

HURRICANE ENGINEERING & TESTING INC.

Computer Controlled Product Testing & Design,
.....Wind Load Analysis

Uniform Static Air Pressure Test, Air and Water Infiltration Tests, And Forced Entry Tests

October 14, 2003

REPORT NUMBER: **HETI-03-1350**
MANUFACTURER: RC Aluminum Industries, Inc.
2805 NW 75th Avenue, Miami, Florida 33122

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

NOTIFICATION NUMBER: HETI03041 (MIAMI-DADE COUNTY, FLORIDA)

SBCCI LISTING NUMBER: TL - 9596B.

LAB CERTIFICATION NUMBER: 02-0415.01 (MIAMI-DADE COUNTY, FLORIDA).

PRODUCT: Muller Picture & Casement Window

MODEL: CM100

PRODUCT DESCRIPTION: Aluminum Window with Insulated laminated glass

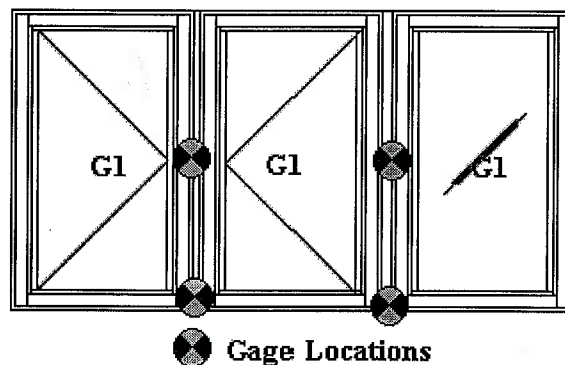
PRODUCT SIZE: 111" w x 74 1/4" h (overall frame size)

DRAWING TITLE: Mockup #3 by RC Aluminum dated 11-12-2003

DESIGN LOADS (psf): **+80, -80**

TEST WITNESSED BY: Syed Waqar Ali, Ph. D. (HETI)
Dr. Nasreen K. Ali, E. I. (HETI)

WITNESSING ENGINEER: Mr. Rafael E. Droz-Seda, P.E. (HETI)



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Construction Details

PRODUCT: Mulled Picture & Casement Window

DESCRIPTION OF UNIT

- Model designation:** CM100.
- Overall size** 111" w x 74 1/4" h (overall frame size)
- Configuration** XXO (See Figure on page one).
- No. & size of vents** (3) Fix Vent 37" w x 74 1/4" h , Operable Vents 35 3/8" x 72 3/4"

MATERIAL CHARACTERISTICS

Frame construction (aluminum material)

Part No.	Description	Overall Dimension (INCHES)	Maximum Thickness (INCHES)	Material
CM100-001	Frame Jamb	2.013 x 2.998	0.100	6063-T5
CM100-002	Frame Head and Sill	2.074 x 2.750	0.163	6063-T5
CM100-007	Picture Window Jamb	2.121 x 1.997	0.064	6063-T5
CM100-008	Picture Window Head and Sill Meeting Section	2.000 x 1.375	0.062	6063-T6
CM100-012	Anchor Clip for CM100-001	1.581 x 0.740	0.110	6063-T5
CM100-013	Vent Hinge (3" long)	1.692 x 0.535	0.222	6063-T0
CM100-014	Frame Hinge	1.511 x 1.617	0.197	6063-T0
CM100-015	Window Sill and block Condition	1.977 x 1.871	0.100	6063-T5
CM100-016	Glazing Bead for Laminated Glass	1.261 x 0.897	0.068	6063-T6
CM100-018	CA. Window Snap Cover CM100-016	1.315 x 0.875	0.050	6063-T5
CM100-020	Vertical Impost	6.124 x 2.00	0.185	6063-T6
CM100-021	U-Anchor Clip for Vertical Impost	2.187 x 2.750	0.188	6063-T6
CM100-022	Anchor Arm Operator	5.611 x 0.750	0.250	6063-T0
CM100-023	Left Jamb Screen	1.268 x 0.430	0.050	6063-T6
CM100-024	Right Jamb Screen	1.268 x 0.430	0.050	6063-T6
CM100-025	Horz. Top and Bottom Screen	0.430 x 1.268	0.050	6063-T6
CM100-026A	Molded Vent Rail and stile for LAM/INS. Glass	2.625 x 1.828	0.100	6063-T5
CM100-027	Corner Lock (Key)	2.500 x 2.500	0.312	6063-T6
20-63-230	Mullion - Aluminum Tube	3.00 x 1.00	0.052	6063-T5

Picture Window and Casement Window Frame Assembly

The corners were butt joined with (2) #10 x 1" LG PHL PH SMS TYPE B ST/ST Assembly screws. Sealant was applied to all corners, and seams. The impost was attached to continuous Sill and header using a U shaped clip. The clip was attached to sill and header using (4) #10 x 1" LG PHL PH SM TYPE B ST/ST screws, and impost was attached to the clip using (4) #10 x 3/4" LG. PHL PH thread forming screw two from each side.

Operable Vent Construction

The corners were mitered and connected using corner key and (2) #10 x 1/2" LH PHL F.H. SMS ST/ST from each rail of the vent. Sealant was applied to all corners, and seams.

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Glazing Material

G1: Laminated Glass Miami-Dade County Notice of Acceptance (NOA): 00-1212.04

- 1/8" nominal (0.121") inboard heat strengthened glass
 - 0.090" nominal Dupont Butacite® PVB
 - 1/8" nominal (0.121") outboard heat strengthened glass
- 5/16" nominal (0.319") total thickness

Glazing method**Casement Window**

Wet glazed, the window was glazed with a black Dow Corning 795. Filling the remaining cavity in molded vent rail and stiles for casement window.

Picture Window

Wet inside glazed, the window was glazed with a black Dow Corning 795. A thin bead of Dow 795 Silicone was also applied to the glazing stop and glazing stop was snapped to the window frame.

Setting/Glazing Material**Casement Window**

V054 and V055 were used for laminated and laminated insulated glass for setting the glass.

Picture Window

3/16" x 3/8" x 4" setting block and 1/8" x 1/2" single face tape to inside leg of frame extrusion and Vinyl V059 applied to the glazing stop.

Glass Bite**Casement Window**

3/4"

Picture Window

5/8"

DLO**Casement Window**

30 1/8" w x 67 1/2" h

Picture Window

32 3/4" w x 70 1/2" h

Operable Vent Weather-stripping

PART NO.	COMPONENT	LOCATION	Quantity
V-033	TREMCO TR-5804N SPONGE NEOPRENE	VENT FRAME PERIMETER	(2) Rows

Hardware

PART NO	COMPONENT
C25	9.5" ST/ST Single Arm operator (Right Hand)
C35	9.5" St/St Single Arm Operator (Left Hand)
CB304	Surface mounted operator track
CB201	Operator Top spacer
CB253	8.5mm. Operator button spacer
LH08-1001-51	Bushing for handle
GS-001	Striker
GT553	Guide Housing
G2-HND-LPLT-02	Handle fastener Plate
GF379	Lock Bar Multi-Point Stainless Steel

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2/20/04

Lock

A GF379 lock with five (5) point 60" locking bar was attached with two guides at lock point. Each guide was connected to the frame with (3) #8 x 3/4" PHL FH SMS ST/ST. Each lock point on sliding bar engaged with striker at the center of striker. Each striker was attached with (3) #8 x 1/2" LG. PHL FH Stainless Steel screws the strikers were placed at the center of the impost and 14.875", and 29.75" above and below the center striker.

Hinges

(3) Frame Hinges were installed with (2) #10-24 x 3/8 Machine screws centered at 6", 36 1/4", and 66 1/2" from bottom. The (3) vent hinges were installed with (3) #10-24 x 3/8 Machine screws centered at 6", 36 1/4", and 66 1/2" from bottom of the window.

Weepholes

none.

Muntins

none.

Reinforcements

none.

Sealant

White caulk at frame and operable vent corners and fasteners.

Screen

Inside screen only.

Special Note:

A 1 1/2" x 1" x 1/2" Plastic guide block was attached to operable window sill and header at 5" from end with (2) #10 x 3/4" PH SMS ST/ST.

INSTALLATION

Substrata 2x12 SYP PT.

Shimming gap 1/4".

SCREWS/ AND METHOD OF ATTACHMENT

Location	Type	Size	Spacing	Quantity
Head & Sill	HILTI KWIK- CON II+	1/4" x 2 3/4" LG. HEX HD	@ 8 5/8" from end and 20.375" o.c	2
Casement Window Jambs	HILTI KWIK- CON II+	1/4" x 2 3/4" LG. HEX HD	@4 1/2" from end and 21 3/4" o.c	4
Picture Window Jamb	HILTI KWIK- CON II+	1/4" x 2 3/4" LG. HEX HD	@4 1/2" from end and 21 3/4" o.c	4
Casement Window Jambs to Mullion	LG. HD SMS	1/4" x 1 1/4"	@4 1/2" from end and 21 3/4" o.c	4
Picture Window Jamb to Mullion	LG. HD SMS	1/4" x 1 1/4"	@4 1/2" from end and 21 3/4" o.c	4

Test Results

Operating Force: The window was operated five times prior to testing. The maximum operating forced was 4 lbs to start and negligible to maintain the motion.

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Air Infiltration Test

Test Pressure (psf)	Chamber Air Flow (cfm)	Total Air Flow (cfm)	Specimen Air Leakage (cfm)	Tributary Area (squared feet)	Air Leakage Rate (ft ³ /min-ft)
+1.57	0.0	0.8	0.8	57.2	0.01
+6.24	0.0	2.2	2.2	57.2	0.04

The Air Infiltration Test was conducted as per ASTM E-283-91. The equipment used to measure the flow rate was calibrated with equipment, which meets NIST specification. The flow meter was temperature compensated and meets MIL-STD-45662A. The flow rate was computed for air at standard conditions of 75°F and 14.7 psia.

Uniform Static Air Pressure Results, Half Test and Design Loads

	Pressure (psf)	Net Impost (inches)	Net Mullion (inches)	Set (inches)	Recovery (%)	Duration (seconds)
Positive Pressure						
Half test load	+60	0.256	0.366	0.0/0.0	100/100	30
Design Load	+80	0.355	0.464	0.0/0.0	100/100	30
Negative Pressure						
Half test load	-60	0.342	0.370	0.01/0.0	98/100	30
Design Load	-80	0.474	0.478	0.0/0.0	100/100	30

Uniform Load Test was performed with ASTM E330-02 test method.

Water Infiltration Test Results

Test Pressure (psf)	Test Duration (min.)	Water Leakage (inches ³ /sec)
+12	15.0	0.00

The Water Infiltration Test was conducted as per ASTM E-331-00. A uniform water spray was applied to the exterior surface of the windows at a rate of 5.0 gal/ft²/hr for 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 Results, Test Loads

	Pressure (psf)	Net Impost (inches)	Net Mullion (inches)	Set (inches)	Recovery (%)	Duration (seconds)
Positive Pressure						
test load	+120	0.500	0.757	0.0/0.0	100/100	30
Negative Pressure						
test load	-120	0.705	0.770	0.0/0.0	100/100	30

Uniform Load Test was performed with ASTM E330-02 test method.

FORCED ENTRY TEST RESULTS

Test A	300 lbs load in opening direction	Passed
Test B	300 lbs load in opening direction, 75 lbs horizontal in-plane load	Passed
Test C	300 lbs load in opening direction, 75 lbs horizontal in-plane load	Passed

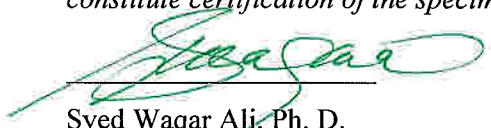
Test A-C Performed per AAMA 1302.5 as indicated by Florida Building Code TAS 202 sec 12.1 and Sec 1707.4.2. The forces were applied by means of a winch and a force dial gage apparatus, thus passing the test.

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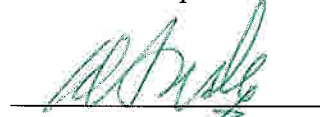
Conclusion

The samples were tested as in accordance with Florida Building Code TAS 202, Miami-Dade County Protocol PA 202-94, meets or exceeds the requirements of ANSI/AAMA 101/97, and Standard Building Code and ASTM Test Standards as indicated along with the test results. The sample was structurally intact, operable 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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