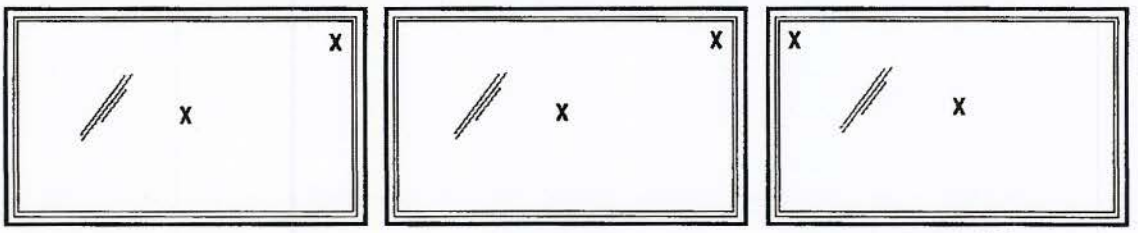
Large Missile Impact &
Cyclic Wind Pressure Tests

(ASTM E 1886-02/ASTM E 1996-03, Level C, 4.5 lbs 2x4*)

February 10, 2009

REPORT NUMBER:	HETI-09-2518
MANUFACTURER:	WinTec Security, Inc. 1702 Cullen Blvd., Houston, Texas 77023
TEST LOCATION:	Hurricane Engineering & Testing Inc. 6120 NW 97th Avenue, Doral, Florida, 33178
LAB. CERTIFICATION No.:	07-0213.01 (MIAMI-DADE COUNTY, FLORIDA)
IAS. CERTIFICATION No.:	TL-296 per ISO 17025-2005
FBC ORGANIZATION No:	TST1691
FBPE Certificate of Authorization Number: 6905	
PRODUCT:	Fixed Curtain Wall.
MODEL:	Kawneer 1600 Wall System with Thermal Break
PRODUCT SIZE:	100" w x 75 ¾" h overall
DRAWING NUMBER:	Cross_1, & Cross_2 by WinTec Security, Inc. Dated 10/09/08.
DESIGN LOADS (psf):	**+70, -70**
TEST WITNESSED BY:	Syed Waqar Ali, Ph. D. (HETI) Dr. Nasreen K. Ali, E.I. (HETI) Mr. Candido F. Font, P.E. (HETI) Mr. Paul H. Brogan (WinTec Security, Inc.)



Sample # 1 **Sample # 2** **Sample # 3**

X Impact Locations

Construction Details

PRODUCT Fixed Curtain Wall.

DESCRIPTION OF UNIT

FILM TYPE: 11 Mill Clear Mylar Film by Commonwealth Laminating & Coating, Inc.
PRODUCT SIZE: 100" w x 75 ¾" h (overall frame size)
CONFIGURATION: O (Fixed lite)
NO. & SIZE OF VENTS (1) Fixed

Frame Components (Aluminum Extrusions)

Drawing No	Description	Overall Dimension (Inches)	Maximum Thickness (Inches)	Material
162-091	Head, Sill, and Jamb	6.50 x 2.49	0.111	6063-T6
162-505	Pressure Plate	2.50 x 1.78	0.106	6063-T6
162-020	Cover for Frame	4.99 x 0.43	0.080	6063-T6
162-006	Cover for Pressure Plate	2.50 x 0.500	0.050	6063-T6
162-378	Shear Block (1.56" long)	4.53 x 2.11	0.150	6063-T6

Corner Construction

Corners were butt joined and secured using a Shear Block. The Shear Blocks were attached to the frame jambs using (2) #12 x 1" Philips Flat Head Sheet Metal Screws, and to the head and sill using (2) #12 x 1 7/8" Pan Head Sheet Metal Screw Type B (PFH SMS).

Glazing Material

- 11 Mill Clear Mylar Film
- 3/16" nominal (0.221") inboard heat strengthened
- 0.521" Air Space
- 3/16" nominal (0.221") outboard heat strengthened

15/32" nominal (0.974") total thickness

Glazing Method

The glass was dry glazed using (2) Glazing gaskets part no. 27-850 by Kawneer. One gasket was placed on the Frame and the other on the Pressure plate.
The Pressure Plate was attached as follows:
Head: (13) ¼" x 1" Hex Head ST. ST. SMS at 2 ¼" from left end and 8" o.c.
Sill: (12) ¼" x 1" Hex Head ST. ST. SMS at 2 ½" from left and 8 ¾" o.c.
Jambs: (9) ¼" x 1" Hex Head ST. ST. SMS at 3 ½", 9 ½", 18 ¼", 27 ¼", 36", 45", 53 ¾", 63" and 71 ¾" from top.

Glass Preparation

The #4 surface of the insulated Glass was prepared for film attachment by applying Cleaning & Bonding Solution, Part No. **C-Bond, by WinTec Security, Inc.**

Film Attachment

The film was applied to the #4 surface of the insulated glass, and attached to the frame using a continuous triangular bead of **GE SCS 2800** Series Structural Silicone. The size of the bead was 1.00" w x 1.00" h.

Glass bite 0.40"
Reinforcements None.
Day Light Opening: 93 1/8" w x 68 ¾" h
Glass Stop See Glazing Method.

Setting Blocks (2) per side, Neoprene 0.43" x 1.12" x 4.05" long setting block with adhesive back with shore A Hardness of 88.

Weatherstripping

Location	Type	Quantity
Pressure Plate	0.59" x 0.60"gasket part no. 27-850 by Kawneer	1
Frame	0.59" x 0.60"gasket part no. 27-850 by Kawneer	1
Between Frame and Pressure Plate	0.64" x 0.60" gasket part no. 162-310 by Kawneer	1
Between Frame and Pressure Plate	0.32" x 0.31" gasket part no. 27-857 by Kawneer	1

Muntins None.

Reinforcements None.

INSTALLATION.

SCREWS/METAL CLIPS AND METHOD OF ATTACHMENT

Substrata 2 x 12 SYP PT wood

Shimming ½" all around perimeter

Frame Sealant GE SCS 2800 Series was applied around the exterior frame perimeter.

Location	Type	Size	Spacing	Quantity
Frame Jambs	Slotted Hex Head Tapcon	¼ x 1 ¾"	7", 11", 29 ¾", 34", 66 ½" and 70" from top	6

Test Results

Impact Test Results

Impact Location	*Speed (fps)*	*Maximum Deflection (in)*	*Set (in)*	*Observations*
Sample # 1				
Center	40	--	--	Glass broke, no penetration or rupture
Top Right Corner	40	--	--	Glass broke, no penetration or rupture
Sample # 2				
Center	40	--	--	Glass broke, no penetration or rupture
Top Right Corner	40	--	--	Glass broke, no penetration or rupture
Sample # 3				
Center	40	--	--	Glass broke, no penetration or rupture
Top Left Corner	40	--	--	Glass broke, no penetration or rupture

The samples were impacted with a #2 Southern Yellow Pine S4S, 2x4 missile, weighing 4.5 lbs and 51 1/2" long.

Cyclic Wind Pressure Test Results

Sample # 1

Cycles	Pressure (psf)	Deflection (in)	Set (in)	Recovery (%)	Duration (sec)
Positive Pressure Cycles					
3500	+35	----	----	----	1.6
300	+42	----	----	----	2.6
600	+56	----	----	----	1.3
100	+70	----	----	----	2.1
Negative Pressure Cycles					
50	-70	----	----	----	3.5
1050	-56	----	----	----	1.6
50	-42	----	----	----	2.3
3350	-35	----	----	----	2.1

Sample # 2

Cycles	Pressure (psf)	Deflection (in)	Set (in)	Recovery (%)	Duration (sec)
Positive Pressure Cycles					
3500	**+35**	----	----	----	1.6
300	**+42**	----	----	----	2.6
600	**+56**	----	----	----	1.3
100	**+70**	----	----	----	2.1
Negative Pressure Cycles					
50	**-70**	----	----	----	3.5
1050	**-56**	----	----	----	1.6
50	**-42**	----	----	----	2.3
3350	**-35**	----	----	----	2.1

Sample # 3

Cycles	Pressure (psf)	Deflection (in)	Set (in)	Recovery (%)	Duration (sec)
Positive Pressure Cycles					
3500	**+35**	----	----	----	1.6
300	**+42**	----	----	----	2.6
600	**+56**	----	----	----	1.3
100	**+70**	----	----	----	2.1
Negative Pressure Cycles					
50	**-70**	----	----	----	3.5
1050	**-56**	----	----	----	1.6
50	**-42**	----	----	----	2.3
3350	**-35**	----	----	----	1.4

Conclusion

The samples were tested in accordance with ASTM E 1886-02/ASTM E 1996-03 **Level C, 4.5 lbs 2x4.** The samples were intact and all parts were securely in place at the conclusion of each test.

NOTE: The above results were obtained using the designated test methods, which indicates compliance with the performance requirements of the referenced specifications. This report does not constitute certification of the specimens tested.

STATEMENT OF INDEPENDENCE

The Hurricane Engineering & Testing, Inc., does not have, nor does it intend to acquire or will acquire, a financial interest in any company manufacturing or distributing products tested or labeled by the Hurricane Engineering & Testing, Inc. Hurricane Engineering & Testing, Inc., is not owned, operated or controlled by any company manufacturing or distributing products it test or labels.

Dr. Nasreen K. Ali
Vice President

02/12/09
Mr. Candido F. Font, P.E.
Resident Engineer

Tensile Test

(ASTM D 638-03 & ASTM D 638-08)

February 10, 2009

REPORT NUMBER: HETI-09-T108

MANUFACTURER: WinTec Security, Inc.
1702 Cullen Blvd., Houston, Texas 77023

TEST LOCATION: Hurricane Engineering & Testing Inc.
6120 NW 97th Avenue, Doral, Florida, 33178

LAB. CERTIFICATION No.: 07-0213.01 (MIAMI-DADE COUNTY, FLORIDA)

IAS. CERTIFICATION No.: TL-296

FBC ORGANIZATION No.: TST1691

FBPE CA No.: 6905

PRODUCT: Fixed Curtain Wall.

MATERIAL: 0.0115" thick Film

CONDITIONING: THE SPECIMENS WERE CONDITIONED AT 72°F / 50%RH FOR AT LEAST 48 HOURS PRIOR TO TESTING

TENSILE TEST EQUIP.: Universal Testing Machine HETI-0887.

COMMENT: Tested as per ASTM D 638-03 & ASTM D 638-08.

Test Results

Sample No.	Width (in)	Thickness (in)	Area (in^2)	Ultimate Load (lbs)	Break Strenght (psi)	Yield Strenght (psi)	Elongation (%)
1	0.697	0.0115	0.008	149	17951	14436	26
2	0.767	0.0115	0.009	148	16738	16779	17
3	0.756	0.0115	0.009	149	16741	17089	20
4	0.755	0.0115	0.009	158	18182	18191	23
5	0.716	0.0115	0.008	151	18201	18341	24
Mean				**151**	**17563**	**16967**	**22**
Sample Standard Deviation				4	758	1569	4

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Dr. Nasreen K. Ali
Vice President

02/12/09
Mr. Candido F. Font, P.E.
Resident Engineer

HURRICANE ENGINEERING & TESTING INC.

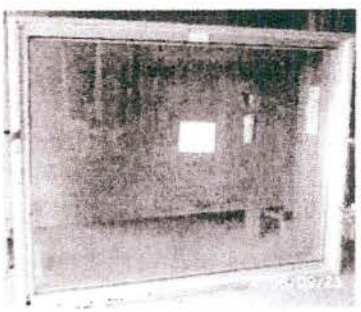
www.hurricanetesting.com

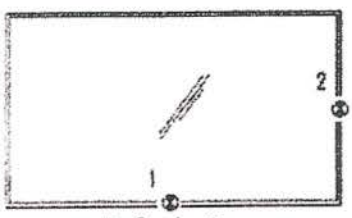
Computer controlled product testing & design, wind load analysis

Uniform Static Air Pressure Test and Water, Air Infiltration Tests (FBC TAS 202)

October 14, 2008

REPORT NUMBER:	HETI-08-2185
CLIENT:	City Of Houston 1001 Avenida de las Americas, Houston, Texas 77010
MANUFACTURER:	WinTec Security, Inc. 2245 Schlumberger, Houston, Texas 77023
TEST LOCATION:	Hurricane Engineering & Testing Inc. 6120 NW 97th Avenue, Doral, Florida, 33178
LAB. CERTIFICATION No.:	07-0213.01 (MIAMI-DADE COUNTY, FLORIDA)
IAS. CERTIFICATION No.:	TL-296 per ISO 17025-2005
FBC ORGANIZATION No:	TST1691
FBPE Certificate of Authorization Number: 6905	
PRODUCT:	Fixed Curtain Wall.
MODEL:	Kawneer 1600 Wall System with Thermal Break
PRODUCT SIZE:	100"w x 76"h overall
DRAWING NUMBER:	Cross_1, & Cross_2 by WinTec Security, Inc. Dated 10/09/08.
DESIGN LOADS (psf):	**+70, -120**
TEST WITNESSED BY:	Syed Waqar Ali, Ph. D. (HETI) Dr. Nasreen K. Ali, E.I. (HETI) Mr. Candido F. Font, P.E. (HETI)





Construction Details

PRODUCT Fixed Curtain Wall.

DESCRIPTION OF UNIT

FILM TYPE: 11 Mill Clear Mylar Film by Commonwealth Laminating & Coating Inc.
PRODUCT SIZE: 100" w x 76 1/8" h (overall frame size)
CONFIGURATION: O (Fixed lite)
NO. & SIZE OF VENTS (1) Fixed

Frame Components (Aluminum Extrusions)

Drawing No	Description	Overall Dimension (Inches)	Maximum Thickness (Inches)	Material
162-091	Head, Sill, and Jamb	6.50 x 2.49	0.111	6063-T6
162-505	Pressure Plate	2.50 x 1.78	0.106	6063-T6
162-020	Cover for Frame	4.99 x 0.43	0.080	6063-T6
162-006	Cover for Pressure Plate	2.50 x 0.500	0.050	6063-T6
162-378	Shear Block (1.56" long)	4.53 x 2.11	0.150	6063-T6

Corner Construction

Corners were butt joined and secured using a Shear Block. The Shear Block were attached to the frame jambs using (2) #12 x 1" Philips Flat Head Sheet Metal Screws, and was attached to the head and sill using (2) #12 x 1 7/8" Pan Head Sheet Metal Screw Type B (PFH SMS).

Glazing Material

- 11 Mill Clear Mylar Film
- 3/16" nominal (0.221") inboard heat strengthened
- 0.521" Air Space
- 3/16" nominal (0.221") outboard heat strengthened

15/32" nominal (0.974") total thickness

Glazing Method

The glass was dry glazed using (2) Glazing gaskets part no. 27-850 by Kawneer. One gasket was placed on the Frame and the other on the Pressure plate. The Pressure Plate was attached to the Head and Sill using (12) ¼" x 1" Hex Head ST. ST. SMS at 1"from end and 9" on center, and to the jambs using (10) ¼" x 1" Hex Head ST. ST. SMS at 1", 8", 17', 25", 41 1/8", 50 ¼", 58" 66" and 69" from end.

Glass Preparation

The #4 surface of the insulated Glass was prepared for film attachment by applying Cleaning & Bonding Solution, Part No. **C-Bond, by WinTec Security, Inc.**

Film Attachment

The film was applied to the #4 surface of the insulated glass, and attached to the frame using a continuous triangular bead of **GE SCS 2800** Series Structural Silicone. The size of the bead was 0.790" w x 0.790" h.

Glass bite 0.400"
Reinforcements None.
Day Light Opening: 95"w x 71 1/4" h
Glass Stop See Glazing Method.

Setting Blocks (2) per side, Neoprene 0.43" x 1.12" x 4.05" long setting block with adhesive back with shore A Hardness of 88.

Weatherstripping

Location	Type	Quantity
Pressure Plate	0.59" x 0.60"gasket part no. 27-850 by Kawneer	1
Frame	0.59" x 0.60"gasket part no. 27-850 by Kawneer	1
Between Frame and Pressure Plate	0.64" x 0.60" gasket part no. 162-310 by Kawneer	1
Between Frame and Pressure Plate	0.32" x 0.31" gasket part no. 27-857 by Kawneer	1

Muntins None.
Reinforcements None.

INSTALLATION.

SCREWS/METAL CLIPS AND METHOD OF ATTACHMENT

Substrata 2 x 12 SYP PT wood
Shimming ½" all around perimeter
Frame Sealant GE SCS 2800 Series was applied around the exterior frame perimeter.

Location	Type	Size	Spacing	Quantity
Frame Jamb	Slotted Hex Head Tapcon	¼ x 1 ¾"	7", 11", 44", 47 ½", 67 3/4" and 70 ¼" from ends	6

Test Results

Air Infiltration Test Results

Test Pressure (psf)	Total Air Flow (cfm)	Chamber Air Flow (cfm)	Specimen Air Leakage (cfm)	Area (ft^2)	Air Leakage Rate ($ft^3/min\text{-}ft^2$)
+1.57	8.0	0.00	8.0	52.8	0.15
+6.24	21.5	0.00	21.5	52.8	0.41

The Air Infiltration Test was conducted as per ASTM E283-04.

Uniform Static Air Pressure Test Results

	Pressure (psf)	Loc. 1 Deflection (inches)	Loc. 2 Deflection (inches)	Loc. 1 Set (inches)	Loc. 2 Set (inches)	Recovery Loc.1/Loc.2 (%)	Duration (seconds)
Positive Load							
Pre load	**+50**	0.03	0.05	0.00	0.00	100/100	30
Design Load	**+70**	0.06	0.08	0.00	0.00	100/100	30
Negative Load							
Pre load	**-105**	0.09	0.04	0.00	0.00	100/100	30
Design Load	**-120**	0.10	0.07	0.00	0.00	100/100	30

Uniform Load Test was performed with ASTM E330-02 test method. See Figure on page 1 for loc1, & loc 2.

Water Infiltration Test Results

Test Pressure (psf)	Test Duration (min.)	Water Leakage (inches^3/sec)
+10.5	15.0	Passed

The water Infiltration Test was conducted as per ASTM E-331-93. A uniform water spray was applied to the exterior surface of the windows at a rate of 5.0 gal/ft^2/hr for a duration of 15 minutes. There were no water leakage or structural damages to the window at the conclusion of the 15.0 minutes cycle.

Uniform Static Air Pressure Test Results

	Pressure (psf)	Loc. 1 Deflection (inches)	Loc. 2 Deflection (inches)	Loc. 1 Set (inches)	Loc. 2 Set (inches)	Recovery Loc.1/Loc.2 (%)	Duration (seconds)
Positive Load							
Test Load	**+105**	0.09	0.10	0.00	0.00	100/100	30
Negative Load							
Test Load	**-180**	0.22	0.13	0.00	0.00	100/100	30

Uniform Load Test was performed with ASTM E330-02 test method. See Figure on page 1 for loc1, & loc 2.

Conclusion

The sample was tested as in accordance with Florida Building Code TAS 202-94, Standard Building Code and ASTM Test Standards as indicated along with the test results. The unit was tested per AAMA 101-97, and meets the requirements except air infiltration. The sample was structurally intact and all parts were securely in place at the conclusion of each test.

NOTE: The above results were obtained using the designated test methods, which indicates compliance with the performance requirements of the referenced specifications. This report does not constitute certification of the specimens tested.

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Dr. Nasreen K. Ali
Vice President

10/15/08

Mr. Candido F. Font, P.E.
Resident Engineer