



SUBSTITUTION REQUEST

(During the Bidding Phase)

Project: _____ Substitution Request Number: _____

From: _____
To: _____ Date: _____

A/E Project Number: _____
Re: _____ Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: DriPlane Drainage Plane
Manufacturer: Mortar Net Solutions Address: 326 Melton Rd Burns Harbor IN Phone: 800-664-6638
Trade Name: DriPlane Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____
Signed by: _____
Firm: _____
Address: _____
Telephone: _____

A/E's REVIEW AND ACTION

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: _____

Date: _____

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____



DriPlane™ drainage plane for exterior rainscreen systems

Provides continuous drainage and drying for residential and commercial walls

Use

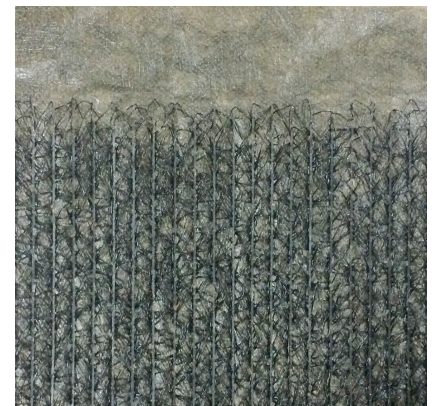
- Install between the inner structural wall and exterior cladding, fabric side toward the building exterior. May be used behind stucco, thin brick and stone, manufactured stone, stone and brick masonry; fiber cement, vinyl and wood siding; and with most other absorptive claddings and rainscreen systems.

Benefits

- 90% open-weave entangled filament mesh and vapor-permeable geotextile allows rapid drainage and drying
- Helps prevents peeling, cracking or blistering of exterior finishes by allowing them to dry quickly and completely
- Molded-in channels provide clear, continuous drainage and ventilation pathways
- Fabric removes easily without tearing for cutting around openings and creating overlaps
- Black color makes DriPlane virtually invisible through gaps in rainscreen veneer
- Rigid mesh material proven to resist compression up to 140 lbs/SF with no change in thickness to keep drainage channels open
- Easy to install using familiar tools
- Will not absorb moisture
- 100% inert material provides no food source for mold, mildew or bacteria
- Allows complete encapsulation of metal lath in adhered masonry applications
- Acts as a capillary and mortar break between cladding and weather resistant barrier
- Allows siding and veneers to move independently of the structural wall to help prevent damage due to variations in expansion/contraction rates of wall components
- Allows rapid pressure equalization to prevent air pressure-driven water infiltration

Product Characteristics

- Polypropylene blend mesh bonded to a water and vapor permeable membrane
- No low temperature embrittlement
- UV resistant
- ASTM E84 Class A rated (flame spread and smoke-developed indices)



Sizes and Packaging

THICKNESS	HEIGHT	LENGTH	LF/BOX	WEIGHT	PACKAGING
1/4"	48"	65'	260 LF	18 lbs/roll	Rolls
.4"	48"	45'	180 LF	18 lbs/roll	Rolls
.75"	48"	50'	200 LF	8 lbs/roll	Rolls

Please see other side for installation instructions



INSTALLATION INSTRUCTIONS OVERVIEW

1. Install building paper or WRB* and flashing according to manufacturers' recommendations.
2. Install all window and door frames before installing DriPlane.
3. Place DriPlane horizontally against exterior wall, fabric side out and the mesh toward the building interior. The membrane is even with the top edge of the mesh and extends 3 inches beyond the bottom edge of the mesh. The fabric overlap should be at the bottom of the DriPlane sections.
4. Starting at the bottom of the wall, position the first piece of DriPlane where the bottom edge of veneer meets the weep screed or flashing. On the first row only, fold the fabric under the mesh to form an insect barrier along the bottom edge. Butt the mesh sections together at horizontal and vertical seams without overlapping or "shingling" the mesh.
5. If it's necessary to cut the DriPlane width down to fit between the last full row of DriPlane and the top of the wall, cut the membrane along the side where the membrane is even with the mesh. Peel the fabric away from the mesh before cutting to allow a minimum 3 inch overlap at the top edge of the cut section, and fold the fabric over the mesh to form an insect barrier at the top of the wall.
6. Mechanically fasten DriPlane with a cap nail, cap staple, or cap screw. Adequately fasten DriPlane so it lays flat against the substrate until cladding material is applied. With wood or steel stud construction, be sure all fasteners penetrate structural members only. When installing over concrete or block back-up walls that do not accept mechanical fasteners, hold in place with small dabs of glue. **DO NOT FASTEN THROUGH FLASHING.**
7. Seam adjacent DriPlane sections with the fabric overlapping adjacent sections in a shingle fashion. At horizontal seams, the fabric from the top section should overlap the lower section. At vertical seams, the overlap may be from either side.
8. Trim DriPlane around all penetrations, windows and doors with no gaps between the mesh and the penetrations' frames.
9. If specified, install expanded metal lath or code approved stucco wire over the DriPlane according to the veneer manufacturers' recommendations.
10. If specified, apply scratch coat according to stone manufacturers' recommendations.
11. If specified, install manufactured stone according to guidelines. It is strongly recommended that proper flashing and a weep screed or weep holes be used to allow proper ventilation and drainage. For weep holes, use WeepVent or CellVent from Mortar Net Solutions.

For more information
call 800.664.6638



Moisture
Management
for Masonry

326 Melton Rd., Burns Harbor, IN 46304
P 800 664 6638 F 219 787 5088
www.mortarnet.com



December 21, 2016

January 12, 2017

March 6, 2017

March 28, 2017

May 3, 2017

Additional Water Drainage Data Added.

Water Exposure, UV, Freeze Thaw and Mold/Fungi data added.

Compression Data Revised.

Heat Aging data added.

Mail To:

Mr. Gary Johnson
Mortar Net Solutions
326 Melton Road
Burns Harbor, IN 46304

Bill To:

<= Same

email: GJohnson@mortarnet.com

Dear Mr. Johnson:

Thank you for consulting TRI/Environmental, Inc. (TRI) for your geosynthetics testing needs.
TRI is pleased to submit this final report of the laboratory testing for the samples listed below.

TRI Job Reference Number: 25729

Materials Tested: DriPlane (6 mm)

Tests Requested: Air Leakage (ASTM E 2925, Annex A1)
Water Drainage (ASTM E 2925, Annex A2)
Water Drainage (ASTM D 2273)
Water Exposure - 168 hours @ 50 C (ASTM D 5322)
UV Resistance - 336 hrs (ASTM G 154, Cycle 1)
Freeze Thaw Exposure
Heat Aging and Exposure - 90 days @ 77C (ASTM D 3045)
Mold and Fungi Resistance - 28 days (ASTM C 1338)

If you have any questions or require any additional information, please call us at 1-800-880-8378

Sincerely,

Jarrett A. Nelson
Technical Director
Geosynthetic Services Division
www.GeosyntheticTesting.com

*Signature is on file



DRAINAGE AND VENTILATION/AIR FLOW TEST RESULTS

TRI Client: Mortar Net Solutions

Material: Drainage Material

Sample Identification: Driplane

TRI Log #: 25729

Air Flow (ASTM E 2925, Annex A1)

Differential Vacuum

Pressure (pa)	Air Flow Rate (L/s)
1	0.07
5	0.32
10	0.62
15	0.90
25	1.41
75	3.45

Water Drainage (ASTM E 2925, Annex A2)

Parameter	Wt. g	% of Total
Water Drained	3211	93%
Water Retained	239	7%

Water Drainage (ASTM E 2273)

	Elapsed Time (min)	Wt. g	% of Total
	15	2087	
	30	1860	
Water Flowing	45	1887	
	60	1769	
	75	1724	
Water Draining	60	608	
Total Water Drained		9934	86%



DRAINAGE AND VENTILATION/AIR FLOW TEST RESULTS

TRI Client: Mortar Net Solutions

Material: Drainage Material

Sample Identification: Driplane (Insect/Mortar screen removed from bottom)

TRI Log #: 25729

Water Drainage (ASTM E 2925, Annex A2)

<u>Parameter</u>	<u>Wt. g</u>	<u>% of Total</u>
Water Drained	2921	96%
Water Retained	118	4%

Water Drainage (ASTM E 2273)

	<u>Elapsed Time (min)</u>	<u>Wt. g</u>	<u>% of Total</u>
	15	1805	
	30	2132	
Water Flowing	45	2159	
	60	2141	
	75	2168	
Water Draining	60	445	
Total Water Drained		10850	94%



LABORATORY TEST RESULTS

TRI Client: Mortar Net Solutions

Material: Drainage Material

Sample Identification: Driplane

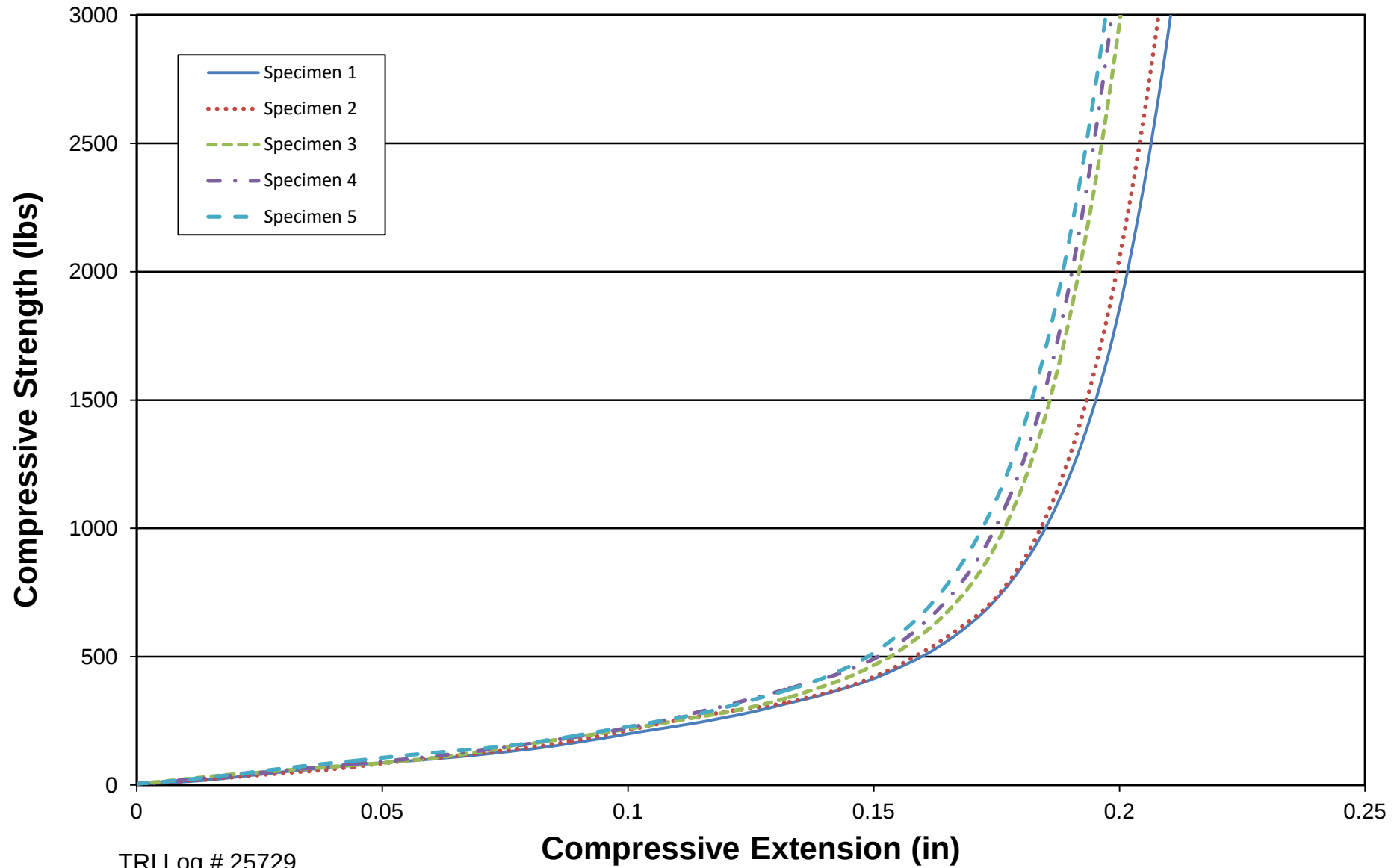
TRI Log #: 25729

PARAMETER	TEST REPLICATE NUMBER					MEAN	DEV.
	1	2	3	4	5		
Compressive Strength (ASTM D 6364)							
Original Thickness (in)	0.2326	0.2395	0.2331	0.2250	0.2290	0.2318	0.0054
Compressive Strength (lbf)	381	408	590	452	404	447	84
Compressive Strength (psf)	1524	1632	2360	1808	1616	1788	336
Extension @ Compressive Strength Point (in)	0.1912	0.1897	0.1814	0.1798	0.1776	0.1839	0.0061
Thickness @ Compressive Strength Point (in)	0.0414	0.0498	0.0517	0.0452	0.0514	0.0479	0.0045



Compression Test Results

TRI Client : Mortar Net Solutions
Product: Driplane

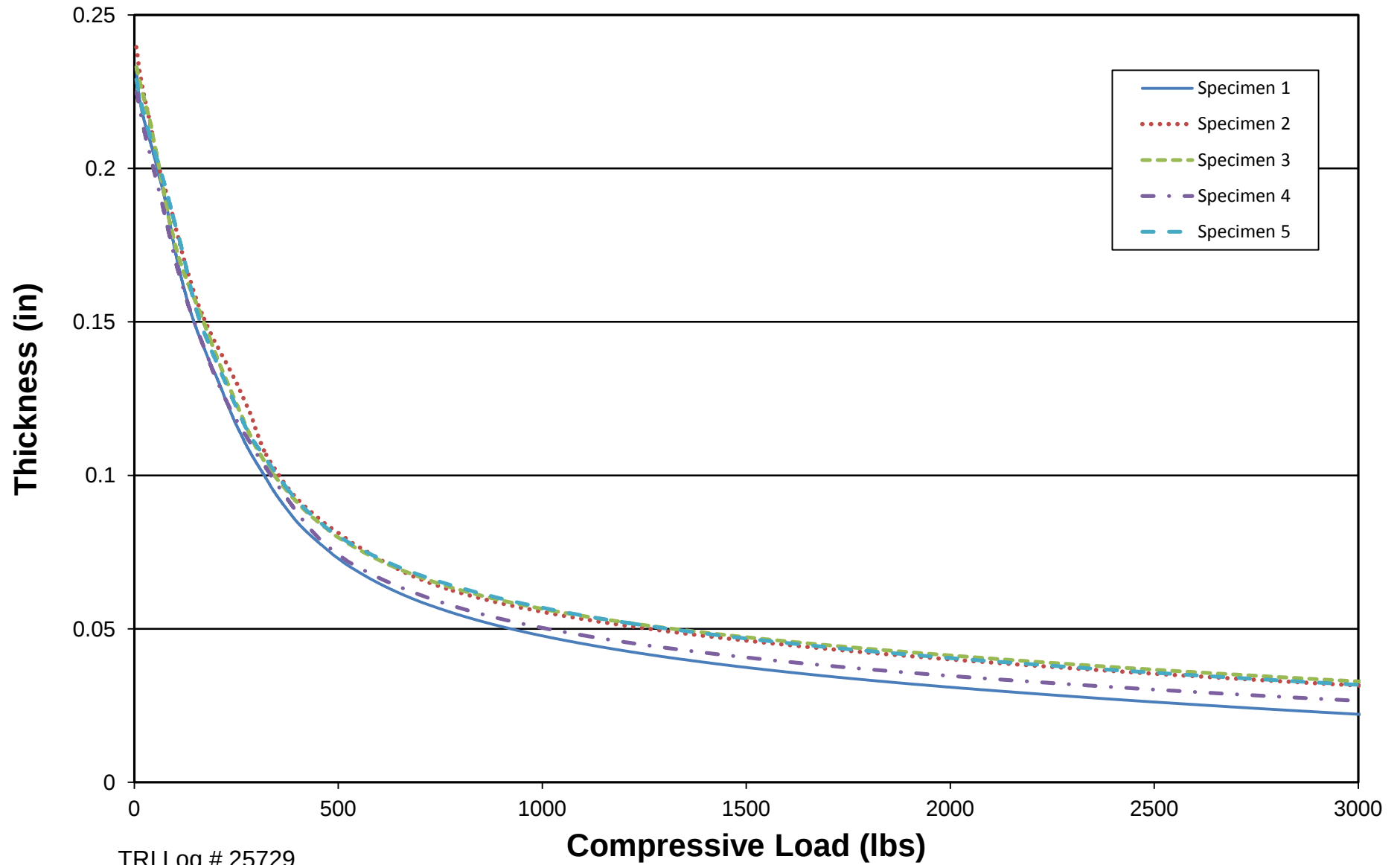


TRI Log # 25729



Compression Test Results

TRI Client : Mortar Net Solutions
Product: Driplane



TRI Log # 25729



LABORATORY TEST RESULTS

TRI Client: Mortar Net Solutions

Material: Drainage Material

Sample Identification: Driplane

TRI Log #: 25729

PARAMETER	TEST REPLICATE NUMBER					MEAN	DEV.
	1	2	3	4	5		
Water Exposure - 168 hours @ 50 C (ASTM D 5322)							
Strength Retained measured via Compressive Strength (ASTM D 6364)							
Compressive Strength (lbf) - B	381	408	590	452	404	447	84
Compressive Strength (psf) - B	1524	1632	2360	1808	1616	1788	336
Compressive Strength (lbf) - E	474	423	458	404	447	441	28
Compressive Strength (psf) - E	1896	1692	1832	1616	1788	1765	111
UV Resistance - 336 hrs (ASTM G 154, Cycle 1)							
Strength Retained measured via Compressive Strength (ASTM D 6364)							
Compressive Strength (lbf) - B	381	408	590	452	404	447	84
Compressive Strength (psf) - B	1524	1632	2360	1808	1616	1788	336
Compressive Strength (lbf) - E	514	472	453	471	415	465	36
Compressive Strength (psf) - E	2056	1888	1812	1884	1660	1860	143
Freeze Thaw Exposure (25 cycles of 3 h at (50 ± 2) °C, 3 h in water at (21 ± 2) °C, 18 h at (-10 ± 2) °C)							
Strength Retained measured via Compressive Strength (ASTM D 6364)							
Compressive Strength (lbf) - B	381	408	590	452	404	447	84
Compressive Strength (psf) - B	1524	1632	2360	1808	1616	1788	336
Compressive Strength (lbf) - E	457	409	403	479	443	438	32
Compressive Strength (psf) - E	1828	1636	1612	1916	1772	1753	129
Heat Aging and Exposure - 90 days @ 77C (ASTM D 3045)							
Strength Retained measured via Compressive Strength (ASTM D 6364)							
Compressive Strength (lbf) - B	381	408	590	452	404	447	84
Compressive Strength (psf) - B	1524	1632	2360	1808	1616	1788	336
Compressive Strength (lbf) - E	474	487	469	430	410	454	33
Compressive Strength (psf) - E	1896	1948	1876	1720	1640	1816	130
Pre expose Thickness (inch)	0.230	0.232	0.232	0.230	0.224	0.230	0.003
Post expose Thickness (inch)	0.233	0.231	0.236	0.226	0.225	0.230	0.005



LABORATORY TEST RESULTS

TRI Client: Mortar Net Solutions

Material: Drainage Material

Sample Identification: Driplane

TRI Log #: 25729

Mold and Fungi Resistance - 28 days (ASTM C 1338)

Material	After 1 Week	After 28 Days	Fungal Growth	Results
Sample - Insect/Mortar Screen Down	Light Growth at Bottom and Sides	Heavy Growth at Bottom and Sides	Growth was less than or equal to comparable item	Pass
Sample - Insect/Mortar Screen Up	Light Growth	Light Growth	Growth was less than comparable item	Pass
Comparative Item - Wood	Heavy Growth	Heavy Growth	Heavy Growth	-
Negative Control	No Growth	No Growth	No Growth	-
Viability Control (Sabouraud agar)	Heavy Growth	Heavy Growth	Heavy Growth	-
Viability Control (Czepek agar)	Heavy Growth	Heavy Growth	Heavy Growth	-



Report On
Surface Burning Characteristics Determined By
ASTM E84/ (UL 723) Twenty-Five Foot Tunnel
Furnace Test Method

TEST NUMBER: T-15438R

MATERIAL TESTED:
48" Wide Rainscreen (L5)

DATE OF ISSUE: 2/13/2017

REVISION DATE: 3/9/2017



I. SCOPE

This report contains the reference to the test method, purpose, test procedure, rounding procedures, preparation and conditioning of specimens, description of materials, test and post test observation data, and test results.

II. TEST METHOD

The test was conducted in accordance with ASTM E 84-16, "Standard Test Method for Surface Burning Characteristics of Building Materials." The 25-foot tunnel method is also described by NFPA 255 and UL 723.

III. PURPOSE

The purpose of the test is to determine the relative performance of the test material under standardized fire exposure. Results are given for Flame Spread and Smoke Developed Index. The values obtained from burning the test material represent a comparison with that of 1/4" inorganic reinforced cement board expressed as zero and red oak flooring expressed as 100.

The flame spread results of 25-foot tunnel tests are frequently used by building code officials and regulatory agencies in the acceptance of interior finish material for various applications. The most widely accepted classification system is epitomized by the International Code Council (ICC) and National Fire Protection Association (NFPA) Life Safety Code, NFPA 101:

Class A*	0 - 25	flame spread	0-450 smoke developed
Class B*	26 - 75	flame spread	0-450 smoke developed
Class C*	76 - 200	flame spread	0-450 smoke developed

*Class A, B and C correspond to I, II and III, respectively, in other historical codes such as UBC and BOCA.

This flame spread classification system is based on the premise that the higher the flame spread numbers, the greater the fire spread potential. The actual relationship between the numbers developed under this test and life safety from fire has not been adequately established.

IV. TEST PROCEDURE NOTES

The furnace was preheated to a minimum of 150°F as measured by an 18 AWG thermocouple embedded in cement 1/8" below the floor surface of the chamber, 23-1/4' from the centerline of the ignition burners. The furnace was then cooled to 105°F ($\pm$ 5°F) as measured by a thermocouple embedded 1/8" below the floor surface of the test chamber 13' from the fire end.

Prior 10-minute tests with 1/4" inorganic reinforced cement board provided the zero reference for flame spread. Periodic 10-minute tests with unfinished select grade red oak flooring provided for the 100 reference for flame spread and smoke developed as noted in Section III

Page 3 of 6

A. Flame Spread

The flame spread distance is observed and recorded at least every 15 seconds or every 2 feet of progression. The peak distance is noted at the time of occurrence. The flame spread distance is plotted over time. The total area under the flame spread distance-time curve is determined; flame front recessions are ignored. The flame spread is then calculated as a function of the area under the curve relative to the standard red oak curve area. The value for flame spread classification for the tested material may be compared with that of inorganic reinforced cement board and select grade red oak flooring.

B. Smoke Developed

The smoke developed during the test is determined by the reduction in output of a photoelectric cell. A light beam vertically orientated across the furnace outlet duct is attenuated by the smoke passing through the duct. The output of the photoelectric cell is related to the obscuration of the light source through the duct caused by the smoke. A curve is developed by plotting photoelectric cell output against time. The value of smoke developed is derived by calculating the net area under the curve for the test material and comparing this area with the net area under the curve for unfinished select grade 23/32" red oak flooring.

V. FLAME SPREAD AND SMOKE DEVELOPED ROUNDING PROCEDURES

Single test calculated flame spread and smoke developed values are rounded to the nearest multiple of 5 and reported as the Flame Spread or Smoke Developed Index. Actual test values are available on request.

For multiple tests, the individual calculated flame spread and smoke developed values are recorded, averaged, and the results rounded to the nearest multiple of 5. The averaged, rounded number is reported as the Flame Spread or Smoke Developed Index.

VI. PREPARATION AND CONDITIONING OF TEST SAMPLES

Three or four sections are generally used in the preparation of a complete test specimen which is 20-1/2" wide and 24' long. Materials 8' in length may be tested by using three sections 20-1/2" wide by 8' long for a total specimen length of 24'. A 14" length of uncoated 16 gauge steel sheet is used to make up the remainder of the test specimen; it is placed at the fire end of the test chamber. Prior to testing, three 8' long sections of 1/4" inorganic reinforced cement board are placed on the back side of the specimens to protect the furnace lid assembly. Test specimens are conditioned at a controlled temperature of 73.4°F ($\pm 5^\circ\text{F}$) and a controlled relative humidity of 50 $\pm$ 5 percent.

VII. LABORATORY ACCREDITATION

HPVA Laboratories is an internationally accredited testing laboratory according to ISO/IEC 17025 and recognized by state and local building code jurisdictions. International Accreditation Service (IAS) Accredited Testing Laboratory Number: TL-224.



TEST NUMBER T-15438R

Page 4 of 6

DATE OF TEST 2/13/2017

REVISION DATE 3/9/2017

VIII: MATERIAL TESTED

- 1) Manufacturer: Enka NC
- 2) Burn Number: 1
- 3) Average Thickness(in.): 0.114
- 4) Average Weight (lbs./sq.ft.): 0.076
- 5) Product Description: 48" Wide Rainscreen (L5)
- 6) Color: Black
- 7) Surface: Face Side
- 8) Sample Selection Manufacturer
- 9) Date of Selection: 1/25/2017
- 10) Material Description By: Manufacturer
- 11) Method of Mounting: Supported with 1/4" diameter steel rods spaced 24 inches on center and 2" hexagonal wire mesh
- 12) Days in Conditioning: 18

IX: TEST CONDITIONS AND DATA

- 1) Specimen Preheat Time (min.) 2:00
- 2) Tunnel Brick Temp (deg. F): 102
- 3) Time to Zero Mark (seconds): 10
- 4) Time to End of Tunnel
or Flamefront Distance: 2'@0:30
- 5) Time-Distance Curve Area
(min./ft.): 18.9
- 6) Fuel and Temperature
 - a) Fuel (cu.ft./min.): 5.494
 - b) Max. Vent End Temp. (deg.F): 535
 - c) Time to Max. Temp (min.): 9:52
- 7) After Flaming: Yes



TEST NUMBER T-15438R

Page 5 of 6

DATE OF TEST 2/13/2017

REVISION DATE 3/9/2017

X: TEST RESULTS

Test results calculated on the basis of the area under the curves of flame spread distance and smoke developed versus time are provided in the table below for calibration materials and for:

48" Wide Rainscreen (L5)

Material Description	Flame Spread Index	Smoke Developed Index
High Density Inorganic Reinforced Cement Board	0	0
T-15438	10	100

Observations:

Melting and dripping of the material during the test.
Completely melted through to 21', discoloration to 24'

Remarks:

The sample consisted of one 20.5" x 24' long piece.

Revision (3/9/17) - Sample color changed from "Grey" to "Black".

Conclusions:

Meets Class A, Flame Spread Index 25 or less and Smoke Developed Index 450 or less.

REPORT PREPARED BY:

Chris Palumbo

Manager of Fire Testing - Engineer

REPORT REVIEWED BY:

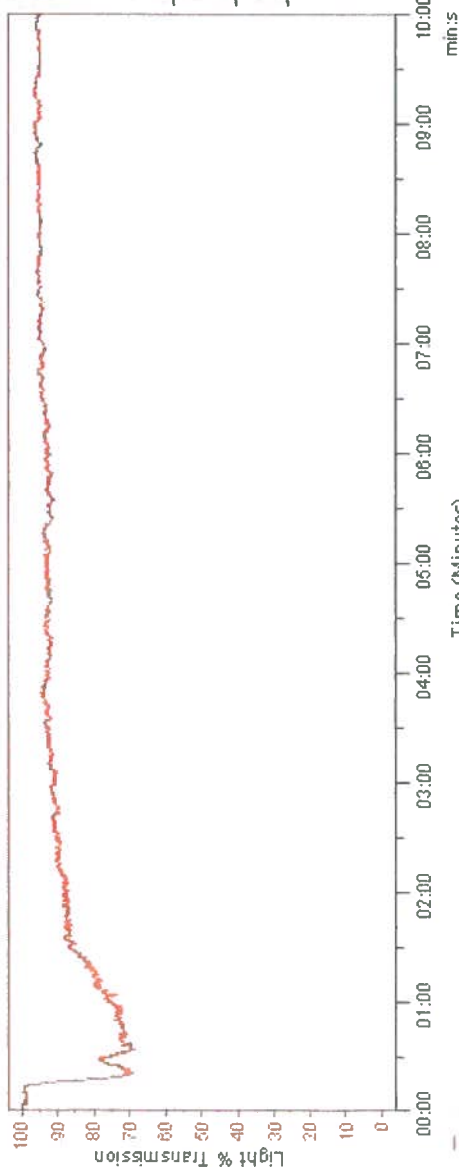
Brian Sause

Director - HPVA Laboratories

This is a factual report of the results obtained from laboratory tests of sample products. The results may be applied only to the products tested and should not be construed as applicable to other similar products of the manufacturer. HPVA Laboratories does not verify the description of materials and products when the description is provided by the client. The report is not a recommendation or a disapprobation by HPVA Laboratories of the material or product tested. While this report may be used for obtaining product acceptance; it may not be used in advertising.

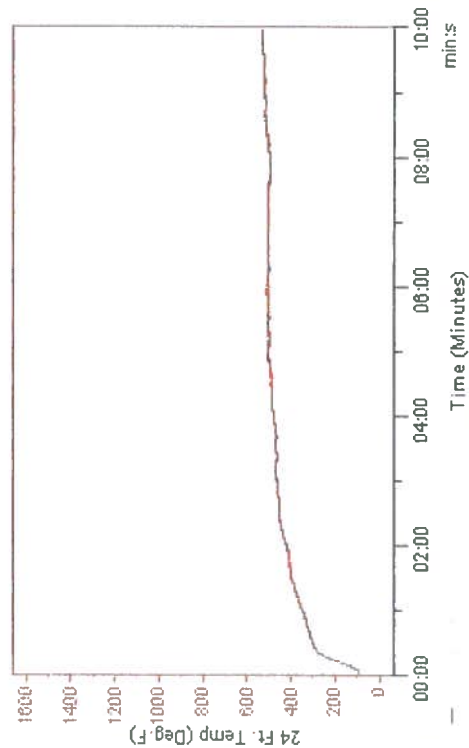
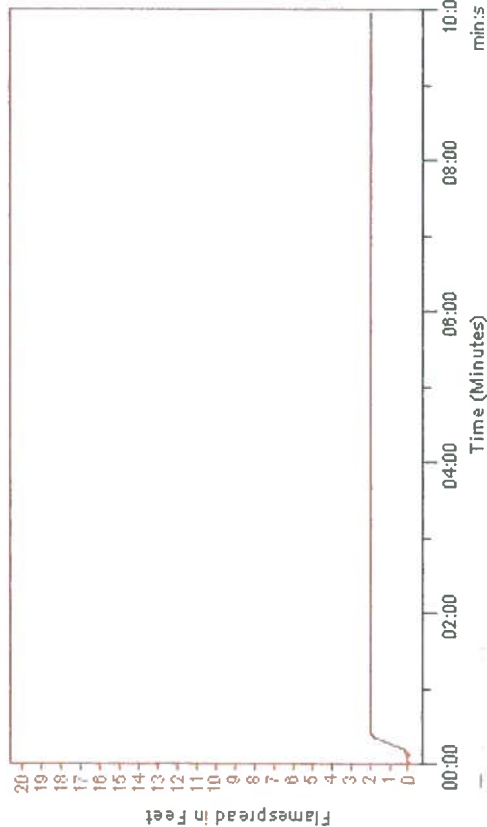


Test Time 600 FS Counts 18.9
seconds Fuel Counts 628
STOP Early
NEW TEST
program Smk Cts 162



Max Temp = 535
@ Time = 592

Flame Progression (mV) 10.90
Smoke (mV) 8.50
24 Ft. Temp (Deg. F) 530
13 Ft. Temp (Deg. F) 187
24 Foot Floor TC (Deg. F) 172



test ON/OFF

