

EVALUATION OF DIZAL INC., PRINTED ALUMINUM SIDING SYSTEM IDENTIFIED AS

“6” Wide Horizontally Mounted Aluminum Siding”

FOR WIND LOAD RESISTANCE

Report to: DiZal Inc.
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Quebec City, Quebec
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Report No.: 19-06-B0034-1
7 Pages, 1 Appendix

Proposal No.: 19-006-591690

Date: April 29, 2019



1.0 INTRODUCTION

At the request of DiZal Inc., Element Materials Technology (formerly known as Exova) was retained to evaluate "6" Wide Horizontally Mounted Aluminum Siding" system for structural performance. The testing was conducted in accordance to ASTM E1592 – "Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference" as outlined in Proposal Number: 19-006-591690 for Wind Load Resistance.

Upon receipt and construction, the specimen was assigned the following Element Specimen Number:

<u>Client Specimen Description</u>	<u>Element Specimen No.</u>
Digitally Printed Aluminum Siding / 6" (Horizontal Cladding- Wind Load) (for ASTM1592, "Wind Load Resistance" Testing)	19-06-B0034

Specimens were constructed by DiZal Inc.'s representative at Element on March 21, 2019

2.0 PROCEDURE

Test Method	Test Description
E1592: Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference	Wind Load Resistance

3.0 TEST WALL CONSTRUCTION

A test wall siding was constructed for wind load resistance in the horizontal orientation.

Wind Load Resistance Test Wall

The 2440 mm (96.1") wide by x 2440 mm (96.1") high test wall section was constructed by Element trained staff at Element's Mississauga facility on March 21, 2019.

The wind load resistance base wall sections consisted of nominal 6", 16 Gauge Steel studs, two tracks top and bottom, The track plates were fastened to the studs using 8 x 1/2" self-tapping screws. Two 2440 mm (96.1") wide x 1220 mm (48.0") high 5/8" thick Gold Georgia Pacific DensGlass Gypsum Sheathing were fastened to the framing using #6 x 1-1/4" scavenger head drywall screws on nominal 203 mm (8") centres.

The spacing between each stud section was nominally 406 mm (16") on-center, except for the last stud at each end, where the stud was positioned 335 mm (13.2") on centre from the outside edge of the adjacent perimeter stud and a 2x4 wood stud was added to adjacent to each outside steel stud, Aluminum Z-Grits of 2" width, and of 0.09" (13 Gauge) were installed over the gypsum sheath at vertical each steel stud outside of the adjacent perimeter stud. The Z-grits fastened to the studs with #12-24x2" self drilling tek screw

Each piece of "6" Wide Horizontally Mounted Aluminum Siding" measured 2440 mm (96.1") wide with an exposure of 153 mm (6.0"), with nominal thickness of 11.4 mm (0.449") fastened to the Z-Grits with seven #8 x 1 1/4 pan head screws. Along one edge of the cladding there were slots present measuring nominally 406 mm (16") on centre for fastener installation. The pieces of cladding were provided precut by DiZal prior to installation on the respective test wall.

Snap-on trim caps were used at the top and sides of the cladding panels.

A full-width aluminum starter strip as fastened along the bottom of the wall on the exterior face using #8 38 mm (1-1/2") long Robertson was screws fastened every 406 mm (16") on centre.

The test wall section was installed into a wood buck

Prior to installation of the cladding system on the test wall, a 6 mil polyethylene sheet was loosely fitted to the exterior wall between cladding members and Z-Grit and sealed to the test wall perimeter. This was used to apply a negative wind load to the cladding system by introducing a positive pressure differential onto the backside of the cladding system. The wind load was applied using a blower system.

4.0 STRUCTURAL PERFORMANCE

The wall system was subjected to an incremental pressure, each pressure was held for a maximum of 60 seconds and up to the maximum pressure until failure

Deformation measurements were taken continuously during pressurisation.

Note: During wind load resistance testing, Positive load was applied directly to the cladding material using a 6-mil plastic membrane which transferred the loads to the supporting structure.

5.0 TEST DATES

Cladding Horizontal:

Test Criteria

Structural Performance

Testing Date

April 12, 2019

6.0 GENERAL TEST SPECIMEN SETUP PHOTOGRAPHS FOR WIND LOAD RESISTANCE



Photo 1 – Testing Chamber Prior to Specimen Installation (Stock Photo)



Photo 2 – Wall Section (Cladding Horizontal) post test



Photo 3 – Wall Section (Studs)

7.0 SUMMARIZED TEST RESULTS

7.1 DETAILED WIND LOAD RESISTANCE - HORIZONTAL CLADDING

Table 2 – Wind Load Resistance Deflection Results in Accordance with ASTM E1592 Element Specimen No.: 19-06-B034--Horizontal Cladding				
Cycle	Pressure (Pa)	Gauging Positions & Maximum Deflections (mm)		
		Exterior Side		
		Gauge 7	Gauge 8	Gauge 9
Sustained Loads	2500	-0.91	-1.97	-0.74
	Residual at 0 Pa	-0.13	-0.6	-0.15
	3000	-1.02	-3.94	-2.77
	Residual at 0 Pa	-0.35	-0.93	-0.09
	3500	-2.44	-4.86	-0.28
	Residual at 0 Pa	-0.52	-1.02	-0.26
	4000	-3.33	-5.56	-1.56
	Residual at 0 Pa	-0.06	-1.28	-0.28
	4500	-4.06	-6.4	-1.95
	Residual at 0 Pa	-0.6	-1.49	-0.41
	5000	-5.08	-7.03	-2.14
	Residual at 0 Pa	-0.17	-0.37	-0.19
	Failure at 5236	A cladding panel, 609.6 mm (24"), from the top came disengaged from the rest of the panels. See Photo 2.		

7.2 RESULT SUMMARY

During and after the wind loading schedule as shown in Tables 1, the cladding system Element Specimen Number: 19-06-B0034 was capable of resisting and transmitting to its supports the positive forces of 5000 Pa generated by the design wind loads without any fracture or permanent deformation of the surfaces.

8.0 CONCLUSION

Element has conducted wind load testing on Dizal Inc "6" Wide Horizontally Mounted Aluminum Siding" horizontally installed onto a steel stud frame. In accordance with ASTM E1592 - "Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference" results are contained herein.

9.0 REPORT REVISION SUMMARY

Revision No:
19-06-B0034

Date:
April 22, 2019

Description of Revisions:
Original Document

Reported by:

Reviewed & Authorized by:



Mark Balonzo, C.Tech, Ext. 11225
Building Systems Technician
Products Testing Division



Scott Hallam, B.Eng. Ext 11511
Building Systems Specialist, Building Systems
Building Science Division

This report and service are covered under Element Materials Technology Inc's. Standard Terms and Conditions of Contract which may be found on our company's website www.element.com, or by calling 1 888 786 7555

APPENDIX A

Product Drawings
(As Provided by DiZal Inc.)

(3 Pages)

Aluminum Accessories
1" J-Trim and Base

TECHNICAL DATA SHEET

1. ALUMINUM
6063-T5 Aluminum extrusion 1.40 mm (0.055 in) thick recognized as the industry's first choice for its exceptional durability.

Accessory trim and base are joined together by snap fit allowing for seamless installation without visible screws.

Installation can be made both vertically and horizontally.

2. PRIMER COAT
Primer coat (±1,2 mil. thick) applied to ensure perfect adhesion between aluminum and ink.

3. HD PRINTING
High-definition digital inkjet printing (±1 mil. thick) is used to create photographic reproductions of a wide range of textures and outstanding color variations.

4. UV BARRIER
A protective clear coat (±1,2 mil. thick) is applied to provide long-term protection against UV rays and fading.

Scale : 1:1

Tests & Certifications*

- . CAN/ULC S102 - Fire Resistance
- . CAN/ULC S114 - Fire Resistance
- . ASTM E84 - Fire Resistance
- . NFPA 285 - Fire Resistance
- . ASTM D6578 - Graffiti Resistance
- . ASTM G155 - UV Resistance
- . ISO 7895 / ASTM E330 - Wind Load
- . ISO 7895 - Impact Resistance
- . ASTM D3359 - Adhesion testing
- . ASTM D4060 (CS-17) - Abrasion Resistance
- . Florida Building Code (FBC) compliance
- . LEED V4

* see website for full details



Name :	Job # :	Color :	Date :
<p>DiZAL DIGITALLY PRINTED ARCHITECTURAL PRODUCTS</p>	Model : FA-JTS-1201	Product : Aluminum siding accessories	Initials :
	Length : 3.65 m / 12 ft	Material : Aluminum 6063-T5	
	Drawing by: JCC Date: 18-11-22	Weight per piece (Trim cap) : 1.93 kg / 4.25 lbs	
		Weight total (Trim cap & Base) : 2.83 kg / 6.25 lbs	

APPROVED

JCC

April 30, 2019

Aluminum Accessories Starter Strip

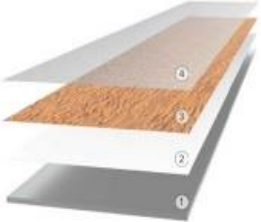
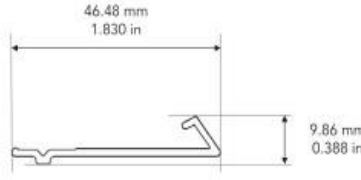
TECHNICAL DATA SHEET

- 1. ALUMINIUM**
6063-T5 Aluminum extrusion 1.50 mm (0.06 in) thick recognized as the industry's first choice for its exceptional durability.

Two oblong holes 1" X 0,125", spaced 2" apart, all being repeated every 4" to allow for fast and easy screw insertion.

Works with every profile and plank width.

Can be used for both vertically and horizontally installed siding.
- 2. PRIMER COAT**
Primer coat (±1,2 mil. thick) applied to ensure perfect adhesion between aluminum and ink.
- 3. HD PRINTING**
High-definition digital inkjet printing (±1 mil. thick) is used to create photographic reproductions of a wide range of textures and outstanding color variations.
- 4. UV BARRIER**
A protective clear coat (±1,2 mil. thick) is applied to provide long-term protection against UV rays and fading.





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- . ASTM D6578 - Graffiti Resistance
- . ASTM G155 - UV Resistance
- . ISO 7895 / ASTM E330 - Wind Load
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- . ASTM D4060 (CS-17) - Abrasion Resistance
- . Florida Building Code (FBC) compliance
- . LEED V4

* see website for full details




Name :	Job # :	Color :	Date :
 DIGITALLY PRINTED ARCHITECTURAL PRODUCTS	Model : FA-SSV-1201	Product : Aluminum siding accessories	Initials :
	Length : 3.65 m / 12 ft	Material : Aluminum 6063-T5	
	Drawing by: JCC Date: 18-11-22	Weight per piece : 1.16 kg / 2.56 lbs	

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April 30, 2019

Aluminum Plank 6" V Groove

Detail A

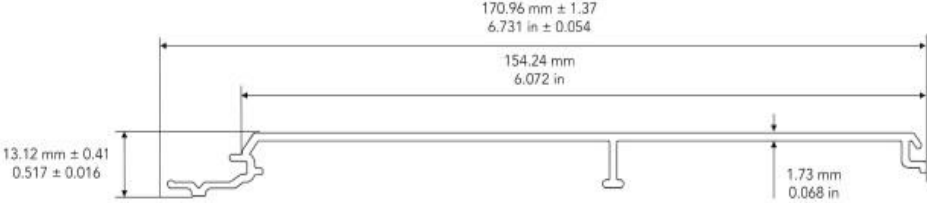
TECHNICAL DATA SHEET

- 1. ALUMINUM**
6063-T5 Aluminum extrusion 1.73 mm (0.068 in) thick recognised as the industry's first choice for its exceptional durability. Planks are designed to allow air circulation and water drainage.

Two oblong holes 1" X 0.125", spaced 2" apart, all being repeated every 4" to allow for fast and easy screw insertion.

All sizes of profiles interlock with each other with simple tongue and groove mating. (Detail A)

Installation can be made both vertically and horizontally.
- 2. PRIMER COAT**
Primer coat (±1.2 mil. thick) applied to ensure perfect adhesion between aluminum and ink.
- 3. HD PRINTING**
High-definition digital inkjet printing (±1 mil. thick) is used to create photographic reproductions of a wide range of textures and outstanding color variations.
- 4. UV BARRIER**
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- . ISO 7895 / ASTM E330 - Wind Load
- . ISO 7895 - Impact Resistance
- . ASTM D3359 - Adhesion testing
- . ASTM D4060 (CS-17) - Abrasion Resistance
- . Florida Building Code (FBC) compliance
- . LEED V4

* see website for full details

Name :	Job # :	Color :	Date :
 <small>DIGITALLY PRINTED ARCHITECTURAL PRODUCTS</small>	Model : FP-06V-1612	Product : Aluminum siding plank	Initials :
	Length : 4.87 m / 16 ft	Material : Aluminum 6063-T5	
	Drawing by: JCC Date: 18-11-22	Weight per plank : 4.13 kg / 9.10 lb	
		Weight per box (12 pcs) : 49.61 kg / 109.37 lb	

APPROVED

JCC

April 30, 2019