



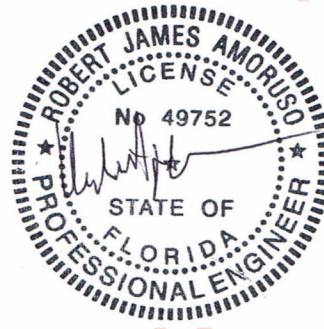
Product Evaluation Report

Date:	October 1, 2015
Report #:	2108
Report Revision No.:	1
Project #:	415-0223 and 415-0711
Product Mfg.:	Storm Depot of America, Inc. DBA Storm Busters® 720 N. Harbor City Blvd. Melbourne, FL 32925
Product Description:	16MM Clearview® Polycarbonate Storm Panels – HVHZ and Non-HVHZ
Product Category:	Shutters
Product Sub-Category:	Storm Panels
Compliance Method:	Product Approval Rule 61G20-3.005(1)(d) – Product Evaluation Report by a Licensed Professional Engineer
Prepared By:	Robert J. Amoruso, P.E. Florida P.E. No. 49752 PTC Product Design Group, LLC, PO Box 520775, Longwood, FL 32752-0775 Florida C of A No. 25935

CERTIFICATE OF INDEPENDENCE

PTC Product Design Group, LLC and Robert J. Amoruso, P.E. do not have, nor will acquire, any financial interest in the company manufacturing or distributing product(s) covered by this Product Evaluation Report.

PTC Product Design Group, LLC and Robert J. Amoruso, P.E. do not have, nor will acquire any financial interest in any other entity involved in the approval process or testing of the product(s) covered by this Product Evaluation Report.



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SCOPE

Evaluate Storm Depot of America, Inc. DBA Storm Busters® 16MM Clearview® Polycarbonate Storm Panels for conformance to the 5th Edition (2014) Florida Building Code – Building and Residential Volumes for the following:

- Drawing No. STB0022 for use in Wind Borne Debris Regions **excluding** the High Velocity Hurricane Zone (HVHZ)
- Drawing No. STB0013 for use in Wind Borne Debris Regions **including** the High Velocity Hurricane Zone (HVHZ)

The engineering analysis (Reference 3) determines the anchorage of the product to the supporting substrate and the product evaluation report (this document) summarizes 5th Edition (2014) FBC compliance verification and appropriate Limitations and Conditions of Use.

DESCRIPTION OF PRODUCT – INSTALLATION REQUIREMENTS

See Reference 1 for a description of the product, its installation and other pertinent data related to its approved use.

LIMITATIONS AND CONDITIONS OF USE

This product evaluation report contains or makes reference to specifications, technical details and installation details and/or methods that pertain to the proper use and/or installation of the product specified herein. Specific limitations and conditions of its use including but not limited to the following are contained in Reference 1 and are the subject of Product Approval in accordance with the State of Florida Product Approval Rule 61G20-3.

- Design Pressure Rating (psf)
- Installation substrate requirements.
- Installation anchor requirements.
- Installation restrictions.
- Product description.
- Product components.

APPLICATIONS/INSTALLATIONS OUTSIDE THE LIMITATIONS AND CONDITIONS OF USE

Rule 61G20-3.005(1)(e) states “Rational engineering analysis cannot be used in lieu of a standard test required by the Code for approval of products within the scope of the standard, except that project specific approval by the local authorities having jurisdiction in accordance with alternate methods and materials authorized in the Code.” Any modification to this product as evaluated in this report and approved by the Florida Building Commission is outside the scope of this evaluation and will be the responsibility of others. As allowed in Rule 61G20-3.005(1)(e), a project specific approval by the local authorities having jurisdiction may be used given an appropriate rational analysis is conducted and deemed acceptable to the local authorities having jurisdiction.



QUALITY ASSURANCE

This product is manufactured under a quality assurance program audited by an approved Certification and Quality Assurance Entity **National Accreditation & Management Institute (NAMI)** as required in Rule 61G20-3.005(3). See FBC Organization No. CER1773 and QUA1789 for approval under Rule 61G20-3.

PERFORMANCE AND TESTING STANDARDS

Reference 2.a conducted testing to the following standards. See Reference 3.d for equivalency evaluation of structural testing standards.

1. ASTM E330-02, Standard Test Method for Structural Performance of Exterior windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
2. ASTM E1886-02, 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.
3. ASTM E1996-02, Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.

Reference 2.b conducted testing to the following standards. See Reference 3.d for equivalency evaluation of structural testing standards.

1. TAS201-94, Impact Test Procedures.
2. TAS202-94, Criteria for Testing Impact & Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure.
3. TAS203-94, Criteria for Testing Products Subjected to Cyclic Wind Pressure Loading.

CODE CONFORMANCE STRUCTURAL PERFORMANCE, IMPACT & CYCLIC LOADING

DESIGN PRESSURE LIMITATIONS

- Design Pressure is based on the following requirements:
 - 5th Edition (2014) Florida Residential Code, Section R615.1
 - Tested at 1.5 x Design Pressure
 - 5th Edition (2014) Florida Building Code, Section 1609.1.2.4.1
 - Tested at 1.5 x Design Pressure

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- Testing documented in Reference 2.a and 2.b test reports was based on:
 - Static Wind Loading testing to 1.5 x Design Pressure.
 - Post-Impact Cyclic Wind Loading testing to the Design Pressure.
 - The Design Pressure limitations shown on the Installation Anchorage Details (Reference 1.a and 1.b) are based on the Design Pressure results.
- Conclusion
 - Design Pressures shown in Reference 1.a are in compliance with the 5th Edition (2014) Florida Building and Residential Codes as follows:
 - Testing Requirements, Static Loading at 1.5 x Design Pressure
 - Section 1609.1.2.4.1 and Section R615.1.
 - Impact Testing Requirements
 - Section 1609.1.2 and Section R301.2.1.2.

CODE CONFORMANCE - LABELING

Labeling shall be in compliance with the requirements of the 5th Edition (2014) Florida Building Code. See Reference 4.b.

CODE CONFORMANCE - INSTALLATION

Installation shall be as shown on the Installation Drawing (Reference 1.a and 1.b) in compliance with the requirements of the 5th Edition (2014) Florida Building Code and 5th Edition (2014) Florida Residential Code. See Reference 4.c.

MATERIAL CERTIFICATION TESTING

Polycarbonate storm panel identified as Item No. 1 in the drawing Bill of Materials (STB0013 and STB0022) is manufacturer by Brett Martin LTD as Marlon ST Longlife Multiwall Polycarbonate Panel. The specific product used is a triple wall 16mm thick polycarbonate material. See Reference 3.d for equivalency evaluation of material testing standards.

The Polycarbonate has undergone material testing as follows:

- ATI Test Report Number ATI 67803.01-106-18, dated 11/28/2006
 - ASTM D638-03 Testing
 - Tensile Strength, UV Side = 8533 psi (average result)
 - Tensile Strength, Non-UV Side = 8621 psi (average result)
 - ASTM D1929-96 (Reapproved 2001)e1
 - Self-Ignition Temperature > 500°C which equates to 982°F
 - Flash-Ignition Temperature = 459°C which equates to 858°F
 - ASTM D2843-99 (Reapproved 2004)e1
 - Smoke Density Rating = 53.1
 - ASTM D635-03
 - Linear Rate of Burn – Class C1 rating.



- PRI Construction Materials Test Report Number BML-001-02-01, dated July 23, 2007
 - TAS 110-2000 accelerated weathering testing using the following:
 - ASTM G26-96 (withdrawn in 2000 and replaced by ASTM G155)
 - ASTM G155-00a, 04a, 05
 - MD Checklist Number 0445 plastics approval using the following:
 - ASTM D638 (revision not recorded in report)
 - ASTM G26-96 (withdrawn in 2000 and replaced by ASTM G155)
 - ASTM G155-00a, 04a, 05
 - Tensile Strength change due to weathering test:
 - Before testing – mean = 8730 psi
 - After testing – mean = 9223 psi
 - The percent change in strength = 5.6%

The 5th Edition (2014) FBC, Section 2606.4 requires the following for Light-Transmitting Plastics for HVHZ and non-HVHZ areas.

- Self-Ignition Temperature of 343⁰C or greater which equates to 650⁰F or greater tested in accordance with ASTM D1929.
 - >500⁰C per Reference 2.c.ii
- Smoke Density Rating not greater than 75 when tested in accordance with ASTM D2843.
 - 53.1 per Reference 2.c.i
- Combustibility classification of CC1 or CC2 when tested in accordance with ASTM D635.
 - CC1 per Reference 2.c.i

Though not specifically required in non-HVHZ areas by the 5th Edition (2014) FBC, Tensile Strength change due to UV exposure (accelerated weathering) was determined. A maximum 10% change is allowed in the 5th Edition (2014) FBC Code, Section 2614.2 for the HVHZ.

Based on a review of the test results, it is determined that the material certification requirements of the Florida Building Code have been met.



REFERENCES & SUPPORTING DOCUMENTS

1. Drawings:

- a. STB0022, Rev. B, dated October 1, 2015, signed and sealed by Robert J. Amoruso, Storm Depot of America, Inc. DBA Storm Busters® 16MM Clearview® Polycarbonate Storm Panels for Non-HVHZ – Installation Anchorage Details
- b. STB0013, Rev. C, dated October 1, 2015, signed and sealed by Robert J. Amoruso, Storm Depot of America, Inc. DBA Storm Busters® 16MM Clearview® Polycarbonate Storm Panel for HVHZ – Installation Anchorage Details

2. Test Reports:

- a. Testing by Certified Testing Laboratories for non-HVHZ to ASTM E330-02, ASTM E1886-02 and ASTM E1996-02 – applicable to Drawing No. STB0022
 - i. CTLA-1570W-1, dated September 11, 2006
 - ii. CTLA-1632W, dated February 9, 2007
 - iii. CTLA-1632W-1, dated February 9, 2007
 - iv. Revisions to CTLA-1632W and CTLA-1632W-1, dated March 12, 2007
- b. Testing by Certified Testing Laboratories for HVHZ to TAS 201-94, TAS 202-94 (Structural Loads only) and TAS 203-94
 - i. CTLA-1570W, dated 9/11/2006, signed and sealed by Ramesh Patel, FL PE License No. 20224 on 9/14/06 – applicable to Drawing No. STB0013
- c. Brett Martin Ltd. Marlon ST Longlife 16mm Triplewall Polycarbonate Sheet Material testing to the following – applicable to Drawing No. STB0013 and STB0022
 - i. ATI Test Report Number ATI 67803.01-106-18, dated 11/28/2006
 1. ASTM D638-03 Testing
 2. ASTM D1929-96 (Reapproved 2001e1)
 3. ASTM D2843-99 (Reapproved 2004e1)
 4. ASTM D635-03
 - ii. PRI Construction Materials Test Report Number BML-001-02-01, dated July 23, 2007
 1. ASTM D638 (revision not recorded in report)
 2. ASTM G26-96 (withdrawn in 2000 and replaced by ASTM G155)
 3. ASTM G155-00a, 04a, 05

3. Calculations and Reports

- a. PTC Report No. 1310, Rev. 2, Anchorage Engineering for Storm Depot of America, INC. DBA Storm Busters® 16MM Clearview® Polycarbonate Storm Panels – 96” x 80” and 96” x 48”, signed and sealed by Robert J. Amoruso, P.E.
- b. PTC Report No. 1311, Rev. 2, Anchorage Engineering for Storm Depot of America, INC. DBA Storm Busters® 16MM Clearview® Polycarbonate Storm Panels – 75” x 66”, signed and sealed by Robert J. Amoruso, P.E.
- c. PTC PDG Report No. 645, Rev. 1, Anchorage Engineering for Storm Depot of America, INC. DBA Storm Busters® 16MM Clearview® Polycarbonate Storm Panels – HVHZ – 48” x 96”, signed and sealed by Robert J. Amoruso, P.E.



- d. PTC Report No. 2108-EER, Rev. 1, Testing Standards Equivalency Evaluation Report for Storm Depot of America, Inc. DBA Storm Busters® 16MM Clearview® Polycarbonate Storm Panels for conformance to the 5th Edition (2014) Florida Building Code – Building and Residential Volumes excluding the High Velocity Hurricane Zone (HVHZ), signed and sealed by Robert J. Amoruso.
4. 5th Edition (2014) Florida Building Code & 5th Edition (2014) Florida Residential Code
- a. Testing and Labeling Requirements
 - i. Testing Requirements, Static Loading at 1.5 x Design Pressure
 - 1. Section 1609.1.2.4.1
 - 2. Section R615.1
 - ii. Impact Testing Requirements
 - 1. Section 1609.1.2
 - 2. Section R301.2.1.2
 - b. Labeling Requirements
 - i. Section 1710.8.1, 1710.8.2 and 1710.8.3
 - ii. Section R615.2 and R615.3
 - c. Installation Requirements
 - i. Section 1710.8.4
 - ii. Section R615.4
 - d. Material Testing and Certification for Plastics
 - i. Section 2606.4
 - ii. Section 2614.2