

PATWIN PLASTICS, INC.

TEST REPORT

SCOPE OF WORK

UPLIFT RESISTANCE TESTING OF *AMERICAN PRO* CLADDING WITH *INVISICLIP* TECHNOLOGY

REPORT NUMBER

R1545.01-119-19 R0

TEST DATES

06/04/24 - 06/05/24

ISSUE DATE

08/05/24

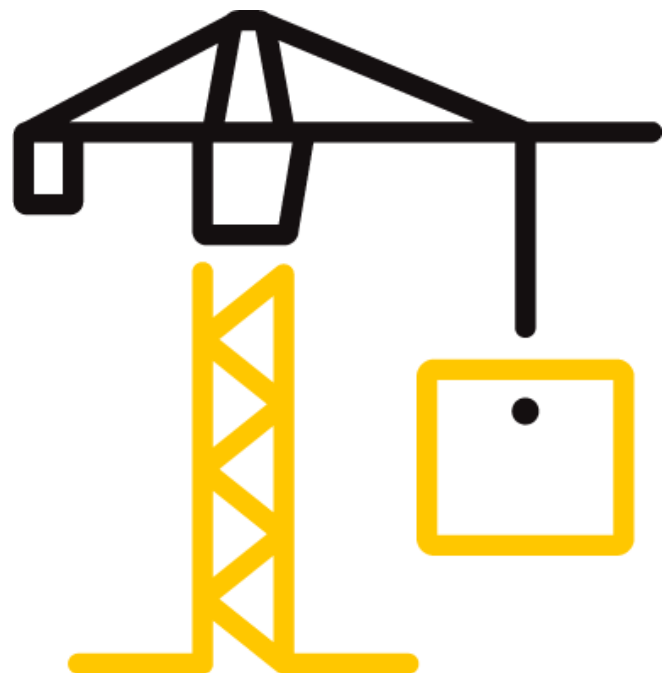
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DOCUMENT CONTROL NUMBER

RT-R-AMER-Test-2785 (05/05/22)

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TEST REPORT FOR PATWIN PLASTICS, INC.

Report No.: R1545.01-119-19 R0

Date: 08/05/24

REPORT ISSUED TO

PATWIN PLASTICS, INC.

2300 East Linden Ave.

Linden, NJ 07036

SECTION 1

SCOPE

Architectural Testing, Inc. (an Intertek company) dba Intertek Building & Construction (B&C) was contracted by Patwin Plastics, Inc. to perform testing in accordance with Section 4.1.4 of ICC-ES™ AC174 on the *American Pro* cladding with *InvisiClip* technology. Results obtained are tested values and were secured by using the designated test methods. Testing was conducted at the Intertek B&C test facility in York, Pennsylvania.

Intertek B&C in York, Pennsylvania has demonstrated compliance with ISO/IEC International Standard 17025 and is consequently accredited as a Testing Laboratory (TL-144) by International Accreditation Service, Inc. (IAS). Intertek B&C is accredited to perform all testing reported herein.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. Unless differently required, Intertek reports apply the "Simple Acceptance" rule, also called "Shared Risk approach," of ILAC-G8:09/2019, Guidelines on Decision Rules and Statements of Conformity. Intertek will service this report for the entire test record retention period. The test record retention period ends four years after the test date. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained for the entire test record retention period.

For INTERTEK B&C:

COMPLETED BY:	Scott T. Gladfelter	REVIEWED BY:	Travis A. Hoover
TITLE:	Senior Project Engineer	TITLE:	Senior Manager
SIGNATURE:		SIGNATURE:	
DATE:	08/05/24	DATE:	08/05/24

STG:tah/aas

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SECTION 2

SUMMARY OF TEST RESULTS

ICC-ES™ AC174	RESULTS
4.1.4 Deck Board Performance ASTM E330 Mechanical Fastener by Wind Uplift Resistance	<i>American Pro</i> cladding with <i>InvisiClip</i> technology with #10 x 2-1/2 in long coated steel screw; 16.0 Span Allowable Uplift Capacity = 198 psf

SECTION 3

TEST METHODS

The specimens were tested in accordance with Section 4.1.4 of the following criteria:

ICC-ES™ AC174 (approved January 2012, editorially revised April 2021), Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails)

AC174-12 was developed by the ICC Evaluation Service, LLC. (ICC-ES™) as acceptance criteria to evaluate compliance with the following building codes:

2021 *International Building Code*®, International Code Council

2021 *International Residential Code*®, International Code Council

The specimens were evaluated in accordance with the following:

ANSI/AWC NDS-2015, National Design Specification (NDS) for Wood Construction

ASTM E330-02, Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

SECTION 4

LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Eric J. Beaudoin	Intertek B&C

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SECTION 5

GENERAL

The purpose of this testing was to determine the ultimate uplift resistance of the *American Pro* cladding with *InvisiClip* technology. Testing was conducted in accordance with Section 4.1.4 of AC174 using the methods described in ASTM E330.

Unless otherwise indicated, all testing reported herein was conducted in a laboratory set to maintain temperature in the range of 68 ± 4 °F and humidity in the range of $50 \pm 5\%$ RH. All test specimen materials were stored in the laboratory environment for no less than 40 hours prior to testing.

SECTION 6

MATERIAL SOURCE/INSTALLATION

All fasteners, clips, and cladding boards were provided by the client. Representative samples of the test specimens will be retained by Intertek B&C for a minimum of four years from the test completion date.

Three deck mock-ups, for each system tested, were constructed from 2x8 MCA preservative-treated Southern Yellow Pine lumber. Each mock-up was fabricated as a three-span condition with four 75 in long joists spaced at 16.0 in on center, was approximately 75 in by 49-1/2 in, and contained six grooved deck boards each (51 in long) with 1/4 in spacing between boards. To maintain air pressure on the deck boards during testing, a layer of 4-mil thick polyethylene plastic was loosely draped between the joists of the mock-up prior to securing the deck boards to the deck mock-up. Deck boards were fastened to the deck mock-up by the client in accordance with the manufacturer's installation instructions. The *InvisiClip* technology was fastened to the joist members at 4 in from either end of the *InvisiClip* and 16 in on-center with one #10 x 2-1/2" long coated steel screw (9 TPI, 0.191 in major dia., 0.121 in minor dia., 0.138 in shank dia., 0.345 in head dia., star drive, countersunk head, type 17 point). The 5-1/2" wide by 0.955" thick cellular PVC *American Pro* cladding members were snap fit to the *InvisiClip* via longitudinal slots in the bottom of the cladding. Refer to drawings in Section 10 and photographs in Section 9 for additional details.

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SECTION 7

TEST PROCEDURE

Uplift testing was performed in factory ambient conditions. Test specimens were assembled to the deck mock-ups and tested within two hours of removal from the laboratory conditions. The mock-up deck assembly was inverted and placed upside down on a vacuum chamber constructed of structural steel channels. The lumber framing of the mock-up rested on the vacuum chamber walls; test specimens were not supported by the vacuum chamber walls. The mock-up to chamber interface was sealed for air-tightness. The plastic-covered underside of all deck boards was exposed to atmospheric pressure. A negative static air pressure (vacuum) was applied to the vacuum chamber, creating an uplift pressure on the underside of all deck boards simultaneously. Test pressure was applied starting at 100 psf and increased in increments of 25 psf until deck board failure. Each load increment was held for 10 seconds. Differential pressure was measured using an electronic, differential pressure transducer.

SECTION 8

TEST RESULTS

TEST DATE: 04/11/24			
SPECIMEN NO.	PRESSURE AT FAILURE (psf)	MAXIMUM SUSTAINED UPLIFT PRESSURE (psf) ¹	MODE OF FAILURE
1	307	300	Plastic clip released from aluminum rail member
2	283	275	
3	327	300	
Average:		292	

¹Held for 10 seconds

Maximum sustained uplift load DOES NOT take into account the weight of the deck board based on the inverted condition of the assembled deck mockup. In a typical installation of the deck board, the self-weight of the decking would help resist uplift. However, in the inverted assembled deck mockup, the self-weight was not resisting uplift but actually contributing to the failure of the assembly. Therefore, due to the assembly setup, twice the deck board self-weight must be added to the measured sustained uplift load to determine the actual uplift load the deck boards can resist.

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Weight of grooved deck board in 51 in length = 7 lb

Five decks boards per test specimen, 7 lb x 6 = 42 lb

Tributary Area of assembled deck mock-up = 34.25 in wide x 51 in span ÷ 144 in² / ft² = 12.1 ft²

Dead Load of grooved deck board = Total Weight / Tributary Area = 42 lb / 12.1 ft² = 3.5 psf

Additional Uplift Resistance = 2 x Product Dead Load = 2 x 3.5 psf = 7 psf

Total Uplift Load, $w_{uplift} = 7 \text{ psf} + 292 \text{ psf} = 299 \text{ psf}$

Allowable uplift capacity in accordance with Section 4.1.4 of AC174:

Allowable uplift capacity = Average ultimate load divided by a factor of 3.0.

$$w_{uplift} = 299 / 3.0 = 99.7 \text{ psf}$$

The allowable capacity determined from uplift testing, w_{uplift} , shall be compared to the withdrawal value specified in the NDS. Based on one fastener per deck board, per each support, the tributary deck area per fastener (A_t) is as follows:

$A_t = W_t \times S$, where:

Tributary width, (W_t) = 11.4 in (deck mock-up width / 3 screws)

Span, (S) = 16.0 in

$$A_t = 11.4 \text{ in} \times 16.0 \text{ in} / 144 \text{ in}^2/\text{ft}^2 = 1.269 \text{ ft}^2$$

Below are NDS calculated withdrawal values (W) for wood screws.

$W = 2850 G^2 D$ (equation 12.2-2 of NDS), where:

Bulk Specific Gravity of Wood, (G) = 0.55 for Southern Pine from Table 12.3.3A

Major Diameter of Fastener, (D) = 0.191 in

$$W = 165 \text{ lb/in}$$

Penetration Depth, (P) = $L_{fastener} - T_{clip} = 2.5 \text{ in} - 0.072 \text{ in} = 2.43 \text{ in}$

Uniform Load, ($w_{calculated}$) = $W \times P / A_t = 165 \text{ lb/in} \times 2.43 \text{ in} / 1.269 \text{ ft}^2 = 316 \text{ psf}$

NDS Adjustment Factors from Table 11.3.1:

Load Duration (C_D) = 1.6 from 11.3.2 & Table 2.3.2, Footnote 2

Wet Service (C_m) = 0.7 from 11.3.3 & Table 11.3.3, Footnote 2

Temperature (C_t) = 0.7 from 11.3.4 & Table 11.3.4 for wet in-service conditions up to 125°F

$$w_{adjusted} = 316 \times 1.6 \times 0.7 \times 0.7 = 248 \text{ psf}$$

$w_{uplift} < w_{adjusted}$ ∴ w_{uplift} Governs **Maximum wind uplift rating = 99.7 psf**

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SECTION 9 PHOTOGRAPHS



Photo No. 1
Typical Test Setup



Photo No. 2
Typical Failure (Plastic Clip Releasing from Aluminum Rail)

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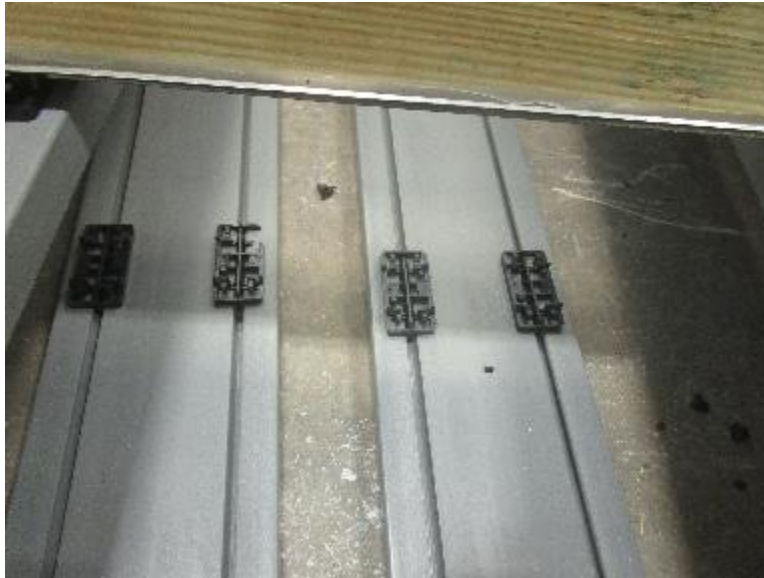


Photo No. 3

Typical Failure (Plastic Clip Releasing from Aluminum Rail)

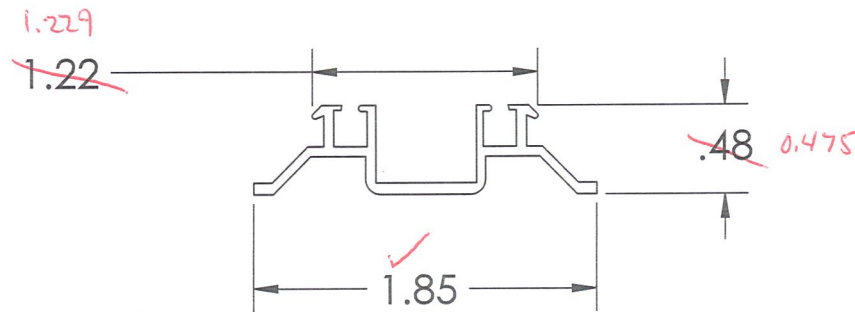
SECTION 10 **DRAWINGS**

The "As-Built" drawings, which follow, have been reviewed by Intertek B&C and are representative of the project reported herein. Project construction was verified by Intertek B&C per the drawings included in this report. Any deviations are documented herein or on the drawings.

Test sample complies with these details.
Deviations are noted.

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Date 8/5/24 Tech STC



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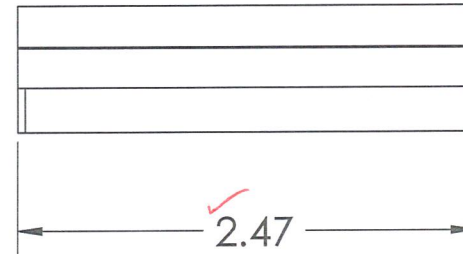
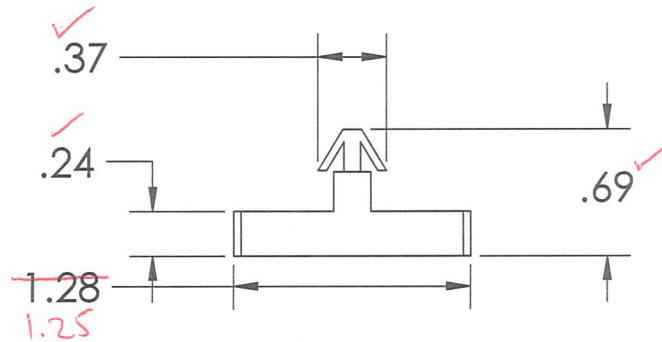
		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	PATWIN PLASTICS	
		DIMENSIONS ARE IN INCHES	DRAWN	JPM	08/02/24	TITLE: American Pro InvisiClip System (Aluminum Rail)	
		TOLERANCES:	CHECKED				
		TWO PLACE DECIMAL ±.030	ENG APPR.				
		INTERPRET GEOMETRIC TOLERANCING PER:	MFG APPR.				
		MATERIAL	Q.A.			SIZE DWG. NO. REV	
		FINISH	COMMENTS:				
NEXT ASSY	USED ON	DO NOT SCALE DRAWING					
APPLICATION			SHEET 1 OF 1				



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Test sample complies with these details.
Deviations are noted.

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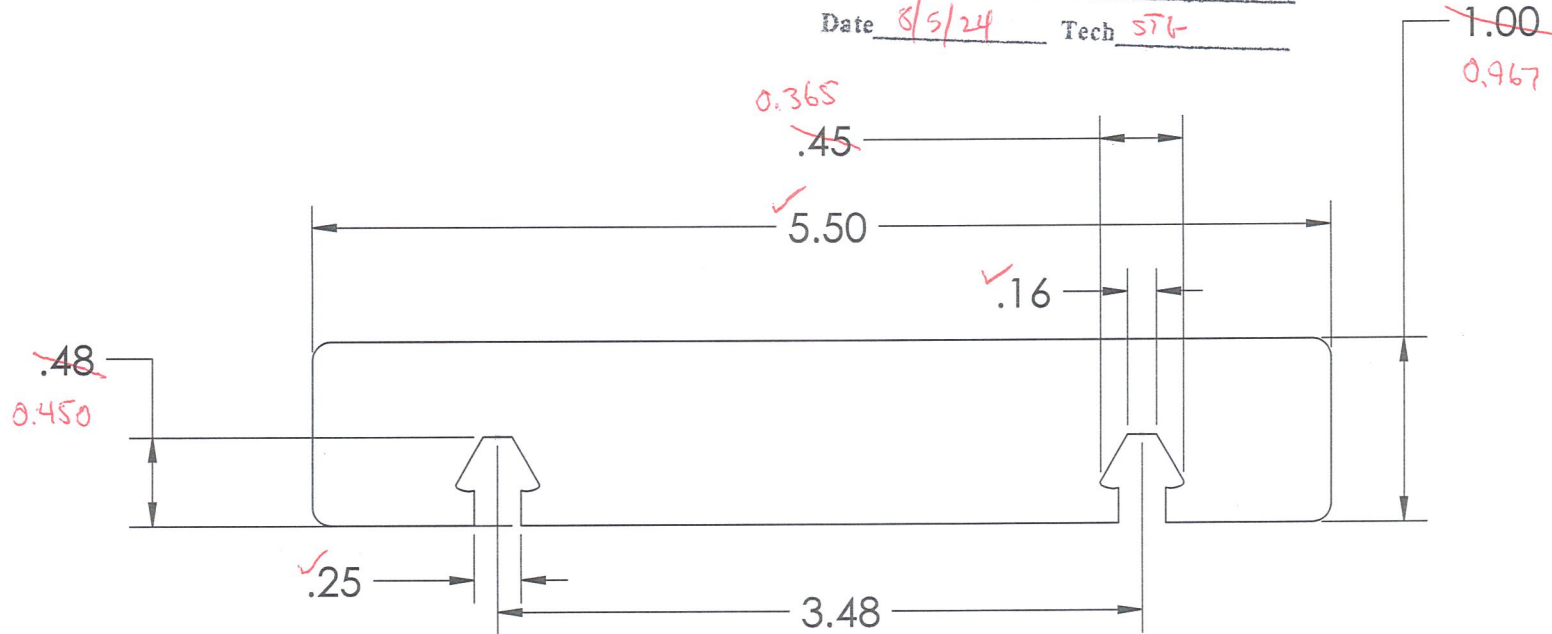


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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE	PATWIN PLASTICS	
		DIMENSIONS ARE IN INCHES	DRAWN	JPM	08/02/24	TITLE: American Pro InvisiClip System (Clip)
		TOLERANCES:	CHECKED			
		TWO PLACE DECIMAL ±.030	ENG APPR.			
		INTERPRET GEOMETRIC TOLERANCING PER:	MFG APPR.			
		MATERIAL	Q.A.			SIZE
		FINISH	COMMENTS:			DWG. NO.
NEXT ASSY	USED ON					REV
APPLICATION		DO NOT SCALE DRAWING				SHEET 1 OF 1

Test sample complies with these details.
Deviations are noted.

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE	PATWIN PLASTICS	
		DIMENSIONS ARE IN INCHES	DRAWN	JPM	08/02/24	TITLE: American Pro InvisiClip System (Deck Board with Groove)
		TOLERANCES:	CHECKED			
		TWO PLACE DECIMAL ±.030	ENG APPR.			
		INTERPRET GEOMETRIC TOLERANCING PER:	MFG APPR.			
		MATERIAL	Q.A.			SIZE
		FINISH	COMMENTS:			DWG. NO.
NEXT ASSY	USED ON					REV
APPLICATION		DO NOT SCALE DRAWING				



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SECTION 11

REVISION LOG

REVISION #	DATE	PAGES	REVISION
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