

DO KIM & ASSOCIATES, LLC
CONSULTING STRUCTURAL ENGINEERS

Florida Board of Engineers Certificate of Authorization No. 26887

Product Evaluation Report

Date: April 8, 2021

Report No.: 120421-1.4

Product Category: Shutters (FL 13531-R4)

Product sub-category: Storm Panels

Product Name: PlyFASTner[®]

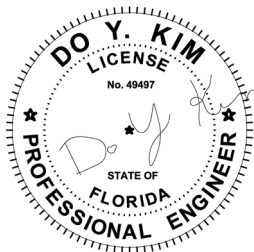
Manufacturer: PlyFASTner LLC
1951 Teakwood Road
Charleston, SC 29414
Phone: 843-766-8199

Scope:

This product evaluation report issued by Do Kim and Associates, LLC and Do Kim, P.E. for Metals Building Products based on Florida Department of Business and Professional Regulation Rule 61G20-3, Method (1) (d) of the State of Florida Product Approval. Re-evaluation of this product shall be required following pertinent Florida Building Code modifications or updates.

Do Kim and Associates, LLC and Do Kim, P.E. do not have nor will acquire financial interest in the company manufacturing or distributing the product or in any other entity involved in the approval process of the product named herein.

This product has been evaluated for use in locations adhering to the Florida Building Code 7th Edition (FBC), exclusive of the HVHZ and where pressure and deflection requirements, as determined by Chapter 16 of the Florida Building Code, do not exceed the following allowable (net) design pressures of +/- 52 psf.



Do Kim, P.E.
FL #49497

Supporting Documents

1. Drawings:
 - a. Drawing No. 100301 titled “PlyFASTner Anchor Products”, Sheets 1-2, prepared by Do Kim & Associates, LLC and signed/sealed by Do Kim, P.E.

2. Testing
 - a. Testing per **ASTM E1996/E1886** by PRI-Construction Materials Technologies, LLC, 6412 Badger Drive, Tampa, FL 33610. Test reports referenced:
 - i. PLY-001-02-01 (03/04-05/19)
 - b. Testing per ASTM E 488 by Hurricane Engineering & Testing, Inc., 6120 NW 97th Avenue, Doral, FL 33178. Test reports referenced:
 - i. HETI-02-1003 (02/25/02)
 - ii. HETI-02-1004 (02/25/02)
 - iii. HETI-02-1005 (02/25/02)
 - c. Testing per ASTM E 8 by Hurricane Engineering & Testing, Inc., 6120 NW 97th Avenue, Doral, FL 33178. Test report referenced:
 - i. HETI-02-T007 (02/25/02)
 - d. Testing per **ASTM E 330** by Hurricane Engineering & Testing, Inc., 6120 NW 97th Avenue, Doral, FL 33178. Test report referenced:
 - i. HETI-02-1137 (02/14/02)
 - e. Testing per **ASTM E 1886** and **SSTD 12** by Hurricane Engineering & Testing, Inc., 6120 NW 97th Avenue, Doral, FL 33178. Test report referenced:
 - i. HETI-02-1138 (02/14/02)

3. Calculations
 - a. Structural engineering calculations have been prepared which evaluate the product based on engineering analysis for tested loading conditions have been prepared based on comparative and/or rational analysis.
 - i. Anchor Spacing
 - ii. Maximum Allowable Size/Pressure Combinations
 - b. Anchor factor of safety is 4:1. No 33% increase in allowable stress has been used in the design of this product.

4. Wind Load Resistance
 - a. This product has been designed to resist wind loads as indicated in the span schedule(s) on its Product Evaluation Document (i.e. engineering drawing).
 - b. Max. Nominal Allowable Design Pressure +/-52psf. Ultimate Design Pressure +/-78psf.

5. Impact Resistance:
 - a. Large Missile Impact Resistance has been demonstrated as evidenced in the listed test reports above as cited in Section 1609.1.2 FBC.
 - b. This is a non-porous impact protection system.
 - c. Minimum separation between panel and any glazing behind it is not required.

6. Quality Assurance
 - a. Certification Program and License Agreement with National Accreditation & Management Institute, Inc. (FBC Organization ID# QUA1789) that attests PlyFASTner LLC is participating within a quality assurance program with an approved Quality Assurance Entity for this product under Rule 61G20-3.008.

Limitations and Condition of Use

1. This product has been designed and tested in accordance to the 7th Edition Florida Building Code (FBC) excluding the HVHZ provisions. Panels and brackets specified and used in the system are part of the PlyFASTner product system and subject to quality assurance audits by the QA entity. Panels shall be labeled in accordance with the labeling requirements of FBC Section 1710.8 Impact resistant coverings.
2. Impact Resistance:
 - Protective panel shall be min. ½” 3-ply CDX plywood or approved equal.
 - This is a non-porous impact protection system.
 - **This product is not valid for use within the HVHZ, ASTM E 1996 Wind Zone 4, or essential facilities as defined in ASTM E1996.**
 - Minimum separation between panel and any glazing behind it is not required.
3. The PlyFASTner bracket and PlyFASTner Plus Heavy Duty bracket is a 1/8” thick formed steel bracket with a min. yield stress of 36 ksi. PlyFASTner brackets are powder coated for corrosion resistance. The PlyFASTner Plus bracket is made from Alcom PA66 which is a base polymer (Polyamide 66) with an infill of 30% glass beads, 2% molybdenum disulphide.
4. The PlyFASTner Plus bracket is a 3/16” (0.187”) thick black 33% glass filled nylon bracket with a min. tensile strength at break at 11 ksi. Density of 1360 kg/m³. Thermal melting point is 263° C.
5. PlyFASTner system shall be installed in accordance with manufacturer’s published installation instructions and these instructions. The instructions within this approval govern if there are any conflicts between the manufacturer’s instructions and these product approval documents. Powers Fasteners AC100+ Gold Adhesive Anchoring System shall be used to anchor to concrete and grout filled hollow block. Install per manufacturer’s instructions.
6. Anchors shall be installed in accordance with manufacturer’s published installation instructions and these instructions. PlyFASTner Anchor w/ Retractable Bolt shall be zinc coated C-1022 low carbon steel lag screws.
7. Concrete shall conform to ACI 301 specifications with concrete strength properties as specified herein. Hollow and grout-filled concrete block shall conform to ASTM C-90. Grout shall be min. 3 ksi.
8. Hollow concrete masonry units (CMU) shall conform to ASTM C-90 and be minimum “medium weight” CMU with density > 117 PCF.
9. Pilot holes for all installations shall be provided and have depth ¼” longer than indicated embedment depth and diameter as follows:
 - ¼” dia. anchors shall use a 3/16” carbide tipped masonry drill bit meeting ANSI masonry bit specifications, and whose diameter is 0.206” +.000/-.008”.

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- Pilot holes for all use with AC100+ Gold Adhesive Anchoring System shall use a 5/16" carbide tipped masonry drill bit per manufacturer's instructions.
10. Allowable load design capacities shown in installation drawing tables have been determined using a safety factor of 4:1. No 33% increase in allowable stress has been used in this evaluation.
 11. Minimum edge distance and spacing for 100% of allowable load are shown in tables.
 12. Linear interpolation may be used for edge distance and spacing between minimum and maximum distances shown in tables.
