

**ASTM E 1886 and ASTM E 1996 TEST REPORT**

**Report No.:** A2657.02-401-44

**Rendered to:**

CORAL ARCHITECTURAL PRODUCTS  
Tuscaloosa, Alabama

**PRODUCT TYPE:** Curtain Wall  
**SERIES/MODEL:** PW257 Dry Glazed

**This report contains in its entirety:**

**Cover Page:** 1 page  
**Report Body:** 16 pages  
**Sketches:** 2 pages  
**Photographs:** 3 pages  
**Drawings:** 15 pages

**Test Dates:** 11/30/10  
**Through:** 12/30/10  
**Report Date:** 02/17/11  
**Test Record Retention End Date:** 12/30/14

**1.0 Report Issued To:** Coral Architectural Products  
3010 Rice Mine Road  
Tuscaloosa, Alabama 35406

**2.0 Test Laboratory:** Architectural Testing, Inc.  
2250 Massaro Boulevard  
Tampa, Florida 33619  
813-628-4300

**3.0 Project Summary:**

**3.1 Product Type:** Curtain Wall

**3.2 Series/Model:** PW257 Dry Glazed

**3.3 Compliance Statement:** Results obtained are tested values and were secured by using the designated test method(s). The samples tested met the performance requirements set forth in the referenced test procedures for a +3352 Pa (+70.0 psf) and a -3830 Pa (-80.0 psf) Design Pressure with missile impacts corresponding to Missile Level D and Wind Zone 4.

**3.4 Test Dates:** 11/30/2010 - 12/30/2010

**3.5 Test Location:** Architectural Testing, Inc. test facility in Tampa, Florida.

**3.6 Test Sample Source:** The test specimens were provided by the client. Representative samples of the test specimen(s) will be retained by Architectural Testing for a minimum of four years from the test completion date.

**3.7 Drawing Reference:** The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Architectural Testing per the drawings located in Appendix C. Any deviations are documented herein or on the drawings.

**3.8 List of Official Observers:**

<u>Name</u>	<u>Company</u>
Bill Smith	Coral Architectural Products
John McClane	Architectural Testing, Inc.
Don Beltz	Architectural Testing, Inc.
Shawn G. Collins, P.E.	Architectural Testing, Inc.

#### 4.0 Test Specification(s):

ASTM E 1886-05, *Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.*

ASTM E 1996-05, *Standard Specification for Performance of Exterior Windows, Glazed Curtain Walls, Doors and Storm Shutters Impacted by Wind Borne Debris in Hurricanes.*

#### 5.0 Test Specimen Description:

##### 5.1 Product Sizes:

##### Test Specimens #1 #2 #3:

Overall Area: 17.66 m <sup>2</sup> (190.1 ft <sup>2</sup> )	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	4636	183	3810	150

##### 5.2 Frame Construction:

Frame Member	Material	Description
Head / Sill	Extruded Aluminum	Drawing #16 (PW203), #23 (PW613) & #25 (PW652) on sheet 15 of 15
Vertical Mullion	Extruded Aluminum	Drawing #14 (PW151), #15 (PW202) & #24 (PW650) on sheet 15 of 15
Horizontal Mullion	Extruded Aluminum	Drawing #16 (PW203) & # 26 (PW655) on sheet 15 of 15
Jambs	Extruded Aluminum	Drawing #24 (PW650), #15 (PW202), #23 (PW613)

	Joinery Type	Detail
All frame corners	Mechanical	The horizontal members were butt joints, sealed with Isocryl joint sealant tape and secured with three (3) #14 x1" hex head screws; through the vertical members into the adjacent horizontal members screw spline.

##### 5.3 Sash/Vent/Panel Construction: Not utilized

## 5.0 Test Specimen Description: (Continued)

### 5.4 Weatherstripping:

Description	Quantity	Location
Exterior glazing gasket (NG10)	1 row	Underside of pressure bar; outer edges
Exterior perimeter gasket (NG11)	1 row	Underside of the pressure bar; outer edge at the perimeter frame members
Pressure bar isolator (NG12)	1 row	Underside of the pressure bar; center
Interior gasket (NG16)	1 row	Exterior side of vertical and horizontal mullions; glazing perimeter

### 5.5 Glazing:

Glass Type	Spacer Type	Interior Lite	Exterior Lite	Glazing Method
1-5/16" IG	Reinforced Butyl spacer system	1/4" HS - 0.090" SGP interlayer - 1/4" - HS	1/4" - HS	The glass was exterior glazed against a 0.260" spacer gasket, and back sealed with Dow 995 sealant at all corners. The glass was secured from the exterior utilizing #12 x 1-1/4" hex washer head self drilling screws located 2" from ends and 12" on center through the aluminum pressure plates.

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Bottom Lites	3	57-3/8" x 95-3/4"		3/4"
Top Lites	3	57-3/8" x 46-1/4"		3/4"

**5.0 Test Specimen Description:** (Continued)

**5.6 Drainage:**

Drainage Method	Size	Quantity	Location
Weep holes zoned draining system	1/4"	30	8" in from each vertical mullion on the under side of the horizontal mullion trim caps and 6" from each vertical mullion on the center of the pressure plates.

**5.7 Hardware:** No hardware was utilized.

**5.8 Reinforcement:**

Drawing Number	Location	Material
Page 9 of 15 captured mullion- detail # 21 PN SR150	Vertical mullions	1/4" x 4-1/2" x 1- 7/8" Steel U-channel with 1/2" x 3-3/4" flat bar steel welded to the interior pocket of the U-channel.

**5.9 Screen Construction:** Not utilized.

## 6.0 Installation:

The specimen was installed into a C-8 steel C-channel and plywood chamber. The rough opening allowed for a 1/2" shim space at the top, bottom and at the jambs. The exterior and interior perimeter of the curtain wall was sealed with Dow 795.

Location	Anchor Description	Anchor Location
Head/Sill	1/2"-13 x 2" BGJ steel bolts	One anchor 4" from each jamb and 4" and 6" on each side of the vertical mullions, through the head and steel C-8 channel. The anchors were secured with a flat washer, lock washer and nut.
Jambs	1/2"-13 X 4-1/2" JH FNL steel bolts	The anchors were located 98" from the sill plate and above the intermediate horizontal mullion, through the jamb and the steel C-8 channel. The anchors were secured with a flat washer, lock washer and nut at both jambs.
Vertical mullion reinforcement	1/4"-20 JZ307A bolts	The steel reinforcement was secured to the vertical mullions with one 1/4"-20 x 3" bolt through the mullion at the bottom, above the intermediate horizontal mullion and at the top. Each bolt utilized flat washers, lock washers and nuts. The bottom and top also utilized a second 1/4"-20 x 2" bolt that penetrated through the mullion and steel reinforcement and was secured with flat washers, lock washers and nuts.

**7.0 Test Results:** The results are tabulated as follows:

**ASTM E 1886, Large Missile Impact**

**Conditioning Temperature:** 22.7°C (73°F)  
**Missile Weight:** 4196 g (9.25 lbs)  
**Missile Length:** 2.5 m (8'1")  
**Muzzle Distance from Test Specimen:** 5.18 m (17'0")

**Test Unit #1:** Orientation within  $\pm 5^\circ$  of horizontal

<b>Impact #1:</b> Missile Velocity: 15.24 m/s (50.0 fps)	
<b>Impact Area:</b>	Center of the glazing
<b>Observations:</b>	Missile hit target area, broke the exterior lite of glass with no penetration
<b>Results:</b>	Pass

<b>Impact #2:</b> Missile Velocity: 15.27 m/s (50.1 fps)	
<b>Impact Area:</b>	Upper right corner of the glazing
<b>Observations:</b>	Missile hit target area, re-fractured the lite of glass with no penetration
<b>Results:</b>	Pass

**Test Unit #2:** Orientation within  $\pm 5^\circ$  of horizontal

<b>Impact #1:</b> Missile Velocity: 15.33 m/s (50.3 fps)	
<b>Impact Area:</b>	Lower left corner of the glazing
<b>Observations:</b>	Missile hit target area, broke the exterior glass with no penetration
<b>Results:</b>	Pass

<b>Impact #2:</b> Missile Velocity: 15.24 m/s (50.0 fps)	
<b>Impact Area:</b>	Center of the glazing
<b>Observations:</b>	Missile hit target area, re-fractured the lite of glass with no penetration
<b>Results:</b>	Pass

*Note: See Architectural Testing Sketch #1 for impact locations.*

**7.0 Test Results:** (Continued)

**ASTM E 1886, Large Missile Impact**

**Conditioning Temperature:** 20.5°C (69°F)  
**Missile Weight:** 4196 g (9.25 lbs)  
**Missile Length:** 2.5 m (8'1")  
**Muzzle Distance from Test Specimen:** 5.18 m (17'0")

**Test Unit #3:** Orientation within ±5° of horizontal

<b>Impact #1:</b> Missile Velocity: 15.24 m/s (50.0 fps)	
<b>Impact Area:</b>	Upper right corner of the glazing
<b>Observations:</b>	Missile hit target area, broke the exterior glass with no penetration.
<b>Results:</b>	Pass

<b>Impact #2:</b> Missile Velocity: 15.17 m/s (49.8 fps)	
<b>Impact Area:</b>	Center of the vertical mullion
<b>Observations:</b>	Missile hit target area, dented the trim cap and pressure plate.
<b>Results:</b>	NA

**Additional impacts:**

<b>Impact #1:</b> Missile Velocity: 15.27 m/s (50.1 fps)	
<b>Impact Area:</b>	Center of the glazing
<b>Observations:</b>	Missile hit target area, broke the exterior glass with no penetration.
<b>Results:</b>	Pass

<b>Impact #2:</b> Missile Velocity: 15.24 m/s (50.0 fps)	
<b>Impact Area:</b>	Center of the horizontal mullion
<b>Observations:</b>	Missile missed target area, dented the trim cap and pressure plate.
<b>Results:</b>	NA

*Note: See Architectural Testing Sketch #1 for impact locations.*



**7.0 Test Results:** (Continued)

**ASTM E 1886, Air Pressure Cycling**

**Test Unit #1, 2 and 3**

**Design Pressure: +3352 Pa (+70.0 psf)**

**POSITIVE PRESSURE**

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Maximum Deflection at Indicator mm (inches)					
			#1	#2	#3	#4	#5	#6
670 to 1676 (14.0 to 35.0)	3500	2.30	4.32 (0.17)	10.92 (0.43)	3.56 (0.14)	11.18 (0.44)	11.68 (0.46)	10.92 (0.43)
00.0 to 2011 (00.0 to 42.0)	300	3.20	4.32 (0.17)	12.95 (0.51)	4.32 (0.17)	12.95 (0.51)	13.46 (0.53)	12.70 (0.50)
1676 to 2681 (35.0 to 56.0)	600	2.20	5.33 (0.21)	15.75 (0.62)	4.57 (0.18)	16.00 (0.63)	16.76 (0.66)	15.75 (0.62)
1005 to 3352 (21.0 to 70.0)	100	4.00	5.84 (0.23)	18.79 (0.74)	4.83 (0.19)	18.79 (0.74)	20.32 (0.80)	19.05 (0.75)
			Permanent Set mm (inches)					
			3.30 (0.13)	4.06 (0.16)	2.79 (0.11)	4.57 (0.18)	4.06 (0.16)	4.32 (0.17)

**7.0 Test Results:** (Continued)

**ASTM E 1886, Air Pressure Cycling**

**Test Unit #1, 2 and 3**  
**Design Pressure: +3352 Pa (+70.0 psf)**

**POSITIVE PRESSURE**

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Maximum Deflection at Indicator mm (inches)		
			#7	#8	#9
670 to 1676 (14.0 to 35.0)	3500	2.30	1.27 (0.05)	3.81 (0.15)	1.27 (0.05)
00.0 to 2011 (00.0 to 42.0)	300	3.20	2.03 (0.08)	5.59 (0.22)	2.03 (0.08)
1676 to 2681 (35.0 to 56.0)	600	2.20	2.03 (0.08)	5.59 (0.22)	2.03 (0.08)
1005 to 3352 (21.0 to 70.0)	100	4.00	2.29 (0.09)	5.84 (0.23)	2.29 (0.09)
			Permanent Set mm (inches)		
			1.78 (0.07)	2.03 (0.08)	0.25 (0.01)

**Observations:** *No additional damage or deglazing was observed.*

**Result:** Pass

**Note:** *See Architectural Testing Sketch #2 for indicator locations. Test Specimens #1, #2 and #3 were cycled in a common chamber.*

7.0 Test Results: (Continued)

**ASTM E 1886, Air Pressure Cycling**

Test Unit #1 and 2

Design Pressure:  $\pm 3828$  Pa ( $\pm 80.0$  psf)

**NEGATIVE PRESSURE**

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Maximum Deflection at Indicator mm (inches)					
			#1	#2	#3	#4	#5	#6
1148 to 3828 (24.0 to 80.0)	50	4.50	6.10 (0.24)	21.84 (0.86)	4.83 (0.19)	1956 (0.77)	22.86 (0.90)	21.08 (0.83)
1914 to 3062 (40.0 to 64.0)	1050	2.90	5.84 (0.23)	19.05 (0.75)	5.33 (0.21)	17.27 (0.68)	20.07 (0.79)	18.29 (0.72)
00.0 to 2297 (00.0 to 48.0)	50	3.80	4.83 (0.19)	14.73 (0.58)	3.81 (0.15)	13.21 (0.52)	15.75 (0.62)	14.22 (0.56)
766 to 1914 (16.0 to 40.0)	3350	3.30	4.32 (0.17)	12.70 (0.50)	3.81 (0.15)	11.43 (0.45)	13.46 (0.53)	11.68 (0.46)
			Permanent Set mm (inches)					
			1.52 (0.06)	2.29 (0.09)	1.52 (0.06)	2.03 (0.08)	2.54 (0.10)	1.78 (0.07)

**7.0 Test Results:** (Continued)

**ASTM E 1886, Air Pressure Cycling**

**Test Unit #1 and 2**

**Design Pressure:** ±3828 Pa (±80.0 psf)

**NEGATIVE PRESSURE**

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Maximum Deflection at Indicator mm (inches)		
			#7	#8	#9
1148 to 3828 (24.0 to 80.0)	50	4.50	0.25 (0.01)	2.03 (0.08)	2.03 (0.08)
1914 to 3062 (40.0 to 64.0)	1050	2.90	0.25 (0.01)	2.29 (0.09)	2.29 (0.09)
00.0 to 2297 (00.0 to 48.0)	50	3.80	0.25 (0.01)	1.78 (0.07)	1.78 (0.07)
766 to 1914 (16.0 to 40.0)	3350	3.30	0.25 (0.01)	1.78 (0.07)	1.78 (0.07)
			Permanent Set mm (inches)		
			0.25 (0.01)	0.76 (0.03)	0.76 (0.03)

**Observations:** On the first set of negative cycling; test specimen #3 failed due to fasteners shearing off at the horizontal mullion. Test specimens #1 and 2 completed the full cyclic program No additional damage or deglazing was observed.

**Result:** (specimens 1 and 2) Pass

**Note:** See Architectural Testing Sketch #2 for indicator locations. Test Specimens #1 and 2 were cycled in a common chamber.

**7.0 Test Results:** (Continued)

**ASTM E 1886, Large Missile Impact**

**Conditioning Temperature:** 20.5°C (61°F)  
**Missile Weight:** 4059 g (8.95 lbs)  
**Missile Length:** 2.5 m (8'1")  
**Muzzle Distance from Test Specimen:** 5.18 m (17'0")

**Test Unit #3 R-1:** (Replacement) Orientation within ±5° of horizontal

<b>Impact #1:</b> Missile Velocity: 15.24 m/s (50.0 fps)	
<b>Impact Area:</b>	Upper right corner of the glazing
<b>Observations:</b>	Missile hit target area, broke the exterior glass with no penetration.
<b>Results:</b>	Pass

<b>Impact #2:</b> Missile Velocity: 15.17 m/s (49.8 fps)	
<b>Impact Area:</b>	Center of the glazing
<b>Observations:</b>	Missile hit target area, re-fractured the laminated glass with no penetration.
<b>Results:</b>	NA

**Observations:** No additional damage or deglazing was observed.

**Result:** Pass

**Note:** See Architectural Testing Sketch #3 for indicator locations for Test Specimens #3.

**7.0 Test Results:** (Continued)

**ASTM E 1886, Air Pressure Cycling**

**Test Unit #3 R-1:** (Replacement)

**Design Pressure:** +3352 Pa (+70.0 psf)

**POSITIVE PRESSURE**

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Maximum Deflection at Indicator mm (inches)					
			#1	#2	#3	#4	#5	#6
670 to 1676 (14.0 to 35.0)	3500	2.60	4.57 (0.18)	10.16 (0.40)	3.05 (0.12)	9.65 (0.38)	8.89 (0.35)	4.83 (0.19)
00.0 to 2011 (00.0 to 42.0)	300	3.40	5.08 (0.20)	12.45 (0.49)	3.56 (0.14)	11.43 (0.45)	10.41 (0.41)	5.84 (0.23)
1676 to 2681 (35.0 to 56.0)	600	2.30	6.35 (0.25)	15.75 (0.62)	4.06 (0.16)	14.48 (0.57)	13.21 (0.52)	7.11 (0.28)
1005 to 3352 (21.0 to 70.0)	100	3.90	7.11 (0.28)	18.54 (0.73)	4.32 (0.17)	17.27 (0.68)	15.24 (0.60)	7.87 (0.31)
			Permanent Set mm (inches)					
			4.32 (0.17)	3.56 (0.14)	2.03 (0.08)	3.81 (0.15)	3.30 (0.13)	1.27 (0.05)

**7.0 Test Results:** (Continued)

**ASTM E 1886, Air Pressure Cycling**

**Test Unit #3 R-1:** (Replacement)  
**Design Pressure:** +3352 Pa (+70.0 psf)

**NEGATIVE PRESSURE**

Pressure Range Pa (psf)	Number of Cycles	Average Cycle Time (seconds)	Maximum Deflection at Indicator mm (inches)					
			#1	#2	#3	#4	#5	#6
1148 to 3828 (24.0 to 80.0)	50	5.00	4.83 (0.19)	24.13 (0.95)	3.81 (0.15)	17.02 (0.67)	14.48 (0.57)	9.91 (0.39)
1914 to 3062 (40.0 to 64.0)	1050	2.30	4.57 (0.18)	20.57 (0.81)	3.56 (0.14)	14.73 (0.58)	12.95 (0.51)	9.14 (0.36)
00.0 to 2297 (00.0 to 48.0)	50	3.90	4.06 (0.16)	16.51 (0.65)	3.05 (0.12)	11.94 (0.47)	10.41 (0.41)	8.13 (0.32)
766 to 1914 (16.0 to 40.0)	3350	2.60	3.81 (0.15)	14.22 (0.56)	2.79 (0.11)	9.91 (0.39)	8.89 (0.35)	7.11 (0.28)
			Permanent Set mm (inches)					
			1.27 (0.05)	3.30 (0.13)	1.27 (0.05)	1.78 (0.07)	1.78 (0.07)	2.54 (0.10)

**Observations:** No additional damage or deglazing was observed.

**Result:** Pass

**Note:** See Architectural Testing Sketch #4 for indicator locations for Test Specimens #3.

**General Note:** *Upon completion of testing, the specimens met the requirements of Section 7 of ASTM E 1996.*

## 8.0 Test Equipment:

**Cannon:** Constructed from steel piping utilizing compressed air to propel the missile

**Missile:** 2x4 Southern Pine

**Timing Device:** Electronic Beam Type

**Cycling Mechanism:** Computer controlled centrifugal blower with electronic pressure measuring device

**Deflection Measuring Device:** Linear transducers,

Tape and film were used to seal against air leakage during structural testing. In our opinion, the tape and film did not influence the results of the test.



The service life of this report will expire on the stated Test Record Retention End Date, at which time such materials as drawings, data sheets, samples of test specimens, copies of this report, and any other pertinent project documentation, shall be discarded without notice.

If test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen(s) can be made. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, Inc.

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John C McClane  
Laboratory Manager

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Shawn G. Collins, P.E.  
Laboratory Support Engineer

JCM:ck

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix-A: Sketches (2)
- Appendix-B: Photographs (3)
- Appendix-C: Drawings (15)

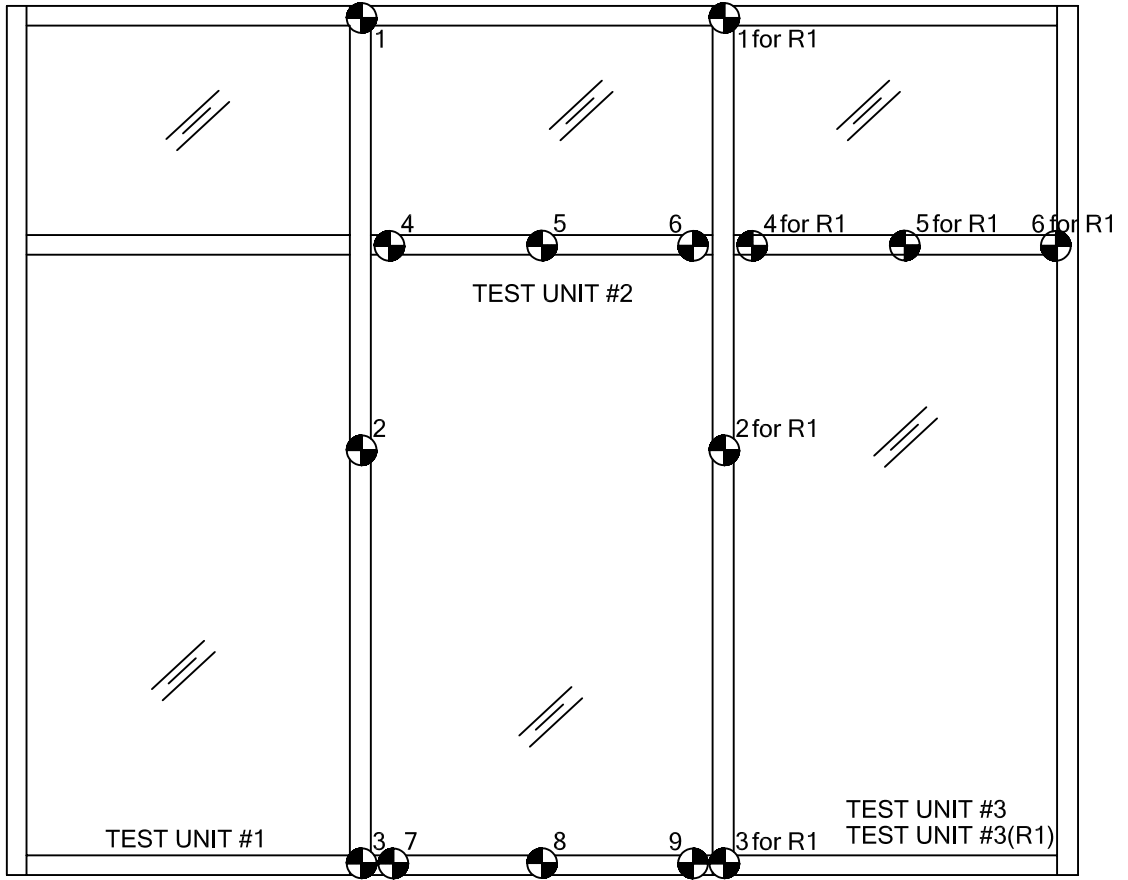


Test Report No.: A2657.02-401-44  
Report Date: 01/07/11  
Test Record Retention End Date: 12/30/14

## **Appendix A**

### **Sketches**

REV	DATE	DESCRIPTION



## INDICATOR LOCATIONS

SCALE: NTS

PROJECT NO.  
A2657.02  
401-44

PROJECT NAME: ASTM 1886/1996  
CLIENT: CORAL AP



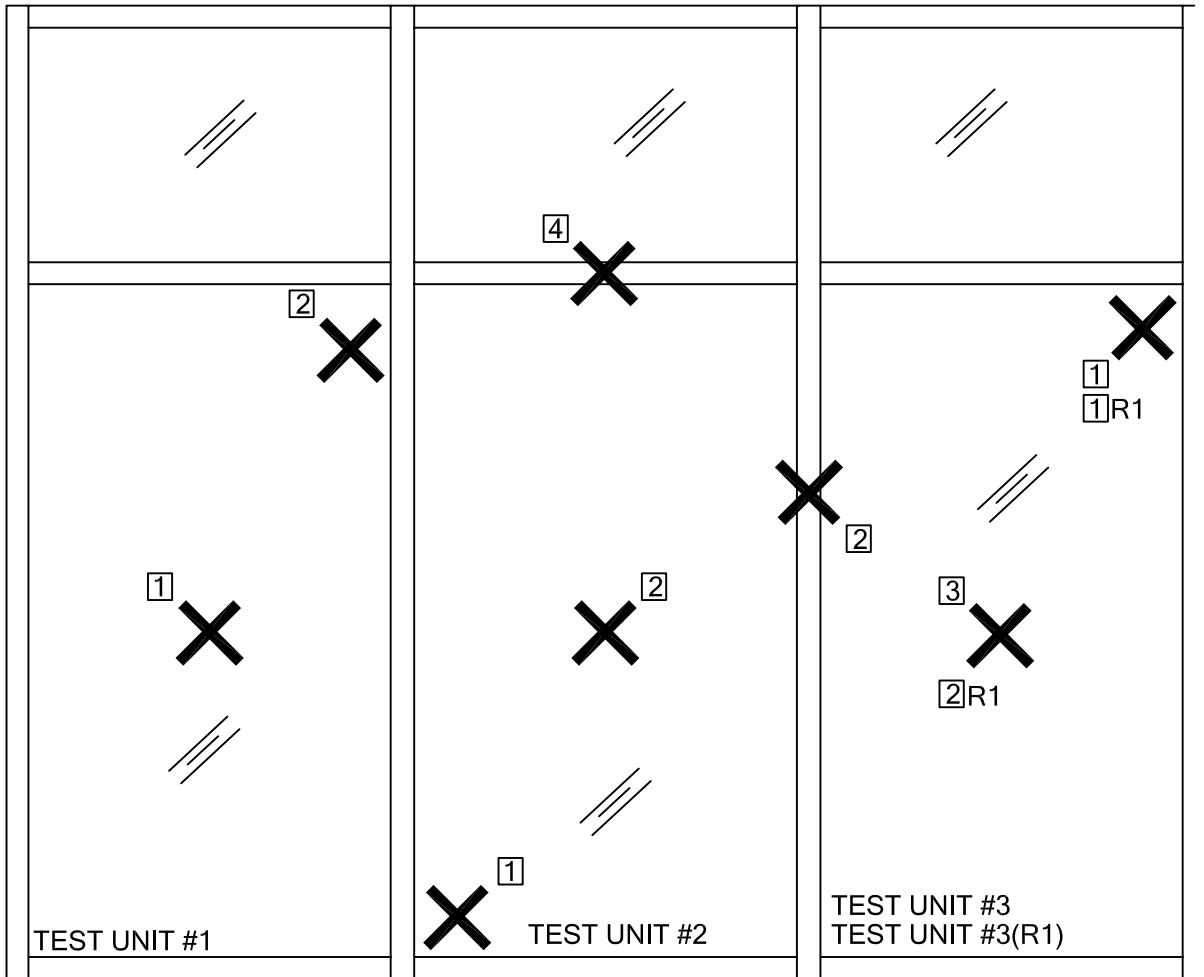
DRAWING

SKETCH #1

DWG. BY:  
SGC  
DATE:  
2-17-11

SHEET  
1 OF  
2

REV	DATE	DESCRIPTION



## LARGE MISSILE IMPACT LOCATIONS

SCALE: NTS

## Appendix B Photographs



Photo No. 1  
Test equipment,



Photo No. 2  
Deflection measuring equipment



Photo No. 3  
Specimen # 1, 2 and 3  
Cycling equipment set up

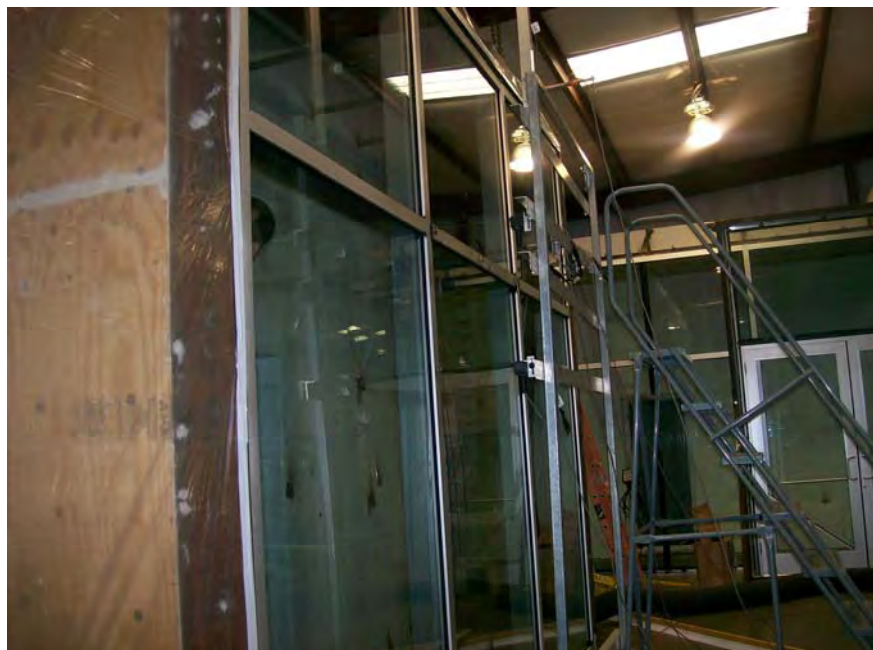


Photo No. 4  
Specimen # 1, 2 and 3  
Set up for test.



Photo No. 5  
Specimen # 1, 2 and 3  
Impact shots and set up for cyclic pressure test.



Test Report No.: A2657.02-401-44  
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## **Appendix C**

### **Drawings**




# TEST REPORT DRAWINGS

## PW257 IMPACT-RESISTANT CURTAIN WALL SYSTEM

### FOR USE IN HURRICANE ZONES REQUIRING LARGE MISSILE IMPACT PROTECTION

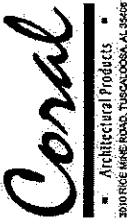
INDEX TO DRAWINGS	
1	INDEX TO DRAWINGS AND NOTES
2	FRAMING ELEVATION - E1 CAPTURED AND B.G. MULLIONS WITH STEEL -LONG SPAN-
3	FRAMING ELEVATION - E2 CAPTURED MULLION WITHOUT STEEL -SHORT SPAN-
4	FRAMING ELEVATION - E3 B.G. MULLION WITHOUT STEEL -SHORT SPAN-
5	FRAMING ELEVATION - E4 CAPTURED MULLION WITH STEEL -LONG SPAN- DRY GLAZE
6	FRAMING ELEVATION FOR DOORS - E5 CAPTURED MULLION WITH STEEL -LONG SPAN-
7	FRAMING DETAILS
8	FRAMING DETAILS
9	FRAMING DETAILS
10	DOOR AND FRAMING DETAILS
11	DOOR AND FRAMING DETAILS
12	FRAMING DETAILS
13	BILL OF MATERIALS
14	BILL OF MATERIALS AND GLAZING SCHEDULE
15	DIE DRAWINGS

**ABBREVIATIONS:**  
D.L.O. = DAY LIGHT OPENING  
D.O.H. = DOOR OPENING HEIGHT  
D.O.W. = DOOR OPENING WIDTH  
ELEVS = ELEVATIONS  
EXT. = EXTERIOR  
INT. = INTERIOR  
MAX. = MAXIMUM  
MIN. = MINIMUM  
OPP. = OPPOSITE  
TYP. = TYPICAL

 **Architectural Testing**

*Test sample compares with these details.  
Revisions are noted.*

Project A2657.02  
Date 8/12/11 Test JC

 Coral Architectural Products 3800 S. W. 11th St., Suite 100 Coral Gables, FL 33134 TEL: 305-441-1200	<b>TEST REPORT DRAWINGS</b> <b>PW257 IMPACT-RESISTANT</b> <b>CURTAIN WALL SYSTEM</b>  <b>INDEX TO DRAWINGS AND NOTES</b>																																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">REV</td> <td style="width: 10%;">BY</td> <td style="width: 10%;">DATE</td> <td style="width: 70%;">DESCRIPTION</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	REV	BY	DATE	DESCRIPTION					<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DATE</td> <td colspan="3">8/24/2010</td> </tr> <tr> <td>DRAWN</td> <td>CHECKED</td> <td colspan="2">APPROVED</td> </tr> <tr> <td>ALL</td> <td>DCW</td> <td colspan="2">DCW</td> </tr> <tr> <td colspan="4">PROJECT NO. TEST</td> </tr> <tr> <td colspan="4">DRAWING NO. PW257_01</td> </tr> <tr> <td colspan="4">SHEET 1 OF 15</td> </tr> </table>	DATE	8/24/2010			DRAWN	CHECKED	APPROVED		ALL	DCW	DCW		PROJECT NO. TEST				DRAWING NO. PW257_01				SHEET 1 OF 15			
REV	BY	DATE	DESCRIPTION																														
DATE	8/24/2010																																
DRAWN	CHECKED	APPROVED																															
ALL	DCW	DCW																															
PROJECT NO. TEST																																	
DRAWING NO. PW257_01																																	
SHEET 1 OF 15																																	

SPECIMEN #E1	
TEST METHOD	TEST CONDITIONS
AIR INFILTRATION TEST (ASTM E183 AND TAS 102)	1.57 PSF & 6.24 PSF
WATER INFILTRATION TEST (ASTM E1331 AND TAS 202)	20.00 PSF
UNIFORM STATIC LOAD TEST (ASTM E1330 AND TAS 202)	+/- 80 PSF DESIGN PRESSURE
LARGE MISSILE IMPACT TEST (ASTM E1886/E1996 AND TAS 201)	9-LB 40Z, 2x4 @ 50FT/SEC
CYCLIC LOAD TEST (ASTM E1996 AND TAS 202)	+/- 80 PSF DESIGN PRESSURE

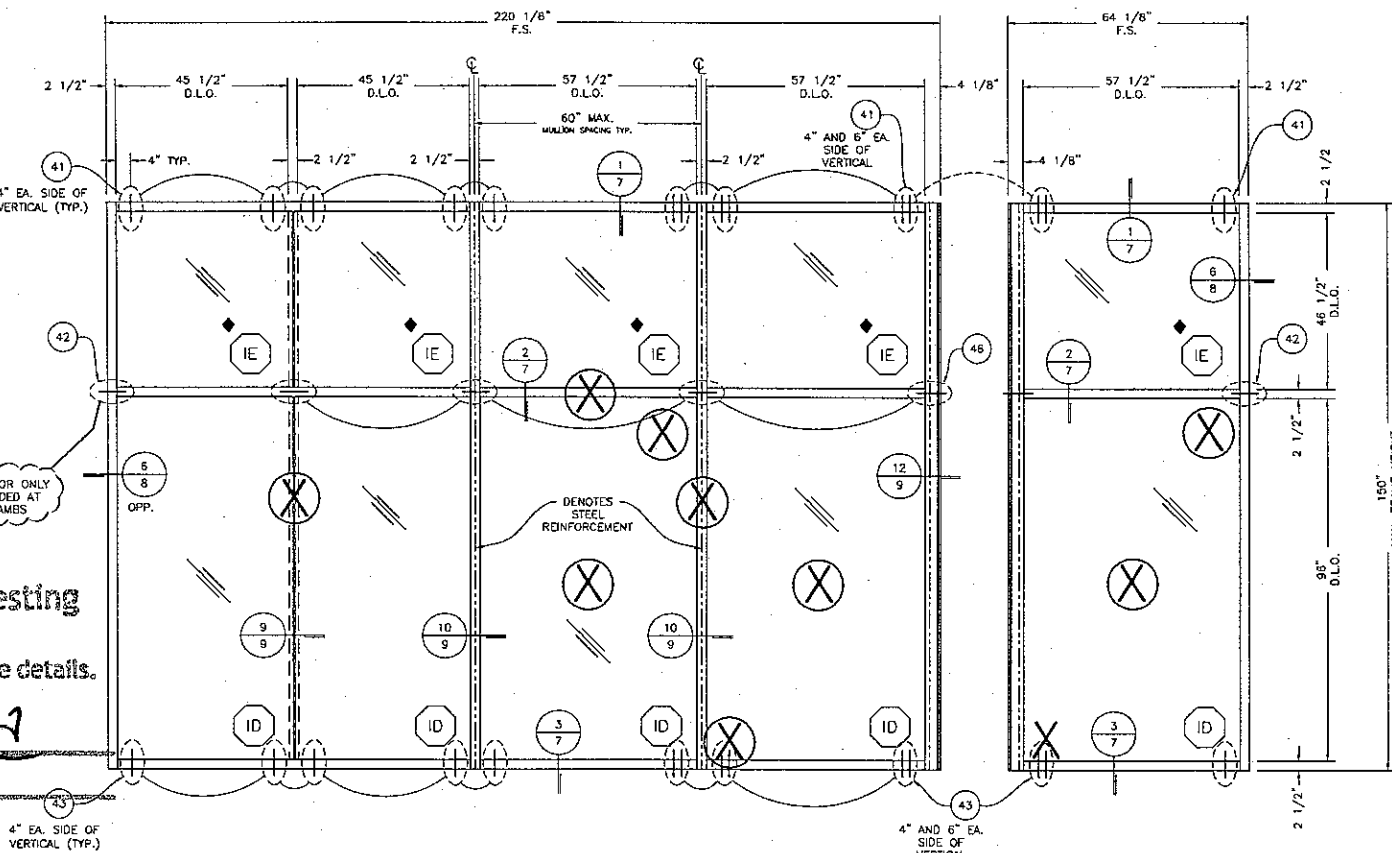


Architectural Testing

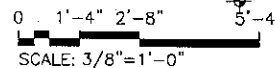
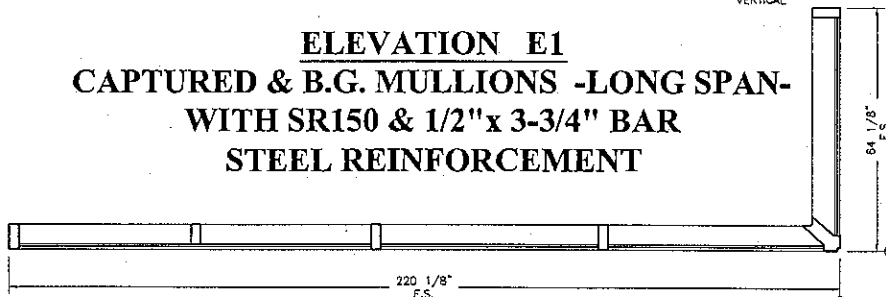
Test sample complies with these details.  
Deviations are noted.

Report# **NOT USED**

Date \_\_\_\_\_ Tech \_\_\_\_\_



**ELEVATION E1**  
**CAPTURED & B.G. MULLIONS -LONG SPAN-**  
**WITH SR150 & 1/2\"x 3-3/4\" BAR**  
**STEEL REINFORCEMENT**



STEEL BUCK FRAME

TESTING:  
AIR, WATER, STATIC, IMPACT, AND CYCLE

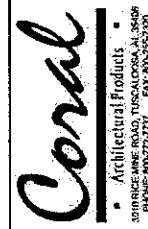
MAX. ALLOWABLE DEFLECTION (L/180)= 0.833

DESIGN PRESSURE = +/- 80 PSF

(X) = LARGE MISSILE IMPACT LOCATIONS

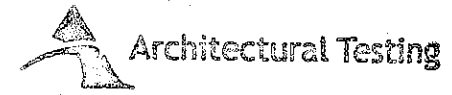
◆ = INFILL ONLY (DO NOT IMPACT)

NO.	REV.	BY	DATE	DESCRIPTION



TEST REPORT DRAWINGS  
PW257 IMPACT-RESISTANT  
CURTAIN WALL SYSTEM  
FRAMING ELEVATION

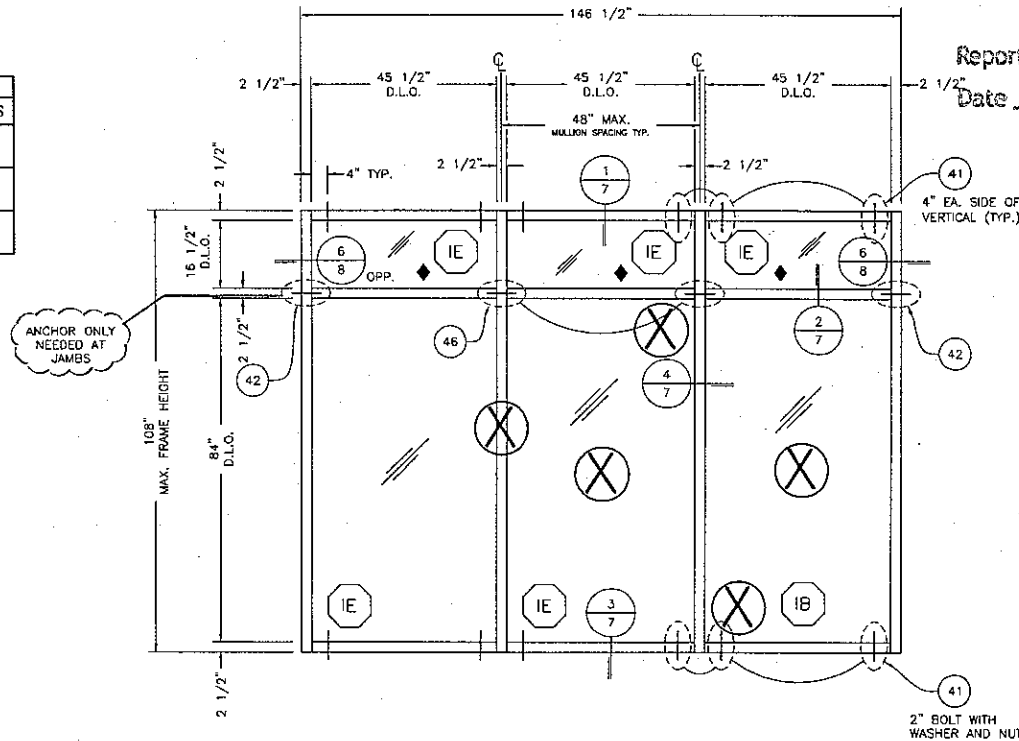
DATE	3/24/2010
DRAWN	ALL
CHECKED	DCW
APPROVED	DCW
PROJECT NO.	TEST
DRAWING NO.	PW257_01
SHEET	2 OF 15



Test sample complies with these details.  
Deviations are noted.

Report# NOT USED  
Date \_\_\_\_\_ Tech \_\_\_\_\_

SPECIMEN #E2	
TEST METHOD	TEST CONDITIONS
UNIFORM STATIC LOAD TEST (ASTM E330 AND TAS 202)	+/- 65 PSF DESIGN PRESSURE
LARGE MISSILE IMPACT TEST (ASTM E1886/E1996 AND TAS 201)	9-LB 40Z 2x4 @ 50FT/SEC
CYCLIC LOAD TEST (ASTM E1996 AND TAS 203)	+/- 65 PSF DESIGN PRESSURE



**ELEVATION E2**  
**CAPTURED MULLION -SHORT SPAN-**  
**WITHOUT REINFORCEMENT**

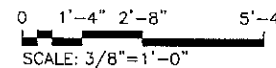
STEEL BUCK FRAME

TESTING:  
STATIC, IMPACT, AND CYCLE

MAX. ALLOWABLE DEFLECTION (L/180) = 0.600

DESIGN PRESSURE = +/- 65 PSF

- = LARGE MISSILE IMPACT LOCATIONS
- = INFILL ONLY (DO NOT IMPACT)

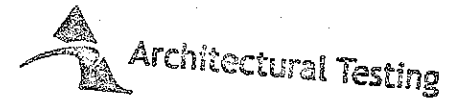


NO.	DATE	BY	REV	DESCRIPTION

**Coral**  
Architectural Products  
3910 RICE MIAMI ROAD, TUSCALOOSA, AL 35466  
PHONE: 800-727-7373 FAX: 205-265-1300

TEST REPORT DRAWINGS  
PW257 IMPACT-RESISTANT  
CURTAIN WALL SYSTEM  
FRAMING ELEVATION

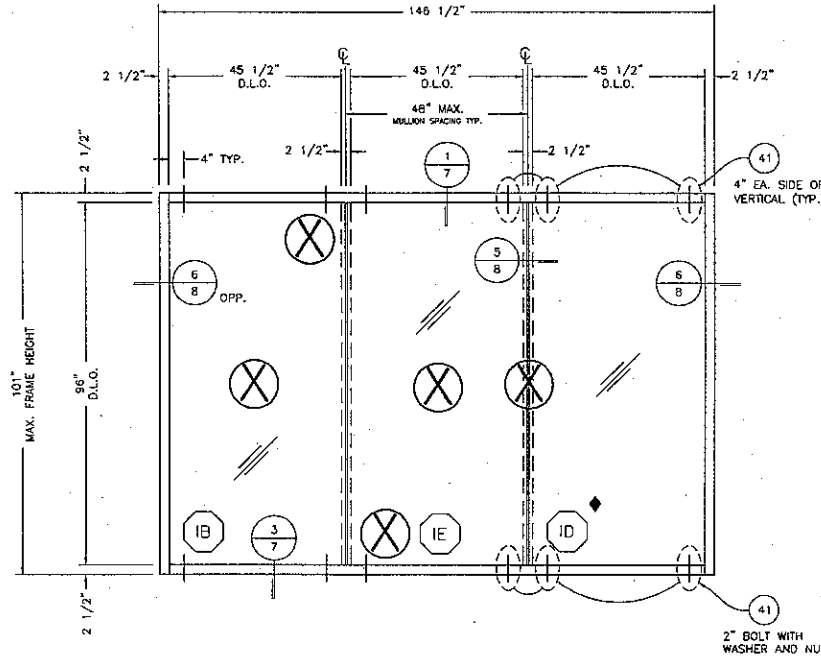
DATE	3/24/2010		
DRAWN	CHECKED	APPROVED	
ALL	OCW	OCW	
PROJECT NO.	TEST		
DRAWING NO.	PW257_01		
SHEET	3 OF 15		



Test sample complies with these details.  
Deviations are noted.

Report# NOT USED  
Date \_\_\_\_\_ Tech \_\_\_\_\_

SPECIMEN #E3	
TEST METHOD	TEST CONDITIONS
UNIFORM STATIC LOAD TEST (ASTM E330 AND TAS 203)	+/- 65 PSF DESIGN PRESSURE
LARGE MISSILE IMPACT TEST (ASTM E1866/E1996 AND TAS 201)	9-LB 4OZ, 2x4 @ 50FT/SEC
CYCLIC LOAD TEST (ASTM E1996 AND TAS 203)	+/- 65 PSF DESIGN PRESSURE



**ELEVATION E3  
B.G. MULLION -SHORT SPAN-  
WITHOUT REINFORCEMENT**

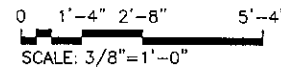
STEEL BUCK FRAME

TESTING:  
STATIC, IMPACT, AND CYCLE

MAX. ALLOWABLE DEFLECTION (L/180) = 0.561

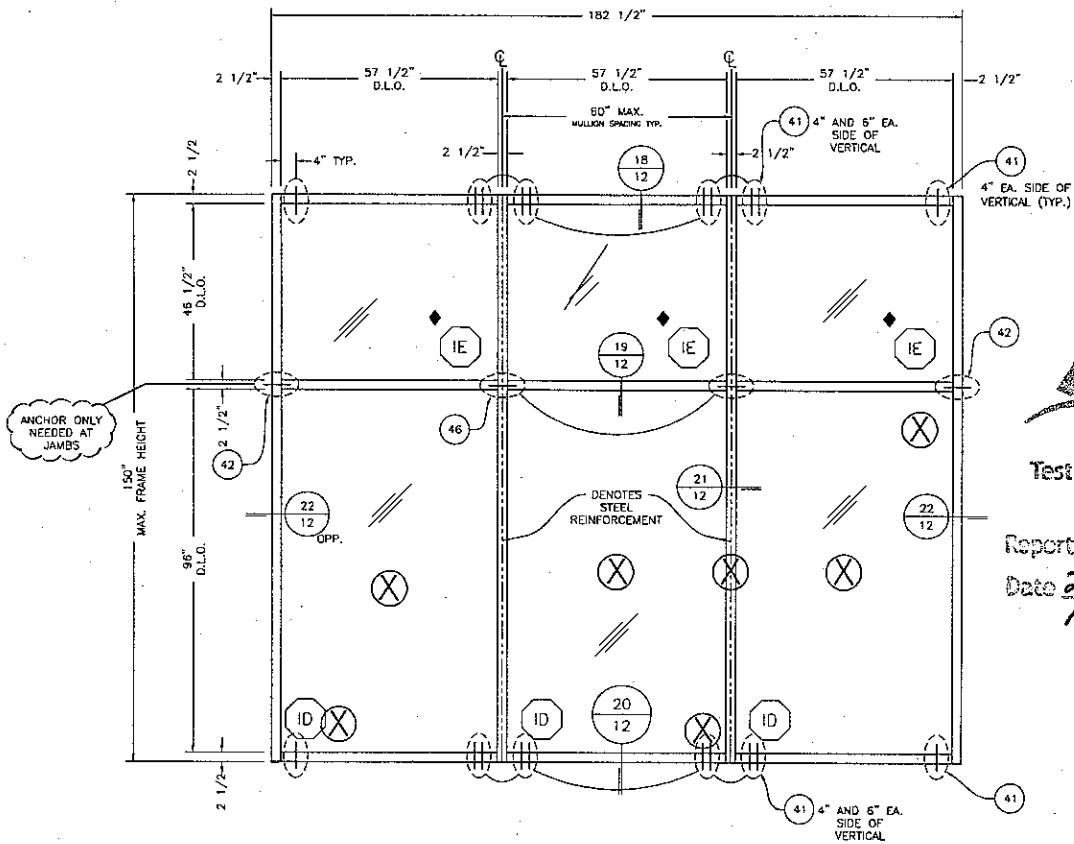
DESIGN PRESSURE = +/- 65 PSF

- = LARGE MISSILE IMPACT LOCATIONS
- = INFILL ONLY (DO NOT IMPACT)



Architectural Products 3010 RICE WINE ROAD, TUSCALOOSA, AL 35406 PHONE 800-772-7377 FAX 205-565-2320			
TEST REPORT DRAWINGS PW257 IMPACT-RESISTANT CURTAIN WALL SYSTEM FRAMING ELEVATION			
DATE	3/24/2010		
DRAWN	CHECKED	APPROVED	
ALL	DCW	DCW	
PROJECT NO. TEST			
DRAWING NO. PW257_01			
SHEET 4 OF 15			

SPECIMEN #E1	
TEST METHOD	TEST CONDITIONS
AIR INFILTRATION TEST (ASTM E283 AND TAS 202)	1.57 PSF & 6.24 PSF
WATER INFILTRATION TEST (ASTM E331 AND TAS 202)	20.00 PSF
UNIFORM STATIC LOAD TEST (ASTM E330 AND TAS 203)	+/- 80 PSF DESIGN PRESSURE
LARGE MISSILE IMPACT TEST (ASTM E186/E1996 AND TAS 201)	9-LB 40Z, 2x4 @ 50FPS/SEC
CYCLIC LOAD TEST (ASTM E196 AND TAS 203)	+/- 80 PSF DESIGN PRESSURE



**ELEVATION E4 - DRY GLAZE  
CAPTURED MULLION -LONG SPAN-  
WITH SR150 & 1/2"X 3-3/4" BAR  
STEEL REINFORCEMENT**

STEEL BUCK FRAME

TESTING:  
IMPACT, AND CYCLE

MAX. ALLOWABLE DEFLECTION (L/180)= 0.833

DESIGN PRESSURE = +/-80 PSF


(X) = SMALL MISSILE IMPACT LOCATIONS

◆ = INFILL ONLY (DO NOT IMPACT)

0 1'-4" 2'-8" 5'-4"  
SCALE: 3/8"=1'-0"


**Architectural Testing**  
 Test sample complies with these details.  
 Deviations are noted.

Report# A7657.02  
 Date 2/17/11 Tech SCM

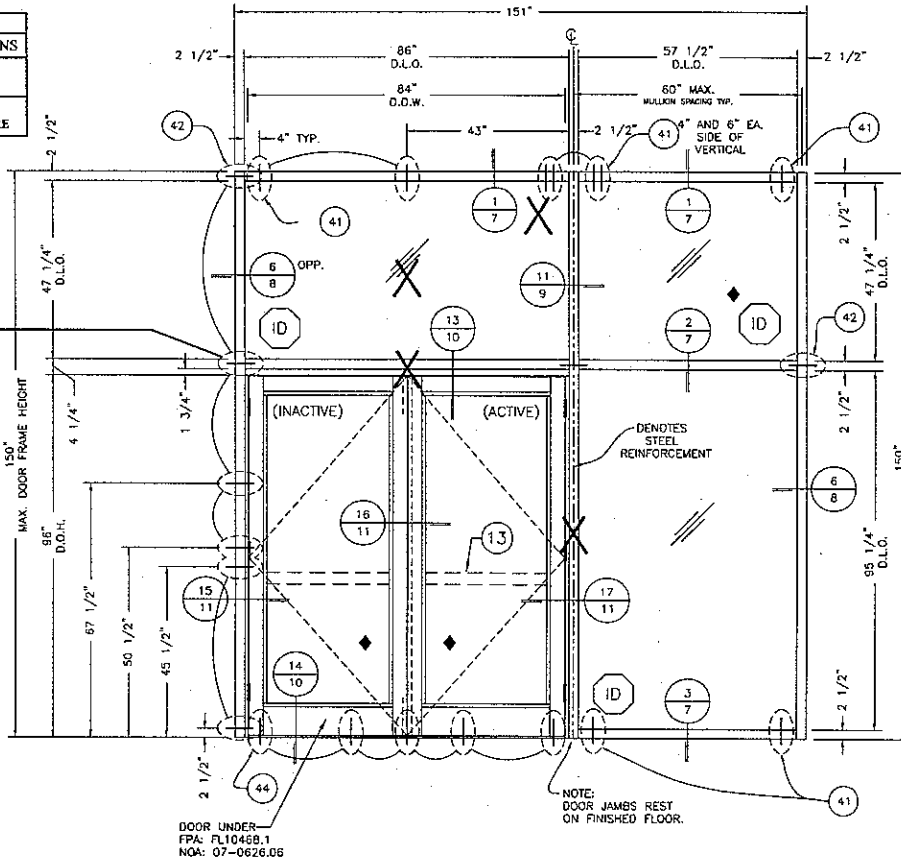
  
 Architectural Products  
 3010 RICE MIAMI ROAD, TUSCALOOSA, AL 35490  
 PHONE: 800-772-7277 FAX: 800-448-6263

TEST REPORT DRAWINGS  
 PW257 IMPACT-RESISTANT  
 CURTAIN WALL SYSTEM  
 FRAMING ELEVATION

DATE	3/24/2010		
DRAWN	CHECKED	APPROVED	
MLL	DCW	DCW	
PROJECT NO.			
DRAWING NO.	PW257_01		
SHEET	5 OF 15		

DESCRIPTION

SPECIMEN #E5	
TEST METHOD	TEST CONDITIONS
LARGE MISSILE IMPACT TEST (ASTM E1366/E1996 AND TAS 201)	9-LB 4OZ, 2x4 @ 50FT/SEC
CYCLIC LOAD TEST (ASTM E1996 AND TAS 203)	+/- 80 PSF DESIGN PRESSURE

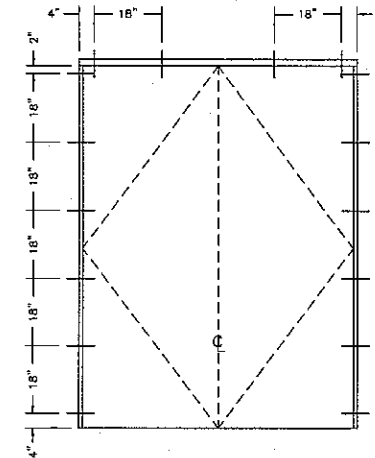


Architectural Testing

Test sample complies with these details.  
Deviations are noted.

Report# NOT USED

Date \_\_\_\_\_ Tech \_\_\_\_\_



**LOCATIONS FOR  
DOOR SUB-FRAME ATTACHMENT  
TO CURTAIN WALL ALUMINUM**

**ELEVATION E5  
CAPTURED MULLION -LONG SPAN-  
WITH SR150 & 3/4"x 3-3/4" BAR STEEL REINFORCEMENT  
FOR SERIES 381 ENTRANCE DOORS**

STEEL BUCK FRAME

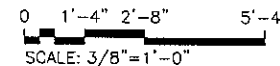
TESTING:  
IMPACT, AND CYCLE

MAX. ALLOWABLE DEFLECTION (L/180) = 0.833

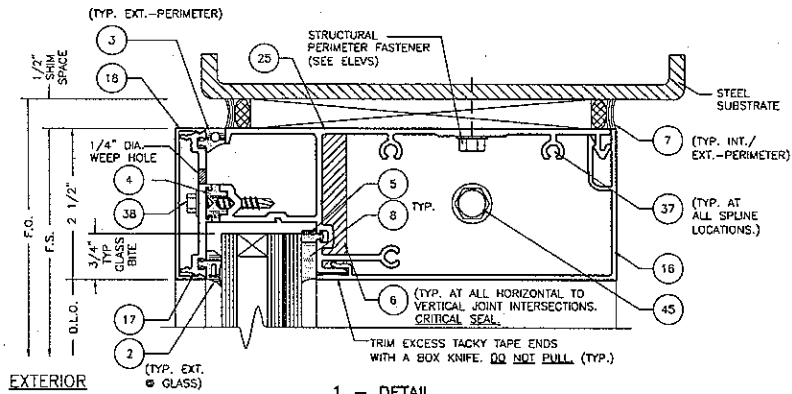
DESIGN PRESSURE = +/- 80 PSF

X = LARGE MISSILE IMPACT LOCATIONS

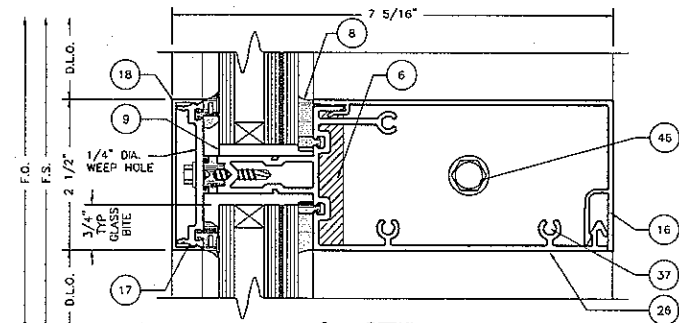
◆ = INFILL ONLY (DO NOT IMPACT)



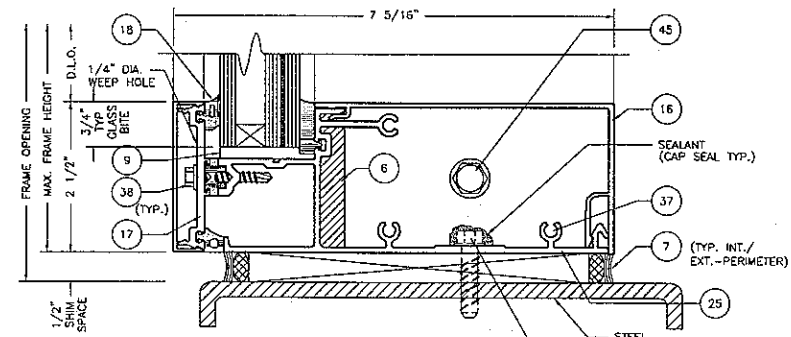
<p>Coral Architectural Products 3100 RICE MIKE ROAD, TUCUMAN, CALIF. 95296 PHONE: 909-727-7257 FAX: 909-355-7326</p>		DATE	3/24/2010				
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DRAWN	CHECKED	APPROVED					
ALL	DCW	DCW					
<p>TEST REPORT DRAWINGS PW257 IMPACT-RESISTANT CURTAIN WALL SYSTEM</p>		PROJECT NO.	TEST				
		DRAWING NO.	PW257_01				
		SHEET	6 OF 15				
FRAMING ELEVATION FOR DOORS							



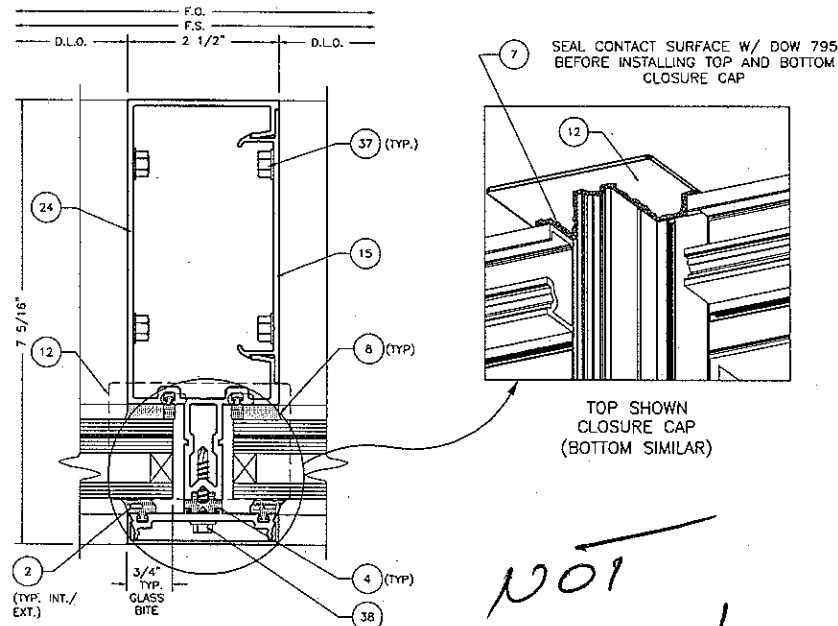
1 - DETAIL  
1:2



2 - DETAIL  
1:2



3 - DETAIL  
1:2



4 - DETAIL  
1:2

*NOT USED*

**Architectural Testing**

Test sample complies with these details.  
Deviations are noted.

Report# \_\_\_\_\_  
Date \_\_\_\_\_ Tech \_\_\_\_\_

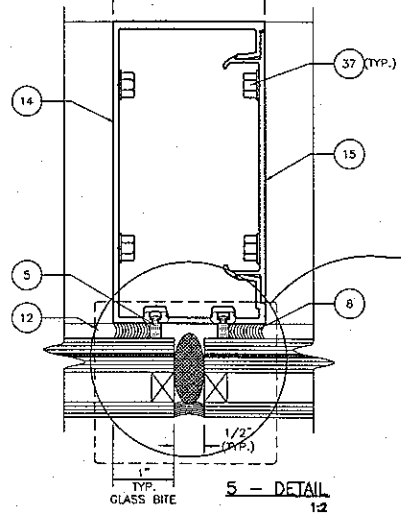
NO.	REV.	DATE	DESCRIPTION

**Coral**  
Architectural Products  
3010 ROCKWELL ROAD, TUCUACORSA, AL 34409  
PHONE: 800-772-7727 FAX: 800-443-6251

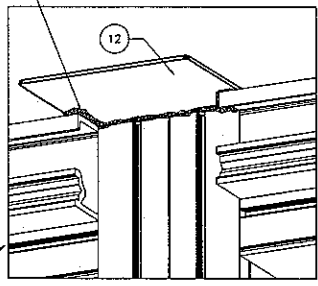
TEST REPORT DRAWINGS  
PW257 IMPACT-RESISTANT  
CURTAIN WALL SYSTEM  
FRAMING DETAILS

DATE	8/24/2010
DRAWN	ALL
CHECKED	DCW
APPROVED	DCW
PROJECT NO.	
DRAWING NO.	PW257_01
SHEET	7 OF 15

FRAME OPENING  
FRAME WIDTH  
2 1/2"  
D.L.O. D.L.O.



7 SEAL CONTACT SURFACE W/  
DOW 795  
BEFORE INSTALLING TOP AND BOTTOM  
CLOSURE CAP



12 TOP SHOWN  
CLOSURE CAP  
(BOTTOM SIMILAR)



Architectural Testing

Test sample complies with these details.  
Deviations are noted.

Report# A2657.02  
Date 2/12/11 Tech ACM

7 CRITICAL SEAL  
FILL GASKET REGLET  
BEHIND END DAM W/  
DOW 795

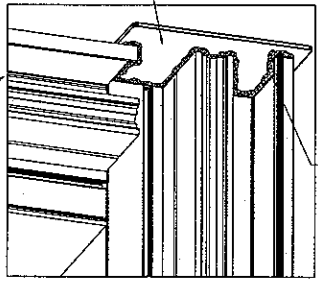
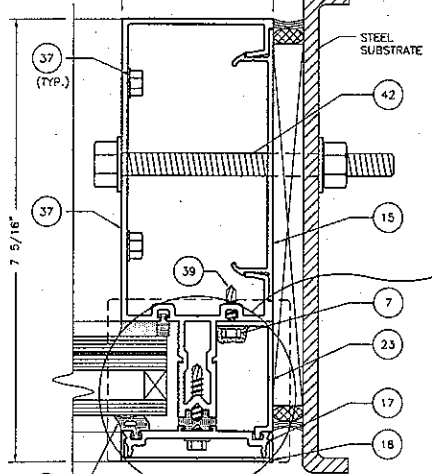
7 CRITICAL SEAL  
APPLY DOW 795  
SEALANT TO ALL THREE  
CONTACT SURFACES.  
PRIOR TO INSTALLATION  
AT HORIZONTALS AND  
SILL.

7 CRITICAL SEAL  
APPLY DOW 795  
SEALANT TO ALL THREE  
CONTACT SURFACES  
PRIOR TO INSTALLATION  
AT HORIZONTALS AND  
SILL.

12 FIELD MODIFY @  
JAMB IF REQUIRED

7 SEAL CONTACT SURFACE  
W/  
DOW 795 BEFORE INSTALLING  
TOP AND BOTTOM CLOSURE CAP

F.O.  
F.S.  
D.L.O. 2 1/2"  
1/2" MIN.  
SHIM  
SPACE

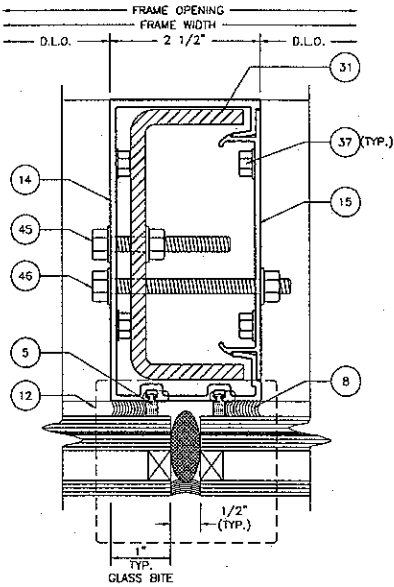


12 TOP SHOWN  
CLOSURE CAP  
(BOTTOM SIMILAR)

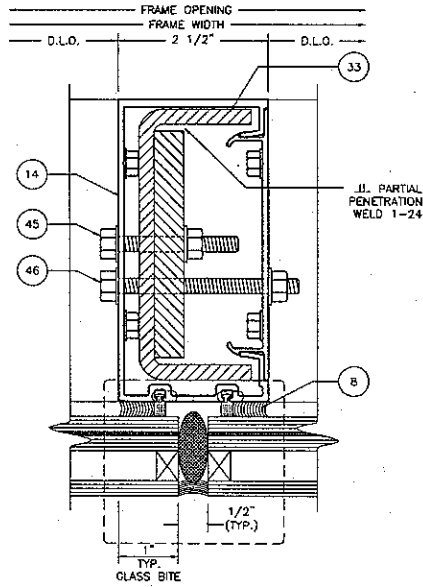
2 (TYP. EXT.  
o GLASS)  
6 - DETAIL  
1:2

TEST REPORT DRAWINGS PW257 IMPACT-RESISTANT CURTAIN WALL SYSTEM	
FRAMING DETAILS	
DATE	8/24/2010
DRAWN	ALL
CHECKED	DCW
APPROVED	DCW
PROJECT NO.	
DRAWING NO.	PW257 01
SHEET	8 OF 15

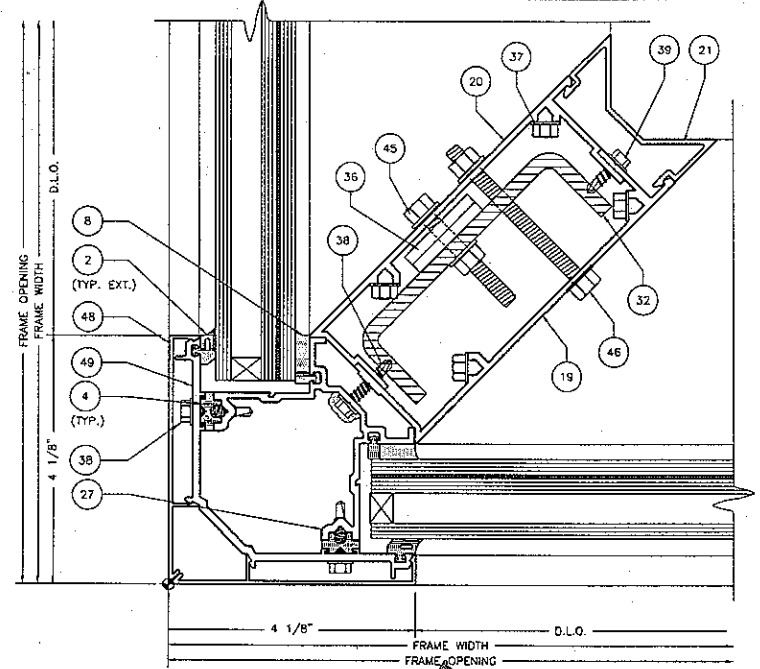




7 - DETAIL  
1:2



9 - DETAIL  
1:2

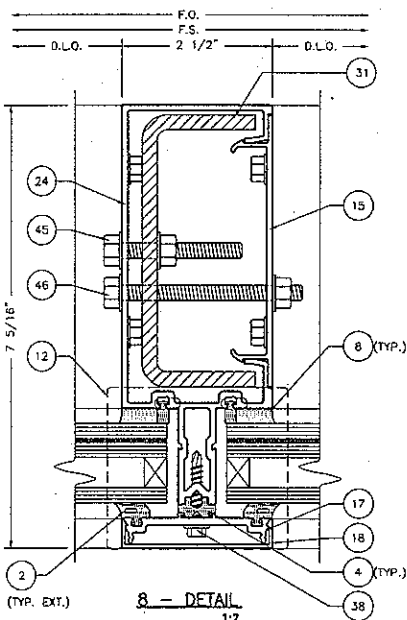


12 - DETAIL  
Architectural Testing

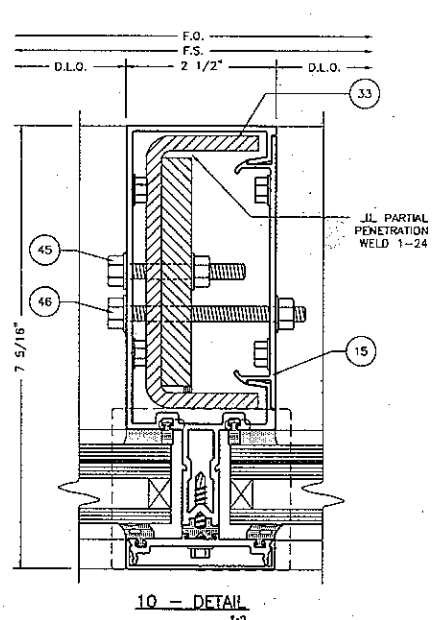
Test sample complies with these details.  
Deviations are noted.

Report# **NOT USED**

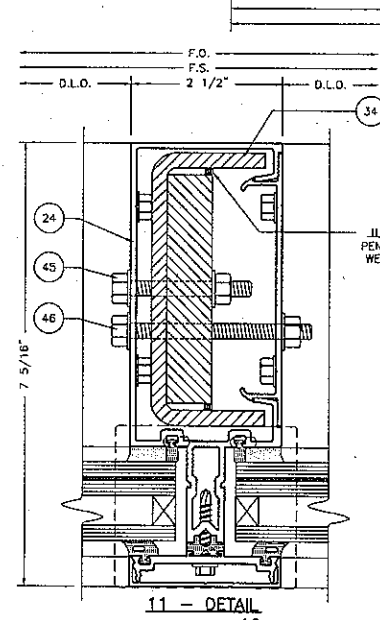
Date \_\_\_\_\_ Tech \_\_\_\_\_



8 - DETAIL  
1:2



10 - DETAIL  
1:2



11 - DETAIL  
1:2

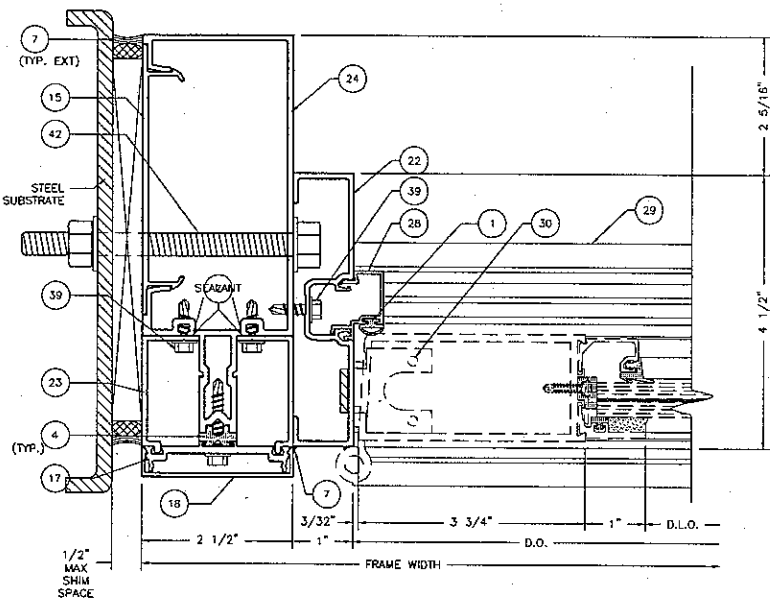
**Coral**  
Architectural Products  
3001 E. WINE ROAD, TUCSON, AZ 85746  
PHONE: 602-775-7737 FAX: 602-443-8261

TEST REPORT DRAWINGS  
PW257 IMPACT-RESISTANT  
CURTAIN WALL SYSTEM

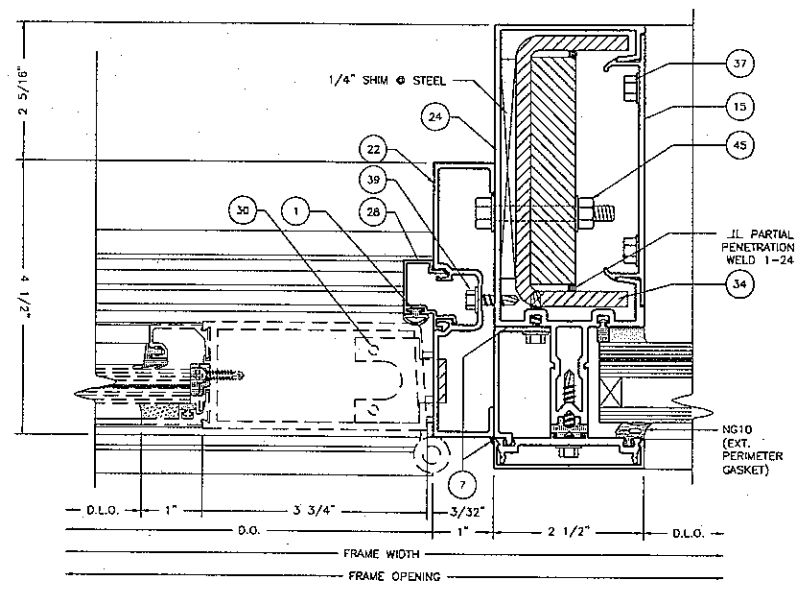
FRAMING DETAILS

DATE 8/24/2010  
DRAWN RLL CHECKED DCW APPROVED DCW  
PROJECT NO.  
DRAWING NO. PW257\_01  
SHEET 9 OF 15



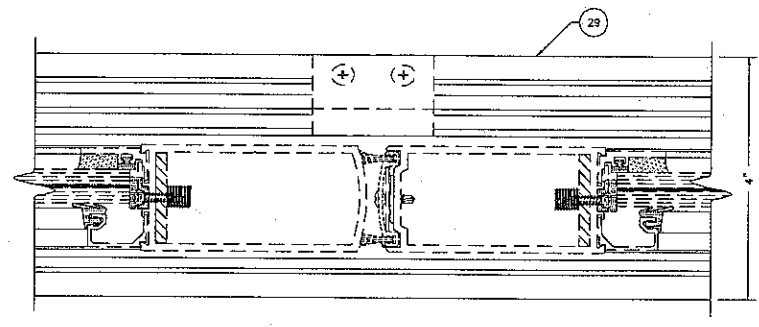


15 - DETAIL  
1/2



17 - DETAIL  
1/2

*NOT USED*



\_\_\_\_\_ DOOR OPENING  
 \_\_\_\_\_ FRAME WIDTH  
 \_\_\_\_\_ FRAME OPENING

16 - DETAIL  
1/2

**Architectural Testing**  
 Test sample complies with these details.  
 Deviations are noted.

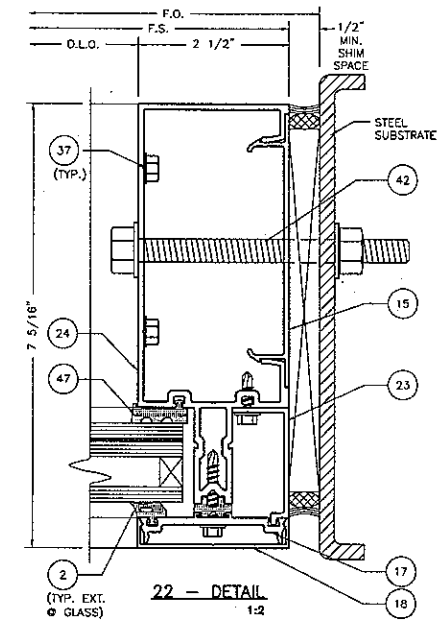
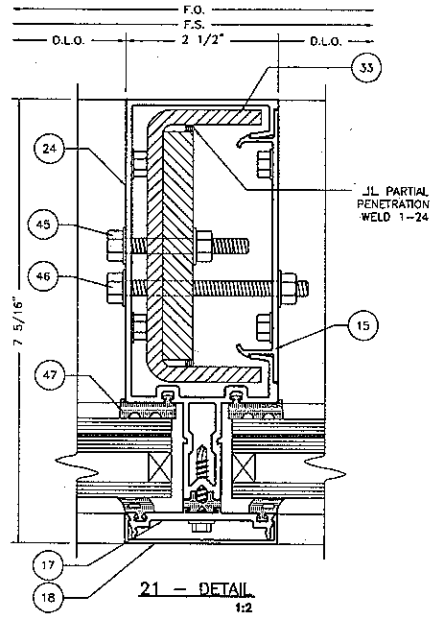
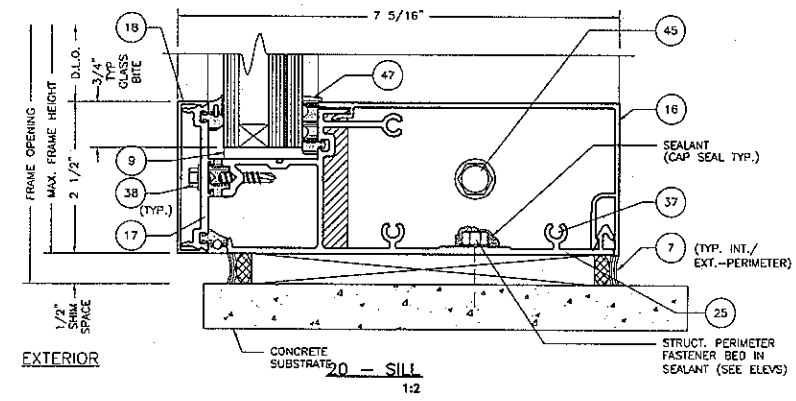
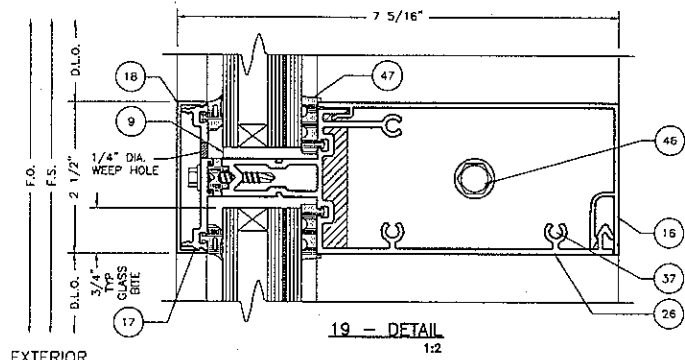
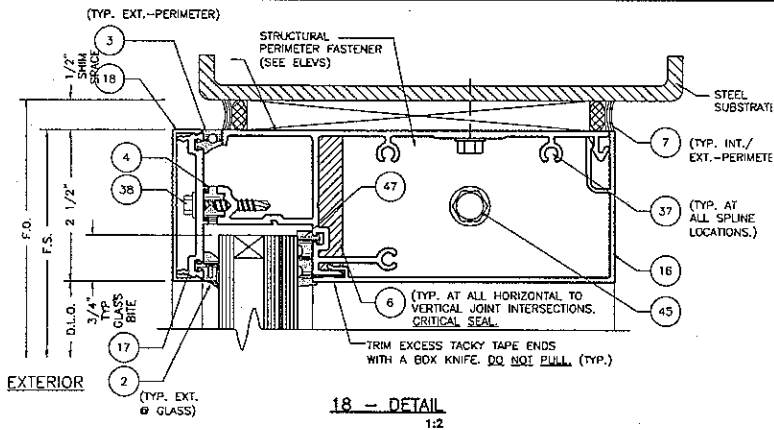
Report# \_\_\_\_\_  
 Date \_\_\_\_\_ Tech \_\_\_\_\_

REV	BY	DATE	DESCRIPTION

**Coral**  
 Architectural Products  
 3010 WILSON BLVD, SUITE 100, LOS ANGELES, CA 90048  
 PHONE: (818) 775-7727 FAX: (818) 443-6281

TEST REPORT DRAWINGS  
 PW257 IMPACT-RESISTANT  
 CURTAIN WALL SYSTEM  
 DOOR AND FRAMING DETAILS

DATE	8/24/2010		
DRAWN	CHECKED	APPROVED	
HLL	DCW	DCW	
PROJECT NO.			
DRAWING NO.	PW257_01		
SHEET	11 OF 15		



**Architectural Testing**

Test sample complies with these details.  
Deviations are noted.

Report# A2657.02  
Date 2/17/11 Tech ICM

Architectural Products  
3010 RED WINE ROAD, TUCKAHOOGA, AL 35405  
PHONE: 904-772-7737 FAX: 904-443-8261

**Coral**

TEST REPORT DRAWINGS  
PW257 IMPACT-RESISTANT  
CURTAIN WALL SYSTEM


FRAMING DETAILS

DATE	8/24/2010		
DRAWN	CHECKED	APPROVED	
MILL	DCW	DCW	
PROJECT NO.			
DRAWING NO.	PW257_01		
SHEET	12 OF 15		




### BILL OF MATERIALS

ITEM NO.	P/N	DESCRIPTION	DIMENSIONS	MATERIAL	MANUFACTURER	NOTES
31	SR150	REINFORCEMENT CHANNEL ✓	4.500 X 1.875 X 0.250	A36 STEEL	VARIES	STEEL REINFORCEMENT FOR (14) AND (24)
32	SR504	REINFORCEMENT CHANNEL	4.562 X 1.250 X 0.250	A36 STEEL	VARIES	STEEL REINFORCEMENT FOR (14) AND (24)
33		SR150 WITH REINFORCEMENT BAR ✓	3.750 X 0.500	A36 STEEL	VARIES	STEEL REINFORCEMENT FOR (14) AND (24)
34		SR150 WITH REINFORCEMENT BAR	3.750 X 0.750	A36 STEEL	VARIES	STEEL REINFORCEMENT FOR (14) AND (24)
35	FL207	DOOR HEADER	1.750 X 4.500 X 0.085	6063-T6 ALUMINUM	CORAL INDUSTRIES, INC.	
36	AS13	SQUARE NUT	1.475 X 1.475 X .180	STEEL	VARIES	
37	AS16	FASTENER ✓	#14 X 1" HHSTS	STEEL	VARIES	TYP. SPLINE SCREW
38	AS32	FASTENER ✓	#12 X 1-1/4" HWH #3 SELF DRILL	STEEL	VARIES	
39	AS25	FASTENER	#12 X 3/4" HWH SELF DRILL	STEEL	VARIES	
40	AS37	FASTENER	#12 X 2" HWH SELF DRILL	STEEL	VARIES	
41	FASTENER	PERIMETER ANCHOR TO STEEL SUBSTRATE	1/2"-13 X 2" BOLT WITH WASHER AND NUT	STEEL	VARIES	
42	FASTENER	PERIMETER ANCHOR TO STEEL SUBSTRATE ✓	1/2"-13 X 4-1/2" BOLT WITH WASHER AND NUT	STEEL	VARIES	
43	FASTENER	PERIMETER ANCHOR TO CONCRETE SUBSTRATE	1/2"X3-1/2" MIN. EMBED WEDGE ANCHOR POWERS	STEEL	VARIES	
44	FASTENER	PERIMETER ANCHOR TO STEEL SUBSTRATE	#12 X 1-1/2" PFH SELF DRILL	STEEL	VARIES	
45	FASTENER	STEEL REINFORCEMENT ATTACHMENT ✓	1/4-20 X 2" BOLT WITH WASHER AND NUT	STEEL	VARIES	
46	FASTENER	THROUGH BOLT ✓	1/4-20 X 3" BOLT WITH WASHER AND NUT	STEEL	VARIES	USED @ HORIZONTALS
47	NG16	DRY GLAZE INTERIOR SPACER GASKET ✓	0.260 SPACE	EPDM	VARIES	
48	PW658	CORNER FACE COVER	4.064 X .500 X 0.078	6063-T6 ALUM	CORAL INDUSTRIES, INC.	
49	PW654	CORNER PRESSURE BAR	3.954 X 3.954 X .125	6063-T6 ALUM	CORAL INDUSTRIES, INC.	
50	SP214	CORNER MULLION CAP	4.000 X 3.826 X D.048	6063-T6 ALUM	CORAL INDUSTRIES, INC.	LOCATE @ TOP AND BOTTOM OF VERTICAL CORNER MULLION


  
**Architectural Testing**  
 Test sample complies with these details.  
 Deviations are noted.

Report# \_\_\_\_\_  
 Date \_\_\_\_\_ Tech \_\_\_\_\_

GLAZING SCHEDULE					
GLASS MARK	GLASS DESCRIPTION	MANUFACTURER	MAXIMUM D.L.O. SIZE (INCHES)	SQUARE FEET	MAXIMUM DESIGN PRESSURE (PSF)
IE	1-5/16" INSULATED -1/4" H.S. -1/2" AIR SPACER -1/4" H.S. - DUPONT BUTCITE 090 PBV INTERLAYER N.O.A. #	DUPONT	57-1/2" X 96"	38.3	± 80
IB	1-5/16" INSULATED -1/4" H.S. -1/2" AIR SPACER -1/4" H.S. -.090 SAFLEX PVB INTERLAYER -1/4" H.S. N.O.A. #	SOLUTIA	45-1/2" X 96"	30.3	± 80
ID	1-5/16" INSULATED -1/4" H.S. -1/2" AIR SPACER -1/4" H.S. -SENTRY GLASS PWS .09D -1/4" H.S.	DUPONT	57-1/2" X 96"	38.3	± 80



**Coral**  
 Architectural Products  
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TEST REPORT DRAWINGS  
 PW257 IMPACT RESISTANT  
 CURTAIN WALL SYSTEM  
 BILL OF MATERIALS AND GLAZING  
 SCHEDULE

DATE	8/24/2010		
DRAWN	MILL	CHECKED	DCW
APPROVED	DCW		
PROJECT NO.			
DRAWING NO.	PW257_01		
SHEET	14 OF 15		

