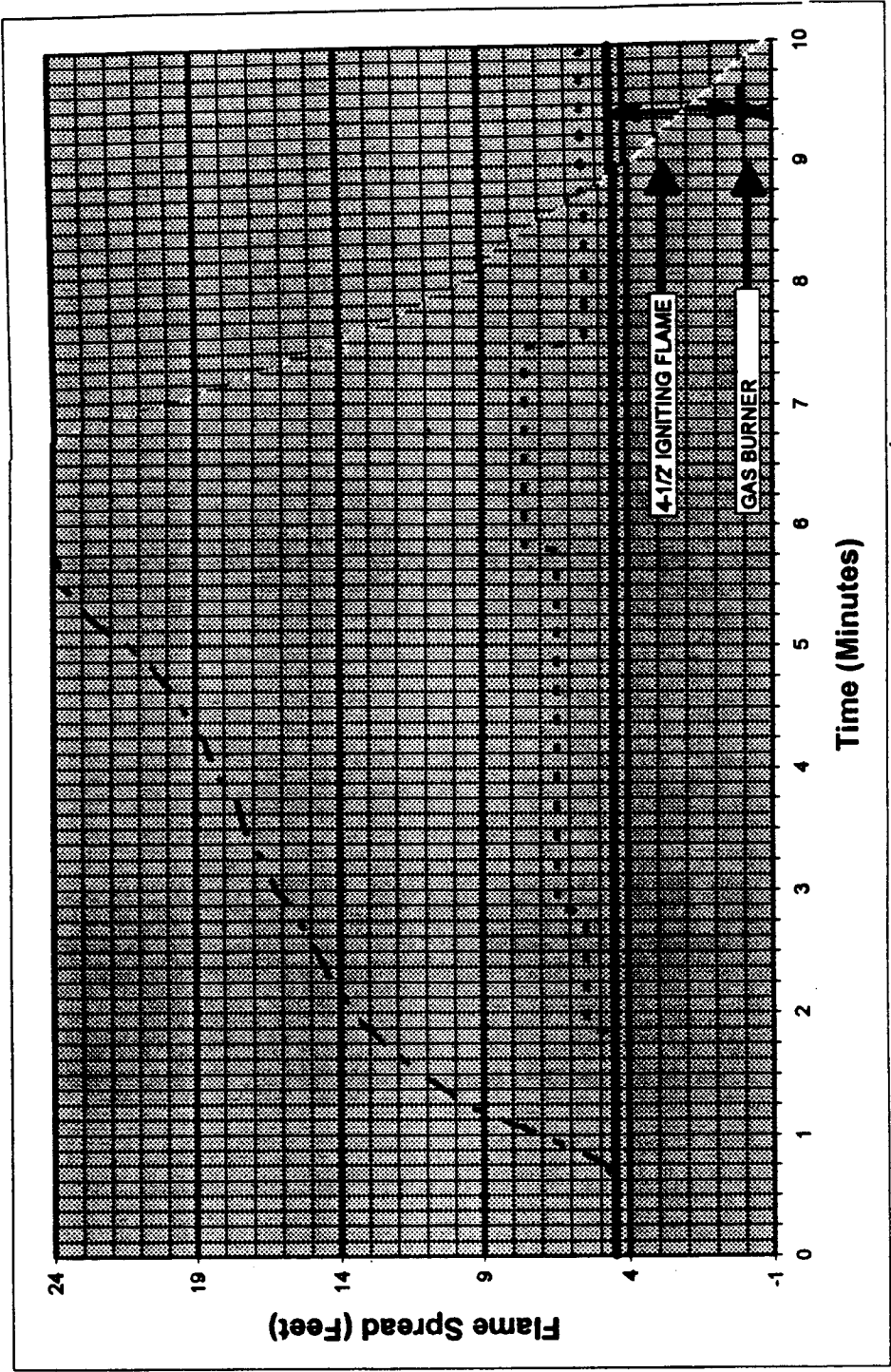
SAMPLE Sanigrid Tee Samples

TEST NO. 117144

TEST DATE February 08, 1996

RED OAK -----

C. Board



REPORT OF TEST

United States Testing Company, Inc.



SMOKE DEVELOPED

SAMPLE Sanigid Tee Samples
.....
RED OAK -----

TEST NO. 117144
TEST DATE February 08, 1996
I.C. Board

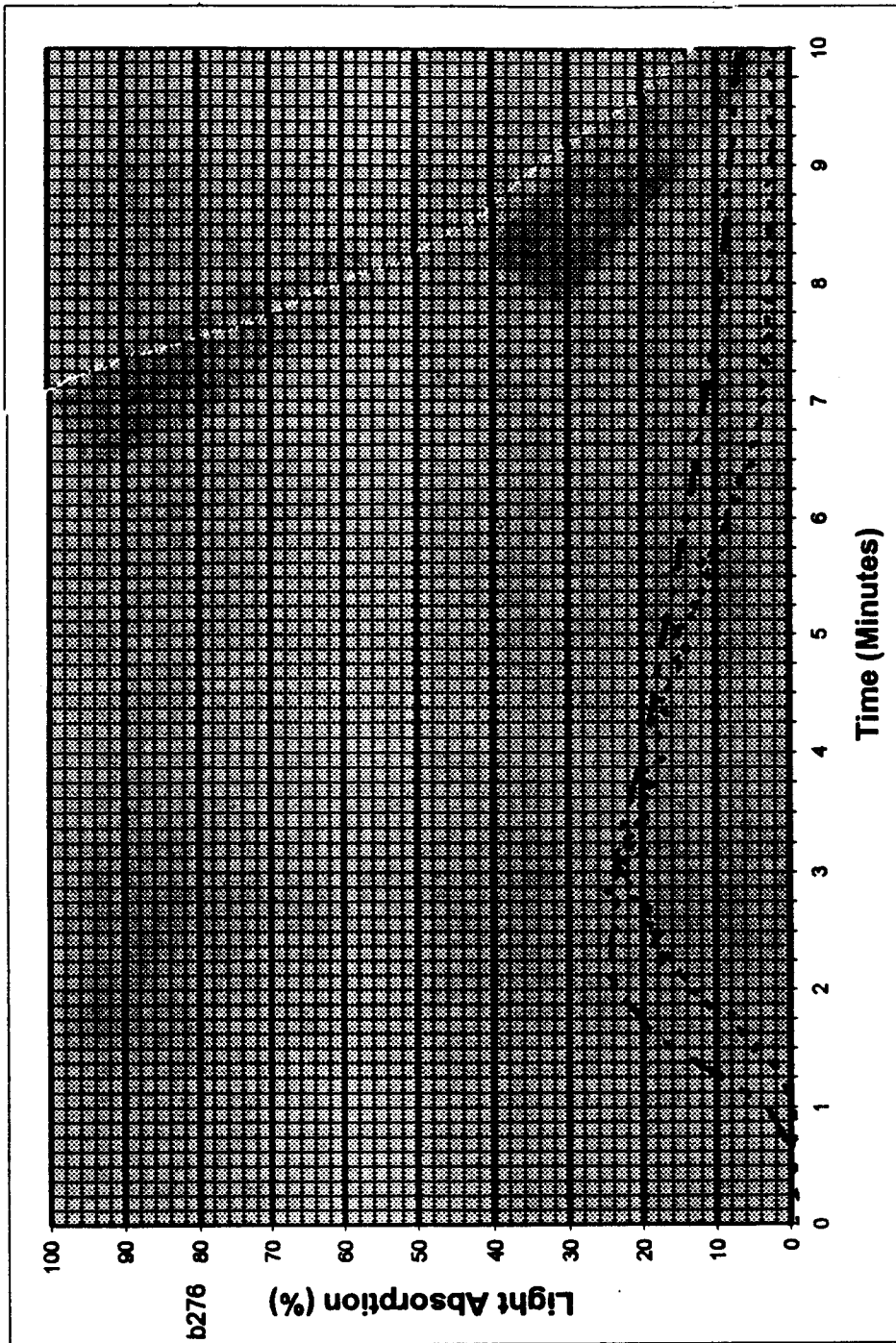


Figure 2

REPORT OF TEST

United States Testing Company, Inc.



SGS U.S. Testing Company Inc.

TIME-TEMPERATURE CURVE OF EXPOSED THERMOCOUPLE

SAMPLE Sanigrd Tee Samples
.....
RED OAK - - - - -

TEST NO. 117144
TEST DATE February 08, 1996
I.C. Board _____

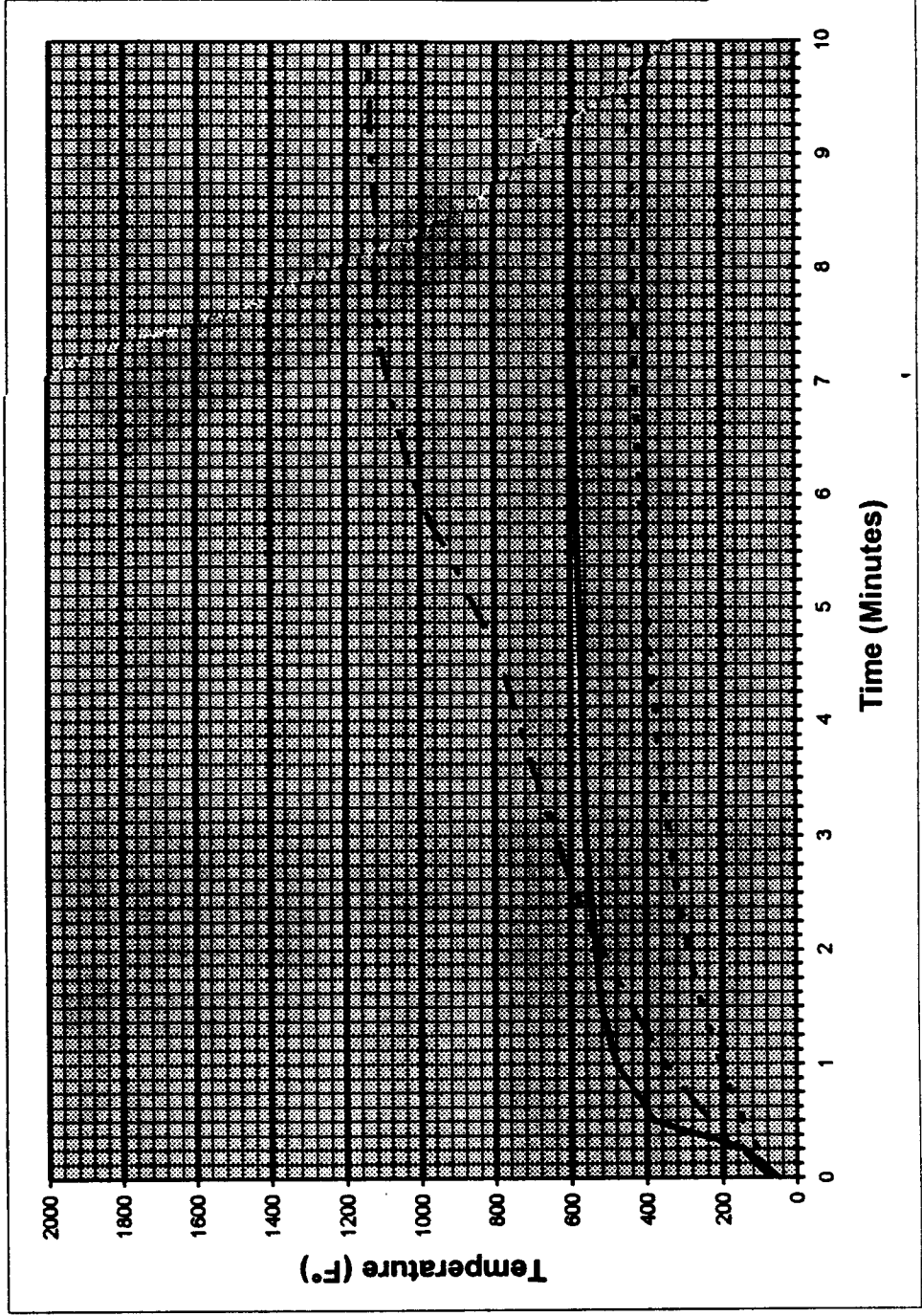


Figure 3

CERTIFICATE OF COMPLIANCE



Crane Composites, Inc.

VARIETEX® beaded | Innovative
Textured and Colored Wall Panels

16349-410

Certificate Number

04/29/2011 - 04/28/2021

Certificate Period

Certified

Status

UL 2818 - 2013 Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Wall finishes are determined compliant using an Office Environment with an air change of 0.68 hr^{-1} and a loading of 33.40 m^2 .

Products tested in accordance with UL 2821 test method to show compliance to emission limits in UL 2818, Section 7.1.



UL investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Mark for the identified Product(s) manufactured at the production site(s) covered by the UL Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

GREENGUARD Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC ^(A)	-	0.50	mg/m ³
Formaldehyde	50-00-0	61.3 (50 ppb)	µg/m ³
Total Aldehydes ^(B)	-	0.10	ppm
Particle Matter less than 10 µm ^(C)	-	50	µg/m ³
4-Phenylcyclohexene	4994-16-5	6.5	µg/m ³
Individual VOCs ^(D)	-	1/10th TLV	-

- (A) Defined to be the total response of measured VOCs falling within the C₆ – C₁₆ range, with responses calibrated to a toluene surrogate. Maximum allowable predicted TVOC concentrations for GREENGUARD (0.50 mg/m³) fall in the range of 0.5 mg/m³ or less, as specified in CDPH Standard Method v1.1.
- (B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.
- (C) Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.
- (D) Allowable levels for chemicals not listed are derived from 1/10th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).



CERTIFICATE OF COMPLIANCE



Crane Composites, Inc.

VARIETEX® linen | Innovative
Textured and Colored Wall Panels

16351-410

Certificate Number

04/29/2011 - 04/28/2021

Certificate Period

Certified

Status

UL 2818 - 2013 Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Wall finishes are determined compliant using an Office Environment with an air change of 0.68 hr^{-1} and a loading of 33.40 m^2 .

Products tested in accordance with UL 2821 test method to show compliance to emission limits in UL 2818, Section 7.1.



UL investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Mark for the identified Product(s) manufactured at the production site(s) covered by the UL Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

GREENGUARD Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC ^(A)	-	0.50	mg/m ³
Formaldehyde	50-00-0	61.3 (50 ppb)	µg/m ³
Total Aldehydes ^(B)	-	0.10	ppm
Particle Matter less than 10 µm ^(C)	-	50	µg/m ³
4-Phenylcyclohexene	4994-16-5	6.5	µg/m ³
Individual VOCs ^(D)	-	1/10th TLV	-

- (A) Defined to be the total response of measured VOCs falling within the C₆ – C₁₆ range, with responses calibrated to a toluene surrogate. Maximum allowable predicted TVOC concentrations for GREENGUARD (0.50 mg/m³) fall in the range of 0.5 mg/m³ or less, as specified in CDPH Standard Method v1.1.
- (B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.
- (C) Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.
- (D) Allowable levels for chemicals not listed are derived from 1/10th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).



CERTIFICATE OF COMPLIANCE



Crane Composites, Inc.

VARIETEX® sandstone | Innovative
Textured and Colored Wall Panels

16364-420

Certificate Number

01/12/2016 - 04/28/2021

Certificate Period

Certified

Status

UL 2818 - 2013 Gold Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Wall finishes are determined compliant in accordance with California Department of Public Health (CDPH) Standard Method V1.2-2017 using a Classroom Environment with an air change of 0.82 hr^{-1} and a loading of 94.60 m^2 ; and Wall finishes are determined compliant in accordance with California Department of Public Health (CDPH) Standard Method V1.2-2017 using an Office Environment with an air change of 0.68 hr^{-1} and a loading of 33.40 m^2 .

Product tested in accordance with UL 2821 test method to show compliance to emission limits on UL 2818. Section 7.1 and 7.2.



UL investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Mark for the identified Product(s) manufactured at the production site(s) covered by the UL Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

GREENGUARD Gold Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC ^(A)	-	0.22	mg/m ³
Formaldehyde	50-00-0	9 (7.3 ppb)	µg/m ³
Total Aldehydes ^(B)	-	0.043	ppm
4-Phenylcyclohexene	4994-16-5	6.5	µg/m ³
Particle Matter less than 10 µm ^(C)	-	20	µg/m ³
1-Methyl-2-pyrrolidinone ^(D)	872-50-4	160	µg/m ³
Individual VOCs ^(E)	-	1/2 CREL or 1/100th TLV	-

- (A) Defined to be the total response of measured VOCs falling within the C₆ – C₁₆ range, with responses calibrated to a toluene surrogate. Maximum allowable predicted TVOC concentrations for GREENGUARD Gold (0.22 mg/m³) fall in the range of 0.5 mg/m³ or less, as specified in CDPH Standard Method v1.2.
- (B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.
- (C) Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.
- (D) Based on the CA Prop 65 Maximum Allowable Dose Level for inhalation of 3,200 µg/day and an inhalation rate of 20 m³/day
- (E) Allowable levels for chemicals not listed are derived from the lower of 1/2 the California Office of Environmental Health Hazard Assessment (OEHHA) Chronic Reference Exposure Level (CREL) as required per the CDPH/EHLB/Standard Method v1.2 and BIFMA level credit 7.6.2 and 1/100th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).



CERTIFICATE OF COMPLIANCE



Crane Composites, Inc.

**VARIETEX® tile-look | Innovative
Textured and Colored Wall Panels**

16352-420

Certificate Number

01/12/2016 - 04/28/2021

Certificate Period

Certified

Status

UL 2818 - 2013 Gold Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Wall finishes are determined compliant in accordance with California Department of Public Health (CDPH) Standard Method V1.2-2017 using a Classroom Environment with an air change of 0.82 hr^{-1} and a loading of 94.60 m^2 ; and Wall finishes are determined compliant in accordance with California Department of Public Health (CDPH) Standard Method V1.2-2017 using an Office Environment with an air change of 0.68 hr^{-1} and a loading of 33.40 m^2 .

Product tested in accordance with UL 2821 test method to show compliance to emission limits on UL 2818. Section 7.1 and 7.2.



UL investigated representative samples of the identified Product(s) to the identified Standard(s) or other requirements in accordance with the agreements and any applicable program service terms in place between UL and the Certificate Holder (collectively "Agreement"). The Certificate Holder is authorized to use the UL Mark for the identified Product(s) manufactured at the production site(s) covered by the UL Test Report, in accordance with the terms of the Agreement. This Certificate is valid for the identified dates unless there is non-compliance with the Agreement.

GREENGUARD Gold Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC ^(A)	-	0.22	mg/m ³
Formaldehyde	50-00-0	9 (7.3 ppb)	µg/m ³
Total Aldehydes ^(B)	-	0.043	ppm
4-Phenylcyclohexene	4994-16-5	6.5	µg/m ³
Particle Matter less than 10 µm ^(C)	-	20	µg/m ³
1-Methyl-2-pyrrolidinone ^(D)	872-50-4	160	µg/m ³
Individual VOCs ^(E)	-	1/2 CREL or 1/100th TLV	-

- (A) Defined to be the total response of measured VOCs falling within the C₆ – C₁₆ range, with responses calibrated to a toluene surrogate. Maximum allowable predicted TVOC concentrations for GREENGUARD Gold (0.22 mg/m³) fall in the range of 0.5 mg/m³ or less, as specified in CDPH Standard Method v1.2.
- (B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.
- (C) Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.
- (D) Based on the CA Prop 65 Maximum Allowable Dose Level for inhalation of 3,200 µg/day and an inhalation rate of 20 m³/day
- (E) Allowable levels for chemicals not listed are derived from the lower of 1/2 the California Office of Environmental Health Hazard Assessment (OEHHA) Chronic Reference Exposure Level (CREL) as required per the CDPH/EHLB/Standard Method v1.2 and BIFMA level credit 7.6.2 and 1/100th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).





TEST REPORT

OMEGA POINT
LABORATORIES, INC.
16015 Shady Falls Road
Elmendorf, TX 78112
(V) 210-635-8100
(F) 210-635-8101
800-966-5253
www.opl.com

ASTM E84-04

SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS

Report No. 16888 - 123812

0.090" Matrex / Varietex

February 22, 2005

Prepared for:
Kemlite Florence
8015 Dixon Drive
Florence, KY 41042



ABSTRACT

Test Specimen: 0.090" Matrex / Varietex

Test Standard: ASTM E84-04

Test Date: February 15, 2005

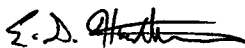
Test Sponsor: Kemlite Florence

Test Results:

FLAME SPREAD INDEX = 135
SMOKE DEVELOPED INDEX = 350

123812

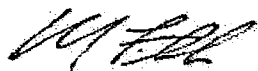
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Eric G. Hutchinson
E84 Operator

February 22, 2005

Reviewed and approved:



William E Fitch PE No. 55296

February 22, 2005



I INTRODUCTION

This report describes the results of the ASTM E84-04 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 E84-04 (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 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: 0.090" Matrex / Varietex

Date Received: 2/8/2005
Date Prepared: 2/8/2005
Conditioning (73°F & 50% R.H.): 7 days
Specimen Width (in): 24
Specimen Length (ft): 24
Specimen Thickness: 0.087-in.
Material Weight: N/A oz./sq. yd
Total Specimen Weight: 34.00-lbs.
Adhesive or coating application rate: N/A

Mounting Method:

The specimen was self-supporting and was placed directly on the inner ledges of the tunnel.

Specimen Description:

The Test specimen was described by the client as the "0.090" Matrex / Varietex." The specimen consisted of (3) 8-ft. long x 24-in. wide x 0.087-in. thick, fiberglass reinforced plastic panels. The FRP panels were white in color. The specimen was identified by the client as "0.090 Matrex / Varietex".



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	100	100
0.090" Matrex / Varietex	135	350

The data sheets are included in the Appendix. These sheets are actual print-outs of the computerized data system which monitors the ASTM E84-04 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 fiberglass reinforced plastic panels ignited at 0:58 (min:sec.). The flames passed out the end of the apparatus at 3:16 (min:sec.). The test continued for the 10:00 duration.

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

The resin was consumed from 0-ft. - 24-ft. The fiberglass was charred from 0-ft. - 24-ft.



APPENDIX

ASTM E84-04 Data Sheets



ASTM E84 DATASHEETS

Client: KEMLITE FLORENCE

Date: 2/15/05

Time: 09:30 AM

Test Number: 1

Project Number: 16888-123812

Operator: EH/TA

Specimen ID: " 0.090" MATREX / VARIETEX, 0.090" MATREX / VARIETEX." THE SPECIMEN WAS SELF-SUPPORTING.

TEST RESULTS

FLAMESPREAD INDEX: 135

SMOKE DEVELOPED INDEX: 350

SPECIMEN DATA . . .

Time to Ignition (sec): 58

Time to Max FS (sec): 185

Maximum FS (feet): 19.5

Time to 980 °F (sec): 197

Max Temperature (°F): 1102

Time to Max Temperature (sec): 351

Total Fuel Burned (cubic feet): 51.39

FS*Time Area (ft*min): 159.2

Smoke Area (%A*min): 349.3

Fuel Area (°F*min): 7638.4

Fuel Contributed Value: 70

Unrounded FSI: 136.7

CALIBRATION DATA . . .

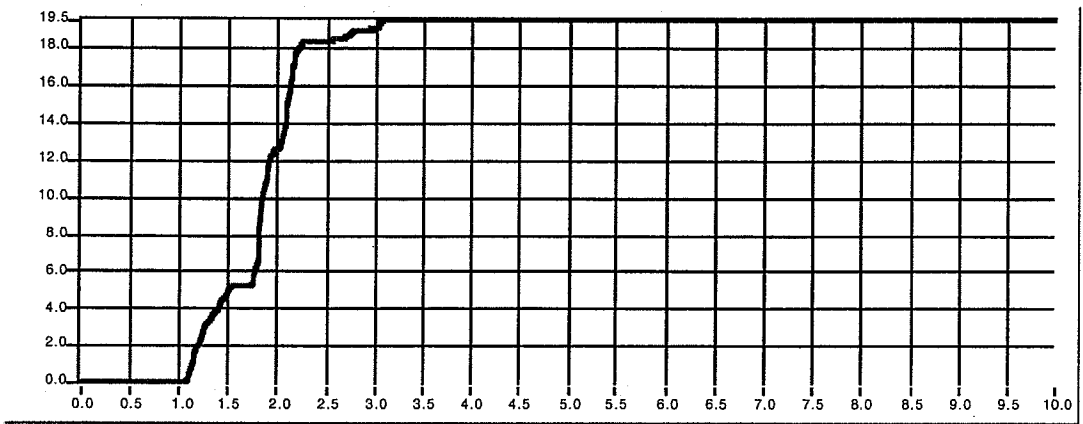
Time to Ignition of Last Red Oak (sec): 38

Red Oak Smoke Area (%A*min): 96.00

Red Oak Fuel Area (°F*min): 8587

Glass Fiber Board Fuel Area (°F*min): 5396

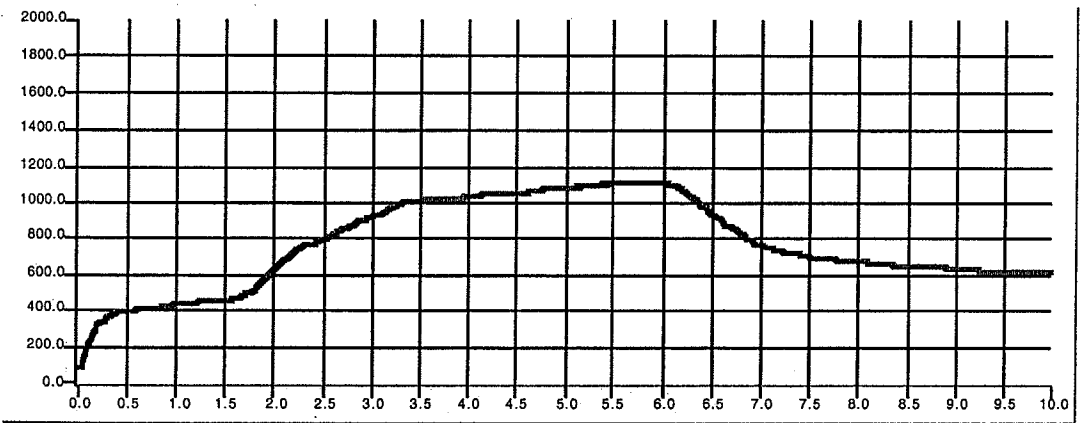
FLAME SPREAD (ft)



Smoke (%A)



Temperature (°F)



Time (min)



TEST REPORT

OMEGA POINT
LABORATORIES, INC.
16015 Shady Falls Road
Elmendorf, TX 78112
(V) 210-635-8100
(F) 210-635-8101
800-966-5253
www.opl.com

ASTM E84-03

SURFACE BURNING CHARACTERISTICS

Report No. 16888 - 122552

0.090" Class "A" Varietex

December 9, 2004

Prepared for:
Kemlite Florence
8015 Dixon Drive
Florence, KY 41042



ABSTRACT

Test Specimen: 0.090" Class "A" Varietex

Test Standard: ASTM E84-03

Test Date: November 29, 2004

Test Sponsor: Kemlite Florence

Test Results:

FLAME SPREAD INDEX = 25
SMOKE DEVELOPED INDEX = 450

122552

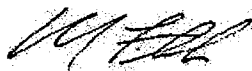
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Eric G. Hutchinson
E84 Operator

December 9, 2004

Reviewed and approved:



William E Fitch PE No. 55296

December 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 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 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: 0.090" Class "A" Varietex

Date Received: 11/10/2004
Date Prepared: 11/10/2004
Conditioning (73°F & 50% R.H.): 19 days
Specimen Width (in): 24
Specimen Length (ft): 24
Specimen Thickness: 0.0865-in.
Material Weight: N/A oz./sq. yd
Total Specimen Weight: 37.60-lbs.
Adhesive or coating application rate: N/A

Mounting Method:

The specimen was self-supporting and was placed directly on the inner ledges of the tunnel.

Specimen Description:

The Test specimen was described by the client as the "0.090" Class "A" Varietex." The specimen consisted of (3) 8-ft. long x 24-in. wide x 0.0865-in. thick, fiberglass reinforced plastic panels. The specimen was white in color. The specimen was identified by the client as "0.090 Class A Varietex".



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	100	100
0.090" Class "A" Varietex	25	450

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 specimen ignited at 0:38 (min:sec.). The test continued for the 10:00 duration.

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

The fiberglass resin was consumed from 0-ft. - 24-ft. The fiberglass reinforced plastic panels were charred from 0-ft. - 9-ft. Black discoloration was observed to the specimen from 10-ft. - 24-ft.



APPENDIX

E84 Data Sheets



ASTM E84 DATASHEETS

Client: KEMLITE (FLORENCE)

Date: 11/29/04

Time: 05:11 PM

Test Number: 6

Project Number: 16888-122552

Operator: EH/TA

Specimen ID: "0.090" CLASS A VARIETEX, 0.090" CLASS A VARIETEX". THE SPECIMEN WAS SELF-SUPPORTING.

TEST RESULTS

FLAMESPREAD INDEX: 25

SMOKE DEVELOPED INDEX: 450

SPECIMEN DATA . . .

Time to Ignition (sec): 38

Time to Max FS (sec): 202

Maximum FS (feet): 5.1

Time to 980 °F (sec): Never Reached

Max Temperature (°F): 554

Time to Max Temperature (sec): 414

Total Fuel Burned (cubic feet): 51.54

FS*Time Area (ft*min): 45.9

Smoke Area (%A*min): 437.7

Fuel Area (°F*min): 4937.2

Fuel Contributed Value: 0

Unrounded FSI: 23.6

CALIBRATION DATA . . .

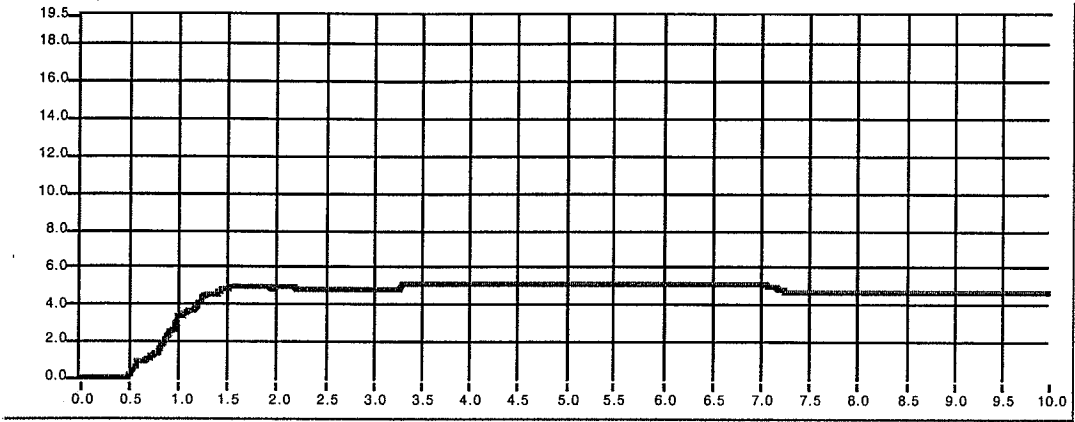
Time to Ignition of Last Red Oak (sec): 38

Red Oak Smoke Area (%A*min): 96.00

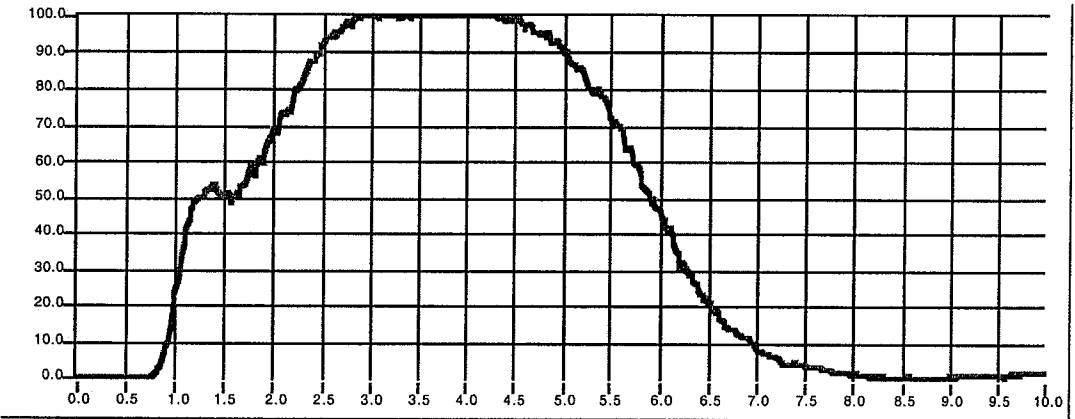
Red Oak Fuel Area (°F*min): 8587

Glass Fiber Board Fuel Area (°F*min): 5396

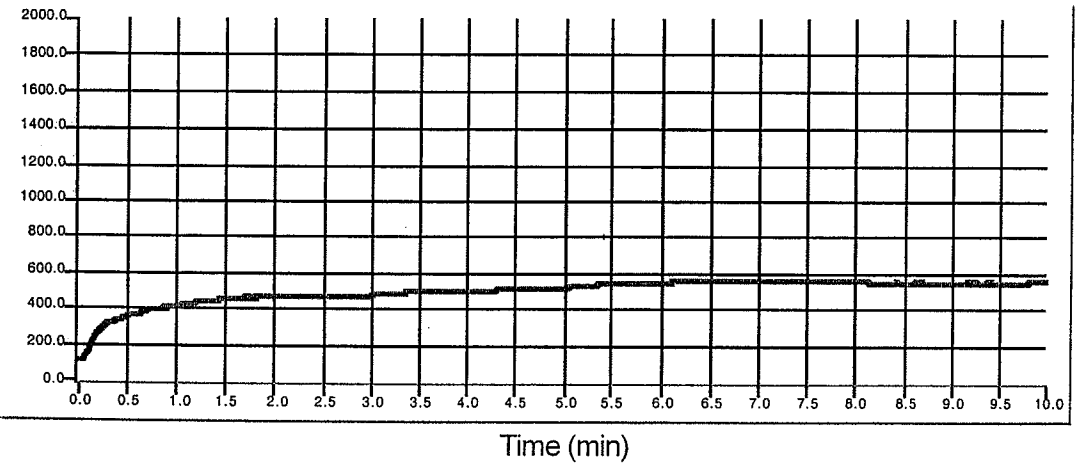
FLAME SPREAD (ft)



Smoke (%A)



Temperature (°F)





TEST REPORT

OMEGA POINT
LABORATORIES, INC.
16015 Shady Falls Road
Elmendorf, TX 78112
(V) 210-635-8100
(F) 210-635-8101
800-966-5253
www.opl.com

ASTM E84-03

SURFACE BURNING CHARACTERISTICS

Report No. 16888 - 122552

0.090" Class "A" Varietex

December 9, 2004

Prepared for:
Kemlite Florence
8015 Dixon Drive
Florence, KY 41042



ABSTRACT

Test Specimen: 0.090" Class "A" Varietex

Test Standard: ASTM E84-03

Test Date: November 29, 2004

Test Sponsor: Kemlite Florence

Test Results:

FLAME SPREAD INDEX = 25
SMOKE DEVELOPED INDEX = 450

122552

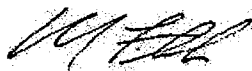
This report and the information contained herein is for the exclusive use of the client named herein. Omega Point Laboratories, Inc. authorizes the client to reproduce this report only if reproduced in its entirety. The description of the test procedure, as well as the observations and results obtained, contained herein are true and accurate within the limits of sound engineering practice. These results apply only for the specimens tested, in the manner tested, and may not represent the performance of other specimens from the same or other production lots nor of the performance when used in combination with other materials. The test specimen identification is as provided by the client and Omega Point Laboratories, Inc. accepts no responsibility for any inaccuracies therein. Omega Point did not select the specimen and has not verified the composition, manufacturing techniques or quality assurance procedures. This report does not imply certification of the product by Omega Point Laboratories, Inc. Any use of the Omega Point Laboratories name, any abbreviation thereof or any logo, mark, or symbol therefor, for advertising material must be approved in writing in advance by Omega Point Laboratories, Inc. The client must have entered into and be actively participating in a Listing & Follow-up Service program. Products must bear labels with the Omega Point Laboratories Certification Mark to demonstrate acceptance by Omega Point Laboratories, Inc. into the Listing program.



Eric G. Hutchinson
E84 Operator

December 9, 2004

Reviewed and approved:



William E Fitch PE No. 55296

December 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 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 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: 0.090" Class "A" Varietex

Date Received: 11/10/2004
Date Prepared: 11/10/2004
Conditioning (73°F & 50% R.H.): 19 days
Specimen Width (in): 24
Specimen Length (ft): 24
Specimen Thickness: 0.0865-in.
Material Weight: N/A oz./sq. yd
Total Specimen Weight: 37.60-lbs.
Adhesive or coating application rate: N/A

Mounting Method:

The specimen was self-supporting and was placed directly on the inner ledges of the tunnel.

Specimen Description:

The Test specimen was described by the client as the "0.090" Class "A" Varietex." The specimen consisted of (3) 8-ft. long x 24-in. wide x 0.0865-in. thick, fiberglass reinforced plastic panels. The specimen was white in color. The specimen was identified by the client as "0.090 Class A Varietex".



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	100	100
0.090" Class "A" Varietex	25	450

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 specimen ignited at 0:38 (min:sec.). The test continued for the 10:00 duration.

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

The fiberglass resin was consumed from 0-ft. - 24-ft. The fiberglass reinforced plastic panels were charred from 0-ft. - 9-ft. Black discoloration was observed to the specimen from 10-ft. - 24-ft.



APPENDIX

E84 Data Sheets



ASTM E84 DATASHEETS

Client: KEMLITE (FLORENCE)

Date: 11/29/04

Time: 05:11 PM

Test Number: 6

Project Number: 16888-122552

Operator: EH/TA

Specimen ID: "0.090" CLASS A VARIETEX, 0.090" CLASS A VARIETEX". THE SPECIMEN WAS SELF-SUPPORTING.

TEST RESULTS

FLAMESPREAD INDEX: 25

SMOKE DEVELOPED INDEX: 450

SPECIMEN DATA . . .

Time to Ignition (sec): 38

Time to Max FS (sec): 202

Maximum FS (feet): 5.1

Time to 980 °F (sec): Never Reached

Max Temperature (°F): 554

Time to Max Temperature (sec): 414

Total Fuel Burned (cubic feet): 51.54

FS*Time Area (ft*min): 45.9

Smoke Area (%A*min): 437.7

Fuel Area (°F*min): 4937.2

Fuel Contributed Value: 0

Unrounded FSI: 23.6

CALIBRATION DATA . . .

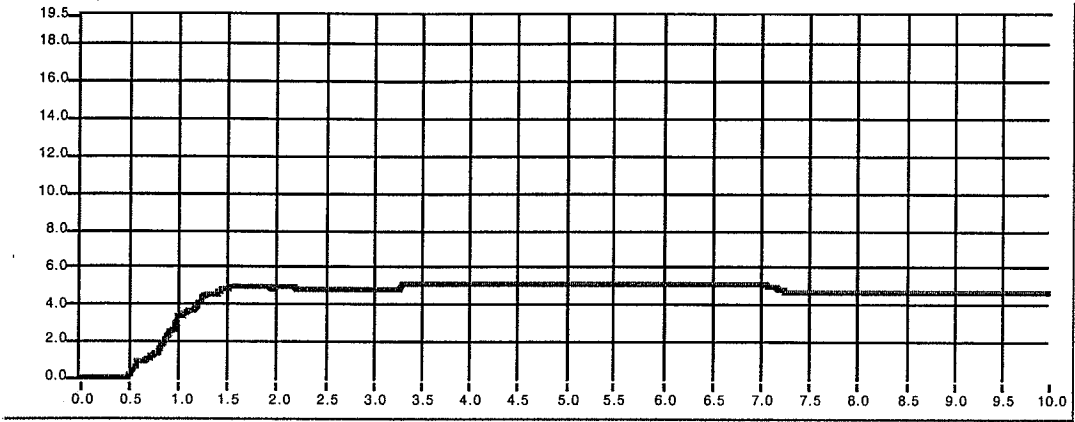
Time to Ignition of Last Red Oak (sec): 38

Red Oak Smoke Area (%A*min): 96.00

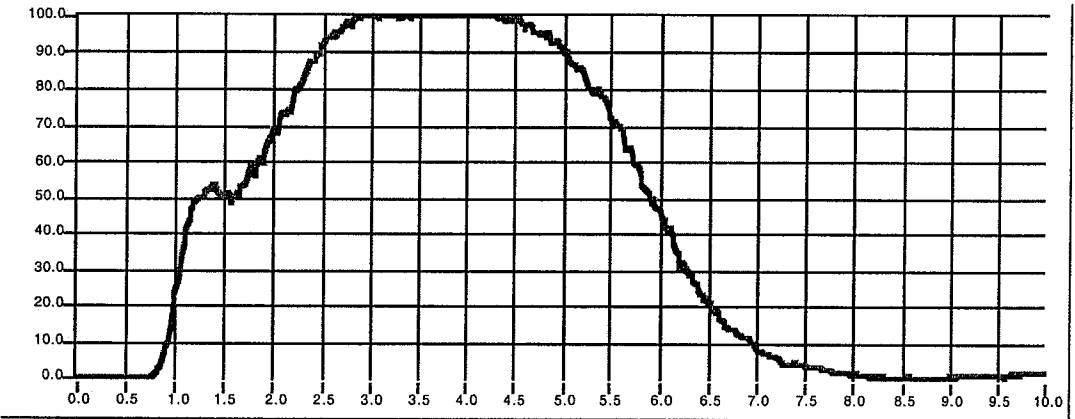
Red Oak Fuel Area (°F*min): 8587

Glass Fiber Board Fuel Area (°F*min): 5396

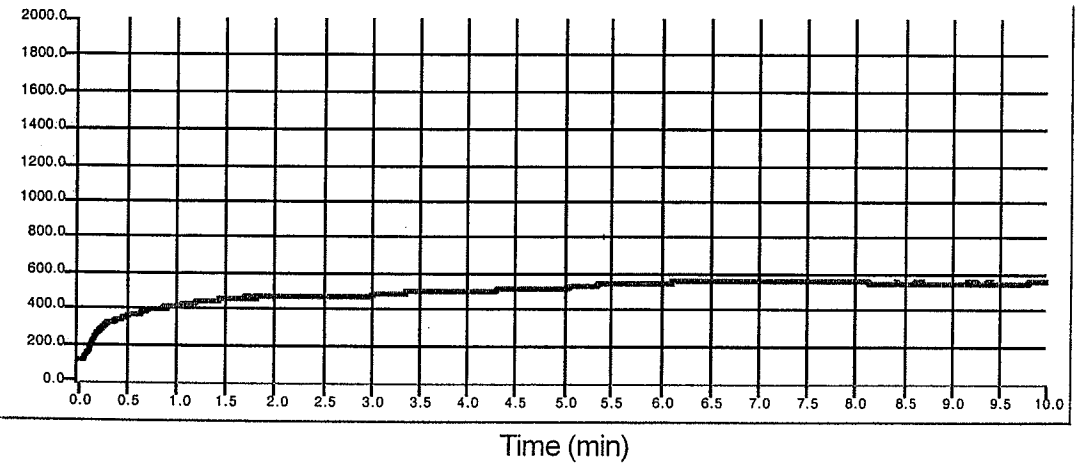
FLAME SPREAD (ft)



Smoke (%A)



Temperature (°F)





TEST REPORT

OMEGA POINT
LABORATORIES, INC.
16015 Shady Falls Road
Elmendorf, TX 78112
(V) 210-635-8100
(F) 210-635-8101
800-966-5253
www.opl.com

ASTM E84-04

SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS

Report No. 16888 - 123812

0.090" Matrex / Varietex

February 22, 2005

Prepared for:
Kemlite Florence
8015 Dixon Drive
Florence, KY 41042



ABSTRACT

Test Specimen: 0.090" Matrex / Varietex

Test Standard: ASTM E84-04

Test Date: February 15, 2005

Test Sponsor: Kemlite Florence

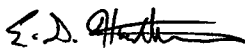
Test Results:

FLAME SPREAD INDEX = 135

SMOKE DEVELOPED INDEX = 350

123812

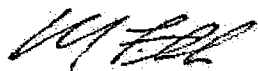
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Eric G. Hutchinson

E84 Operator

Reviewed and approved:



William E Fitch PE No. 55296

February 22, 2005

February 22, 2005



I INTRODUCTION

This report describes the results of the ASTM E84-04 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 E84-04 (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 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: 0.090" Matrex / Varietex

Date Received: 2/8/2005
Date Prepared: 2/8/2005
Conditioning (73°F & 50% R.H.): 7 days
Specimen Width (in): 24
Specimen Length (ft): 24
Specimen Thickness: 0.087-in.
Material Weight: N/A oz./sq. yd
Total Specimen Weight: 34.00-lbs.
Adhesive or coating application rate: N/A

Mounting Method:

The specimen was self-supporting and was placed directly on the inner ledges of the tunnel.

Specimen Description:

The Test specimen was described by the client as the "0.090" Matrex / Varietex." The specimen consisted of (3) 8-ft. long x 24-in. wide x 0.087-in. thick, fiberglass reinforced plastic panels. The FRP panels were white in color. The specimen was identified by the client as "0.090 Matrex / Varietex".



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	100	100
0.090" Matrex / Varietex	135	350

The data sheets are included in the Appendix. These sheets are actual print-outs of the computerized data system which monitors the ASTM E84-04 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 fiberglass reinforced plastic panels ignited at 0:58 (min:sec.). The flames passed out the end of the apparatus at 3:16 (min:sec.). The test continued for the 10:00 duration.

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

The resin was consumed from 0-ft. - 24-ft. The fiberglass was charred from 0-ft. - 24-ft.



APPENDIX

ASTM E84-04 Data Sheets



ASTM E84 DATASHEETS

Client: KEMLITE FLORENCE

Date: 2/15/05

Time: 09:30 AM

Test Number: 1

Project Number: 16888-123812

Operator: EH/TA

Specimen ID: " 0.090" MATREX / VARIETEX, 0.090" MATREX / VARIETEX." THE SPECIMEN WAS SELF-SUPPORTING.

TEST RESULTS

FLAMESPREAD INDEX: 135

SMOKE DEVELOPED INDEX: 350

SPECIMEN DATA . . .

Time to Ignition (sec): 58

Time to Max FS (sec): 185

Maximum FS (feet): 19.5

Time to 980 °F (sec): 197

Max Temperature (°F): 1102

Time to Max Temperature (sec): 351

Total Fuel Burned (cubic feet): 51.39

FS*Time Area (ft*min): 159.2

Smoke Area (%A*min): 349.3

Fuel Area (°F*min): 7638.4

Fuel Contributed Value: 70

Unrounded FSI: 136.7

CALIBRATION DATA . . .

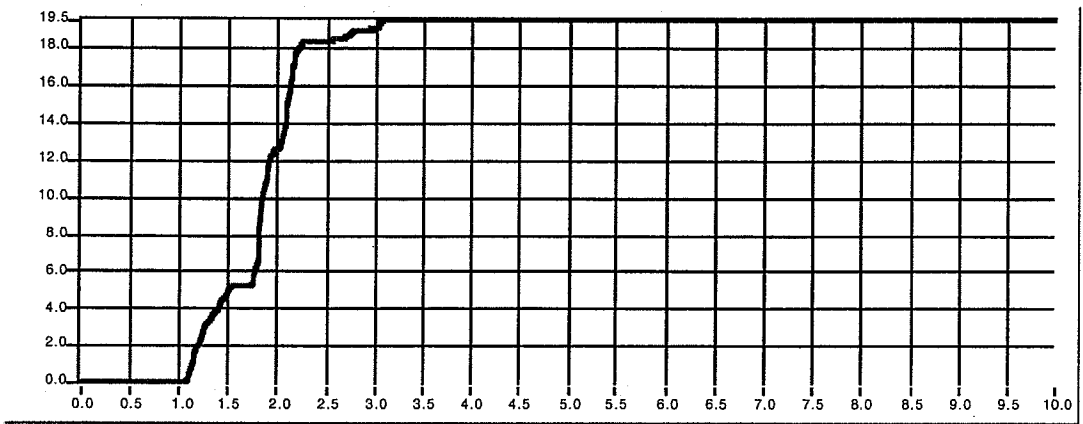
Time to Ignition of Last Red Oak (sec): 38

Red Oak Smoke Area (%A*min): 96.00

Red Oak Fuel Area (°F*min): 8587

Glass Fiber Board Fuel Area (°F*min): 5396

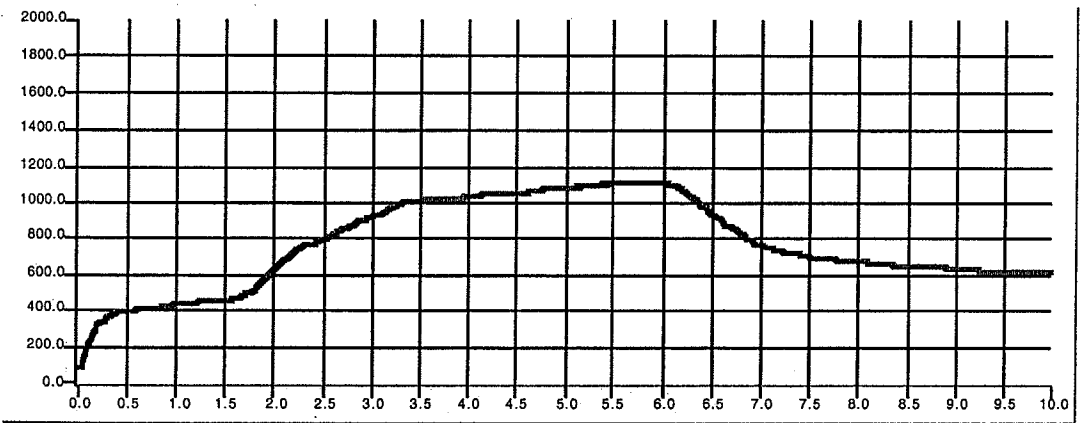
FLAME SPREAD (ft)



Smoke (%A)



Temperature (°F)



Time (min)



Progressive Engineering Inc.

CRANE COMPOSITES

FMVSS and CMVSS 302
Flammability of Interior Materials Test

5/12/2014



This test report contains ten (10) pages, including the cover sheet. Any additions to, alterations of, or unauthorized use of excerpts from this report are expressly forbidden.

2014-772

1. TITLE

FMVSS and CMVSS 302 Flammability of Interior Materials Test

2. OBJECTIVE

To test the interior finish materials of the motor vehicle per the safety standards mentioned in Section 6 of this report.

This test report pertains only to the specimens tested. It remains the sole responsibility of the manufacturer to provide a product consistent to that which was tested.

3. TESTED FOR

Crane Composites
2424 E. Kercher Road
Goshen, IN 46526

4. TESTING ORGANIZATION

Progressive Engineering Inc.

58640 State Road 15
Goshen, IN 46528
www.p-e-i.com

See IAS Evaluation Report TL-178 for ISO 17025 Accreditation.

5. TESTING PERSONNEL

Director of Testing - Jason R. Holdeman
Technician - Todd Miller



6. REFERENCE STANDARDS

Federal Motor Vehicle Safety Standard (FMVSS) 302 - as stated in the Code of Regulations Title 49, Volume 5, Section S571.302 (10-1-12 Edition).

Canadian Motor Vehicle Safety Standards (CMVSS) Standard 302 - Date Modified: 2012-02-06

7. TEST EQUIPMENT

- A. Pre-Conditioning Room
- B. Burn Chamber (PEI No. 269)
- C. Stop Watch

8. TEST SPECIMEN

See attached data pages for specimen descriptions.

9. TEST SPECIMEN CONSTRUCTION

The test specimens were cut into a 4" x 14" x 1/2" thick (maximum) piece for testing. (Where ideal specimen size could not be attained, the closest matching specimen size was used or the actual shape of the finished product.)

10. TEST SPECIMEN CONDITIONING

The test specimens were conditioned at 70 °F and 50% RH for a minimum of twenty-four (24) hours prior to testing.

11. TEST PROCEDURE

- A. Test specimen is mounted in between matching "U" brackets.
- B. Test specimen is then placed in metal cabinet.
- C. Bunsen burner flame is then exposed to end of test sample for fifteen (15) seconds.
- D. The time required for the flame to travel from 1-1/2" in from the open end of the "U" bracket to 1-1/2" in from the closed end of the "U" bracket is measured and recorded.
- E. The rate of burn is then calculated and recorded.

12. TEST RESULTS

See the attached data sheets for test results.

Progressive Engineering Inc.
FMVSS & CMVSS 302 FLAMMABILITY TEST

Client: Crane Composites

Sample Description: STC 090 skin material with an average measured thickness of 0.086". Specimen details provided by Marcus Ulmer of Crane Composites.

Samples Received on: 5/9/2014

PRECONDITIONING

	Date	Time	Temp.	Rel. Hum.
Start	5/9/2014	6:39	72deg.F.	52%
Stop	5/12/2014	1:05	72deg.F.	51%

TEST DATA

Date	Travel Time (s)	Travel Distance	Comments / Observations
5/12/2014	600.0 sec	4.8"	The specimen burned slowly producing lots of black smoke with no flaming drips.

TEST RESULTS

Based on the data above the following Burn Rate (B_r) was obtained. Burn rate is defined as "Travel Distance" divided by the "Travel Time" (in minutes)

Burn Rate	Pass	Fail
0.48"/min	✓	

A PASS is considered a Burn Rate (B_r) of LESS than 4" per minute.

Tested Specimen





TEST REPORT

OMEGA POINT
LABORATORIES, INC.
16015 Shady Falls Road
Elmendorf, TX 78112
(V) 210-635-8100
(F) 210-635-8101
800-966-5253
www.opl.com

ASTM E84-04

SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS

Report No. 16888 - 123812

0.090" Matrex / Varietex

February 22, 2005

Prepared for:
Kemlite Florence
8015 Dixon Drive
Florence, KY 41042



ABSTRACT

Test Specimen: 0.090" Matrex / Varietex

Test Standard: ASTM E84-04

Test Date: February 15, 2005

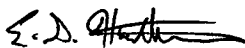
Test Sponsor: Kemlite Florence

Test Results:

FLAME SPREAD INDEX = 135
SMOKE DEVELOPED INDEX = 350

123812

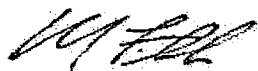
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Eric G. Hutchinson
E84 Operator

February 22, 2005

Reviewed and approved:



William E Fitch PE No. 55296

February 22, 2005



I INTRODUCTION

This report describes the results of the ASTM E84-04 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 E84-04 (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 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: 0.090" Matrex / Varietex

Date Received: 2/8/2005
Date Prepared: 2/8/2005
Conditioning (73°F & 50% R.H.): 7 days
Specimen Width (in): 24
Specimen Length (ft): 24
Specimen Thickness: 0.087-in.
Material Weight: N/A oz./sq. yd
Total Specimen Weight: 34.00-lbs.
Adhesive or coating application rate: N/A

Mounting Method:

The specimen was self-supporting and was placed directly on the inner ledges of the tunnel.

Specimen Description:

The Test specimen was described by the client as the "0.090" Matrex / Varietex." The specimen consisted of (3) 8-ft. long x 24-in. wide x 0.087-in. thick, fiberglass reinforced plastic panels. The FRP panels were white in color. The specimen was identified by the client as "0.090 Matrex / Varietex".



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	100	100
0.090" Matrex / Varietex	135	350

The data sheets are included in the Appendix. These sheets are actual print-outs of the computerized data system which monitors the ASTM E84-04 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 fiberglass reinforced plastic panels ignited at 0:58 (min:sec.). The flames passed out the end of the apparatus at 3:16 (min:sec.). The test continued for the 10:00 duration.

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

The resin was consumed from 0-ft. - 24-ft. The fiberglass was charred from 0-ft. - 24-ft.



APPENDIX

ASTM E84-04 Data Sheets



ASTM E84 DATASHEETS

Client: KEMLITE FLORENCE

Date: 2/15/05

Time: 09:30 AM

Test Number: 1

Project Number: 16888-123812

Operator: EH/TA

Specimen ID: " 0.090" MATREX / VARIETEX, 0.090" MATREX / VARIETEX." THE SPECIMEN WAS SELF-SUPPORTING.

TEST RESULTS

FLAMESPREAD INDEX: 135

SMOKE DEVELOPED INDEX: 350

SPECIMEN DATA . . .

Time to Ignition (sec): 58

Time to Max FS (sec): 185

Maximum FS (feet): 19.5

Time to 980 °F (sec): 197

Max Temperature (°F): 1102

Time to Max Temperature (sec): 351

Total Fuel Burned (cubic feet): 51.39

FS*Time Area (ft*min): 159.2

Smoke Area (%A*min): 349.3

Fuel Area (°F*min): 7638.4

Fuel Contributed Value: 70

Unrounded FSI: 136.7

CALIBRATION DATA . . .

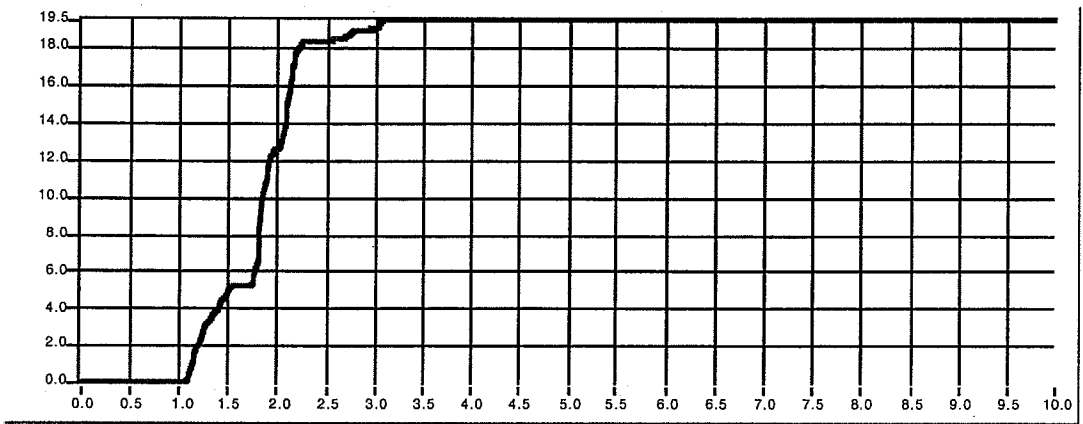
Time to Ignition of Last Red Oak (sec): 38

Red Oak Smoke Area (%A*min): 96.00

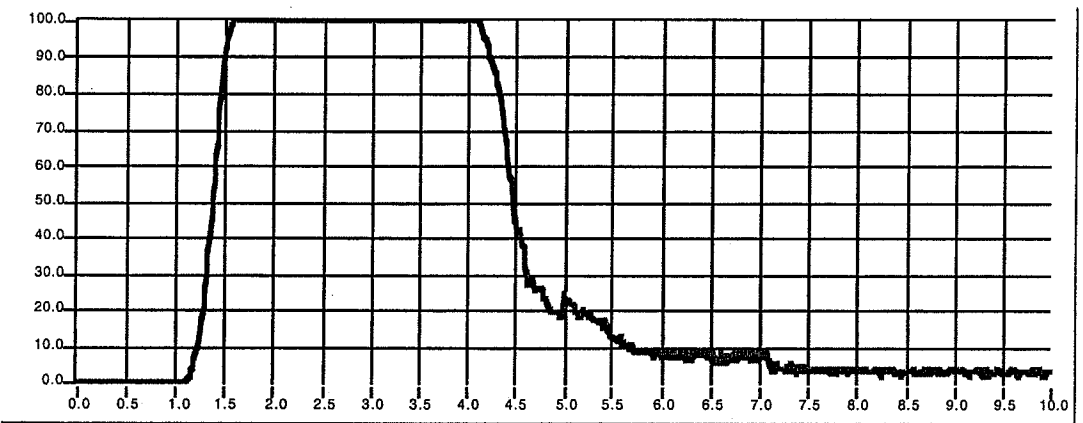
Red Oak Fuel Area (°F*min): 8587

Glass Fiber Board Fuel Area (°F*min): 5396

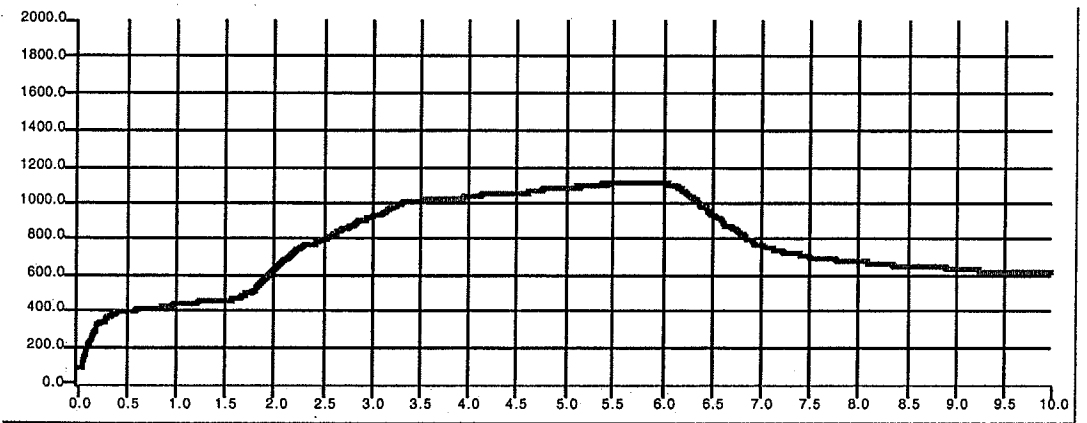
FLAME SPREAD (ft)



Smoke (%A)



Temperature (°F)



Time (min)



Test Report

No.177-002858

Date: Jan 18, 2007

Page 1 of 2

Crane Composites
8015 Dixon Drive
Florence, KY 41042

Attn: Chris Eschenburg

The following sample was submitted and identified by the client as:


0.09" Class C Varietex

Color	:	White
Country of Origin	:	USA
Sample Receiving Date	:	Jan 11, 2007
Test Performing Date	:	Jan 18, 2007
Test Performed	:	Selected test as requested by applicant against test request form, date Jan 08, 2007
* * * * *		
Test Results	:	Please refer to page 2.

Prepared by:

Signed for and on behalf of
SGS U.S. Testing Co., Inc.

M. Szklarski
Mariusz Szklarski
Technician - Textile Laboratory


Greg S. Kolbeck
Manager - Textile Laboratory

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Test Report

No.177-002858

Date: Jan 18, 2007

Page 2 of 2

Test Results:

Flammability Test of Interior Materials
FMVSS 302-10-01-04

<u>Burn Time</u> (seconds)		<u>Burn Distance</u> (mm)		<u>Burn Rate</u> (mm/min)	
<u>Length</u>	<u>Width</u>	<u>Length</u>	<u>Width</u>	<u>Length</u>	<u>Width</u>
600 *	600 *	101	115	10.1	11.5
600 *	600 *	98	117	9.8	11.7
600 *	600 *	115	113	11.5	11.3

* Test discontinued after 10 min.

Requirements:

The material shall not burn or transmit a flame front across its surface, at a rate of more than 102 mm per minute. However, if a material stops burning before it has burned for 60 seconds from the start of timing and has not burned more than 51 mm from the point where timing was started, it shall be considered to meet this requirement.

Conclusion:

The submitted sample meets the requirement of the Department of Transportation Motor Vehicle Safety Standard 302 "Flammability Test of Interior Materials".

*** End of Report ***

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