TILTECO INC.
TILLIT TESTING & ENGINEERING COMPANY

WALTER A. TILLIT, JR., P.E.

tilteco@aol.com
FL P.E. License No. 44167
FL E.B. License No. 0006719

PRODUCT EVALUATION REPORT

REPORT NO.:	11-1208.03
DATE:	December 8, 2011
PRODUCT CATEGORY:	Hurricane Shutters
PRODUCT SUB-CATEGORY:	Accordions
PRODUCT NAME:	Bertha H.V. Accordion Shutter System HV Blades 1 and 2 and HV Window Blade 1A
SUBMITTED BY:	American Shutter Systems Association, Inc. (ASSA) 4268 Westroads Drive West Palm Beach, Florida 33407

1. PURPOSE OF EVALUATION:

This is a Product Evaluation Report issued by **Walter A. Tillit, Jr., P.E.** (System ID # 1906) to the **American Shutter Systems Association, Inc. (A.S.S.A.)**, based on Rule Chapter No. 9B-72.070, Method 1d of the State of Florida Product Approval, Department of Community Affairs-Florida Building Commission.

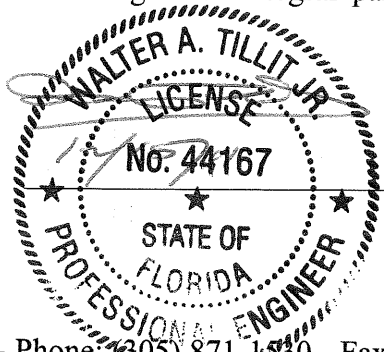
This product is being issued an Evaluation Report as described herein, and has been verified for compliance in accordance with the 20010 edition of the Florida Building Code, and to verify that the product is for the purpose intended at least equivalent to that required by the Code.

This Product Evaluation Report shall be subject to review and revision in case of a Building Code Change that may affect its limitations and conditions.

2. EVIDENCE SUBMITTED:

2.1. PRODUCT EVALUATION DOCUMENT (P.E.D.):

Drawing No. 11-194, titled "BERTHA H.V. ACCORDION SHUTTER SYSTEM", sheets 1 thru 28 of 28, including 28A of 28, prepared by Tilteco, Inc.; signed and sealed by Walter A.Tillit, Jr., P.E.; dated 12/02/11. This drawing is an integral part of this Evaluation Report.



2.2. TEST REPORTS:

For HV Blade 1

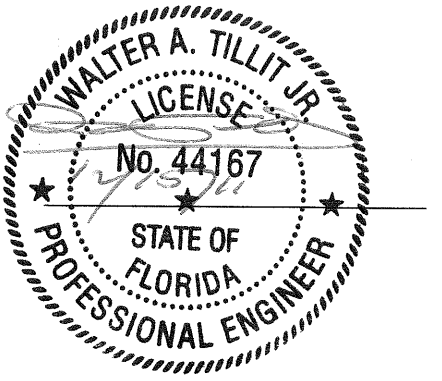
Large missile impact and cyclic loadings under ASTM E 1886 and ASTM E 1996, as well as Protocols TAS 201 and 203, as per section 1609.1.2 of the Florida Building Code.

Uniform Static loads in accordance with Protocol TAS 202. Test reports prepared by American Testing Lab (ATL) of South Florida, Reports No. 0214.01-03, 0715.01-03, dated June 27, 2003; and January 21, 2004 respectively, signed and sealed by William R. Mehner, P.E., and Henry Hatten, P.E., jointly with ATL reports # 1004.01-05, dated 11/16/05, signed and sealed by William R. Mehner, P.E.; # 1214.01-05 dated 12/20/05, signed and sealed by Henry Hattem, P.E. per Protocols TAS 201, 202 and 203 and completed with ATL Report # 0317.02-06, dated on 05/23/06 signed and sealed by William Mehner, P.E. also per Protocols TAS 201, 202 and 203.
Large Missile Impact & Cyclic loading under protocols TAS 201 & 203, and ASTM E 1886 & E 1996. Test reports prepared by American Testing Lab (ATL) of South Florida, Reports No. 0609.01-10, dated June 17, 2010, signed and sealed by Julio E. Gonzales, P.E. and report No. 0210.01-11, dated 02/22/2011, signed and sealed by Henry Hattem, P.E.

Tensile tests as per QC Metallurgical Report No.3DM-388 and No. 5JM-1022, dated May 20, 2003 and November 16, 2005, respectively; signed and sealed by Frank E. Grate Jr., P.E., as per ASTM E-8, as well as Reports No.10FM-718, dated June 22, 2010, and Report No. 11CM-223, dated 03/04/2011 signed and sealed by Frank E. Grate Jr. P.E., as per ASTM E-8.

For HV Blade 2:

Large missile impact and cyclic loadings under Protocols TAS 201 and 203, as per section 1609.1.2 of the Florida Building Code. Uniform Static loads in accordance with Protocol TAS 202. Test reports prepared by American Testing Lab of South Florida, Report No. 0422.01-05, dated April 22 thru June 15, 2005, signed and sealed by William R. Mehner, P.E., and Henry Hatten, P.E.
Tensile test as per QC Metallurgical Report No. 5FM-578, dated 7/6/2005; signed and sealed by Frank Grate, P.E., as per ASTM E 8.



For HV Window Blade 1A

Large missile impact and cyclic loading under ASTM E 1886 and E 1996, as per section 1609.1.2 of the Florida Building Code. Uniform Static loads in accordance with ASTM E-330 per section 1715.5.3. Test reports prepared by American Testing Lab of South Florida, report No. 0505.01-08 signed and sealed by William R. Mehner, P.E., and Henry Hatten, P.E. Testing for Polycarbonate Bayer Makrolon 3103 for Fire Burning characteristics, per sections 2601, 2602, 2607 & 2612 the Florida Building Code, per ETC laboratories report No. ETC-07-1095-19015.1, dated 12 /14/07, signed and sealed by Joseph Labora Doldan, P.E.

Testing for Polycarbonate Bayer Makrolon 3103 for Weathering / (UV exposure) per ASTM G-155 and ASTM D-638, per section 2612 of the Florida Building Code, per ETC Laboratories report No. ETC-07-1095-19015.1, dated 12/14/07, signed and sealed by Joseph Labora Doldan, P.E.
Tensile test as per QC Metallurgical Report # 8GM-693, dated July 21, 2008, signed and sealed by Frank E. Grate, P.E., as per ASTM E 8.

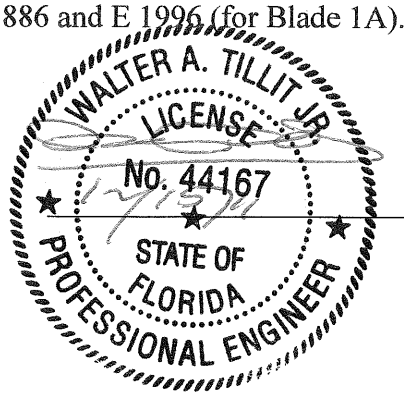
Qualification for Sabic Innovative Plastics Polycarbonate with resin 103, equivalent as per letter issued by Sabic, dated 7/17/08, addressed to Eastern Metal Supply, Inc., to approved # 9034 sheet grade with Miami Dade County Product Approval , addressing Fire Burning characteristics, weathering and structural (mechanical) properties.

2.3. STRUCTURAL ENGINEERING CALCULATIONS:

On Bertha H.V. Accordion Shutter System for maximum shutter span vs. design wind load, as well as maximum anchor spacing vs. design wind load and shutter span based on rational and comparative analysis, and in accordance with section 1604 of the Florida Building Code. Calculations prepared by Tilteco, Inc., dated July 31, 2006, May 23, 2008 and, July 1, 2010, and 10/27/2010 signed and sealed by Walter A. Tillit, Jr., P.E., and revised calculations dated 04/27/2011 addressing New Mounting I 1, sheet No. 7 of drawing No. 11-194.

3. MISSILE IMPACT RESISTANCE:

Large missile impact under section 1609.1.2 of the Florida Building Code, as per ASTM E 1886 and ASTM E 1996, as well as Protocol TAS 201 (for HV Blade 1) and as per Protocol TAS 201 (for HV Blade 2), and per ASTM E 1886 and E 1996 (for Blade 1A).



4. WIND LOADS RESISTANCE:

Accordion Shutter System has been verified to sustain wind pressures. Maximum Shutter Span for HV Blade 1 shall be as indicated on sheets 12 & 28A of 28 of Product Evaluation Document (P.E.D.), drawing No. 11-194. Maximum Anchor Spacing for HV Blade 1 shall be as indicated on sheets 13, 14, 15, 16, 17& 28A of 28 of Product Evaluation Document (P.E.D.), drawing No. 11-194. Maximum Shutter span for HV Blade 2 shall be as indicated on sheet 25 of 28 of Product Evaluation Document (P.E.D.), drawing No. 11-194. Maximum Anchor spacing shall be as indicated on sheet 26 of 28 of Product Evaluation Document (P.E.D.), drawing No. 11-194. Maximum shutter span and anchor spacing shall be as indicated on sheet 28 of drawing No. 11-194. Accordion Shutter System with HV Blades 1, 2 & 1A has been verified for code compliance to work as a non-porous storm shutter assembly, as per section 3.3.2.7 of ASTM E 1996 Standard.

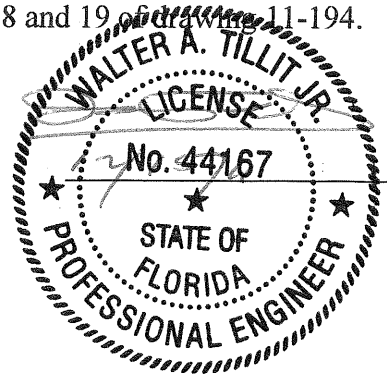
5. INSTALLATION:

For HV Blade 1 shall be performed strictly in accordance with details indicated on sheets 5, 6, 7, 8, 9, 10, 11, 18, 19, 20 & 28A of 28 of Product Evaluation Document (P.E.D.), drawing No. 11-194. Minimum separation to glass shall be as indicated on sheets 6 thru 11, 18 thru 20 & 28A of Product Evaluation Document (P.E.D.), drawing No. 11-194. Requirements for use of locks and/or locking rods shall be as indicated on Notes on sheet 5 of 28, note 10 on sheet 1 of 28 & sheet 28A of Product Evaluation Document (P.E.D.), drawing No. 11-194.

For HV Blade 2 shall be performed strictly in accordance with the details indicated on sheets 21, 22, 23 and 24 of 28 of Product Evaluation Document (P.E.D.), drawing # 11-194.

Minimum separation to glass shall be as indicated on sheets 22 thru 24 of Product Evaluation Document (P.E.D.), drawing No. 11-194. Requirements for use of locks and/or locking rods shall be as indicated on Notes on sheet 21 of 28 and note 10 on sheet 1 of 28 of Product Evaluation Document (P.E.D.), drawing No. 11-194.

The HV Blade working in unison with HV Blade 1A shall be performed strictly in accordance with Limitations included on sheet 28 of drawing No. 11-194. Minimum separation to glass shall be as indicated on sheets 6,7,18 and 19 of drawing 11-194.



6. MATERIAL CHARACTERISTICS AND SPECIFICATIONS:

Shall be strictly in accordance with General Notes and Components indicated on sheets 1 through 4 of 28 of Product Evaluation Document (P.E.D.), drawing No. 11-194. Anchor specifications for HV Blade 1 shall be as indicated on sheets 14, 16, 17 & 28A of 28 of Product Evaluation Document (P.E.D.), drawing No. 11-194. Anchor specifications for HV Blade 2 shall be as indicated on sheet 26 of 28 of Product Evaluation Document (P.E.D.), drawing # 11-194.

7. LIMITATIONS AND CONDITIONS OF USE:

7.1. Shall be strictly in compliance with General Notes No. 1, 2, 9, 10, 11, 12 and 13 indicated on sheet 1 of 28, of Product Evaluation Document (P.E.D.), drawing No. 11-194 prepared by Tilteco, Inc. and signed and sealed by Walter A. Tillit, Jr., P.E.

7.2. Product shall not be installed within HIGH VELOCITY HURRICANE ZONES as defined on section 1620.2 of the Florida Building Code.

7.3. Product shall only be installed into poured concrete, concrete block, wood frame and metal stud walls under the Maximum Span and Maximum Design Load limitations indicated on this drawing, as applicable.

7.4 Limitation of use of Blade HV1 used in unison with Blade HV 1A shall be as per sheet 28 of 28 of drawing No. 11-194.

Product Evaluation Report prepared by Walter A. Tillit, Jr., P.E. (Florida License No. 44167), President of Tilteco, Inc. (Florida EB-0006719).