

**GENERAL NOTES:**

1- THIS PRODUCT WAS TESTED UNDER ASTM E330-02, E1996, E1886 AND IS DESIGNED IN ACCORDANCE WITH THE THE FLORIDA BUILDING CODE 2007 EDITION, NOT APPLICABLE FOR USE IN HIGH VELOCITY HURRICANE ZONES.

2- PANELS SHALL BE LABELED WITH ONE LABEL PER OPENING OR A CERTIFICATE OF COMPLIANCE SHALL BE PROVIDED BY THE MANUFACTURER AND INSTALLER. LABEL SHALL READ AS FOLLOWS:

CLEAR STRENGTH USA, LLC  
POLYCARBONATE HURRICANE SHUTTER PANELS  
LEVEL D - LARGE MISSILE IMPACT RESISTANT

**3- MATERIAL:**

3.1 - STORM PANELS SHALL BE MIN. 0.073" POLYCARBONATE CONFORMING TO ASTM D-638 WITH A MINIMUM  $F_y = 9.36$  Ksi.

3.2 - ALL ALUMINUM EXTRUSIONS SHALL BE 6063-T6 OR AS NOTED.

4- ANCHORS SHALL BE AS SHOWN ON THIS APPROVAL. ANCHOR EMBEDMENT TO BASE MATERIAL SHALL BE BEYOND WALL DRESSING.

5- LOADS: THE DESIGNED LOAD MUST BE CALCULATED BY A PROFESSIONAL ARCHITECT OR ENGINEER BASED ON ASCE 7. THE CALCULATED DESIGNED PRESSURE MUST NOT EXCEED THE ALLOWABLE PRESSURES FOR EACH SHUTTER COMPONENT TO BE USED.

6- THE CONTRACTOR MUST VERIFY THE ADEQUACY OF THE EXISTING STRUCTURE IN SUSTAINING THE SHUTTER IMPOSED LOADS.

7- PANELS CAN BE OVERLAPPED TO CREATE A 1/2 PANEL INSTALLATION.

**8- THIS PRODUCT IS NOT DESIGNED FOR:**

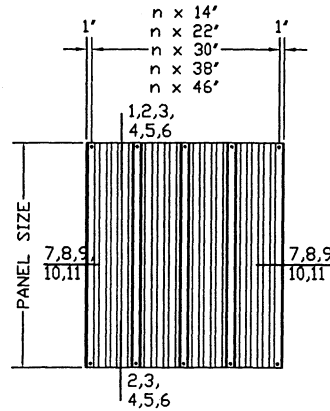
- 8.1- USE IN THE HIGH VELOCITY HURRICANE ZONES (HVHZ)
- 8.2- USE IN WIND ZONE 4 (WIND SPEED >140 mph)
- 8.3- PANEL SMALLER THAN 14' (POROSITY >10%)
- 8.4- ESSENTIAL FACILITIES IN ALL WIND ZONES.

9- IN 'NON HVHZ' - PRODUCT MEETS THE CLASSIFICATION OF ASTM E1996-05 FOR 'NON POROUS' PROTECTIVE DEVICE. SEPARATION FROM FENESTRATION ASSEMBLIES ARE NOT REQUIRED.

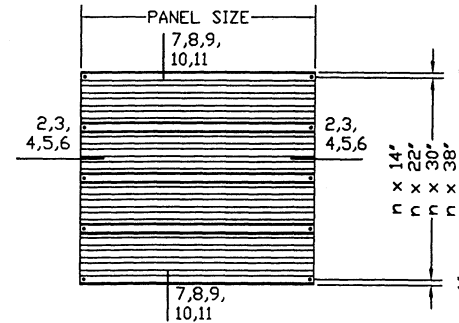
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- SHEET 3 - MOUNT TYPES 1, 2 & 3 DETAILS
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- SHEET 6 - SIDE CLOSURES 7, 8, 9, 10, 11 DETAILS
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**TYPICAL ELEVATION**  
PANELS CAN BE INSTALLED VERTICALLY  
OR HORIZONTALLY USING APPLICABLE  
ANCHORING DETAILS



VERTICAL INSTALLATION



HORIZONTAL INSTALLATION

120" MAXIMUM PANEL SIZE  
n= NUMBER OF PANEL  
PANELS AVAILABLE IN 16', 24', 32', 40' AND 48' WIDTH

**TABLE 1**  
**ALLOWABLE DESIGNED**  
**PRESSURES:**

PANEL SIZE (inches)	Pd (+/-) (psf)
120	45
100	62
80	87
60	132

**USER INSTRUCTION:**

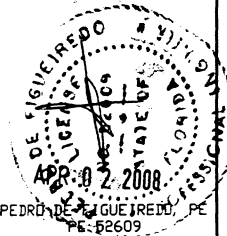
- 1- OBTAIN PROJECT WIND LOAD PRESSURES AS PER GENERAL NOTES 5.
- 2- COMPARE PANEL HEIGHT X ALLOWABLE PRESSURE (TABLE 1) WITH PROJECT WIND LOAD PRESSURES. PROJECT PRESSURE MUST BE EQUAL OR LESS THAN PANEL ALLOWABLE PRESSURE.
- 3- SELECT ANCHOR SPACING (TABLE 3) FUNCTION OF TYPE OF MOUNT, PRESSURE AND TYPE OF ANCHOR (TABLE 2).
- 4- SELECT TYPE OF SIDE CLOSURE AS PER SHEET 6 OF 8.

Manufacturer:  
**Clear  
Strength  
USA, LLC**

1414 COMMERCE PARK DR.  
TIPP CITY, OHIO 45371  
Tel.: (937) 677-4485  
Fax.: (937) 667-3647

Product:  
**Polycarbonate  
Hurricane  
Shutter Panel**

Engineering:  
**EngCo Inc.**  
CA 8116  
6971 W. Sunrise Blvd. 104  
Plantation, FL 33313  
Tel.: (954) 585-0304  
Fax: (954) 585-0305

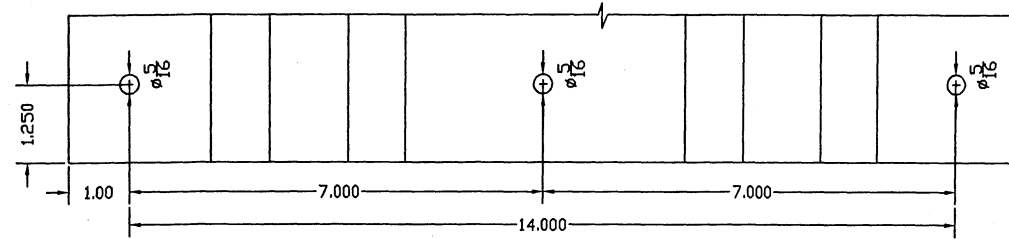
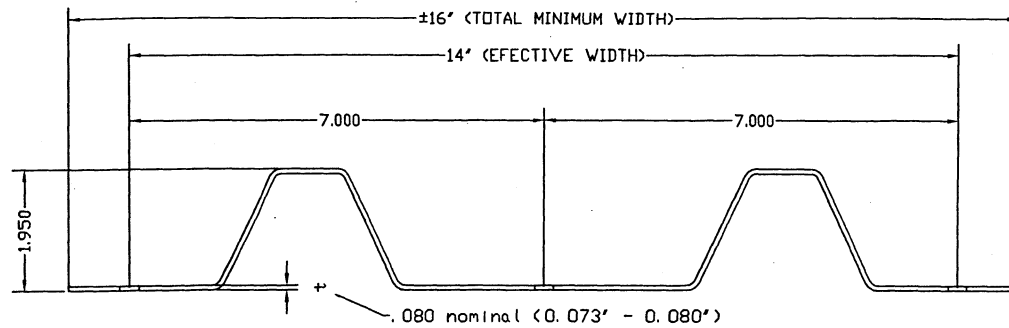


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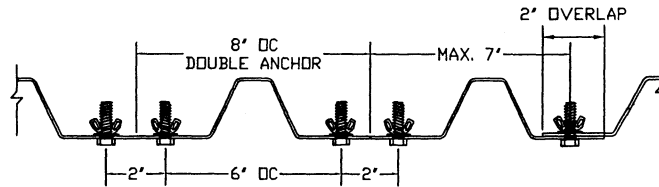
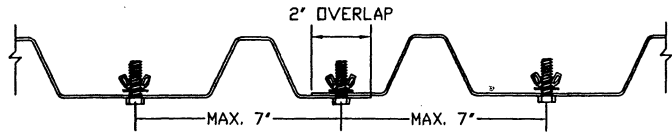
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Design by: PPMF

Drawing Number  
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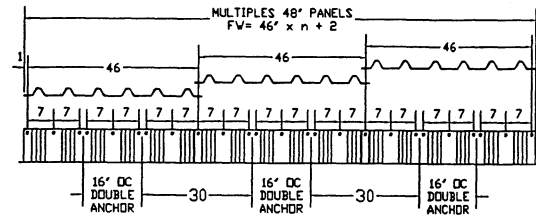
**SHEET**  
1 of 8



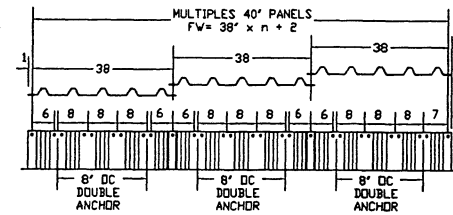
1- TYPICAL POLYCARBONATE HURRICANE SHUTTER PANEL



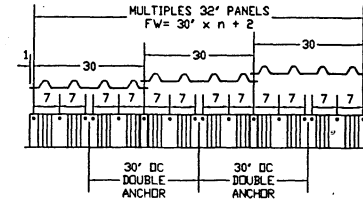
48" PANEL LAY OUT



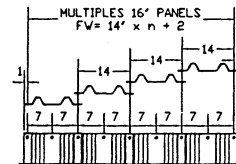
40" PANEL LAY OUT



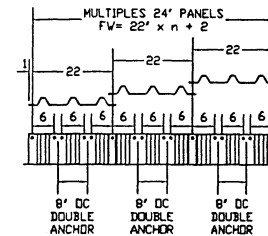
32" PANEL LAY OUT



16" PANEL LAY OUT



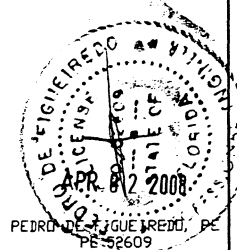
24" PANEL LAY OUT



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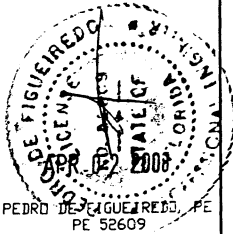
**SHEET**  
2 of 8

Manufacturer:  
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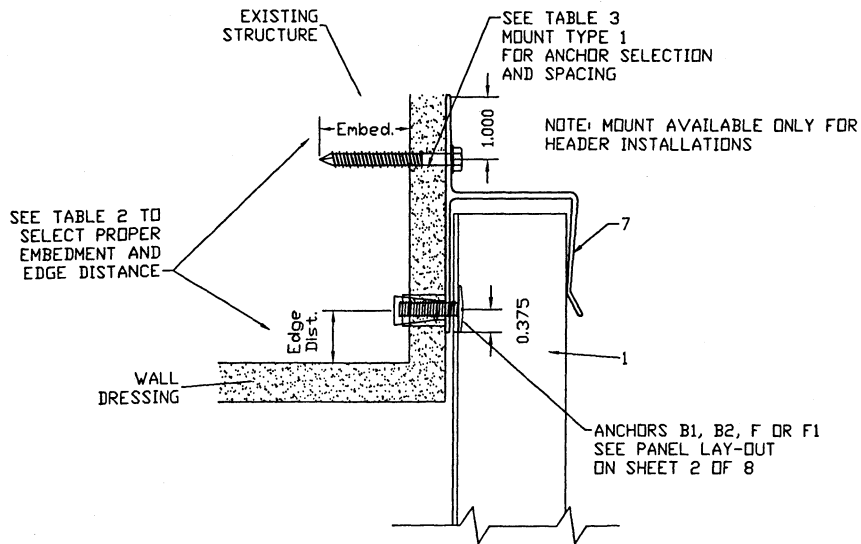
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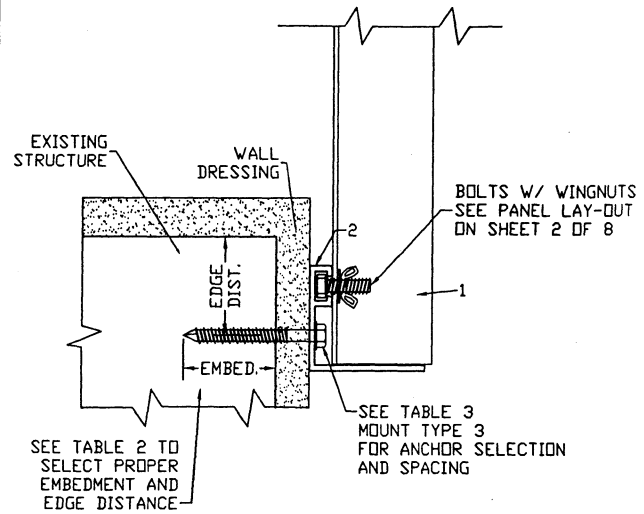
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**SHEET**  
 3 of 8

**MOUNT TYPE 1**

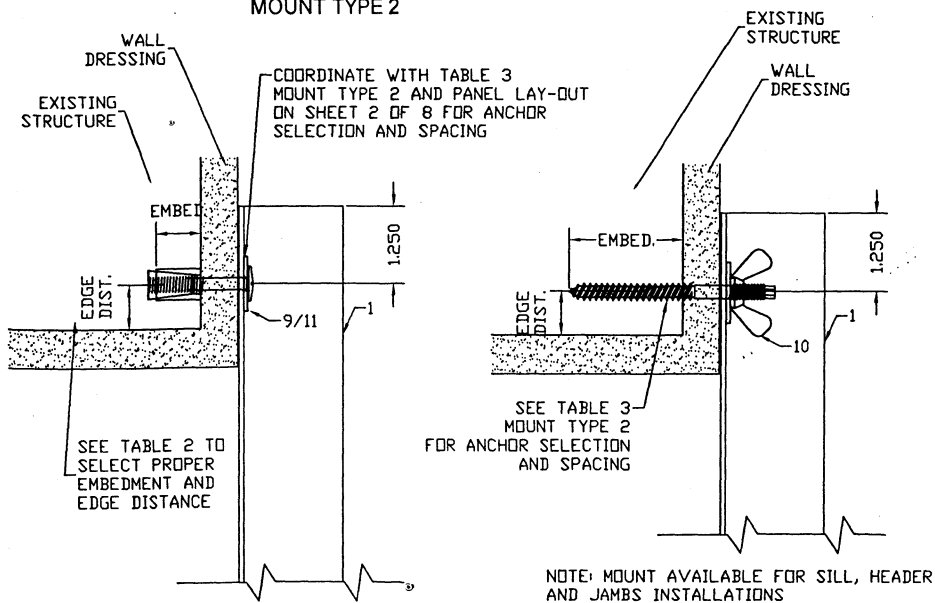


**MOUNT TYPE 3**

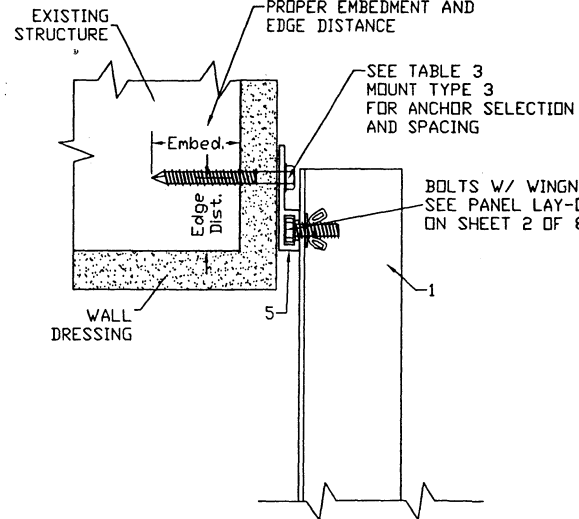


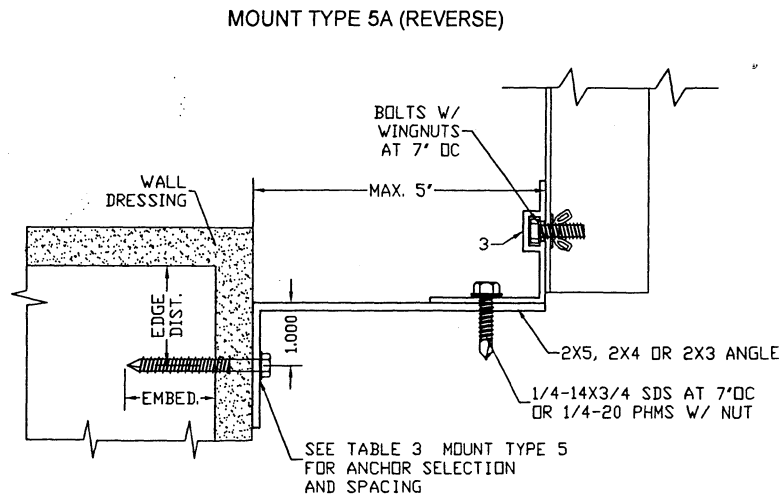
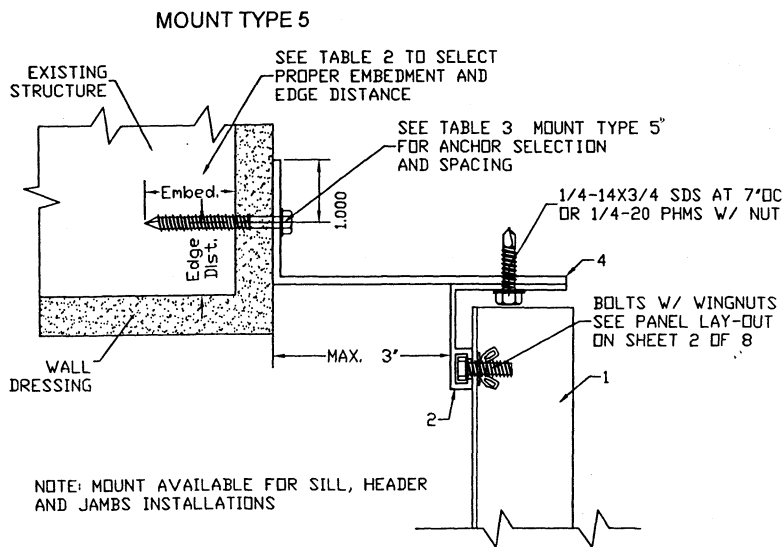
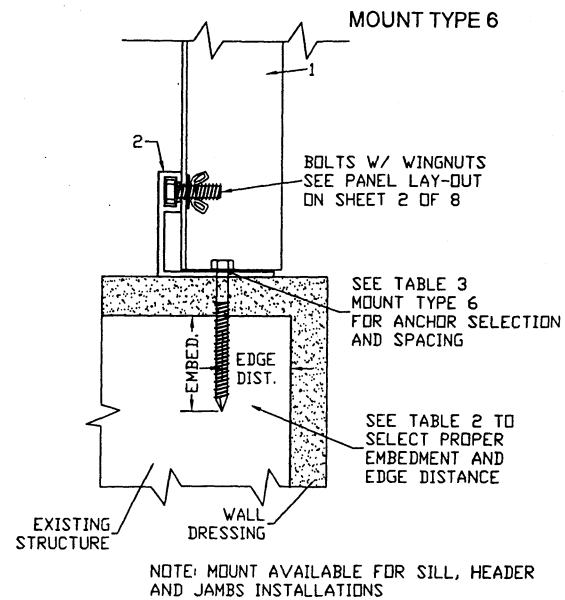
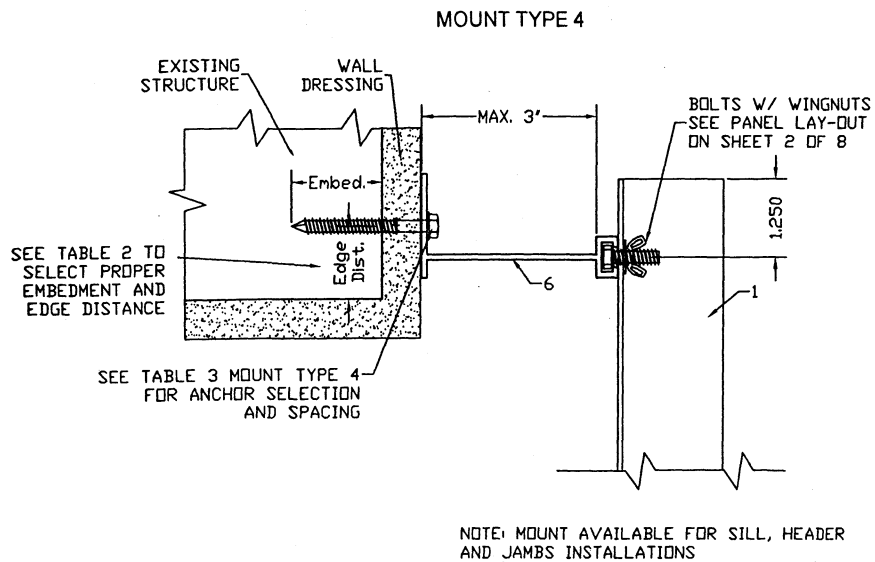
NOTE: MOUNT AVAILABLE FOR SILL, HEADER  
 AND JAMBS INSTALLATIONS

**MOUNT TYPE 2**



SEE TABLE 2 TO SELECT  
 PROPER EMBEDMENT AND  
 EDGE DISTANCE

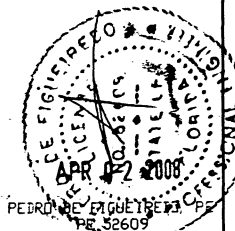




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Engineering:  
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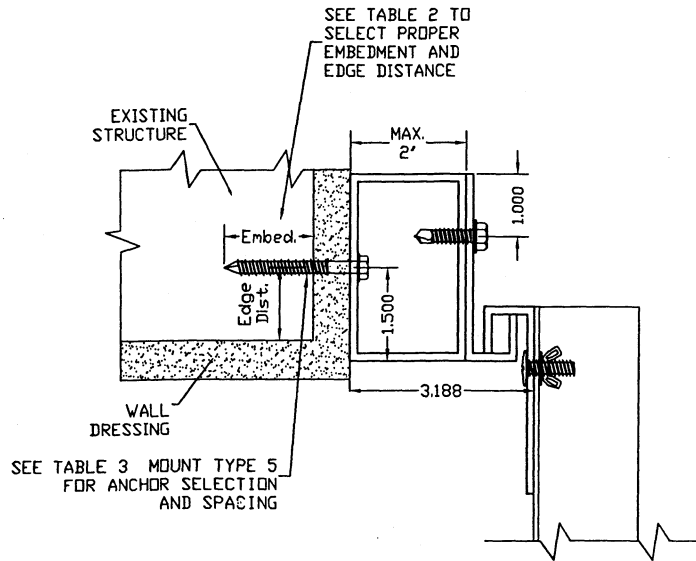
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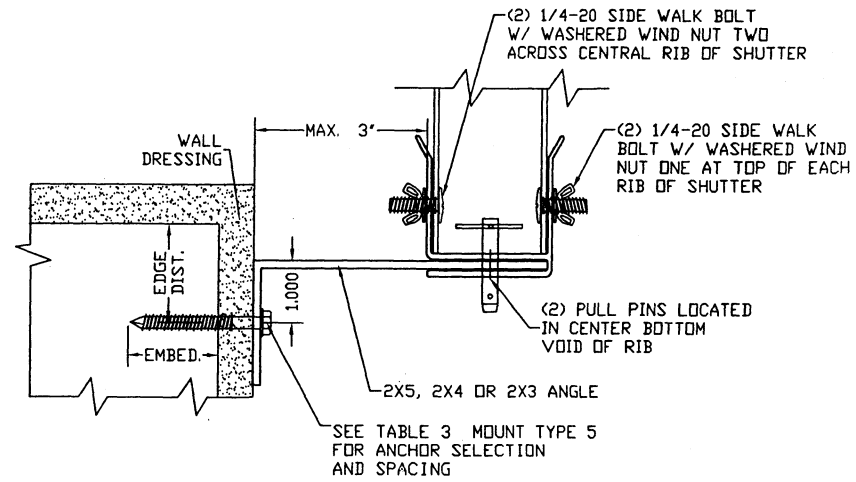
**SHEET**  
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ESCAPE PANELS DETAILS

MOUNT TYPE 5E1



MOUNT TYPE 5E2



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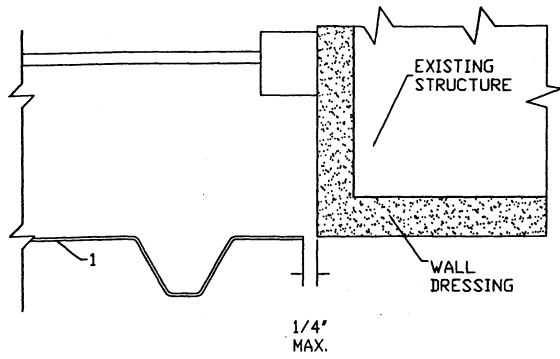
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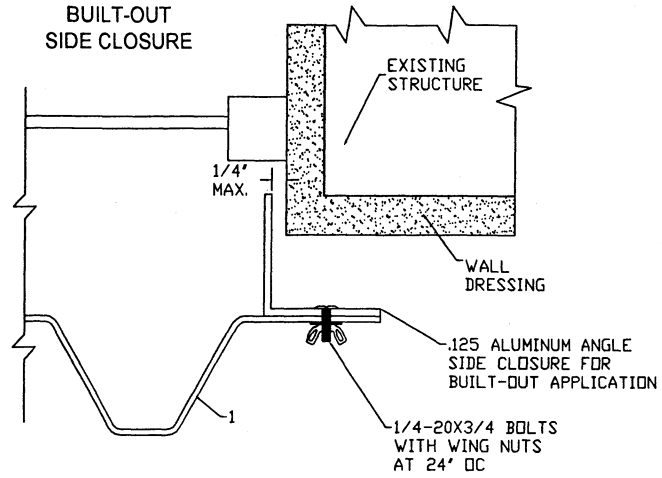
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**SHEET**  
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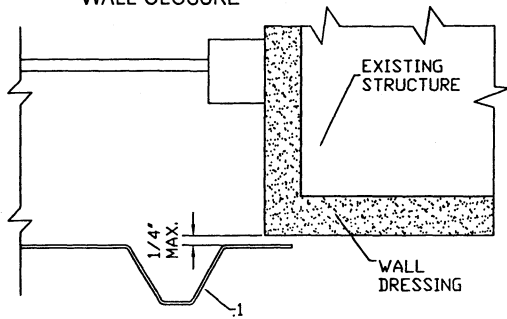
DETAIL 8  
INSET CLOSURE



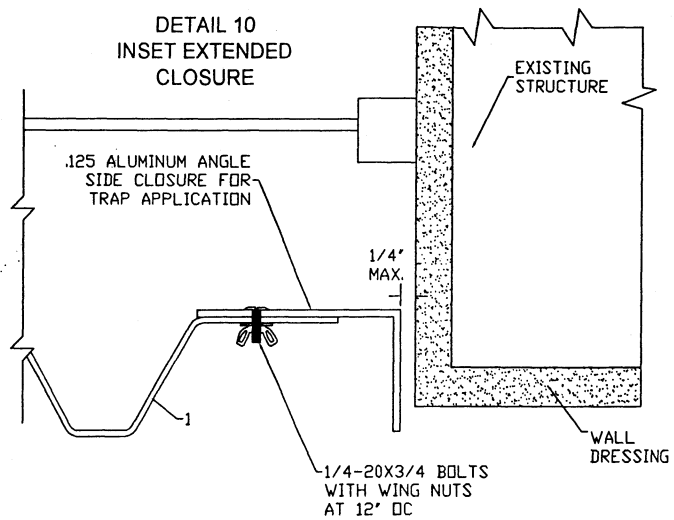
DETAIL 9  
BUILT-OUT  
SIDE CLOSURE



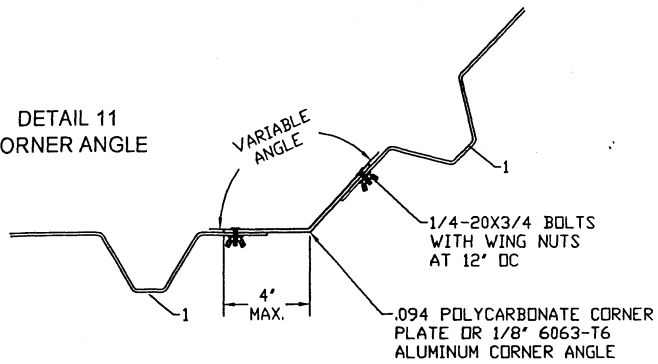
DETAIL 7  
WALL CLOSURE



DETAIL 10  
INSET EXTENDED  
CLOSURE



DETAIL 11  
CORNER ANGLE



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PEDRO DE FIGUEIREDO, PE  
PE 52609

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Scale: na

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**SHEET**  
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TABLE 3 ANCHOR SPACING

PANEL HEIGHT ( INCHES )	ANCHOR TYPE	45 PSF						62 PSF						87 PSF						132 PS					
		1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
60	A		7.0																						
	A1		7.0																						
	A2		7.0																						
	B		7.0	7.0	7.0	7.0	7.0	7.0																	
	B1		7.0	7.0	7.0	7.0	7.0	7.0																	
	D		7.0	7.0	7.0	7.0	7.0	7.0																	
	D1		7.0	7.0	7.0	7.0	7.0	7.0																	
	D2		7.0	7.0	7.0	7.0	7.0	7.0																	
	E		7.0	7.0	7.0	7.0	7.0	7.0																	
	E1		7.0	7.0	7.0	7.0	7.0	7.0																	
	C/E2		7.0	7.0	7.0	7.0	7.0	7.0																	
	80	A		7.0																					
A1			7.0																						
A2			7.0																						
B			7.0	7.0	7.0	7.0	7.0	7.0																	
B1			7.0	7.0	7.0	7.0	7.0	7.0																	
D			7.0	7.0	7.0	7.0	7.0	7.0																	
D1			7.0	7.0	7.0	7.0	7.0	7.0																	
D2			7.0	7.0	7.0	7.0	7.0	7.0																	
E			7.0	7.0	7.0	7.0	7.0	7.0																	
E1			7.0	7.0	7.0	7.0	7.0	7.0																	
C/E2			7.0	7.0	7.0	7.0	7.0	7.0																	
F			7.0	7.0	7.0	7.0	7.0	7.0																	
F1		7.0	7.0	7.0	7.0	7.0	7.0																		
100	A		7.0																						
	A1		7.0																						
	A2		7.0																						
	B		7.0	7.0	7.0	7.0	7.0	7.0																	
	B1		7.0	7.0	7.0	7.0	7.0	7.0																	
	D		7.0	7.0	7.0	7.0	7.0	7.0																	
	D1		7.0	7.0	7.0	7.0	7.0	7.0																	
	D2		7.0	7.0	7.0	7.0	7.0	7.0																	
	E		7.0	7.0	7.0	7.0	7.0	7.0																	
	E1		7.0	7.0	7.0	7.0	7.0	7.0																	
	C/E2		7.0	7.0	7.0	7.0	7.0	7.0																	
	F		7.0	7.0	7.0	7.0	7.0	7.0																	
F1		7.0	7.0	7.0	7.0	7.0	7.0																		
120	A		7.0																						
	A1		7.0																						
	A2		7.0																						
	B		7.0	7.0	7.0	7.0	7.0	7.0																	
	B1		7.0	7.0	7.0	7.0	7.0	7.0																	
	D		7.0	7.0	7.0	7.0	7.0	7.0																	
	D1		7.0	7.0	7.0	7.0	7.0	7.0																	
	D2		7.0	7.0	7.0	7.0	7.0	7.0																	
	E		7.0	7.0	7.0	7.0	7.0	7.0																	
	E1		7.0	7.0	7.0	7.0	7.0	7.0																	
	C/E2		7.0	7.0	7.0	7.0	7.0	7.0																	
	F		7.0	7.0	7.0	7.0	7.0	7.0																	
F1		7.0	7.0	7.0	7.0	7.0	7.0																		

EXAMPLE:  
 PANEL HEIGHT: 80'  
 DESIGNED PRESSURE: Pd= 87 PSF  
 MOUNT TYPE: 6 (SHEET 4 of 8)  
 ANCHOR TYPE D - SEE TABLE 2  
 ANCHOR SPACING: 7' OC  
 EDGE DISTANCE - 3 1/8"  
 EMBEDMENT: 2"

EXAMPLE:  
 PANEL HEIGHT: 100'  
 DESIGNED PRESSURE: Pd= 45 PSF  
 MOUNT TYPE: 5 (SHEET 4 of 8)  
 SE1, SE2 OR SE3 (SHEET 6 OF 8)  
 ANCHOR TYPE F - SEE TABLE 2  
 ANCHOR SPACING: 7' OC  
 EDGE DISTANCE - 3"  
 EMBEDMENT: 1 1/4"

TABLE 2 - ANCHOR SCHEDULE

TYPE	DESCRIPTION	STRUCTURE	EMBED.	EDGE DIST.
A	1/4" Panelmate	Conc. (fc' = 3350psi)	2"	2 1/2"
A1	1/4" Panelmate	ASTM C-90 CMU	1 1/4"	2 1/2"
A2	1/4" Panelmate	Wood (SG) = 54	1 3/4"	3/4"
B1	1/4"-20 Lead shields	ASTM C-90 CMU	7/8"	3"
B2	1/4"-20 Lead shields	Conc. (fc' = 2500psi)	7/8"	3"
C	1/4" Lag Screws	Wood (SG) = 55	2"	3/4"
D	5/16" Ultracon	Conc. (fc' = 3500psi)	2"	3 1/8"
D1	5/16" Ultracon	ASTM C-90 CMU	1 1/4"	3 1/8"
D2	5/16" Ultracon	Wood (SG) = 55	2 1/2"	7/8"
E	1/4" Ultracon	Conc. (fc' = 2700psi)	1 3/4"	2 1/2"
E1	1/4" Ultracon	ASTM C-90 CMU	1 1/4"	2 1/2"
E2	1/4" Ultracon	Wood (SG) = 55	2"	3/4"
F	1/4" Panelmate Insert	Conc. (fc' = 2500psi)	1 1/4"	3"
F1	1/4" Panelmate Insert	ASTM C-90 CMU	1 1/4"	3"

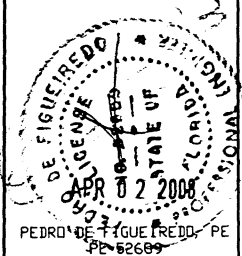
Notes:  
 1- EMBEDMENT IS BEYOND WALL DRESSING.  
 2- ANCHORS TYPE A, PANELMATE BY ELCO, CAN BE USED WITH \*PLUS, PRO, MALE' STILES.  
 3- ANCHORS TYPE E, 1/4" ULTRACON, ARE MADE BY ELCO.  
 4- 1/4"-20 LEAD SHIELDS ANCHORS ARE MADE BY ALLPOINTS DR BY POWERS FASTENERS (\*CALK-IN").

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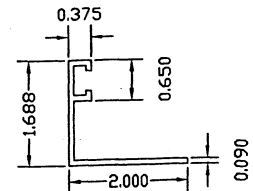
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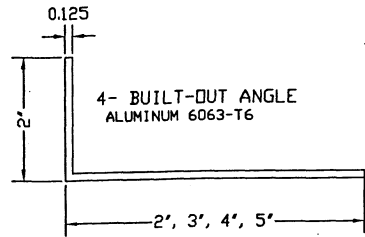
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**SHEET**  
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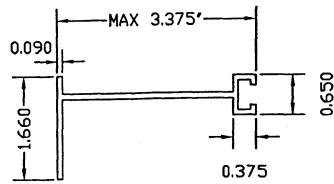
COMPONENTS DETAILS



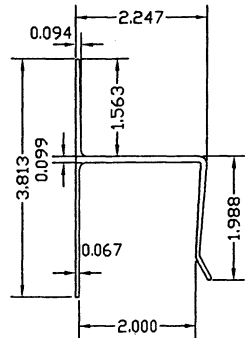
2- 'F' ANGLE TRACK  
ALUMINUM 6063-T6



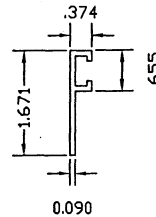
4- BUILT-OUT ANGLE  
ALUMINUM 6063-T6



6- 1', 2', 3'  
'F' BUILT-OUT TRACK  
ALUMINUM 6063-T6

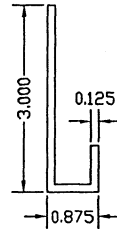
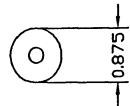


7- 'H' HEADER TRACK  
ALUMINUM 6063-T6

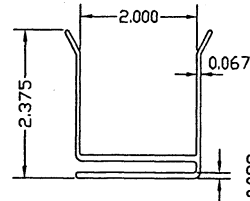


5- 'F' TRACK  
ALUMINUM 6063-T6

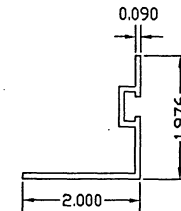
9- 7/8" HOLE WASHER



7E- HOOK TRACK  
ALUMINUM 6063-T6

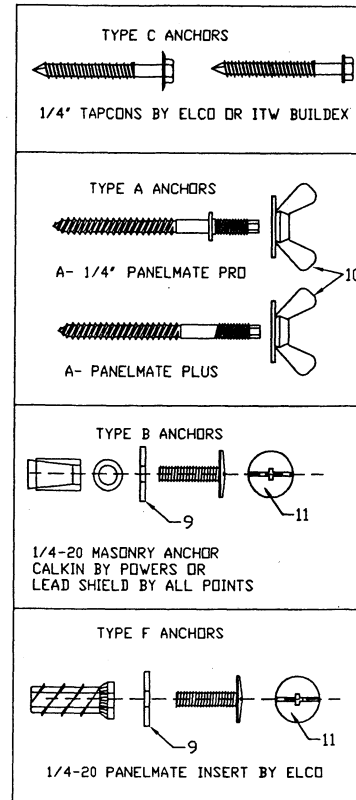


7E1- Y TRACK  
ALUMINUM 6063-T6



3- REVERSE  
'F' ANGLE TRACK  
ALUMINUM 6063-T6

COMPONENTS SCHEDULE		
PART	DESCRIPTION	MATERIAL
1	POLYCARBONATE PANEL	POLYCARBONATE
2	'F' ANGLE TRACK	6063-T6
3	REVERSE 'F' ANGLE TRACK	6063-T6
4	1/8-2X BUILT-OUT ANGLE	6063-T6
5	'F' TRACK	6063-T6
6	'F' BUILT-OUT TRACK	6063-T6
7	'h' HEADER TRACK	6063-T6
7E	HOOK TRACK	6063-T6
7E1	Y TRACK	6063-T6
8	1/4-14X3/4 SDS	GRADE 5 STEEL
9	7/8" WASHER	STAINLESS STEEL
10	1/4-20 WASHERED WINGNUT	ZINC ALLOY
11	1/4-20 SS SIDEWALK SCREWS	STAINLESS STEEL
12	1/4-20 SS HH MACHINE SCREWS	STAINLESS STEEL
13	1/4-20 SS HH NUT	STAINLESS STEEL
14	PULL PIN SS 1/4X 1 1/2"	STAINLESS STEEL



Manufacturer:

**Clear  
Strength  
USA, LLC**

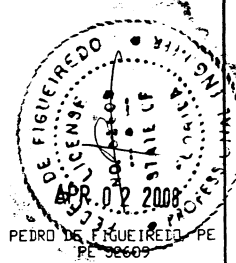
1414 COMMERCE PARK DR.  
TIPP CITY, OHIO 45371  
Tel.: (937) 677-4485  
Fax.: (937) 667-3647

Product:

**Polycarbonate  
Hurricane  
Shutter Panel**

Engineering:

**EngCo Inc.**  
CA 8116  
6971 W. Sunrise Blvd. 104  
Plantation, FL 33313  
Tel.: (954) 585-0304  
Fax: (954) 585-0305



DRAFTING:

**PK DRAFTING & MORE**

Date: 04/02/08  
Scale: no  
Design by: PPMF

Drawing Number  
**08-073**

**SHEET**  
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