

## **TEST REPORT**

ASTM E331-00(16) Modified

REPORT NO.: 1760.01-109-12

- RENDERED TO: BORAL<sup>®</sup> Toledo, Ohio
- PRODUCT TYPE: Cultured Stone<sup>®</sup> over Rainscreen and Lath Composite

SERIES / MODEL: Flex-N-Dry / Cultured Stone<sup>®</sup> / Drain-N-Dry<sup>™</sup> Lath

 Test Date:
 11/19/2018

 Report Date:
 12/21/2018

 Retention End Date:
 11/19/2022



CLIENT INFORMATION:	BORAL <sup>®</sup> 2256 Centennial Road	
	Toledo, Ohio 43617	
TEST LABORATORY:	Molimo, LLC	
	1410 Eden Road	
	York, Pennsylvania 17402	
	717-900-6034	

## PROJECT SUMMARY:

**PRODUCT Type:** Cultured Stone<sup>®</sup> over Rainscreen and Lath Composite

**SERIES/MODEL:** Flex-N-Dry / Cultured Stone<sup>®</sup> / Drain-N-Dry<sup>™</sup> Lath

#### **PROJECT SUMMARY:**

Molimo, LLC was contracted to perform testing on the above referenced product. The results are tested values and were secured by using the designated test method. The specimens were successfully tested to ASTM E 331 (Modified to 2 hours). The Water Penetration Resistance test results for each specimen is shown in the table below.

Test	Specimen #1 Flex-N-Dry / Cultured Stone <sup>®</sup> w/ Drain-N-Dry™ Lath over Tyvek House Wrap	<b>Specimen #2</b> Flex-N-Dry / Cultured Stone <sup>®</sup> w/ Expanded Metal Lath over Tyvek House Wrap	Specimen #3 Expanded Metal Lath over ExoAir 230 Fluid- Applied Synthetic Permeable Air Barrier Membrane
Water Penetration Resistance Test Pressure	300 Pa (6.27 psf)	300 Pa (6.27 psf)	300 Pa (6.27 psf)

PROJECT DETAILS:

**Test Dates**: 11/19/2018

**Test Record Retention End Date**: 12/19/2022

Test Location: Tremco, Inc. test facility in Cleveland, Ohio.

Test Specimen Source: The test specimens were provided by the client.



#### WITNESSES:

The following representatives witnessed all or part of the testing.

Name	Company	
Chris Hines	Boral	
Jeffery Tew	Boral	
Joerg Birklebach	Tremco, Inc	
Steven Kraynik	Tremco, Inc.	
Joe Allison	Molimo, LLC	

#### TEST METHOD:

ASTM E331-00(16) (Modified 2 Hour test) – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference

#### TEST SPECIMEN DESCRIPTION:

#### **PRODUCT SIZES:**

Test Specimen #1: Flex-N-Dry / Cultured Stone<sup>®</sup> w/ Drain-N-Dry<sup>™</sup> Lath over Tyvek House Wrap

Overall Size:	1219 mm x 2438 mm	(48" x 96")
Overall Area:	3.0 m <sup>2</sup> (32 ft <sup>2</sup> )	

Test Specimen #2: Flex-N-Dry / Cultured Stone<sup>®</sup> w/ Expanded Metal Lath over Tyvek House Wrap

Overall Size:	1219 mm x 2438 mm (48" x 96")
Overall Area:	3.0 m2 (32 ft2)

Test Specimen #2: Expanded Metal Lath over ExoAir 230 Fluid-Applied Synthetic Permeable Air Barrier Membrane

Overall Size:	1219 mm x 2438 mm (	48" x 96")
Overall Area:	3.0 m2 (32 ft2)	



#### **TEST SPECIMEN DESCRIPTION**: (Continued)

#### TEST SPECIMEN #1: Flex-N-Dry / Cultured Stone<sup>®</sup> w/ Drain-N-Dry<sup>™</sup> Lath over Tyvek House Wrap

Wall Construction: The 48" x 96" specimen was constructed with 2" x 4" x 93" wood studs spaced appx. 11" on center with a centralized framed 23-1/4" x 35-1/4" rough opening. A 1/2" oriented strand board (OSB) was then fastened to the exterior with 2" 8D smooth shank nails spaced appx. 8" on center. The structure was then set into a 2" x 10" wood buck and sealed around the perimeter with Dymonic 100 Polyurethane sealant. Dupont Tyvek house wrap was then installed to the exterior of the OSB with 1" 8D ribbed nails with 1" Grip-Rite caps spaced appx. 8" on center. Dupont FlexWrap was then used to detail the rough opening. A 23-1/2" x 35-1/2" double hung flanged window was then installed into a bed Spectrem 1 Silicone sealant around the interior of the nail flange, then fastened to the perimeter with 1" smooth shank roofing nails. Boral Drain-N-Dry Lath Weep Screed Starter was installed to the bottom of the wall with 1"crown x 2" galvanized lath staples then Boral Drain-N-Dry<sup>™</sup> Lath rainscreen and lath composite was then installed onto the exterior with 1" crown x 2" galvanized lath staples. A scratch coat of ASTM C270 Type S Mortar was then applied onto the rainscreen and lath composite and left to cure for appx. 24 hours. Country Ledgestone Cultured Stone® was then applied onto the scratch coat using the same mortar mix leaving a 1/2" perimeter between the window and the stone. The specimen was left to cure for appx. 30 days. After the cure, expandable 15mm (5/8") / 8mm (3/8") – 15mm (5/8") Boral Flex-N-Dry acrylic impregnated foam tape was applied around the exterior window perimeter. This tape was left to expand before testing began.

*Refer to photos #1, #2 and #3.* 

# **TEST SPECIMEN #2:** Flex-N-Dry / Cultured Stone<sup>®</sup> w/ Expanded Metal Lath over Tyvek House Wrap

**Wall Construction**: The 48" x 96" specimen was constructed with 2" x 4" x 93" wood studs spaced appx. 11" on center with a centralized framed 23-1/4" x 35-1/4" rough opening. A 1/2" oriented strand board (OSB) was then fastened to the exterior with 2" 8D smooth shank nails spaced appx. 8" on center. The structure was then set into a 2" x 10" wood buck and sealed around the perimeter with Dymonic 100 Polyurethane sealant. Dupont Tyvek house wrap was then installed to the exterior of the OSB with 1" 8D ribbed nails with 1" Grip-Rite caps spaced approximately 8" on center. Dupont FlexWrap was then used to detail the rough opening. A 23-1/2" x 35-1/2" double hung flanged window was then installed into a bed Spectrem 1 Silicone sealant around the interior of the nail flange, then fastened to the perimeter with 1" smooth shank roofing nails.



#### TEST SPECIMEN DESCRIPTION: (Continued)

#### TEST SPECIMEN #2: (Continued)

Galvanized Metal Weep Screed was installed to the bottom of the wall with 1"crown x 2" galvanized lath staples then Self-Furring Expanded Diamond Metal Lath was installed onto the exterior with 1"crown x 2" galvanized lath staples. A scratch coat of ASTM C270 Type S Mortar was then applied onto the lath and left to cure for approximately 24 hours. Country Ledgestone Cultured Stone<sup>®</sup> was then applied onto the scratch coat using the same mortar mix leaving a 1/2" perimeter between the window and the stone. The specimen was left to cure for appx. 30 days. After the cure, expandable 15mm(5/8") / 8mm(3/8") - 15mm(5/8") Boral Flex-N-Dry acrylic impregnated foam tape was applied around the exterior window perimeter. This tape was left to expand before testing began.

Refer to photos #4, #5 and #6.

#### TEST SPECIMEN #3: Expanded Metal Lath over ExoAir 230 Fluid-Applied Synthetic Permeable Air Barrier Membrane

**Wall Construction**: The 48" x 96" specimen was constructed with 2" x 4" x 93" wood studs spaced appx. 11" on center with a centralized framed 23-1/4" x 35-1/4" rough opening. A 1/2" oriented strand board (OSB) was then fastened to the exterior with 2" 8D smooth shank nails spaced approximately 8" on center. The structure was then set into a 2" x 10" wood buck and sealed around the perimeter with Dymonic 100 Polyurethane sealant. ExoAir 230 Fluid-Applied Synthetic Permeable Air Barrier Membrane was then roller applied onto the exterior of the OSB at 48mils and left to cure for appx. 24 hours. ExoAir 110AT butyl backed membrane was then used to detail the rough opening. A 23-1/2" x 35-1/2" double hung flanged window was then installed into a bed Spectrem 1 Silicone sealant around the interior of the nail flange, then fastened to the perimeter with 1" smooth shank roofing nails. Expanded metal lath was then installed onto the exterior with 1"crown x 2" galvanized lath staples. A scratch coat of ASTM C270 Type S Mortar was then applied onto the lath. The specimen was left to cure for appx. 30 days before testing began.

Refer to photos #7 and #8.



**TEST RESULTS**: The temperature during testing was 19°C (67°F).

**TEST SPECIMEN #1:** Flex-N-Dry Cultured Stone<sup>®</sup> w/ Drain-N-Dry Lath over Tyvek House Wrap

WATER PENETRATION TESTING: (per ASTM E 331 modified for a 2-hour duration)

Test	Results	Allowable
300 Pa	Dace	Noloskago
(6.27 psf)	rass	NU Leakage

**TEST SPECIMEN #2:** Flex-N-Dry Cultured Stone<sup>®</sup> w/ Expandable Metal Lath over Tyvek House Wrap

WATER PENETRATION TESTING: (per ASTM E 331 modified for a 2-hour duration)

Test	Results	Allowable
360 Pa	Dace	Noloskago
(7.52 psf)	Pass	NU LEakage

**TEST SPECIMEN #3: Expandable Metal Lath over ExoAir 230 Fluid-Applied Synthetic Permeable** Air Barrier Membrane

WATER PENETRATION TESTING: (per ASTM E 331 modified for a 2-hour duration)

Test	Results	Allowable
360 Pa	Daca	Nolookaga
(7.52 psf)	Pass	NO LEAKAge

*General Note*: All testing was performed in accordance with reference test method.



A copy of this report, detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Molimo, LLC for the entire test record retention period. At the end of this retention period, the service life of this report will expire.

Results obtained are tested values and were secured by using the designated test methods. This test report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written permission of Molimo, LLC.

For MOLIMO, LLC:

Joseph E. Allison Regional Project Manager Michael D. Stremmel, P.E. Senior Project Engineer

MDS:jld

Attachments (pages): This report is complete only when all attachments listed are included. Appendix-A: Photographs (8) Appendix-B: Air Leakage Charts (4)

This report was produced from controlled document template MMO-00047, Rev 1, 11/28/2016.



## Appendix A

## Photographs



Photo 1 Specimen #1: Exterior





Photo 2 Specimen #1: Interior of penetration wall





Photo 3 Specimen #1: Expandable foam tape perimeter





Photo 4 Specimen #2: Exterior





Photo #5 Specimen #2: Interior





Photo #6 Specimen #2: Expandable foam tape perimeter





Photo #7 Specimen #3: Exterior





Photo #8 Specimen #3: Interior



#### Appendix B





















