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KAWNEER COMPANY INC
FLORIDA BUILDING CODE TEST REPORT

SCOPE OF WORK
ASTM E330, ASTM E1886/1996, TAS 201, TAS 202, AND TAS 203
TESTING ON 1600 WALL SYSTEM™ 1 CURTAIN WALL

REPORT NUMBER
I7021.03-550-18 R0

TEST DATE(S)
08/15/18 – 08/17/18

ISSUE DATE
12/14/18

LABORATORY CERTIFICATION NO.
18-0524.06

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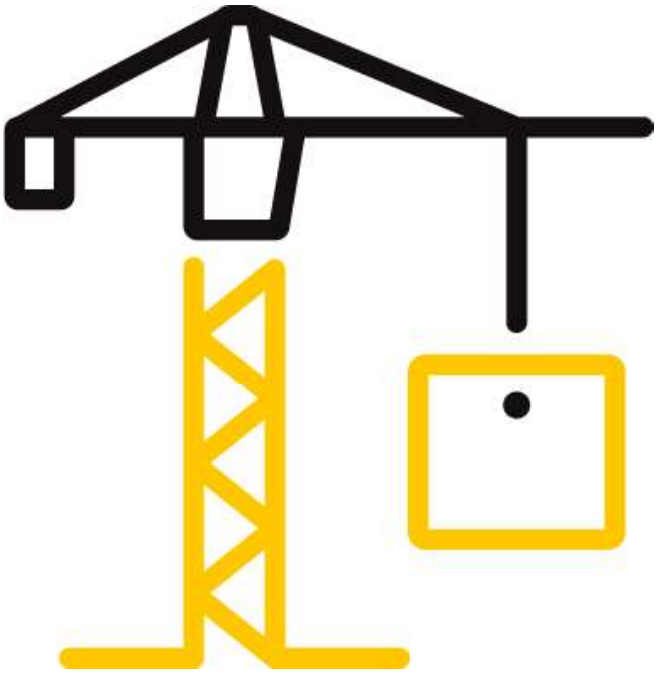

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TEST REPORT FOR KAWNEER COMPANY INC

Report No.: I7021.03-550-18 R0
Date: 12/14/18

REPORT ISSUED TO

KAWNEER COMPANY INC
555 Guthridge Court
Norcross, Georgia 30092

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by Kawneer Company Inc to perform ASTM E330, E1886/E1996, TAS 201, TAS 202, and TAS 203 testing in accordance with Florida Building Code for High Velocity Hurricane requirements on their 1600 Wall System™ 1 Curtain Wall. Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at the Intertek B&C test facility in Lithia Springs. This` report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

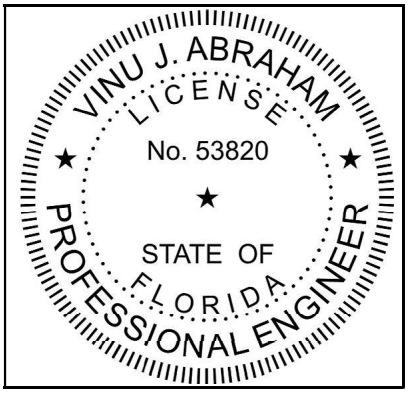
SECTION 2

SUMMARY OF TEST RESULTS

The specimen(s) tested met the performance requirements set forth in the protocols.

Product Type: Curtain Wall System
Series/Model: 1600 Wall System™ 1 Curtain Wall

SPEC.	TEST PROTOCOL	DESIGN PRESSURE
1	TAS 202 (Static only) ASTM E330	+90 / -90 psf
1	TAS 201/203 ASTM E1886/E1996 (Large Missile, Level E)	+90 / -90 psf



For INTERTEK B&C:

COMPLETED BY:	Ryan K. Hedgepeth, E.I.T.	**REVIEWED BY:**	Vinu Abraham, P.E.
TITLE:	Project Engineer	**TITLE:**	Vice President
SIGNATURE:	Digitally Signed by: Ryan K. Hedgepeth	**SIGNATURE:**	Digitally Signed by: Vinu Abraham
DATE:	12/14/18	**DATE:**	12/14/18

RKH: jab

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SECTION 3
TEST METHOD(S)

The specimens were evaluated in accordance with the following:

ASTM E283-04(2012), *Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen*

ASTM E330-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

ASTM E331-00(2016), *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*

ASTM E1886-13a, *Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials*

ASTM E1996-17, *Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes*

TAS 201-94, *Impact Test Procedures*

TAS 202-94, *Criteria for Testing Impact & Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure*

TAS 203-94, *Criteria for Testing Products Subject to Cyclic Wind Pressure Loading*

SECTION 4
MATERIAL SOURCE/INSTALLATION

Test specimen(s) were provided by the client. Representative samples of the test specimen(s) will be retained by Intertek B&C for a minimum of ten years from the test completion date.

Then specimen was installed into a 2x12 wood test buck. The rough opening allowed for a 1/2" shim space. The exterior perimeter was sealed with sealant. Installation of the tested product was performed by the client.

LOCATION	ANCHOR DESCRIPTION	ANCHOR LOCATION
Head/Sill	Aluminum "F" Anchor (Part# 162311) and four (4) 5/16" x 2-1/2" Ultracon Anchors	At each Jamb Mullion (See drawings)
Head/Sill	Aluminum "F" Anchor (Part# 162312) and four (4) 5/16" x 2-1/2" Ultracon Anchors	At each Intermediate Mullion (See drawings)

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SECTION 5
EQUIPMENT

Cannon: Constructed from steel piping utilizing compressed air to propel the missile
Missile: 2x4 Southern Pine
Timing Device: Electronic beam type
Cycling Mechanism: Computer controlled centrifugal blower with electronic pressure measuring device
Deflection Measuring Device: Linear transducers

SECTION 6
LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Noah Atinafu	The Kawneer Company
Phillip Busenlehner	The Kawneer Company
Raul Nieves	Intertek B&C
Robert Glore	Intertek B&C
Ryan Hedgepeth	Intertek B&C

SECTION 7
TEST SPECIMEN DESCRIPTION

Product Type: Curtain Wall System
Series/Model: 1600 Wall System™ 1 Curtain Wall

Product Size(s):

OVERALL AREA:	WIDTH		HEIGHT	
11.3 m² (122 ft²)	millimeters	inches	millimeters	inches
Overall Size	46356	182-1/2	2439	96

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Frame Construction:

FRAME MEMBER	MATERIAL	DESCRIPTION
Head	Aluminum	Extruded aluminum (Part# 162095)
Sill	Aluminum	Extruded aluminum (Part# 162095)
Jambs	Aluminum	Extruded aluminum (Part# 162003)
Mullions	Aluminum	Extruded aluminum (Part# 162003)

	JOINERY TYPE	DETAIL
Head/Sill	Aluminum "F" Anchor (Part# 162311) and four (4) 5/16" x 2-1/2" Ultracon Anchors	At each Jamb Mullion (See drawings)
Head/Sill	Aluminum "F" Anchor (Part# 162312) and four (4) 5/16" x 2-1/2" Ultracon Anchors	At each Intermediate Mullion (See drawings)

Reinforcement: *No reinforcement was utilized.*

Weatherstripping: *No weatherstripping was utilized.*

Glazing: *No conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen(s) can be made.*

GLASS TYPE	OVERALL THICKNESS	GLASS MAKEUP	GLAZING METHOD
1	1-5/16"	1/4" tempered glass 1/2" air space 3/16" heat-strengthened glass 0.180" (Kuraray SentryGlas) interlayer 3/16" heat-strengthened glass	Exterior: EPDM Gasket (Part# 02850) Interior: Foam Tape (Part# 127192) and Silicone sealant

LOCATION	QUANTITY	DAYLIGHT OPENING		GLASS BITE
		millimeters	inches	
All	3	1461 x 2311	57-1/2 x 91	3/4"

Drainage:

DRAINAGE METHOD	SIZE	QUANTITY	LOCATION
Weep Holes	5/16”	6	2” from edges on DLOs

Hardware: *No hardware was utilized.*

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SECTION 8
TEST RESULTS

Protocol ASTM E330 & TAS 202-94, *Static Air Pressure*

Test Date: 08/15/18
The temperature during testing was 24.4°C (76°F). The results are tabulated as follows:

Test Specimen #1: Preload and Design Load per ASTM E330 & TAS 202

LOAD (psf)	INDICATOR LOCATION	DEFLECTION (in.)		PERMANENT SET (in.)	
		MEASURED	ALLOWED	MEASURED	ALLOWED
+67.50 50% of Test Pressure	A	0.217	N/A	0.008	N/A
+90.00 Design Pressure	A	0.291	0.53	0.010	0.192
-67.50 50% of Test Pressure	A	0.214	N/A	0.009	N/A
-90.00 Design Pressure	A	0.287	0.53	0.015	0.192

Test Specimen #1: Structural Overload Load per ASTM E330 & TAS 202

LOAD (psf)	INDICATOR LOCATION	DEFLECTION (in.)		PERMANENT SET (in.)	
		MEASURED	ALLOWED	MEASURED	ALLOWED
+135.00 Test Pressure	A	0.431	N/A	0.016	0.192
-135.00 Test Pressure	A	0.443	N/A	0.023	0.192

Note 1: *Positive and negative uniform static load test loads were held for 30 seconds.*

Note 2: *Tape and film were used to seal against air leakage during structural testing. In our opinion, the tape and film did not influence the results of the test.*

Note 3: *See Sketch #1 for indicator locations. Deflection/permanent set reported is the overall deflection between three points (longest unsupported span) which accounts for support movement.*

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TEST REPORT FOR KAWNEER COMPANY INC
Report No.: I7021.03-550-18 R0
Date: 12/14/18

Protocol ASTM E1886/E1996 & TAS 201-94, *Large Missile Impact Procedures*

Test Date: 08/16/18
The temperature during testing was 26°C (79°F). The results are tabulated as follows:

IMPACT #	MISSILE WEIGHT (lbs.)	MISSILE LENGTH (in.)	MISSILE VELOCITY (ft./sec.)
1	9.40	94	79.72
2	9.40	94	79.78
3	9.40	94	79.80
04	9.40	94	79.91
5	9.40	94	80.17
6	9.40	94	80.22
7	9.40	94	80.29

Note 4: *See Sketch #2 for impact locations.*

Protocol ASTM E1886/E1996 & TAS 201-94, *Cyclic Wind Pressure Loading*

Test Date: 08/16/28
The temperature during testing was 26°C (79°F). The results are tabulated as follows:

Test Specimen #3: Cyclic Test Spectrum and Average Cycle Time per TAS 203

DESIGN PRESSURE	STAGE			
+90.00 / -90.00 psf	**1**	**2**	**3**	**4**
POSITIVE PRESSURE RANGE (psf)	18 – 45	0 – 54	45 – 72	27 – 90
AVERAGE CYCLE TIME (sec.)	2.1	2.8	2.4	3.4
NUMBER OF CYCLES	3500	300	600	100
	5	**6**	**7**	**8**
NEGATIVE PRESSURE RANGE (psf)	27 – 90	45 – 72	0 – 54	18 – 45
AVERAGE CYCLE TIME (sec.)	3.5	2.3	3.5	2.6
NUMBER OF CYCLES	50	1050	50	3350

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SECTION 9
CONCLUSIONS

The large missiles impacted each intended target. Each impact location was carefully inspected. No signs of penetration, rupture, or opening after the large missile impact test were observed; as such, each test specimen satisfies the large missile requirements of TAS 201 and ASTM E1996. Upon completion of testing, specimens tested for TAS 201-94 met the requirements of Section 1626 of the Florida Building Code, Building.

AND

No signs of failure were observed in any area of the test specimen during the TAS 202 testing; as such, the test specimen satisfies the requirements of TAS 202 and ASTM E330. Upon completion of testing, specimens tested for TAS 202-94 met the requirements of Section 1620 of the Florida Building Code, Building.

AND

No signs of failure were observed in any area of the test specimens during the cyclic load test; as such, the test specimens satisfy the cyclic load requirements of TAS 203 and ASTM E1886. Upon completion of testing, specimens tested for TAS 203-94 met the requirements of Section 1626 of the Florida Building Code, Building.

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TEST REPORT FOR KAWNEER COMPANY INC
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SECTION 10
Documentation Statement

Intertek-ATI will service this report until 08/16/28. Test records that are retained such as detailed drawings, data sheets, representative samples of test specimens, or other pertinent project documentation will be retained by Intertek-ATI until this date.

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

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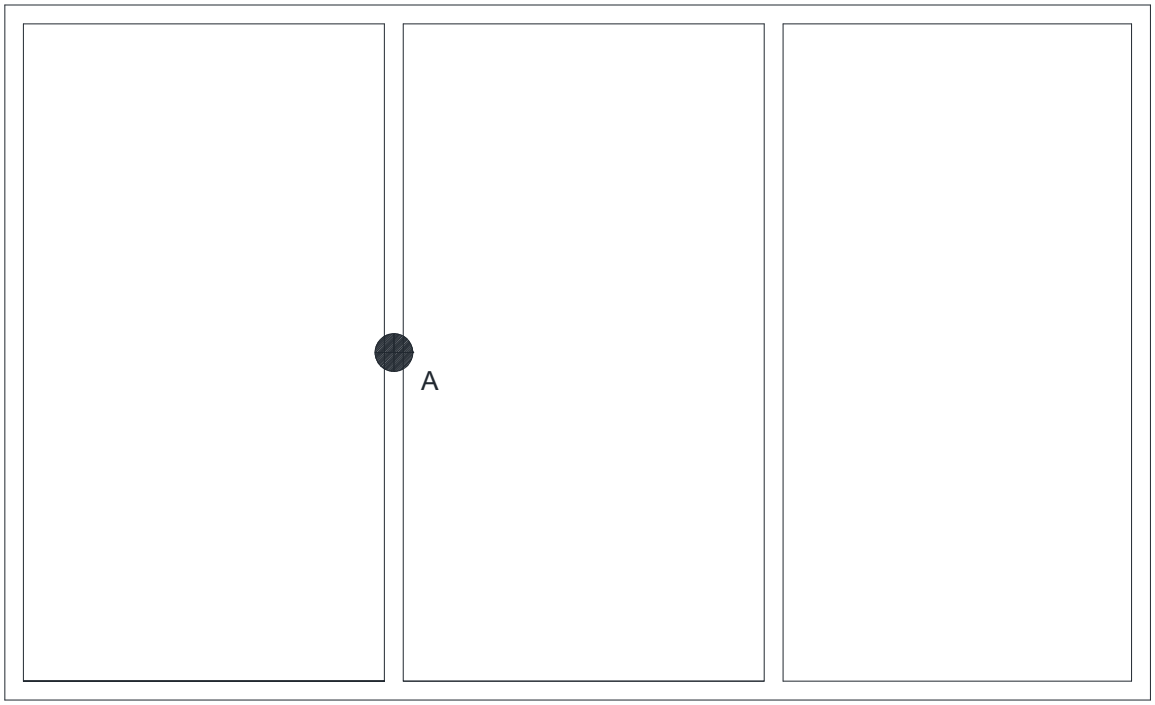
SECTION 11
SKETCH(ES)



Sketch No. 1
Deflection Locations

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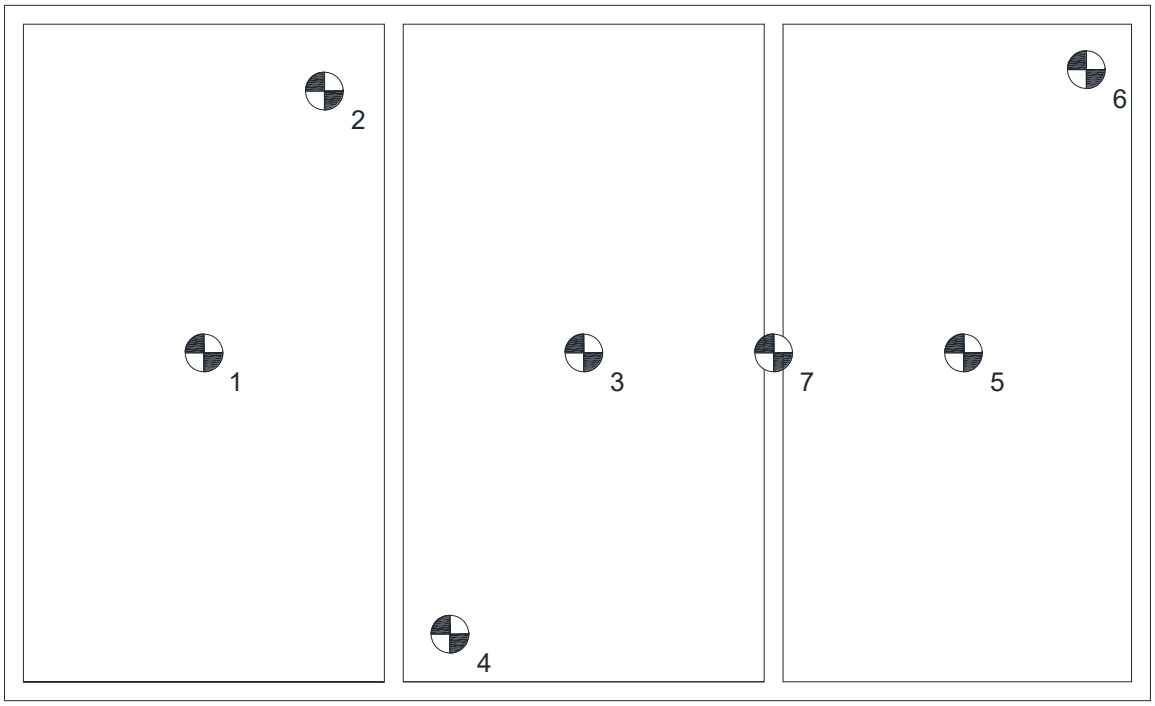

Sketch No. 2
Impact Locations

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SECTION 12
PHOTOGRAPHS

Photo No. 2
Test unit during cyclic loading

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SECTION 13
DRAWINGS

The test specimen drawings have been reviewed by Intertek B&C and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Intertek B&C per the drawings included in this report. Any deviations are documented herein or on the drawings.

***Note**: Complete drawings packet on file with Intertek B&C.*

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TEST REPORT FOR KAWNEER COMPANY INC
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SECTION 14
REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	12/14/18	N/A	Original Report Issue