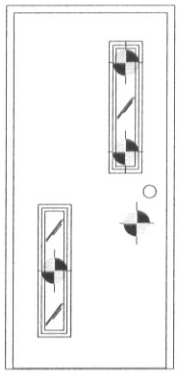
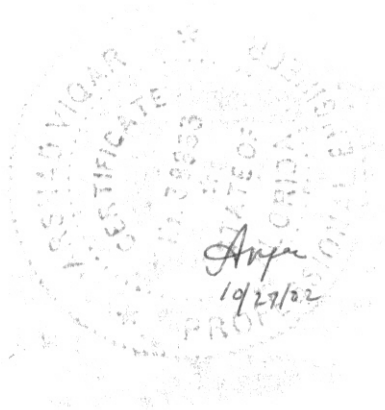
Large Missile Impact & Cyclic Wind Pressure Tests

August 2nd, 2002.

REPORT NUMBER:	**HETI-02-1710**
MANUFACTURER:	Alutech Corporation 8548 NW 64 Street Miami, FL 33166
TEST LOCATION:	Hurricane Engineering & Testing Inc. 6120 NW 97th Avenue, Miami, FL 33178
NOTIFICATION: SBCCI LISTING No.: LAB. CERTIFICATION No.:	HETI02041 (MIAMI-DADE COUNTY) TL – 9596B 02-0415.01 (MIAMI-DADE COUNTY)
PRODUCT: MATERIAL: SERIES:	**Single Door with two windows.** 6063-T6 aluminum frame with 3003-H14 aluminum door skin 200I Aluminum door with FR600S frame.
PRODUCT SIZE (S):	39 3/8" w x 85 11/16" h x 6" deep frame
DRAWING NUMBER:	A95214 by Alutech Corporation, dated 12/15/1995 and A022056 by Alutech Corporation, dated 9/11/2002 *NOTE: HETI stamped drawing is an integral part of this report.*
DESIGN PRESSURE (psf):	**+80, -80**
TEST WITNESSED BY:	Syed Waqar Ali, Ph. D. (HETI) Mr. Leonardo D. Savini, E.I. (HETI)
WITNESSING ENGINEER:	Mr. Arshad Viqar, P.E.(HETI)



Elevation showing impact locations, not to scale.



CONSTRUCTION DETAILS

PRODUCT **Single Door**

DESCRIPTION OF SAMPLES

Model Designations	240I, 260I and 290I
Series	200I
Overall Size	39 1/2" w x 85 3/4" h chamber opening, 6" deep frame.
Configuration	X (one panel operable)
No. & size of vents	(1) 35 3/4" w x 83 5/8" door leaf size.

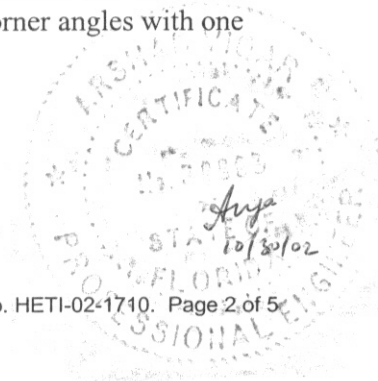
MATERIAL CHARACTERISTICS

Frame Construction

Jambs & Head	1 3/4" wide x 0.086" - 0.110" thick x 6.00" deep 6063-T6 aluminum 52.3 % of IACS (International Annealed Copper Standard) conductivity alloy frame. The corners of the frame were butt joined with two #10 x 1" SS SMS.
Saddle	3/4" high x 0.675" thick x 3 1/4" deep aluminum bumper type.
Door Stop	1/2" effective width. 3/4" x 1 1/2" x 0.075" thick 6063-T6 aluminum snap molding.

Sash Construction

Stiles	(hinge and lock) 4.63" wide x 1.84" deep x 0.107" thick 6063-T6 aluminum extrusion with one hollow.
Rails	(top, center and bottom) 4.55" wide 1.37" deep x 0.073" wall 6063-T6 aluminum tube.
Rail Caps	(top, center and bottom) 0.497" wide x 1.84" deep x 0.062" 6063-T6 aluminum channel.
Lock Rail	None.
Corner Angle	Four 1" x 2" x 1" long x 0.120" 6063-T6 aluminum.
Core	Rigid (no durometer reading) fiberglass-chemical foam combination material.
Panel Surface	The panel material was an 0.042" thick 3003-H14 aluminum 45.3% of IACS (International Annealed Copper Standard) conductivity sheet metal and a 1/8" tempered hardboard.
Sash Assembly	The stiles were connected to all rails with one 3/8" - 16 treaded rod @ 2 3/8" from each stile end with one washer base nut per rod end. The threaded road extended through the entire rail length. A 1" DIA access hole in the stile was capped. The rail cap channels had mortise and tenon joint. The channels were connected to the top and bottom rails with one # 8 x 1/2" SS SMS and were connected to all corner angles with one #8 x 1/2" SS SMS. The ends of the vertical stile were connected to the corner angles with one #8 x 1/2" SS SMS.
Astragal	None.



Window Components

ITEM.	COMPONENT	OVERALL DIMENSION (INCHES)	MAX. WALL THICKNESS (INCHES)	ADDITIONAL INFORMATION
1	**aluminum window bead**	**0.65 x 0.76**	**0.067**	**52.7 % IACS***
2	**aluminum frame base**	**1.81 x 0.93**	**0.050**	**53.3 % IACS***

*Overall dimensions are width x depth, *% of international annealed copper standard conductivity.*

Window Frame Construction 7 3/4" x 31"h.

- Each corner was butt joined with two #10 x 1" PH SMS.
- A 7 1/4" x 30 1/2" hole was made on the door leaf per window @ 6" from the ends.
- The hole was finished with a 1.32" x 1" aluminum channel (cut from part E) placed at the ISO-25 core and a 1.83" x 0.50" aluminum angle (inside angle trim, cut from part G). A 0.040" x 1 1/8" aluminum shim strip was placed between the two angles.
- The frame was locked in place with three #8 x 1 1/4" FH SST Screw @ 3" from the ends and one at the center per jamb and three #6 x 1/2" SMS @ 1 1/2" from ends and one per center and two at the top and bottom.
- The interior bead was retained with three #8 x 1 1/4" PH SST Screw @ 1 1/2" from ends and one at the center.
- A 1/4" vinyl bulb was placed on the interior and exterior beads.
- A 1/4" Lexan Sheet was cut 5.34" x 28.59" and inserted with a 1/8" sealant 4552 bead in the end area of the sheet.
- The exterior bead snap in the frame.

Weather Stripping One 0.3" rubber bulb type inserted on all door stops and saddle.

Door Hardware

Lock Yale single point cylindrical latch. Installed with two 12-24 x 1/2" SS FH MS to a pair of 1" w x 1 1/2" long x 1/4" thick 6063-T6 aluminum plates. The aluminum plates were fastened to the vertical stile with a 10-24 x 1/2" SS FH MS (0.2" edge distance)

Strike Plate 4 7/8" h x 1 13/16"x 3/32" thick stainless steel. Installed with two 12-24 x 1/2" SS FH MS to a pair of 1" w x 2 1/4" long x 1/4" thick 6063-T6 aluminum plates. The aluminum plates were fastened to the jamb with a 10-24 x 1/2" SS FH MS.

Hinges Three 4 1/2" h x 4 1/2" w x 0.129" Alutech steel with 0.39" DIA pins . Each one fastened with eight 12-24 x 1/2" SS FH MS to two 2.2" wide x 7 3/4" long x 1/4" thick 6063-T6 aluminum reinforcing plate. Each plate was fastened to the frame or stile with four 12-24 x 1/2" SS FH MS.

Plate Spacers Two 7/8" x 3/8" x 0.060" aluminum plates per hinge reinforcing plate and lock plate.

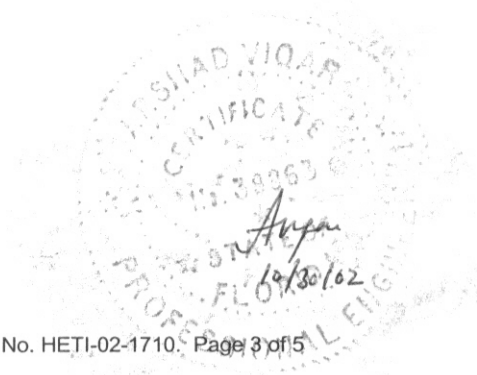
Weepholes None.

Muntins None.

Reinforcements None.

Sealant None.

Screen None.



INSTALLATION

Shimming 1/16".

Substrata Wood.

SCREWS / METAL CLIPS AND METHOD OF ATTACHMENT

	Type	Size	Spacing	Quantity
Header & Jambs	Tapcon	**1/4" x 4"**	8 1/2" from corners, @ 18" O.C.	5 per side
Saddle	Pan Sheet metal screw	**#12 x 1 3/4"**	7 1/4" from corners, @ 18" O.C.	3 per saddle

TEST RESULTS

Large Missile Impact Test

Impact Location	*Speed (fps)*	*Deflection max. (in)*	*Description of Result*
Sample I			
1) Lexan® Center	50	----	no penetration
2) Lexan® Corner	50	----	no penetration
3) Lexan® Corner	50	----	no penetration
4) below the lock	50	----	1/8" set

The samples were impacted with a #2 Southern Yellow Pine S4S, 2 x 4 missile, 9 lbs 96" long.

Cyclic Wind Pressure Test Results

Cycles	Pressure (psf)	Deflection (in)	Set (in)	Recovery (%)	Duration (sec)
Positive Pressure Cycles					
600	**+40**	----	----	----	1
70	**+48**	----	----	----	1
1	**+104**	----	----	----	1
Negative Pressure Cycles					
600	**-40**	----	----	----	1
70	**-48**	----	----	----	1
1	**-108**	----	----	----	1

CONCLUSION

The sample was tested in accordance with Miami-Dade County Protocol PA 201-94 & 203-94/TAS 201 & TAS203 without any deviations except the minimum three sample criteria was not met. The sample was 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.

Syed Waqar Ali, Ph.D.
President

10/27/02
Arshad Viqar, P.E.
Resident Engineer