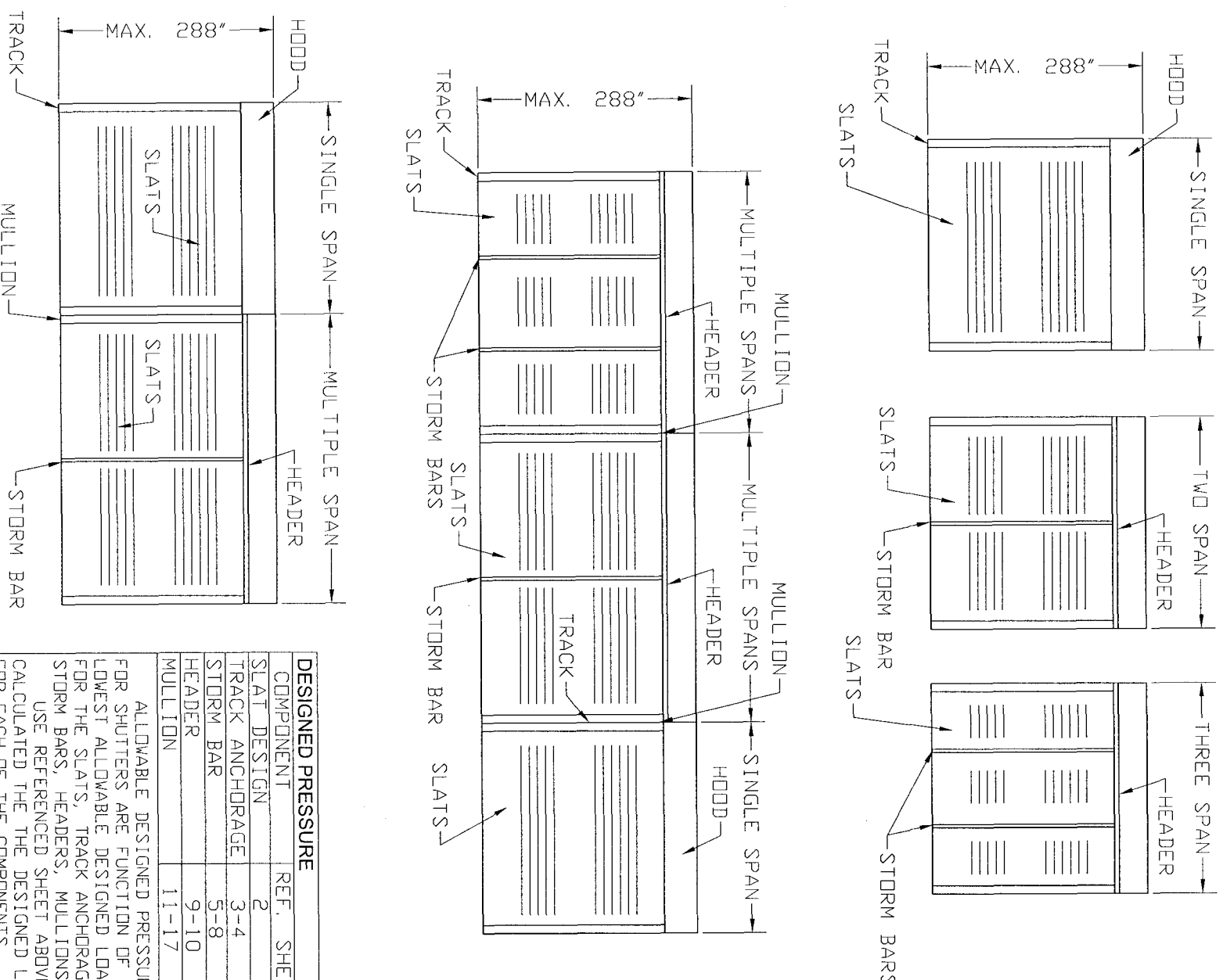


**GENERAL NOTES: (FLORIDA BUILDING CODE 2010 - non HVHZ)**

- 1- DEFINITION: THIS PRODUCT IS A HURRICANE PROTECTION DEVICE; DESIGNED, CONSTRUCTED AND ERECTED TO EASILY ENCLOSE AN AREA, PROVIDING PROTECTION FROM HURRICANE FORCE WINDS AND WIND BORNE DEBRIS WITHIN THE ALLOWABLE DESIGNED PRESSURES AND LIMITATIONS STATED IN THIS APPROVAL.
- 2- POSTING: A PERMANENT LABEL SHALL BE PROVIDED AS PER FBC 2010 SECTION 1715.8.1 IT SHALL BE PLACED ON A READILY VISIBLE LOCATION AND A MINIMUM OF ONE LABEL PER OPENING.
- 3- GLASS SEPARATION (GSS): PRODUCT IS QUALIFIED AS "NON POROUS", THEREFORE GLAZING SEPARATION IS NOT REQUIRED WITH EXCEPTION FOR THE FOLLOWING LOCATIONS:
  - 3.1- WIND ZONE 4 AS DEFINED IN ASTM E 1996-05 (LOCATIONS WITH WIND SPEED GREATER THAN 160 MPH AS PER FBC 2010 SECTION 1609.1.2.4)
  - 3.2- ESSENTIAL FACILITIES AS DEFINED IN ASCE 7 FOR THE ABOVE LOCATIONS THE PRODUCT MUST BE SEPARATED FROM GLAZING AREAS AS PER TABLE 1.
- 4- LOADS: DESIGNED LOAD CALCULATED BASED ON THE ASCE 7 AND PROVIDED BY A PROFESSIONAL ARCHITECT OR ENGINEER FOR EACH SPECIFIC PROJECT. THE CALCULATED DESIGNED PRESSURE MUST NOT EXCEED THE ALLOWABLE PRESSURES FOR EACH SHUTTER COMPONENT TO BE USED.
- 5- MATERIAL: ALL EXTRUDED ALUMINUM SHAPES SHALL BE MADE OF 6063-T6 OR AS NOTED.
- 6- FASTENERS: ASSEMBLY SCREWS AND ANCHORS SHALL BE AS SPECIFIED IN THE CURRENT SET OF DRAWINGS. INSTALLATION AND LOADS AS PER THIS APPROVAL.
- 7- MULTIPLE SPAN SHUTTERS: REINFORCEMENTS SUCH AS STORM BARS, HEADER AND MULLIONS WERE DESIGNED BY RATIONAL ANALYSIS AND ARE PART OF THESE DRAWINGS. DUE TO MANY VARIATIONS OF REINFORCEMENTS, LOADS AND SHUTTER DIMENSIONS BECOME IMPRACTICAL ADDRESSING ALL CONDITIONS IN ONE SET OF DRAWINGS. THE CONDITIONS ADDRESSED IN THE PROPOSED DRAWINGS HAVE CONSERVATIVE LIMITATIONS IN ORDER TO FACILITATE THE DESIGN. SITE SPECIFIC CONDITIONS CAN BE ADDRESSED ON A JOB BASIS PROVIDED PROPER ENGINEERING.
- 8- USE: IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, ARCHITECT OR ENGINEER OF RECORD TO VERIFY THE FOLLOWING:
  - 8.1- THE STABILITY OF THE STRUCTURE WHERE THE SHUTTER IS TO BE ATTACHED INSURING PROPER ANCHORAGE.
  - 8.2- THE SITE SPECIFIC PROJECT CRITERIA, SUCH AS BUT NOT LIMITED TO, WIND LOADS, LOCAL CODE REQUIREMENTS, DESIGNED PRESSURES ETC.
  - 8.3- THAT THIS APPROVAL IS ADEQUATE TO THE SPECIFIC PROJECT.
- 9- LIMITATIONS: NOT DESIGNED FOR HIGH VELOCITY HURRICANE ZONES HVHZ (MIAMI-DADE AND BROWARD COUNTIES)

**TYPICAL SHUTTER CONFIGURATIONS**



DESIGNED PRESSURE	
COMPONENT	REF. SHEET
SLAT DESIGN	2
TRACK ANCHORAGE	3-4
STORM BAR	5-8
HEADER	9-10
MULLION	11-17

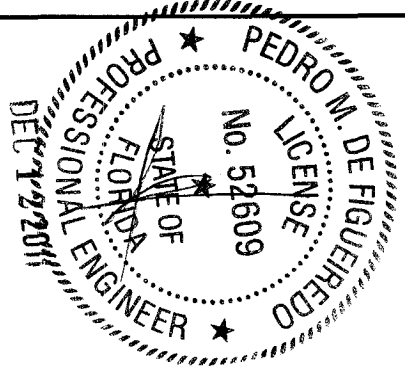
ALLOWABLE DESIGNED PRESSURE FOR SHUTTERS ARE FUNCTION OF THE LOWEST ALLOWABLE DESIGNED LOAD FOR THE SLATS, TRACK ANCHORAGE, STORM BARS, HEADERS, MULLIONS. USE REFERENCED SHEET ABOVE TO CALCULATED THE THE DESIGNED LOAD FOR EACH OF THE COMPONENTS.

**CODE AND STANDARD COMPLIANCE:**  
**FLORIDA BUILDING CODE 2010 (NON HVHZ)**  
 ASTM E330, ASTM E1996, ASTM E1886

Manufacturer:  
**CROCI NORTH AMERICA**  
 11600 ADELMO LANE  
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 Tel.: (239) 278-3066  
 Fax: (239) 278-5977

PRODUCT:  
**ES 55 - ES 44**  
 EXTRUDED ALUMINUM  
 ROLLING SHUTTER

Engineering:  
**Eng'Go Inc.**  
 CA 8116  
 ENGCO@AOL.COM



Engineer Seal  
 Pedro De Figueredo, PE 52609  
 Date: 11/12/2011  
 Scale: NA  
 Design by: PPMF

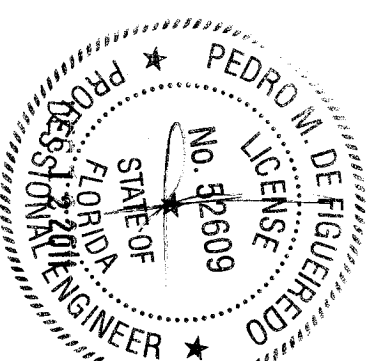
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**PK DRAFTING & MORE**  
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Manufacturer:  
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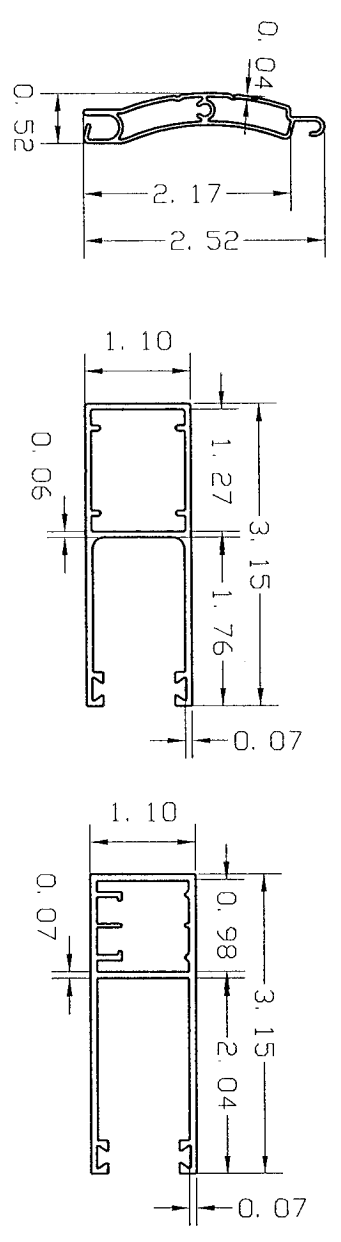
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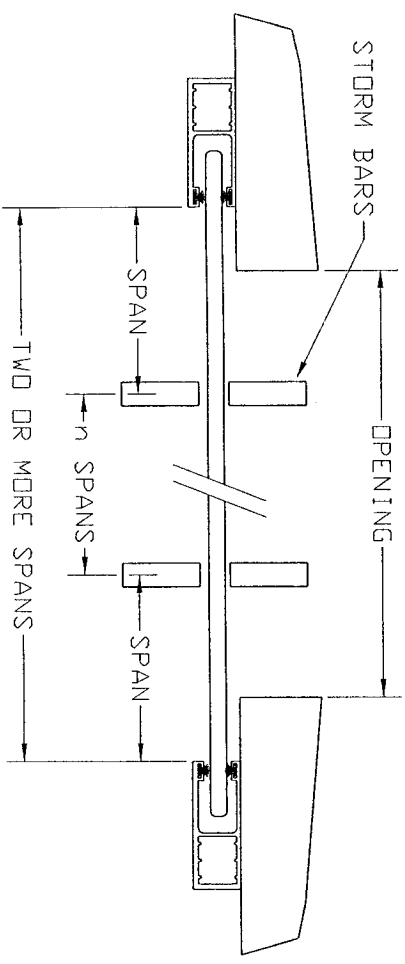
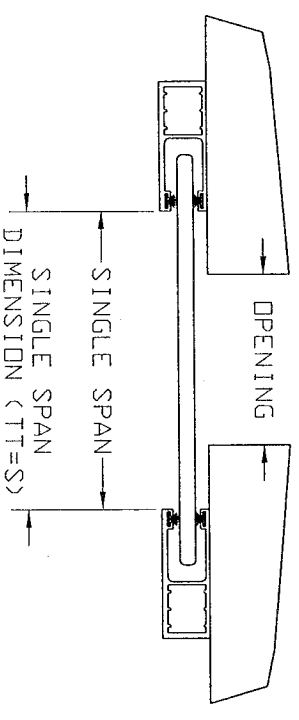
**PRODUCT COMPONENTS**



A1- ES55  
 SLAT BLADE  
 6063-T6 Alloy

A2- GE458028 SIDE RAIL  
 COMPATIBLE WITH ES55,  
 6063-T6 ALLOY

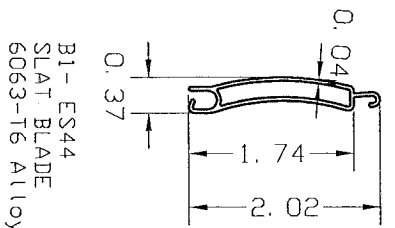
A21- GE8028 ALTERNATE SIDE  
 RAIL COMPATIBLE WITH ES55  
 6063-T6 ALLOY



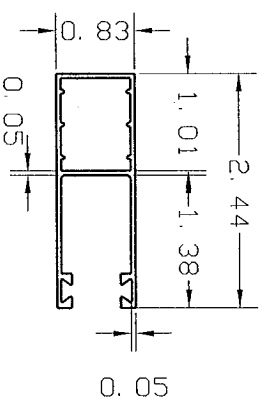
**TABLE 1 - SLAT DESIGN**

ALLOWABLE PRESSURE ± PSF	ES 55 SLAT		ES 44 SLAT	
	MAX. SPAN	MIN. GS	MAX. SPAN	MIN. GS
40	80	5.75	51	5.50
50	74	5.75	48	5.50
60	70	5.25	44	5.00
70	66	4.75	41	5.00
80	62	4.50	38	5.00
90	58	4.50	36	5.00
100	54	4.50	34	5.00
110	49	4.50	32	5.00
120	45	4.50	30	5.00
130	42	4.50	28	5.00
140	39	4.50	26	5.00
150	36	4.50	24	5.00

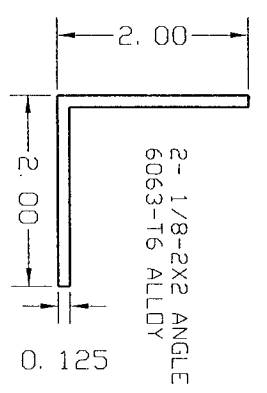
1- ALLOWABLE PRESSURE IN PSF  
 2- MAX. SPAN: MAXIMUM SLAT SPAN IN INCHES  
 3- MIN. GS: MINIMUM GLAZING SEPARATION ONLY  
 APPLICABLE AS PER GENERAL NOTE 3



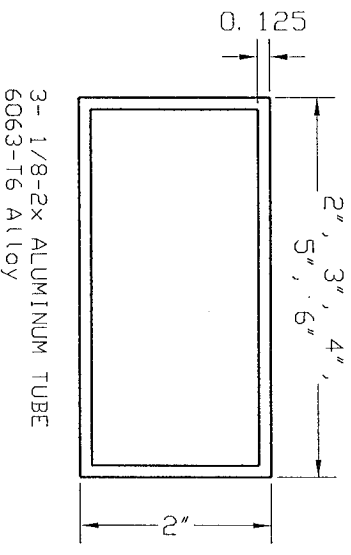
B1- ES44  
 SLAT BLADE  
 6063-T6 Alloy



B2- GE62X21 SIDE RAIL  
 COMPATIBLE WITH ES44  
 6063-T6 ALLOY



2- 1/8-2X2 ANGLE  
 6063-T6 ALLOY



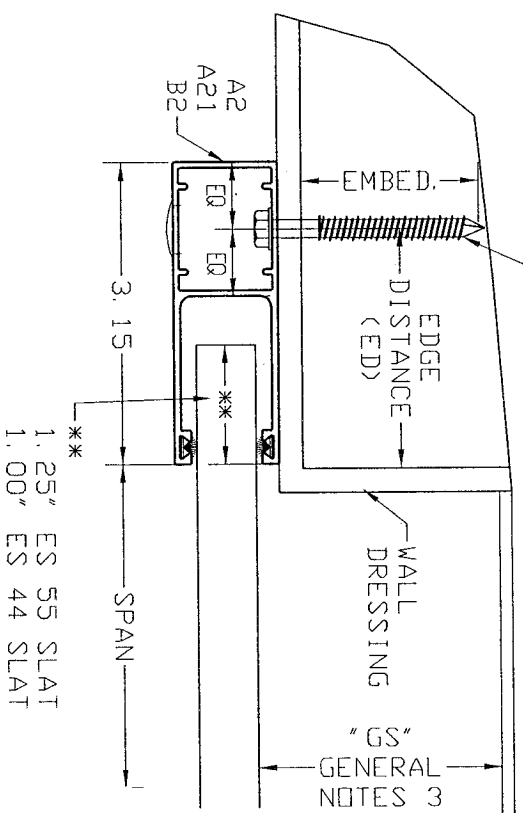
3- 1/8-2x ALUMINUM TUBE  
 6063-T6 Alloy

1- TRACK FELT  
 FELT PILE

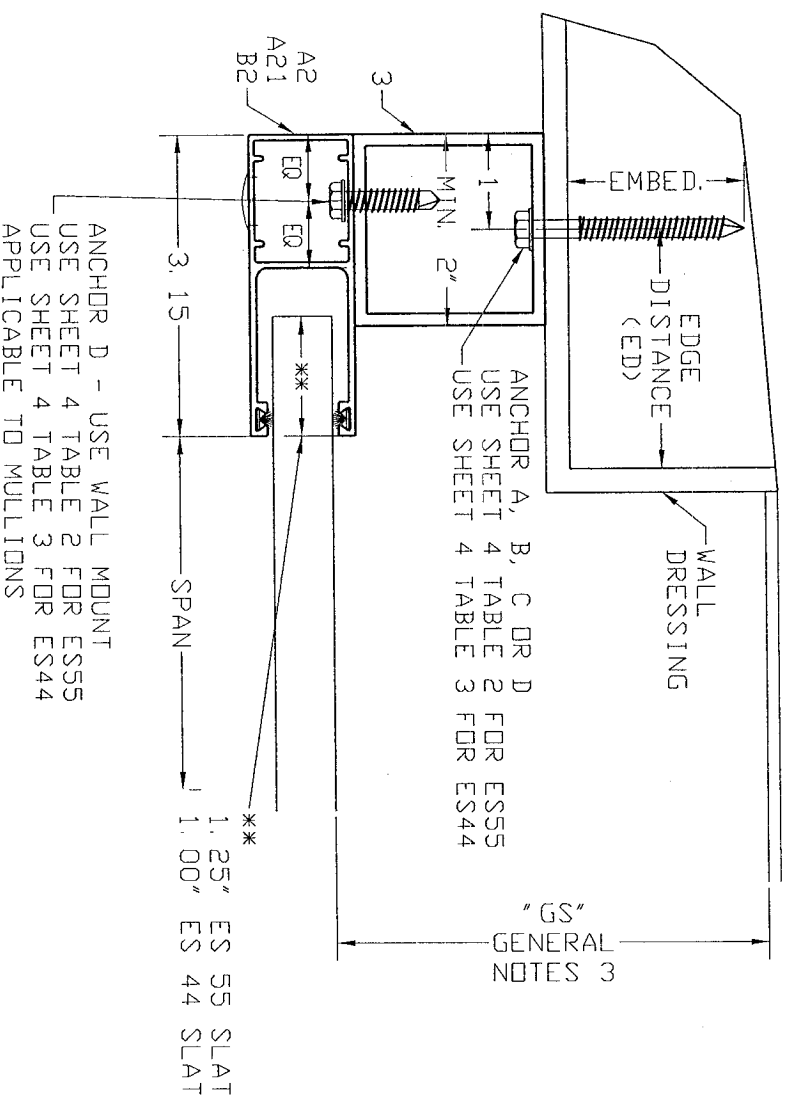
# E 55 - GUIDE RAILS MOUNTING OPTIONS

## A- WALL MOUNT

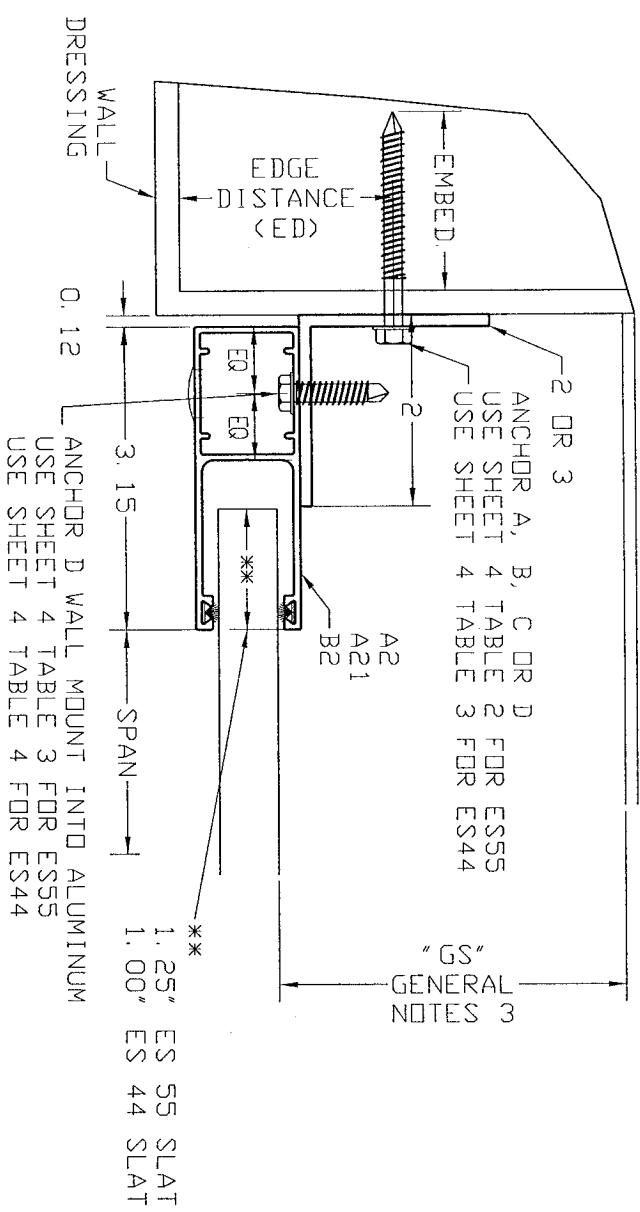
ANCHOR A, B, C DR D  
 USE SHEET 4 TABLE 2 FOR ESS5  
 USE SHEET 4 TABLE 3 FOR ES44



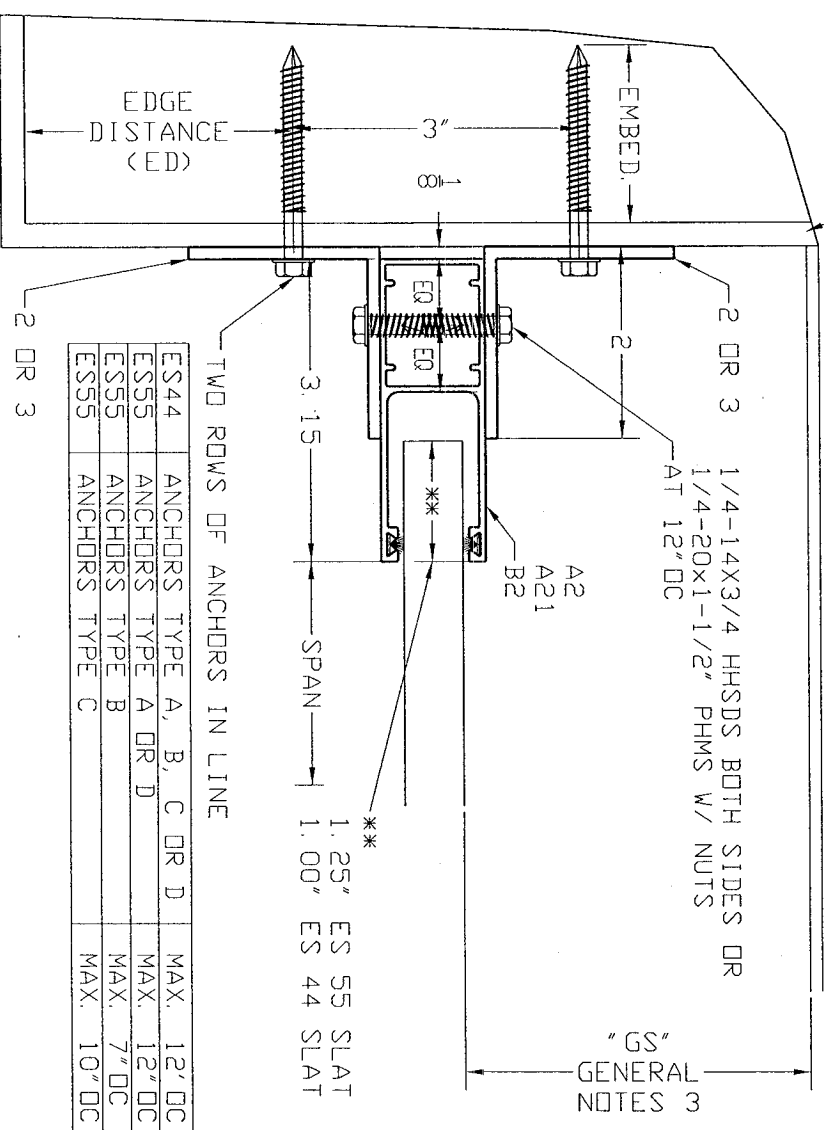
## B- BUILT-OUT MOUNT



## C- INSET MOUNT



## D- ALTERNATE INSET MOUNT

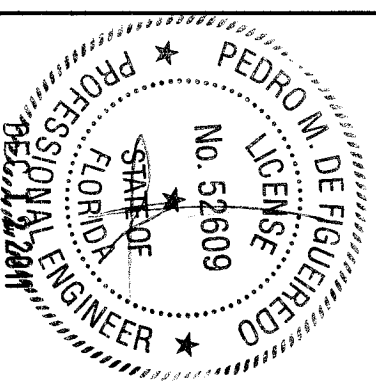


TWO ROWS OF ANCHORS IN LINE			
ES44	ANCHORS TYPE A, B, C DR D	MAX. 12" DC	
ESS5	ANCHORS TYPE A DR D	MAX. 12" DC	
ESS5	ANCHORS TYPE B	MAX. 7" DC	
ESS5	ANCHORS TYPE C	MAX. 10" DC	

Manufacturer:  
**CROCI NORTH AMERICA**  
 11600 ADELMO LANE  
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PRODUCT:  
**ES 55 - ES 44**  
 EXTRUDED ALUMINUM  
 ROLLING SHUTTER

Engineering:  
**EngCo Inc.**  
 CA 8116  
 ENGCO@AOL.COM



Engineer Seal  
 Pedro De Figueredo, PE 52609  
 Date: 11/12/2011  
 Scale: NA  
 Design by: PPMF

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**PK DRAFTING & MORE**

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**11-239**

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**3 of 18**

GUIDE RAILS ANCHORAGE DESIGN

TABLE 2 - ES 55 MAXIMUM TRACK ANCHORAGE SPACING

Table with 4 main columns: GE458028 RAIL WALL MOUNT ANCHOR TYPE, BUILT-OUT MOUNT ANCHOR TYPE, INSET MOUNT ANCHOR TYPE, and GE8028 RAIL WALL MOUNT ANCHOR TYPE. Includes cross-section diagrams for each anchor type.

TABLE 3 - ES 44 MAXIMUM TRACK ANCHORAGE SPACING

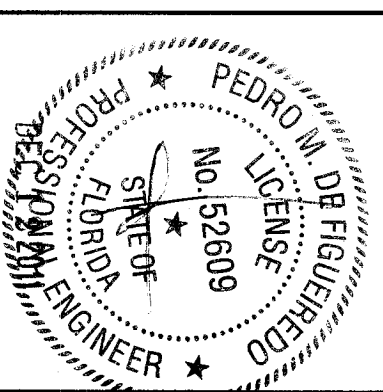
Table with 4 main columns: WALL MOUNT ANCHOR TYPE, BUILT-OUT MOUNT ANCHOR TYPE, INSET MOUNT ANCHOR TYPE, and BASE MATERIAL. Includes cross-section diagrams for each anchor type.

ANCHOR SCHEDULE table with columns: TYPE, DESCRIPTION, MANUFACTURER, EMBEDMENT, ED, and BASE MATERIAL. Includes ANCHOR NOTES at the bottom.

Manufacturer: CROCI NORTH AMERICA 11600 ADELMO LANE FORT MYERS, FL 33966

PRODUCT: ES 55 - ES 44 EXTRUDED ALUMINUM ROLLING SHUTTER

Engineering: EngQu Inc. CA 8116 ENGCO@AOL.COM



Engineer Seal Pedro De Figueredo, PE 52609

Date: 1/1/2011 Scale: NA Design by: PPMF

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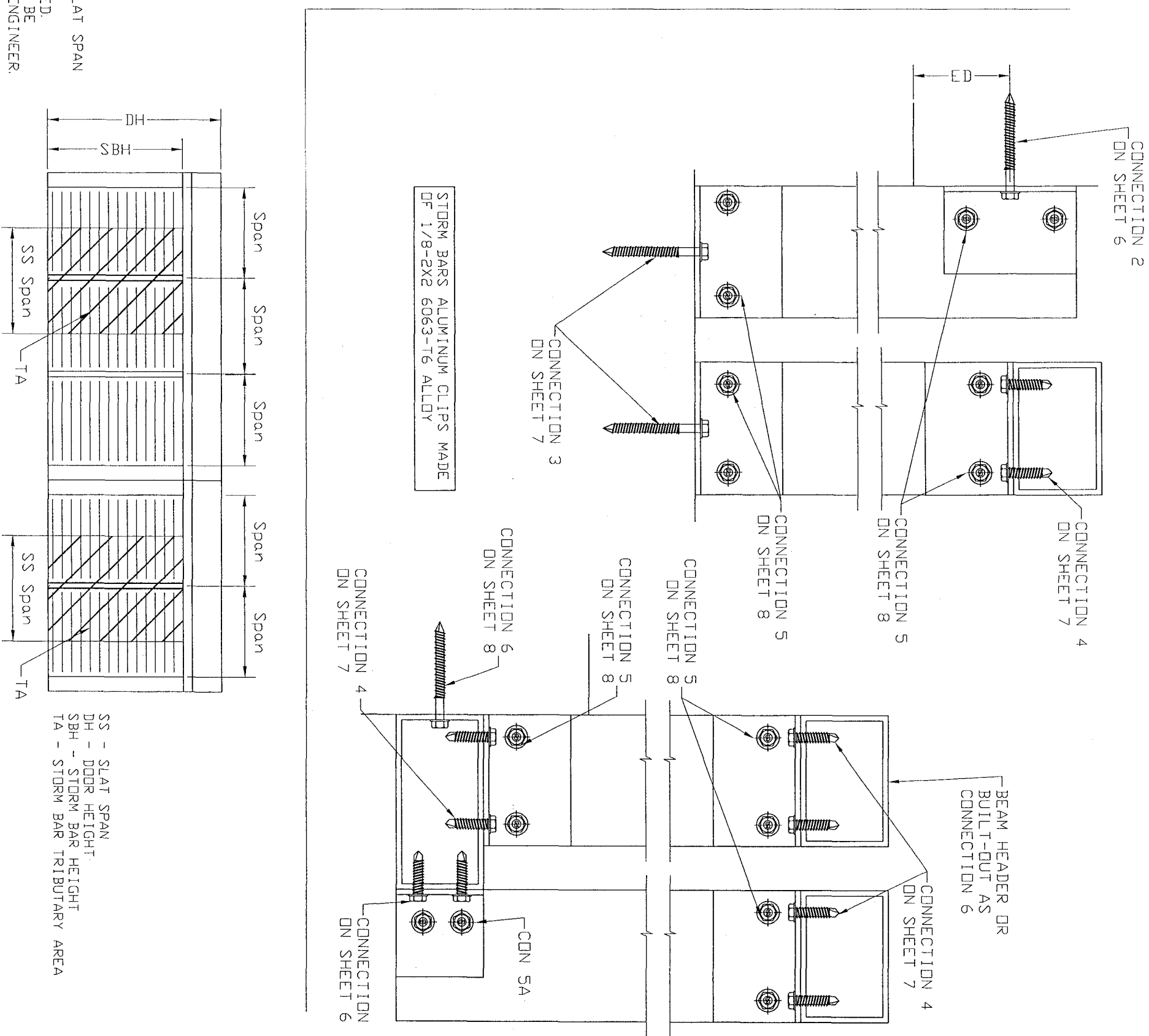
Drawing Number 11-239

TABLE 4- STORM BARS  
ALLOWABLE DESIGN LOAD - Pd (Psf)

SS	SBH	STORM BAR TYPE					
		2X2	2X3	2X4	2X5	2X6	
24	36	150	150	150	150	150	
	48	150	150	150	150	150	
	60	99	150	150	150	150	
	72	57	135	150	150	150	
	84	36	96	150	150	150	
	96	24	64	114	150	150	
30	108	--	45	89	124	150	
	120	--	32	66	100	131	
	36	150	150	150	150	150	
	48	137	150	150	150	150	
	60	79	150	150	150	150	
	72	45	108	150	150	150	
36	84	28	76	120	150	150	
	96	--	51	91	127	150	
	108	--	36	71	99	131	
	120	--	26	53	80	105	
	36	150	150	150	150	150	
	48	114	150	150	150	150	
48	60	66	130	150	150	150	
	72	28	67	103	110	110	
	84	--	48	75	104	110	
	96	--	32	57	79	104	
	108	--	21	44	66	87	
	120	--	110	110	110	110	
54	36	100	100	100	100	100	
	48	76	100	100	100	100	
	60	44	86	100	100	100	
	72	25	60	91	100	100	
	84	--	42	66	93	100	
	96	--	28	50	70	93	
60	108	--	20	39	55	72	
	120	--	11	29	44	58	
	36	85	85	85	85	85	
	48	68	85	85	85	85	
	60	39	78	85	85	85	
	72	22	54	82	85	85	
80	84	--	38	60	83	85	
	96	--	25	45	63	83	
	108	--	11	35	49	65	
	120	--	1	26	40	52	
	36	40	40	40	40	40	
	48	29	40	40	40	40	
84	60	29	40	40	40	40	
	72	--	40	40	40	40	
	84	--	28	40	40	40	
	96	--	11	34	40	40	
	108	--	1	26	37	40	
	120	--	1	20	30	39	

- STORM BAR NOTES:  
 1- SS: SLAT SPAN, SBH: STORM BAR HEIGHT  
 2- TABLES MUST WORK IN CONJUNCTION WITH MAXIMUM ALLOWABLE SLAT SPAN  
 3- THESE TABLES ARE FURTHER LIMITED BY TYPE OF ANCHORAGE USED.  
 4- SPECIFIC CONDITIONS OUT OF THE SCOPE OF THESE TABLES CAN BE ADDRESSED WITH A SITE SPECIFIC DESIGN BY A PROFESSIONAL ENGINEER.

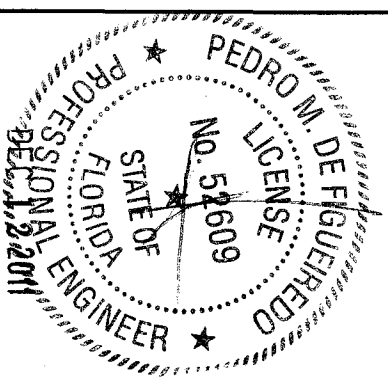
STORM BARS MOUNTING OPTIONS



Manufacturer:  
**CROCI NORTH AMERICA**  
 11600 ADELMO LANE  
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**ES 55 - ES 44**  
 EXTRUDED ALUMINUM  
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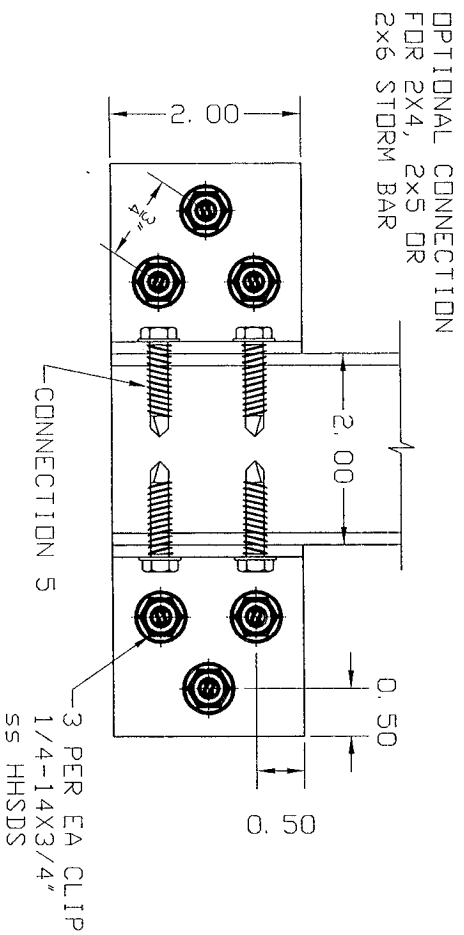
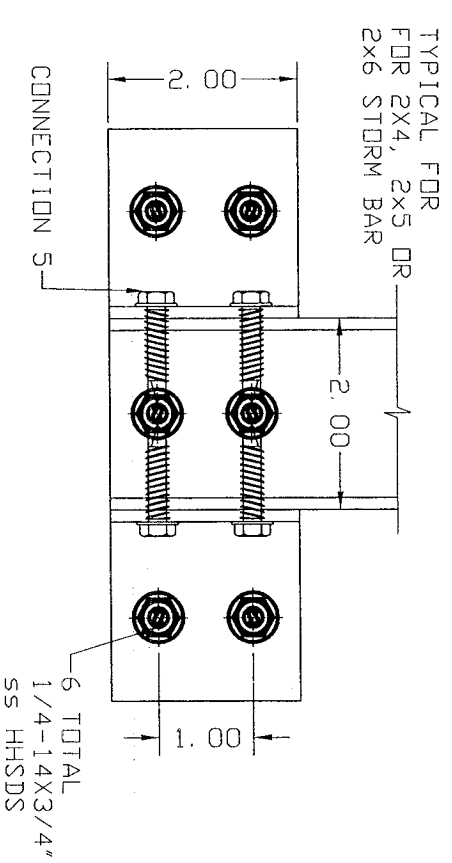
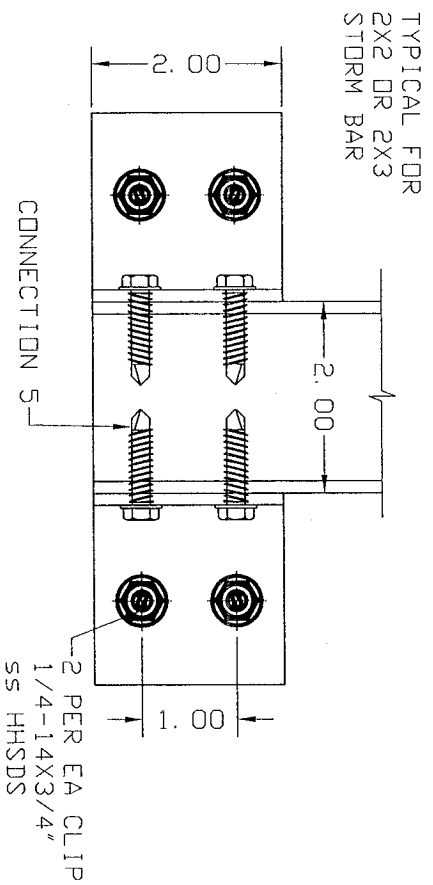
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 Design by: PPMF

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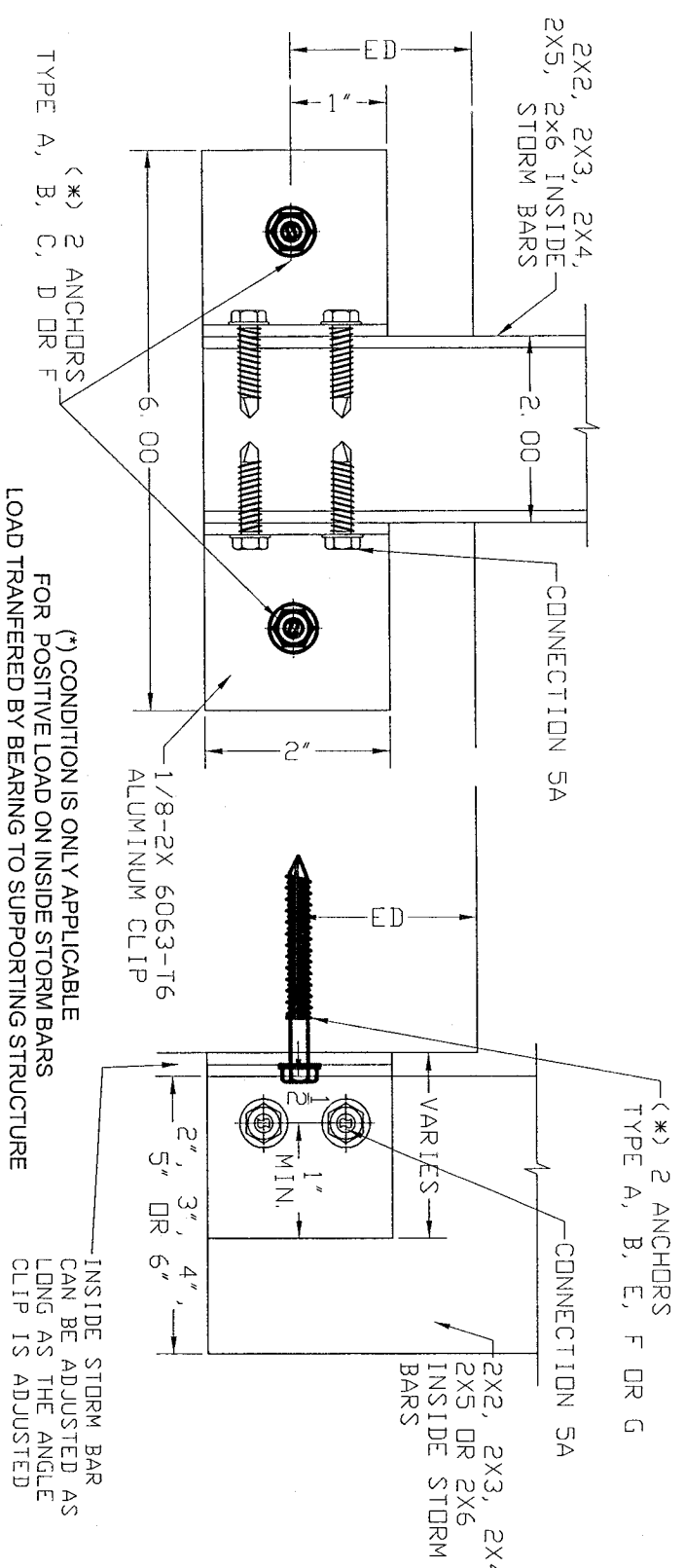
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**CONNECTION 1**  
**STORM BARS ANCHORAGE**  
**WALL MOUNTED TO ALUMINUM TUBE**



CONNECTION CAPACITY IS LIMITED TO THE MAXIMUM ALLOWABLE PRESSURES SPECIFIED AT TABLE 4 DN SHEET 5

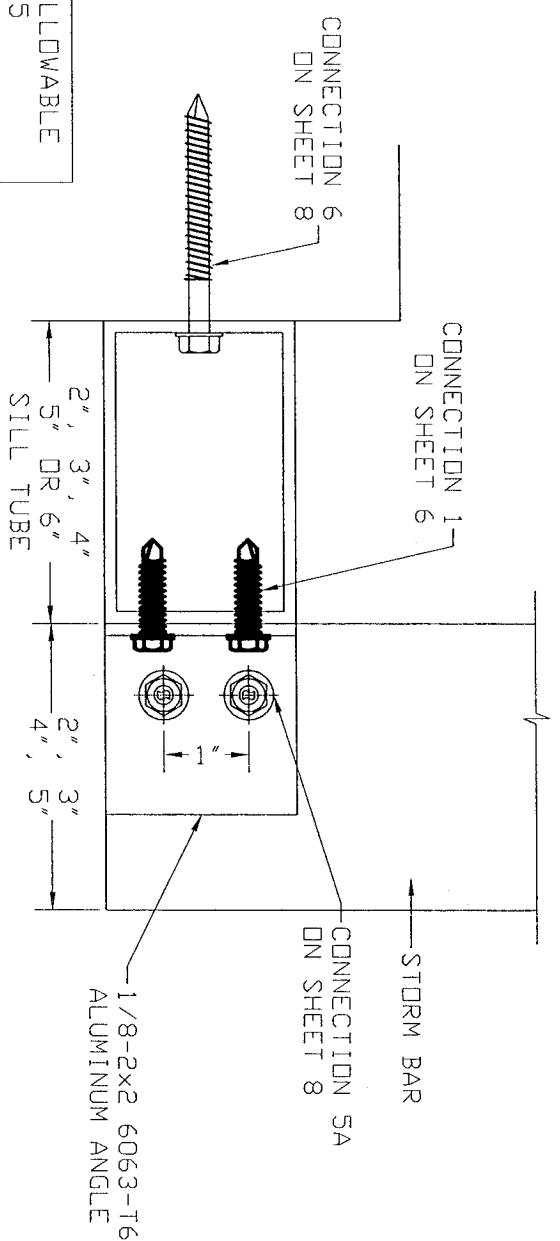
**CONNECTION 2**  
**STORM BARS ANCHORAGE**  
**TO WALL**



**ANCHOR SCHEDULE**

TYPE	DESCRIPTION	MANUFACTURER	EMBEDMENT	ED	BASE MATERIAL
A	1/4" SS TAPCON	ITW	1 3/4"	2 1/2"	3000 PSI: CONCRETE
B	1/4" SS TAPCON	ITW	1 1/4"	2 1/2"	HOLLOW BLOCK
C	1/4"-14 SS HHSMS	GENERIC	1 1/2"	1"	WOOD (SG>=.46)
D	1/4"-14 SS HHSMS	GENERIC	1/8"	3/4"	1/8" METAL STRUCTURE
F	1/4"-20 SS SOLID-SET	ALL POINTS	1"	2 1/2"	3000 PSI: CONCRETE

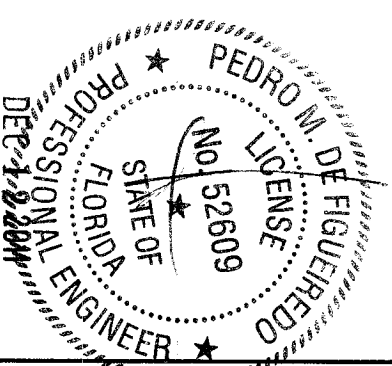
**ANCHOR NOTES:**  
 1- 1/4" TAPCONS CAN BE USED AS TYPE C INTO WOOD  
 2- 1/4" CARBON STEEL TAPCONS CAN BE USED AS AN ALTERNATE TO THE STAINLESS STEEL  
 3- METAL STRUCTURES ARE MADE OF MINIMUM 6063-T6 ALUMINUM OR ASTM A36 STEEL



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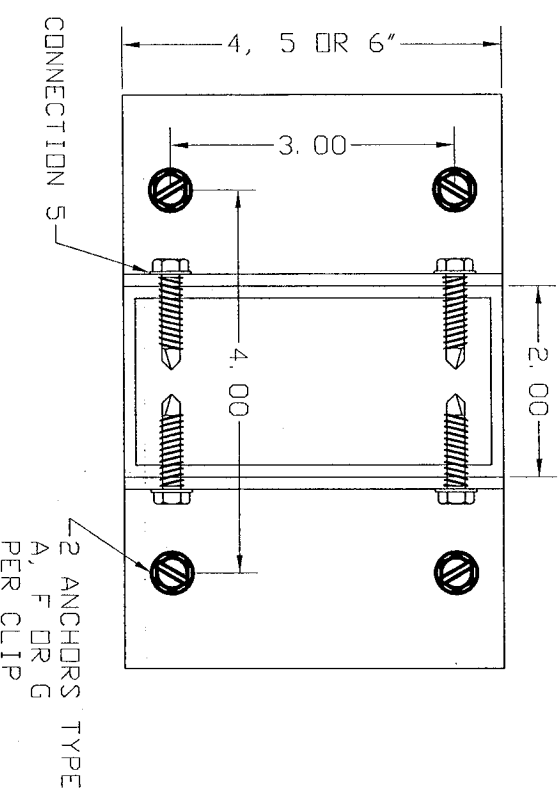
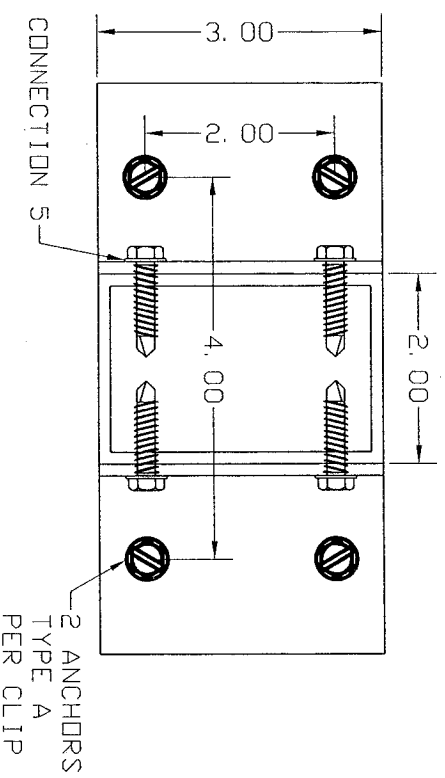
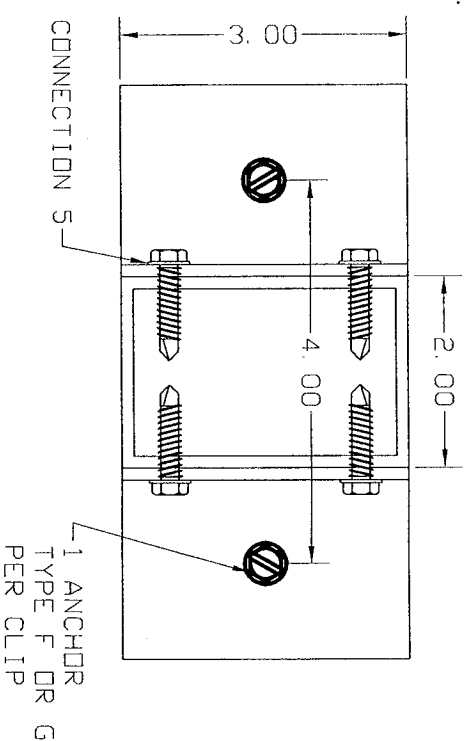
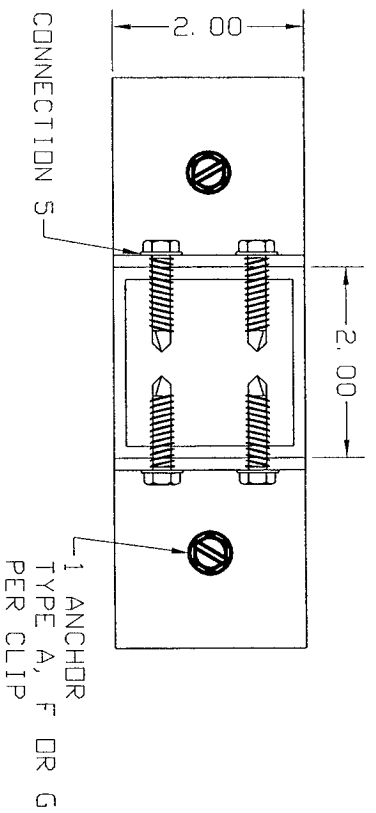
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 Pedro De Figueredo, PE 52609  
 Date: 11/12/2011  
 Scale: NA  
 Design by: PPMF

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**11-239**

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CONNECTION 3 - STORM BARS ANCHORAGE  
FLOOR/CEILING MOUNTED TO CONCRETE



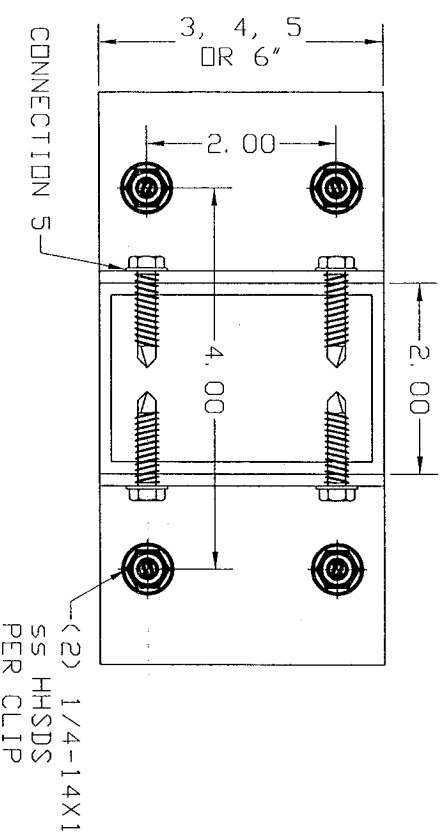
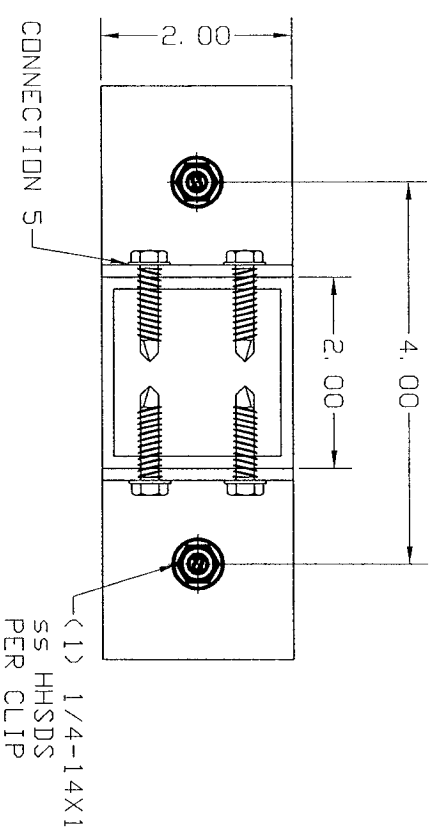
CONNECTION CAPACITY IS LIMITED TO THE MAXIMUM ALLOWABLE PRESSURES SPECIFIED AT TABLE 4 ON SHEET 5

ANCHOR SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER	EMBEDMENT	ED	BASE MATERIAL
A	1/4" SS TAPCON	ITW	1 3/4"	2 1/2"	3000 PSI CONCRETE
F	1/4"-20 SS SOLID-SET	ALL POINTS	1"	2 1/2"	3000 PSI CONCRETE
G	5/16" TAPCON	ITW	2 1/4"	2 1/2"	3000 PSI CONCRETE

ANCHOR NOTES:  
1- 1/4" CARBON STEEL TAPCONS CAN BE USED AS AN ALTERNATE TO THE STAINLESS STEEL

CONNECTION 4  
STORM BARS ANCHORAGE FLOOR/CEILING  
TO BUILT-OUT TUBE OR HEADER



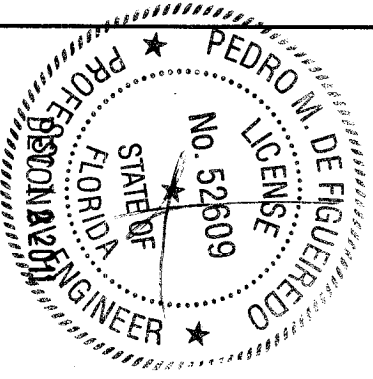
CONNECTION CAPACITY IS LIMITED TO THE MAXIMUM ALLOWABLE PRESSURES SPECIFIED AT TABLE 4 ON SHEET 5

ANCHOR NOTES:  
1- 1/4"-14 HSSDS GRADE 5 CAN BE USED AS AN ALTERNATE TO THE STAINLESS STEEL

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**CROCI NORTH AMERICA**  
11600 ADELMO LANE  
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PRODUCT:  
**ES 55 - ES 44**  
EXTRUDED ALUMINUM  
ROLLING SHUTTER

Engineering:  
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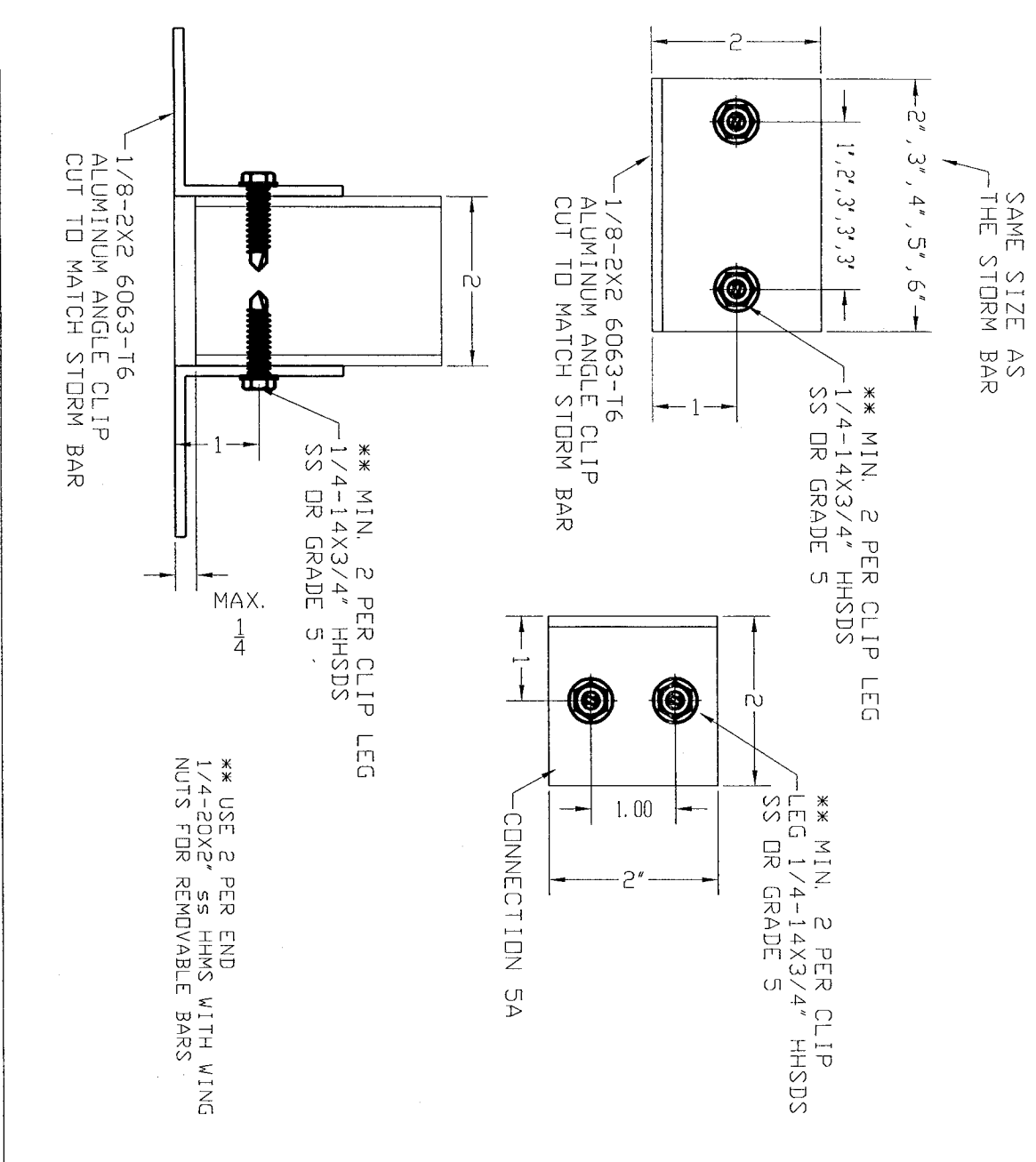
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Scale: NA  
Design by: PPMF

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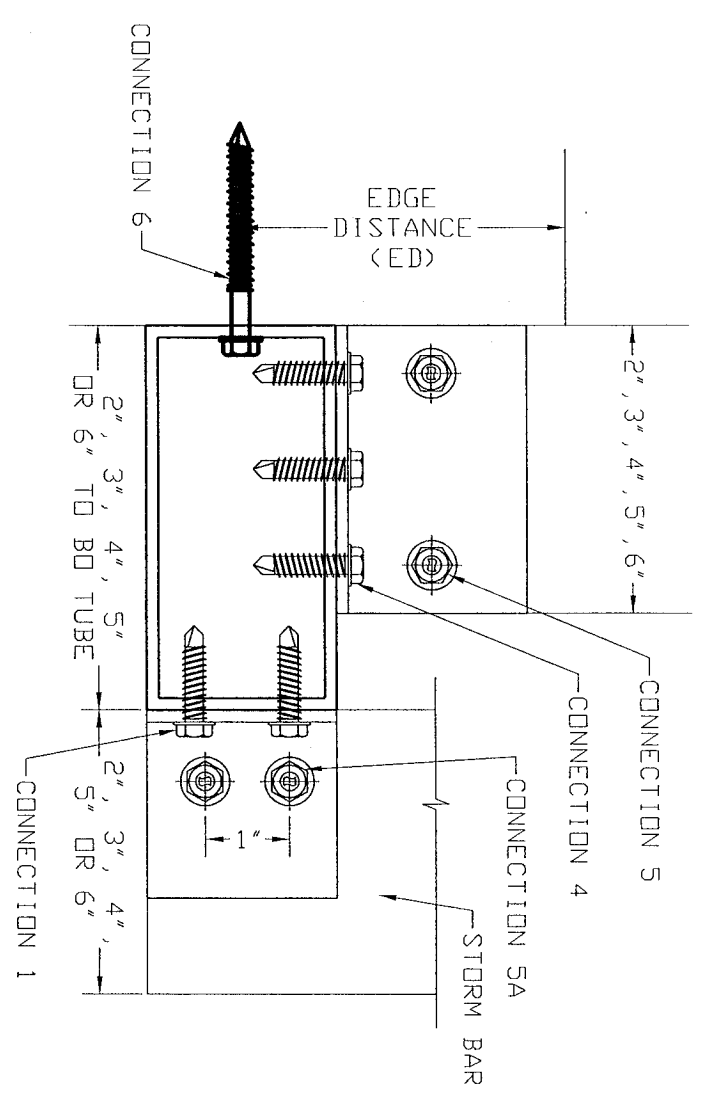
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### CONNECTION 5 CLIP ANCHORED TO STORM BAR



### CONNECTION 6 BUILT-OUT WALL ANCHORAGE



**CONNECTION 6**  
MINIMUM NUMBER OF ANCHORS  
TO SECURE BUILT-OUT TUBE TO WALL

STORM BARS	ANCHOR TYPE						
	A	B	C	D	E	F	G
2x2	4	5	4	3	3	3	3
2x3	5	7	5	4	5	5	5
2x4	7	8	7	4	6	6	6
2x5	8	10	8	5	7	7	7
2x6	9	11	9	6	8	8	8

**CONNECTION 6A:**  
WHEN USED TO HOLD ONLY INSIDE STORM BAR WITH LOAD BEARING AGAINST THE WALL USE ONLY 2 ANCHORS TYPE A, B, C, D, E OR G

ANCHOR TYPE	ANCHOR TYPE						
	A	B	C	D	E	F	G
S	3.0	3.0	3.0	2.0	4.0	3.0	3.0
ED	2.5	2.5	1.0	0.5	4.0	2.5	2.5

S - ANCHOR SPACING  
ED - EDGE DISTANCE

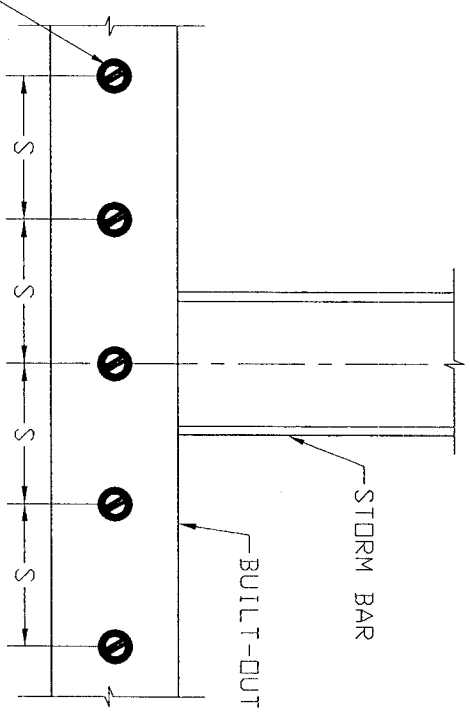
**ANCHOR SCHEDULE**

TYPE	DESCRIPTION	MANUFACTURER	EMBEDMENT	ED	BASE MATERIAL
A	1/4" SS TAPCON	ITW	1 3/4"	2 1/2"	3000 PSI CONCRETE
B	1/4" SS TAPCON	ITW	1 1/4"	2 1/2"	HOLLOW BLOCK
C	1/4"-14 SS HHSS	GENERIC	1 1/2"	1"	WOOD (SG) = 46)
D	1/4"-14 SS HHSS	GENERIC	1 1/2"	3/4"	WOOD (SG) = 46)
E	5/16" TAPCON	ITW	1 1/4"	4"	1/8" METAL STRUCTURE
F	5/16" TAPCON	ITW	1 1/4"	4"	HOLLOW BLOCK
G	5/16" TAPCON	ITW	2 1/4"	2 1/2"	3000 PSI CONCRETE

**ANCHOR NOTES:**  
 1- 1/4" TAPCONS CAN BE USED AS TYPE C INTO WOOD  
 2- 1/4" CARBON STEEL TAPCONS CAN BE USED AS AN ALTERNATE TO THE STAINLESS STEEL  
 3- METAL STRUCTURES ARE MADE OF MINIMUM 6063-T6 ALUMINUM OR ASTM A36 STEEL

CONNECTION CAPACITY IS LIMITED TO THE MAXIMUM ALLOWABLE PRESSURES SPECIFIED AT TABLE 4 ON SHEET 5

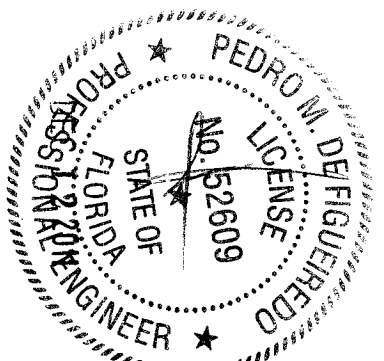
QUANTITY OF ANCHORS FROM TABLE ARE TO BE EQUALLY DIVIDED FROM CENTER LINE OF STORM BAR



Manufacturer:  
**CROCI NORTH AMERICA**  
 11600 ADELMO LANE  
 FORT MYERS, FL 33966  
 Tel.: (239) 278-3066  
 Fax: (239) 278-5977

PRODUCT:  
**ES 55 - ES 44**  
 EXTRUDED ALUMINUM ROLLING SHUTTER

Engineering:  
**Eng'g Inc.**  
 CA 8116  
 ENGCO@AOL.COM



Engineer Seal  
 Pedro De Figueredo, PE 52609  
 Date: 11/12/2011  
 Scale: NA  
 Design by: PPMF

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 Drawing Number  
**11-239**

Sheet  
**8 of 18**

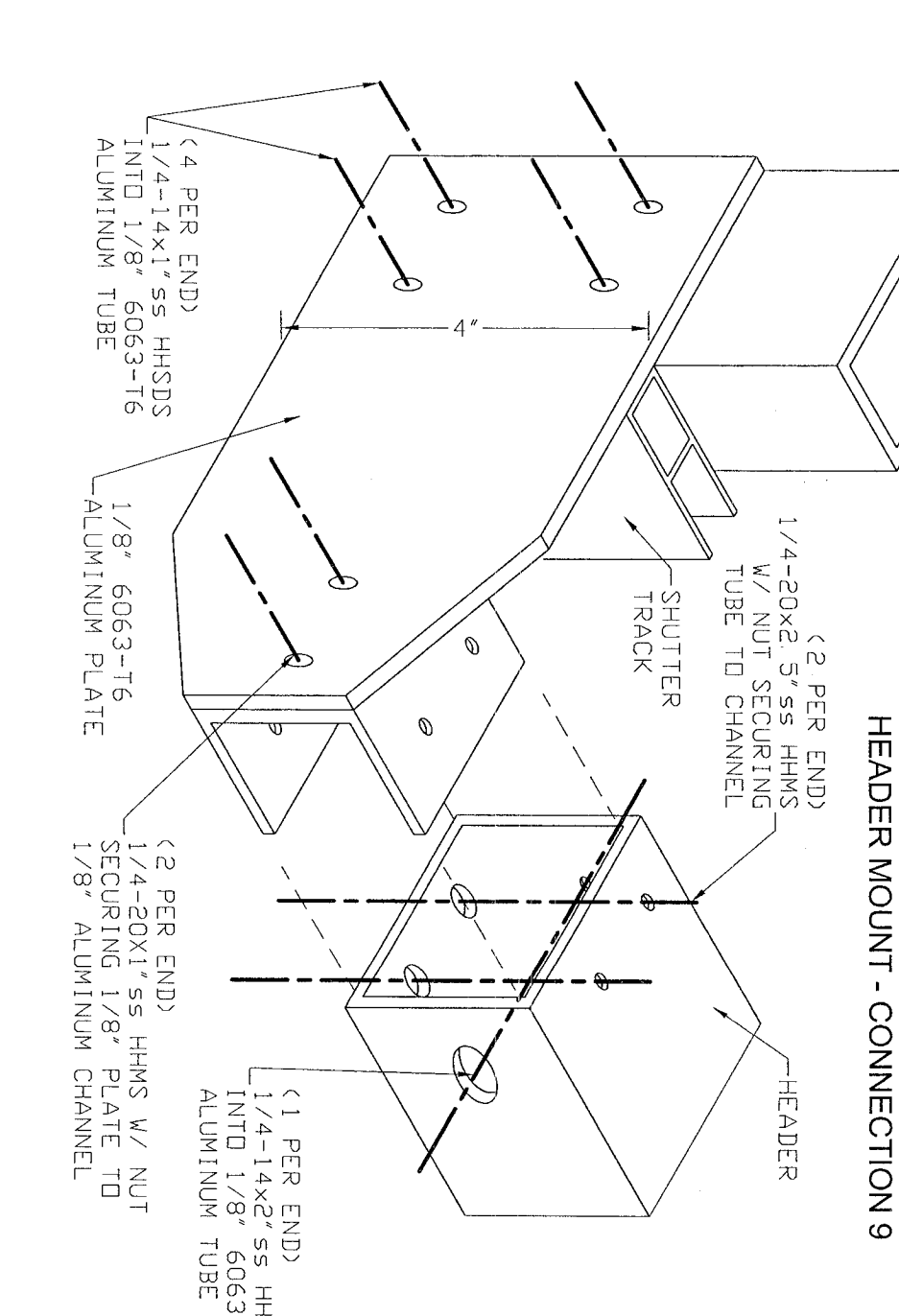
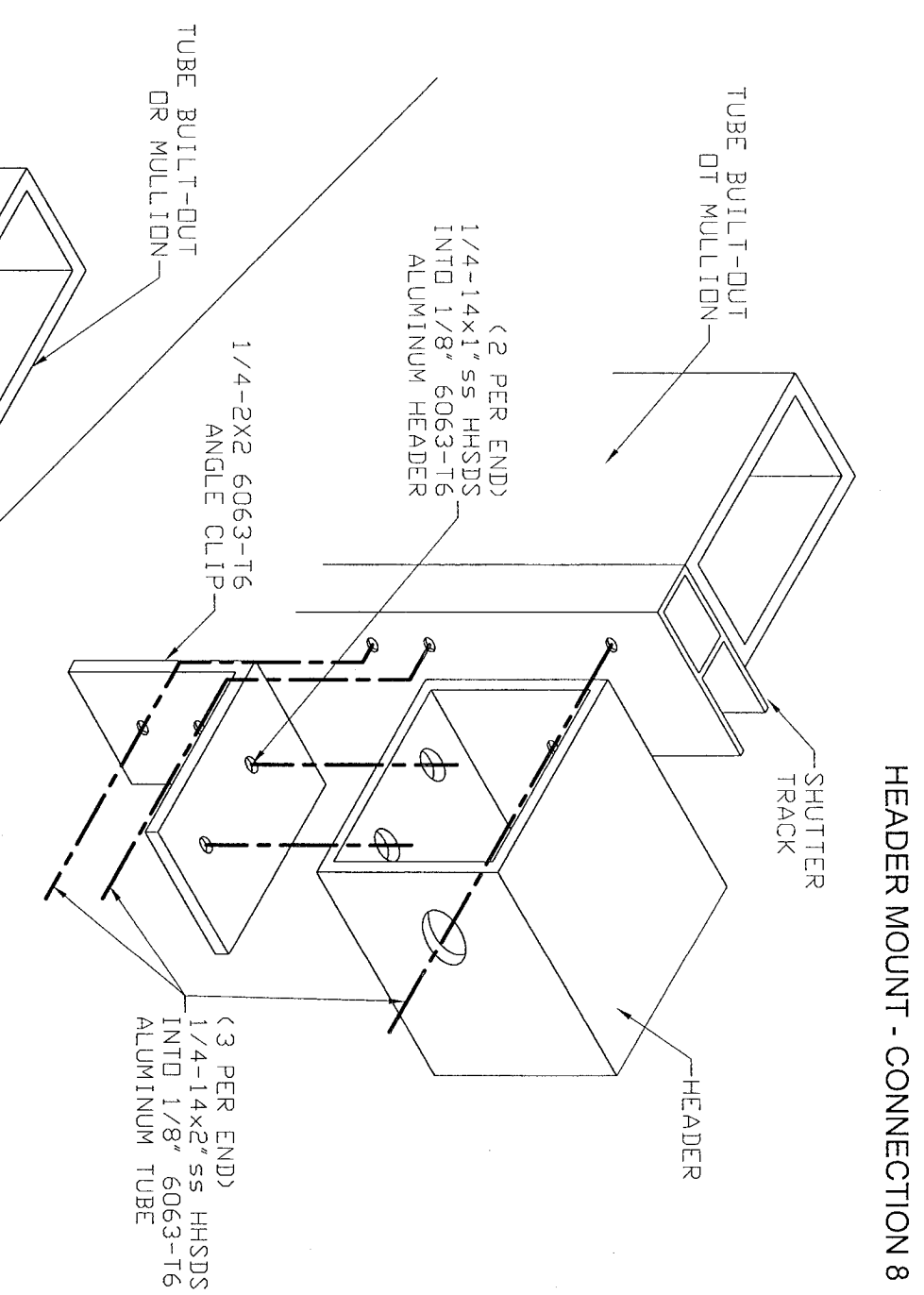


TABLE 5- HEADER BARS  
CONNECTION TYPE 8  
ALLOWABLE DESIGN LOAD - Pd (Psf)

TT	HEADER BAR					
	SBH	2X2	2X3	2X4	2X5	2X6
72	36	75	150	150	150	150
	48	57	136	147	147	147
	60	45	109	117	117	117
	72	38	91	98	98	98
	84	32	78	84	84	84
	96	28	68	73	73	73
84	108	25	60	65	65	65
	120	23	54	59	59	59
	36	48	127	150	150	150
	48	36	95	126	126	126
	60	29	76	100	100	100
	72	24	63	84	84	84
96	84	20	54	72	72	72
	96	--	48	63	63	63
	108	--	42	56	56	56
	120	--	38	50	50	50
	36	32	85	147	147	147
	48	24	64	110	110	110
108	60	--	51	88	88	88
	72	--	43	73	73	73
	84	--	36	63	63	63
	96	--	32	55	55	55
	108	--	28	49	49	49
	120	--	26	44	44	44
120	36	--	44	88	117	117
	48	--	33	66	88	88
	60	--	26	53	70	70
	72	--	22	44	59	59
	84	--	20	40	43	43
	96	--	18	36	39	39
130	108	--	16	32	35	35
	120	--	14	28	31	31
	36	--	34	69	108	108
	48	--	26	52	81	81
	60	--	21	42	65	65
	72	--	17	35	54	54
150	84	--	14	30	46	46
	96	--	12	26	41	41
	108	--	10	23	36	36
	120	--	9	21	32	32
	36	--	22	45	79	94
	48	--	17	34	59	70

TABLE 6- HEADER BARS  
CONNECTION TYPE 9  
ALLOWABLE DESIGN LOAD - Pd (Psf)

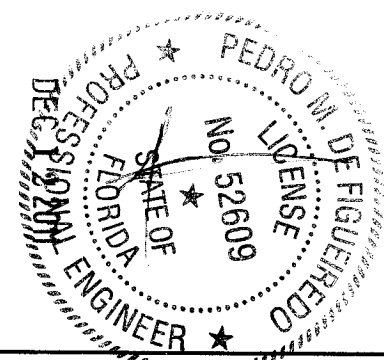
TT	HEADER BAR TYPE					
	SBH	2X2	2X3	2X4	2X5	2X6
72	36	75	150	150	150	150
	48	57	136	150	150	150
	60	45	109	150	150	150
	72	38	91	138	150	150
	84	32	78	118	147	147
	96	28	68	103	129	129
84	108	25	60	92	115	115
	120	23	54	83	103	103
	36	48	127	150	150	150
	48	36	95	126	150	150
	60	29	76	122	150	150
	72	24	63	101	141	147
96	84	20	54	87	121	126
	96	--	48	76	106	111
	108	--	42	68	94	98
	120	--	38	61	85	88
	36	32	85	150	150	150
	48	24	64	116	150	150
108	60	--	51	93	130	150
	72	--	43	78	108	129
	84	--	36	67	93	111
	96	--	32	58	81	97
	108	--	28	52	72	86
	120	--	26	47	65	77
120	36	--	44	88	139	150
	48	--	33	66	104	138
	60	--	26	53	83	110
	72	--	22	44	69	92
	84	--	20	40	57	76
	96	--	18	36	51	68
130	108	--	16	32	35	35
	120	--	14	28	31	31
	36	--	34	69	118	150
	48	--	26	52	89	118
	60	--	21	42	71	94
	72	--	17	35	59	78
150	84	--	14	30	51	67
	96	--	12	26	44	59
	108	--	10	23	39	52
	120	--	9	21	35	47
	36	--	22	45	79	118
	48	--	17	34	59	88



Manufacturer:  
**CROCI NORTH**  
**A M E R I C A**  
11600 ADELMO LANE  
FORT MYERS, FL 33966  
Tel.: (239) 278-3066  
Fax: (239) 278-5977

PRODUCT:  
**ES 55 - ES 44**  
EXTRUDED ALUMINUM  
ROLLING SHUTTER

Engineering:  
**Eng'g Inc.**  
CA 8116  
ENGCO@AOL.COM



Engineer Seal  
Pedro De Figueiredo, PE 52609  
Date: 11/12/2011  
Scale: NA  
Design by: PPMF

DRAFTING:  
**PK DRAFTING & MORE**  
Drawing Number  
**11-239**

Sheet  
9 of 18

HEADER NOTES:  
1- TT: TRACK, SBH: STORM BAR HEIGHT  
2- SPECIFIC CONDITIONS OUT OF THE SCOPE OF THESE TABLES CAN BE ADDRESSED WITH A SITE SPECIFIC DESIGN BY A PROFESSIONAL ENGINEER

DIVIDE EQUALLY FROM CENTER LINE OF HEADER  
THE MINIMUM QUANTITY OF ANCHORS SELECTED  
FROM TABLES BELOW

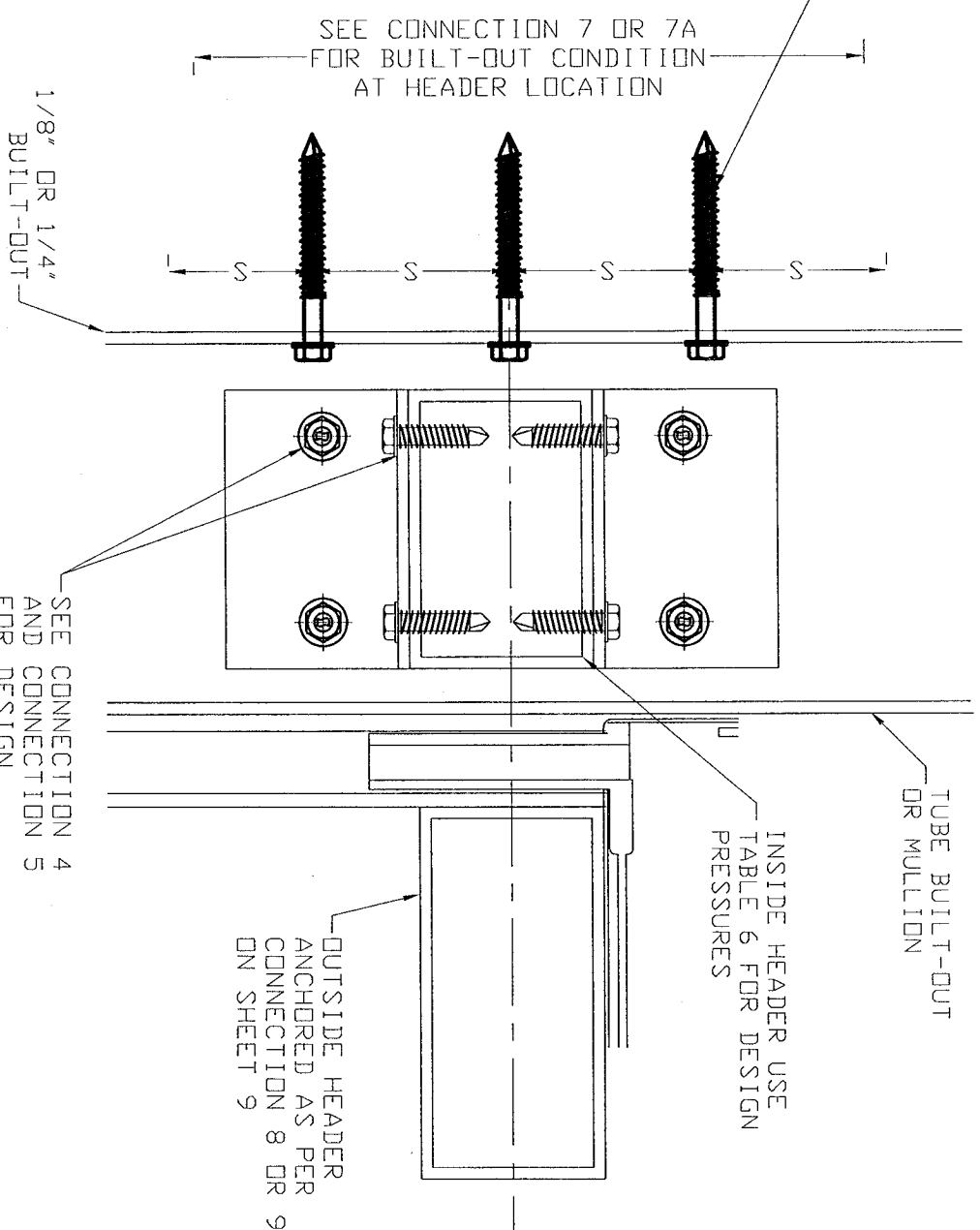
CONNECTION 7  
MINIMUM NUMBER OF ANCHORS  
TO SECURE 1/8" BUILT-OUT TUBE TO WALL

HEADER TYPE	CONNECTION 8				CONNECTION 9							
	A	B	C	D	E	G	A	B	C	D	E	G
2X2	1	2	1	1	1	2	3	2	2	2	2	2
2X3	3	4	3	2	3	3	5	6	5	3	4	4
2X4	5	6	5	3	4	4	-	-	-	4	6	5
2X5	5	6	5	3	4	4	-	-	-	5	-	-
2X6	5	6	5	3	4	4	-	-	-	5	-	-

CONNECTION 7A  
MINIMUM NUMBER OF ANCHORS  
TO SECURE 1/4" BUILT-OUT TUBE TO WALL

HEADER TYPE	CONNECTION 8				CONNECTION 9							
	A	B	C	D	E	G	A	B	C	D	E	G
2X2	1	3	1	2	2	1	1	3	1	2	2	1
2X3	2	6	2	3	4	2	2	6	2	3	4	2
2X4	3	6	3	3	4	2	4	--	4	4	5	3
2X5	3	6	3	3	4	2	4	--	4	4	5	4
2X6	3	6	3	3	4	2	4	--	4	4	5	4

S	ANCHOR TYPE					
	A	B	C	D	E	G
SPACING	3	3	2	2	4	3



ANCHOR SCHEDULE

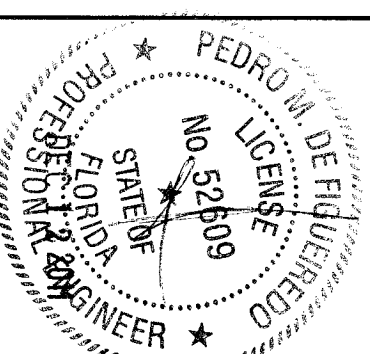
TYPE	DESCRIPTION	MANUFACTURER	EMBEDMENT	ED	BASE MATERIAL
A	1/4" SS TAPCON	ITW	1 3/4"	2 1/2"	3000 PSI CONCRETE
B	1/4" SS TAPCON	ITW	1 1/4"	2 1/2"	HOLLOW BLOCK
C	1/4"-14 SS HHSMS	GENERIC	1 1/2"	1"	WOOD (SG) = .46)
D	1/4"-14 SS HHSDS	GENERIC	1/8"	3/4"	1/8" METAL STRUCTURE
E	5/16" TAPCON	ITW	1 1/4"	4"	HOLLOW BLOCK
G	5/16" TAPCON	ITW	2 1/4"	2 1/2"	3000 PSI CONCRETE

- ANCHOR NOTES:
- 1- 1/4" TAPCONS CAN BE USED AS TYPE C INTO WOOD
  - 2- 1/4" CARBON STEEL TAPCONS CAN BE USED AS AN ALTERNATE TO THE STAINLESS STEEL
  - 3- METAL STRUCTURES ARE MADE OF MINIMUM 6063-T6 ALUMINUM OR ASTM A36 STEEL
  - 4- SPECIFIC CONDITIONS OUT OF THE SCOPE OF THESE TABLES CAN BE ADDRESSED WITH A SITE SPECIFIC DESIGN BY A PROFESSIONAL ENGINEER

Manufacturer:  
**CROCI NORTH  
AMERICA**  
11600 ADELMO LANE  
FORT MYERS, FL 33966  
Tel.: (239) 278-3066  
Fax: (239) 278-5977

PRODUCT:  
**ES 55 - ES 44**  
EXTRUDED ALUMINUM  
ROLLING SHUTTER

Engineering:  
**EngCo Inc.**  
CA 8116  
ENGCO@AOL.COM



Engineer Seal  
Pedro De Figueiredo, PE 52609  
Date: 11/12/2011  
Scale: NA  
Design by: PPMF

DRAFTING:  
**PK DRAFTING & MORE**

Drawing Number  
**11-239**

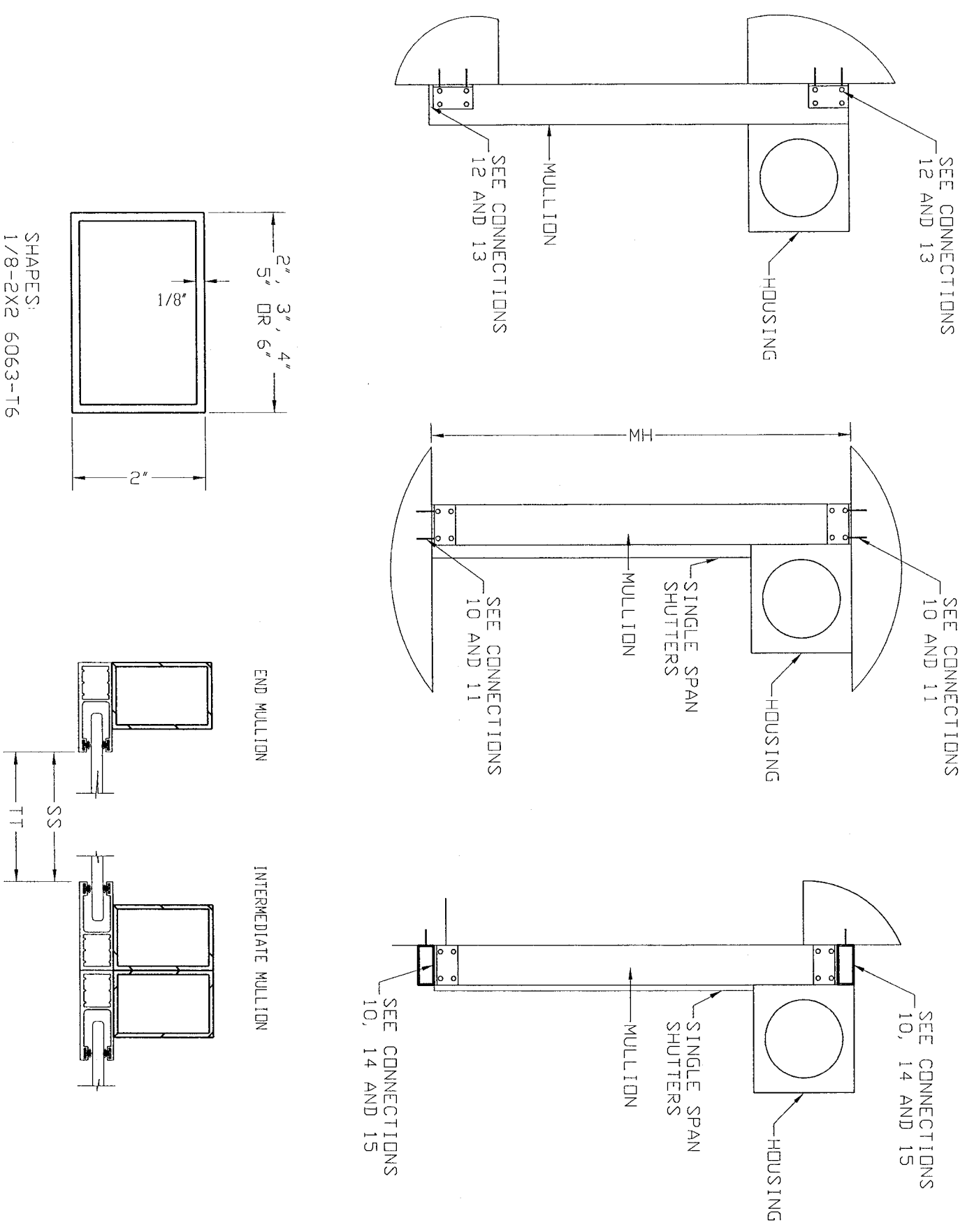
Sheet  
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TABLE 7- MULLION BARS  
ALLOWABLE DESIGN LOAD - Pd (Psf)

SS	MH	MULLION BAR TYPE					
		2X2	2X3	2X4	2X5	2X6	
24	48	150	150	150	150	150	
	60	150	150	150	150	150	
	72	114	150	150	150	150	
	84	72	150	150	150	150	
30	48	150	150	150	150	150	
	60	150	150	150	150	150	
	72	91	150	150	150	150	
	84	57	150	150	150	150	
36	48	150	150	150	150	150	
	60	132	150	150	150	150	
	72	76	150	150	150	150	
	84	48	128	150	150	150	
48	48	100	100	110	110	110	
	60	99	100	110	110	110	
	72	57	100	110	110	110	
	84	36	96	110	110	110	
54	48	100	100	100	100	100	
	60	88	100	100	100	100	
	72	50	100	100	100	100	
	84	32	85	100	100	100	
60	48	85	85	85	85	85	
	60	79	85	85	85	85	
	72	45	85	85	85	85	
	84	28	76	85	85	85	
80	48	40	40	40	40	40	
	60	40	40	40	40	40	
	72	34	40	40	40	40	
	84	21	40	40	40	40	
108	48	27	40	40	40	40	
	60	27	40	40	40	40	
	72	27	40	40	40	40	
	84	27	40	40	40	40	
120	48	27	40	40	40	40	
	60	27	40	40	40	40	
	72	27	40	40	40	40	
	84	27	40	40	40	40	
132	48	27	40	40	40	40	
	60	27	40	40	40	40	
	72	27	40	40	40	40	
	84	27	40	40	40	40	

STORM BAR NOTES:  
1- SS: SLAT SPAN, MH: MULLION BAR HEIGHT  
2- TABLES MUST WORK IN CONJUNCTION WITH MAXIMUM ALLOWABLE SLAT SPAN TABLES ON SHEET 2.  
3- THESE TABLES ARE FURTHER LIMITED BY TYPE OF ANCHORAGE USED.  
4- SPECIFIC CONDITIONS OUT OF THE SCOPE OF THESE TABLES CAN BE ADDRESSED WITH A SITE SPECIFIC DESIGN BY A PROFESSIONAL ENGINEER.

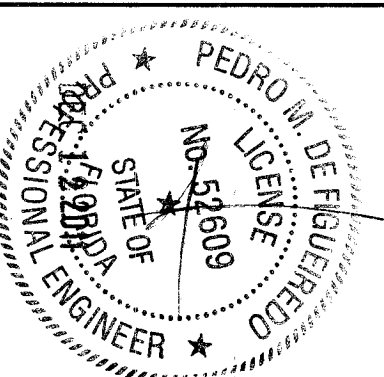
MULLION SELECTION TABLES  
ALLOWABLE DESIGN LOAD - Pd (Psf)  
CASE 1 :  
SINGLE SPAN SHUTTERS



Manufacturer:  
**CROCI NORTH AMERICA**  
11600 ADELMO LANE  
FORT MYERS, FL 33966  
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PRODUCT:  
**ES 55 - ES 44**  
EXTRUDED ALUMINUM  
ROLLING SHUTTER

Engineering:  
**Eng'g Inc.**  
CA 8116  
ENGCO@AOL.COM



Engineer Seal  
Pedro De Figueredo, PE 52609  
Date: 11/12/2011  
Scale: NA  
Design by: PPMF

DRAFTING:  
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Drawing Number  
**11-239**

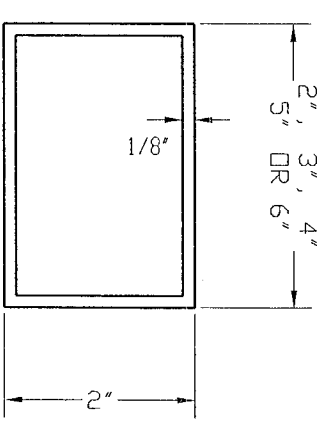
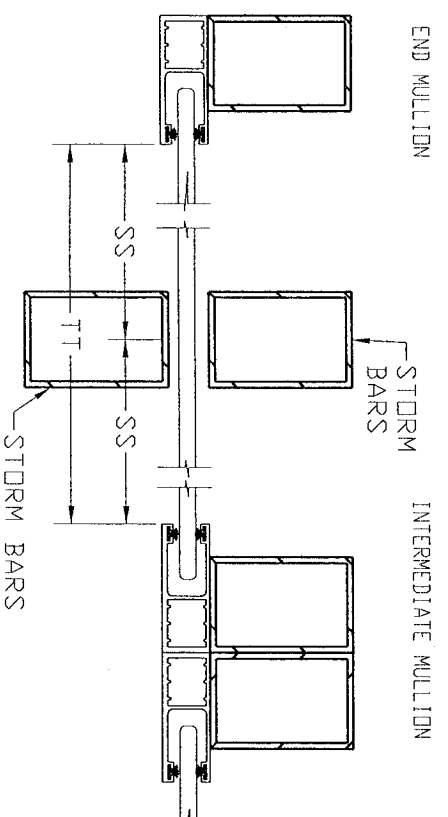
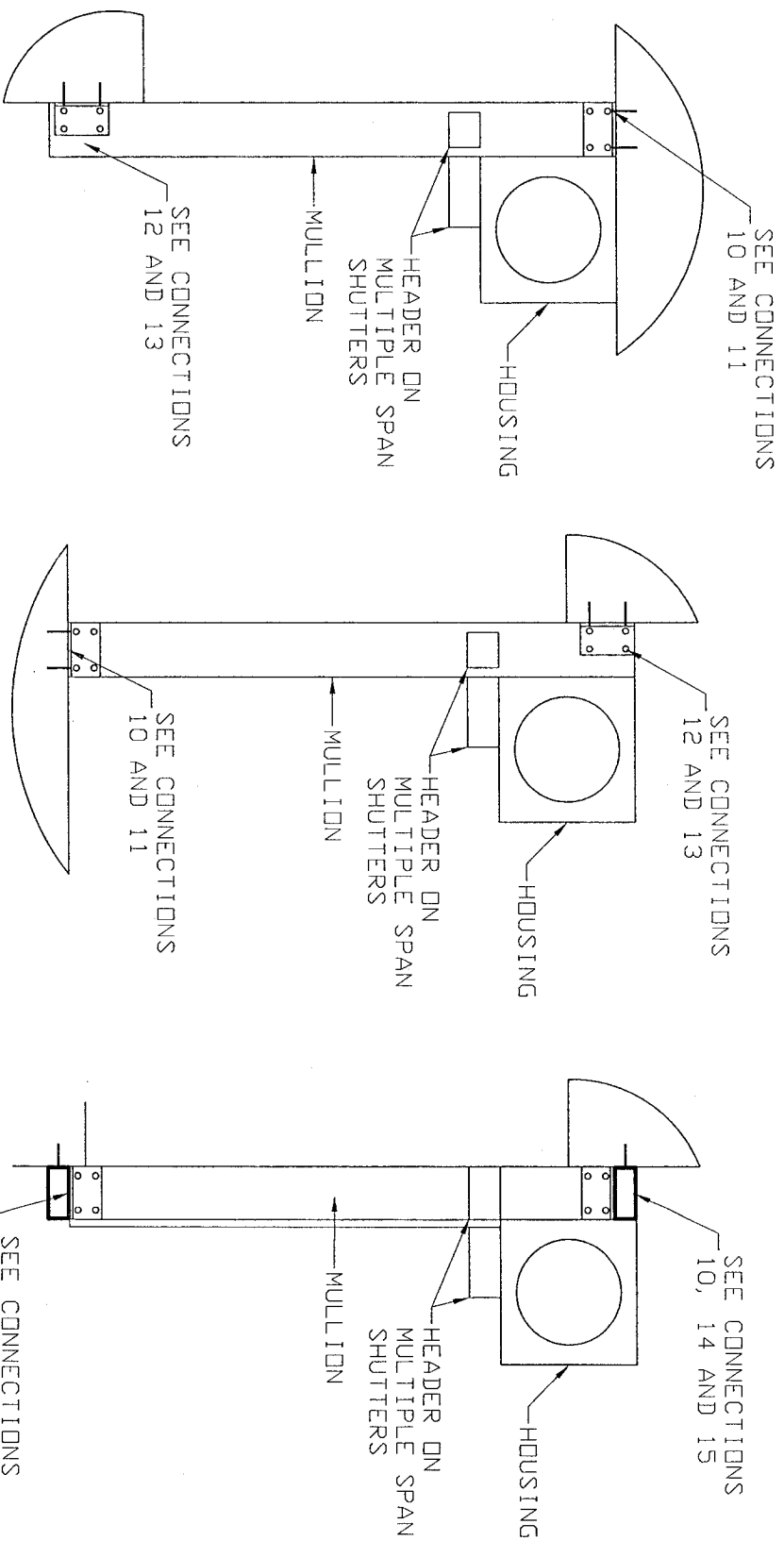
Sheet  
**11 of 18**

**TABLE 8- MULLION BARS**  
ALLOWABLE DESIGN LOAD - Pd (Psf)

TT	MH	MULLION BAR TYPE					
		2X2	2X3	2X4	2X5	2X6	
72	48	75	150	150	150	150	
	60	57	120	150	150	150	
	72	45	95	150	150	150	
	84	29	80	128	150	150	
	96	--	52	100	135	135	
	108	--	34	78	115	118	
84	120	--	23	58	92	104	
	132	--	--	36	75	93	
	48	48	127	150	150	150	
96	60	36	95	150	150	150	
	72	29	76	122	150	150	
	84	21	63	101	137	137	
	96	--	54	87	116	116	
	108	--	39	76	101	101	
	120	--	27	62	89	89	
108	132	--	--	39	76	80	
	48	22	60	121	150	150	
	60	--	45	91	128	150	
	72	--	36	73	103	126	
	84	--	30	61	86	106	
	96	--	26	52	73	90	
120	108	--	22	45	64	78	
	120	--	20	40	57	69	
	132	--	--	36	51	62	
	48	--	44	88	139	150	
	60	--	33	66	104	138	
	72	--	26	53	83	110	
130	84	--	22	44	69	92	
	96	--	--	38	59	79	
	108	--	--	33	52	69	
	120	--	--	29	46	61	
	132	--	--	26	42	55	
	48	--	34	69	118	150	
150	60	--	26	52	89	118	
	72	--	21	42	71	94	
	84	--	--	35	59	78	
	96	--	--	30	51	67	
	108	--	--	26	44	59	
	120	--	--	23	39	52	
150	132	--	--	21	35	47	
	48	--	22	45	79	118	
	60	--	--	34	59	88	
	72	--	--	27	47	71	
	84	--	--	23	39	59	
	96	--	--	--	34	50	
108	--	--	--	30	44		
	120	--	--	26	39		
132	--	--	--	24	35		

**MULLION SELECTION TABLES**  
ALLOWABLE DESIGN LOAD - Pd (Psf)

CASE 2:  
MULTIPLE SPAN SHUTTERS WITH  
HEADER ANCHORED TO MULLION



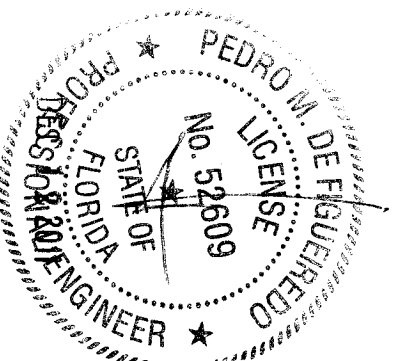
- SHAPES:  
 1/8-2X2 6063-T6  
 1/8-2X3 6063-T6  
 1/8-2X4 6063-T6  
 1/8-2X5 6063-T6  
 1/8-2X6 6063-T6

STORM BAR NOTES:  
 1- TT: TRACK TO TRACK, MH: MULLION BAR HEIGHT  
 2- TABLES MUST WORK IN CONJUNCTION WITH MAXIMUM ALLOWABLE SLAT SPAN TABLES ON SHEET 2.  
 3- THESE TABLES ARE FURTHER LIMITED BY TYPE OF ANCHORAGE USED.  
 4- SPECIFIC CONDITIONS OUT OF THE SCOPE OF THESE TABLES CAN BE ADDRESSED WITH A SITE SPECIFIC DESIGN BY A PROFESSIONAL ENGINEER.

Manufacturer:  
**CROCI NORTH**  
**A M E R I C A**  
 11600 ADELMO LANE  
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PRODUCT:  
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 ROLLING SHUTTER

Engineering:  
**Engco Inc.**  
 CA 8116  
 ENGCO@AOL.COM



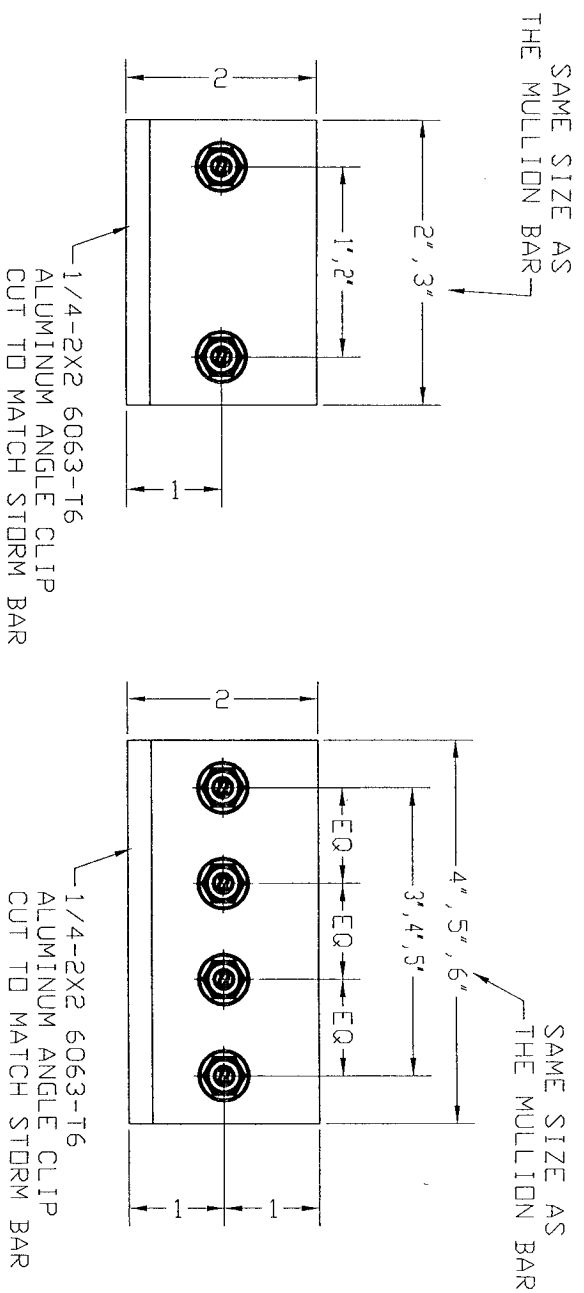
Engineer Seal  
 Pedro De Figueredo, PE 52609  
 Date: 11/12/2011  
 Scale: NA  
 Design by: PPMF

DRAFTING:  
**PK DRAFTING & MORE**

Drawing Number  
**11-239**

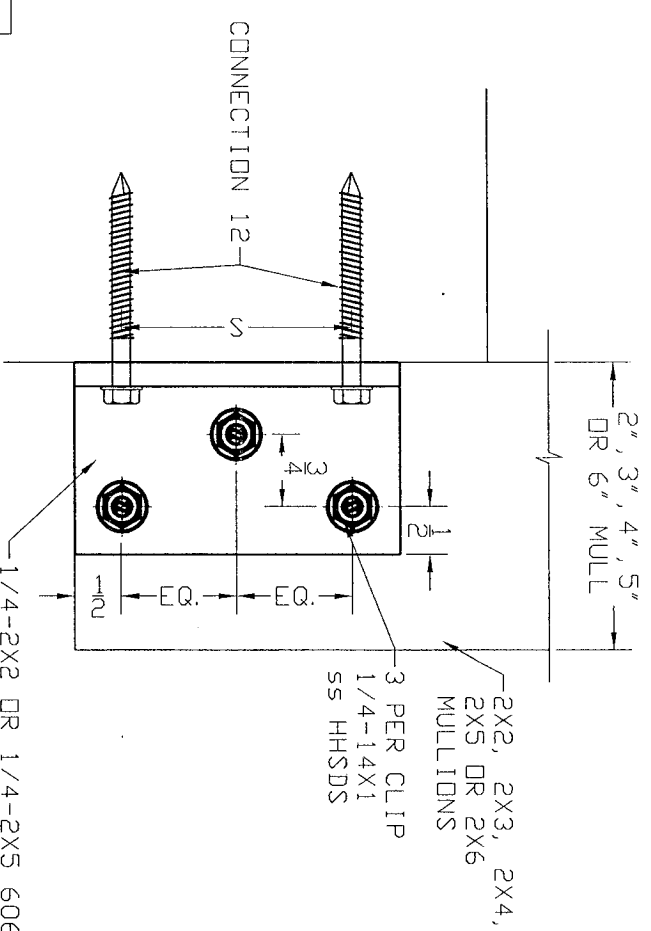
Sheet  
**12 of 18**

**CONNECTION 10  
CLIP ANCHORED TO MULLION**



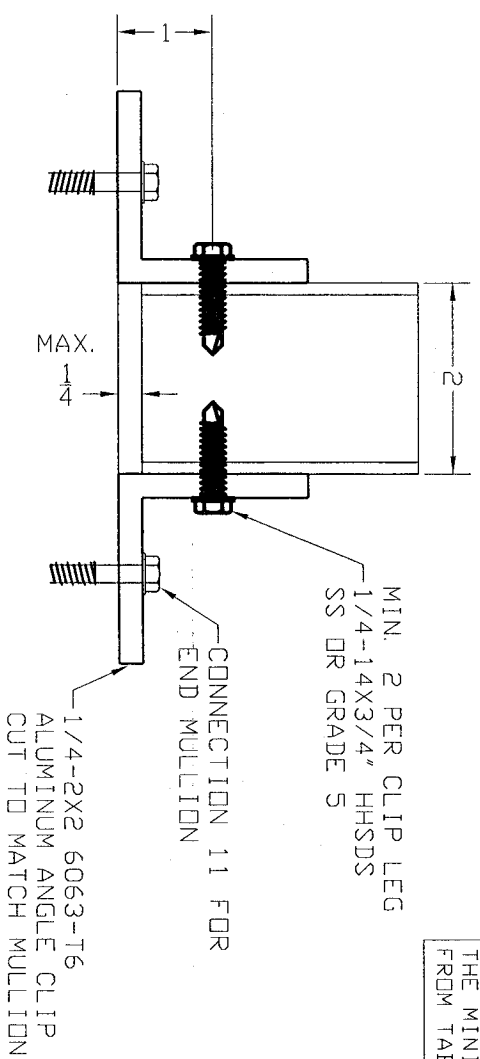
ANCHORS TO BE DESIGNED BASED ON THE MINIMUM MULLION SIZE SELECTED FROM TABLES 7 AND 8.

**CONNECTION 13  
CLIP ANCHORED TO MULLION BAR**



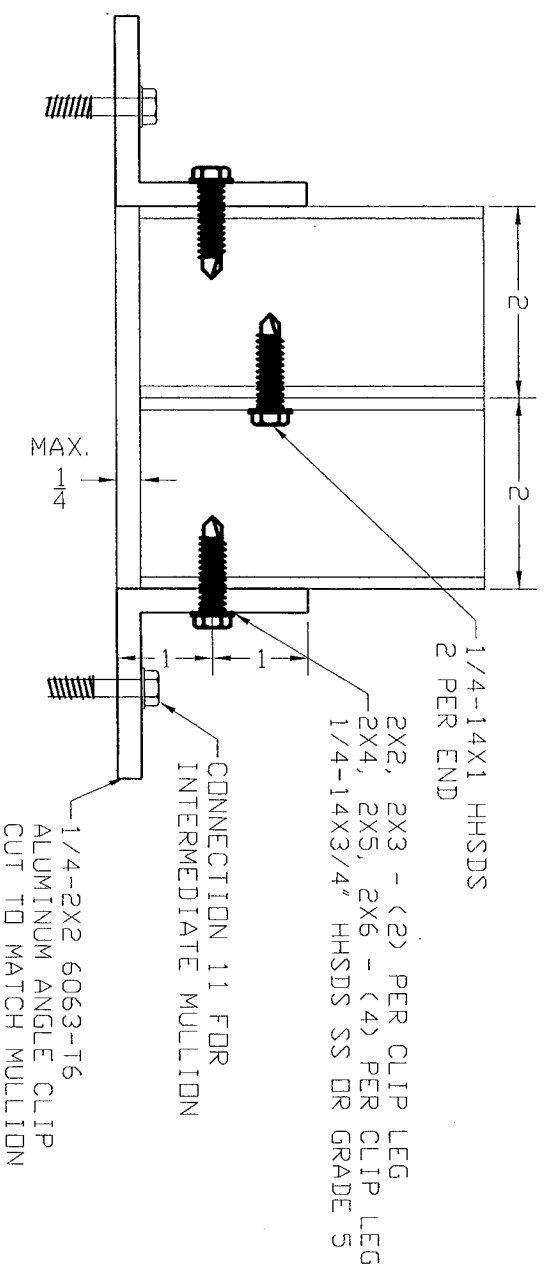
1/4-2X2 DR 1/4-2X5 6063-T6 ALUMINUM ANGLE CLIP MIN. CUT:  
1 ANCHOR PER CLIP = 2" LONG  
2 ANCHORS PER CLIP = 5" LONG  
4 ANCHORS PER CLIP = 5" LONG  
ANCHORS AS PER CON 12

**END MULL**

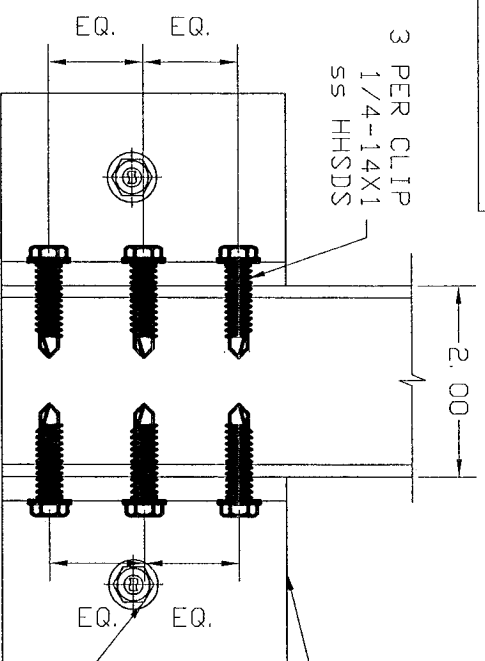


MIN. 2 PER CLIP LEG  
1/4-14X3/4" HSSDS  
SS DR GRADE 5

**INTERMEDIATE MULL**

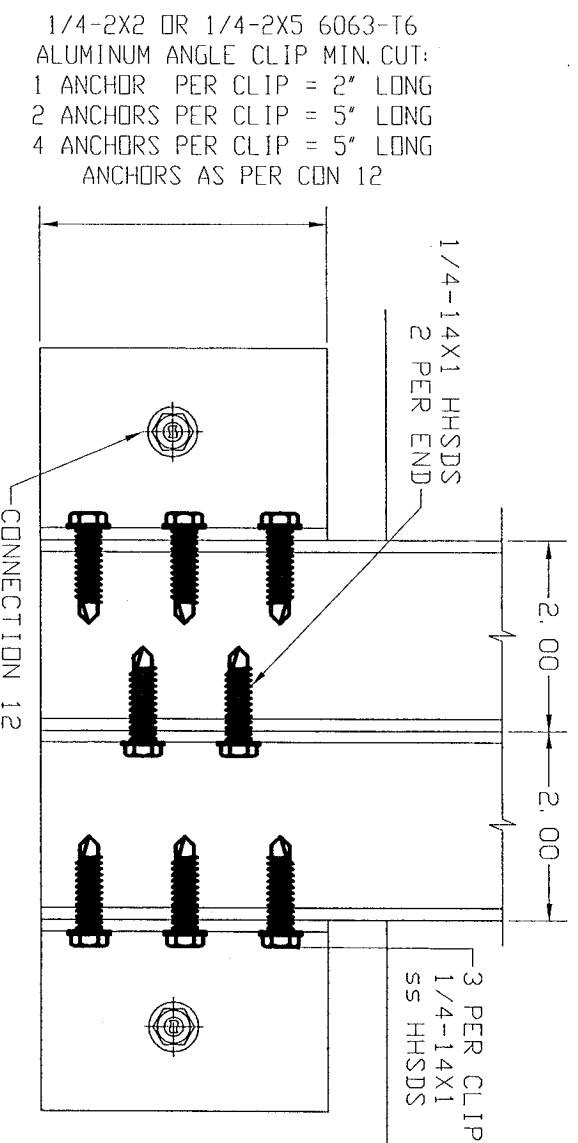


**END MULL**



1/4-2X2 DR 1/4-2X5 6063-T6 ALUMINUM ANGLE CLIP MIN. CUT:  
1 ANCHOR PER CLIP = 2" LONG  
2 ANCHORS PER CLIP = 5" LONG  
4 ANCHORS PER CLIP = 5" LONG  
ANCHORS AS PER CON 12

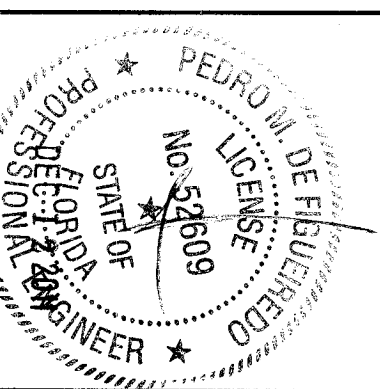
**INTERMEDIATE MULL**



Manufacturer:  
**CROCI NORTH AMERICA**  
11600 ADELMO LANE  
FORT MYERS, FL 33966  
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**ES 55 - ES 44**  
EXTRUDED ALUMINUM  
ROLLING SHUTTER

Engineering:  
**EngDo Inc.**  
CA 8116  
ENGGCO@AOL.COM



Engineer Seal  
Pedro De Figueiredo, PE 52609

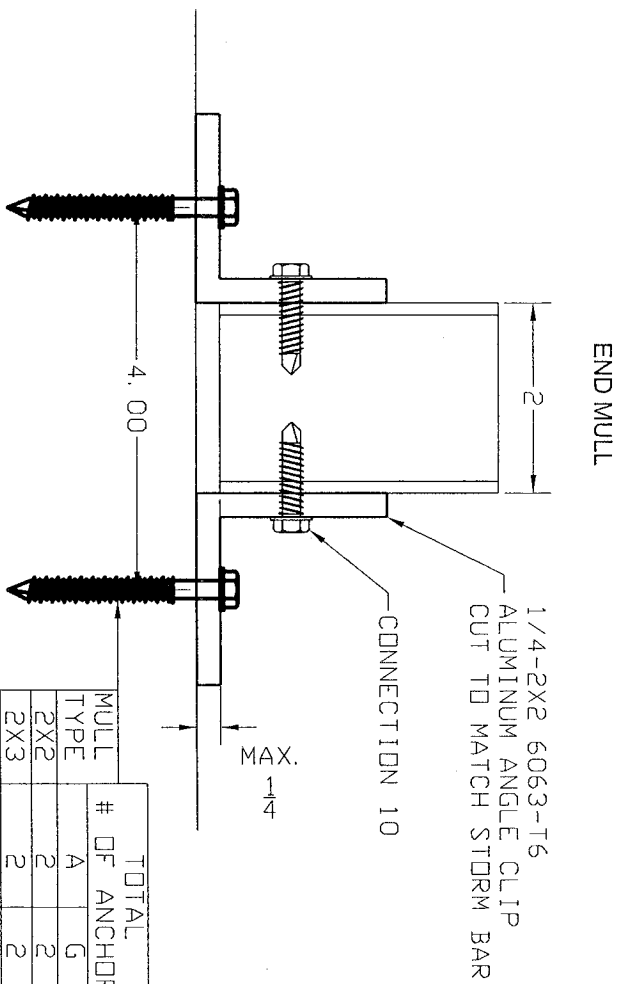
Date: 11/12/2011  
Scale: NA  
Design by: PPMF

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**PK DRAFTING & MORE**

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**11-239**

Sheet  
**13 of 18**

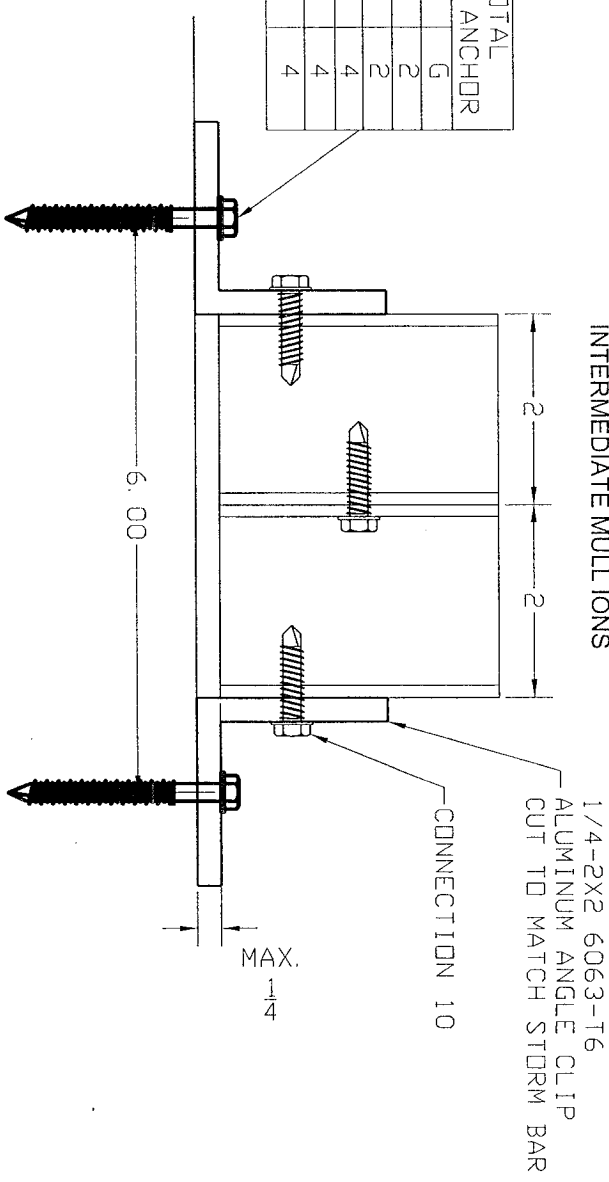
CONNECTION 11  
CLIP ANCHORED TO CONCRETE FLOOR/CEILING



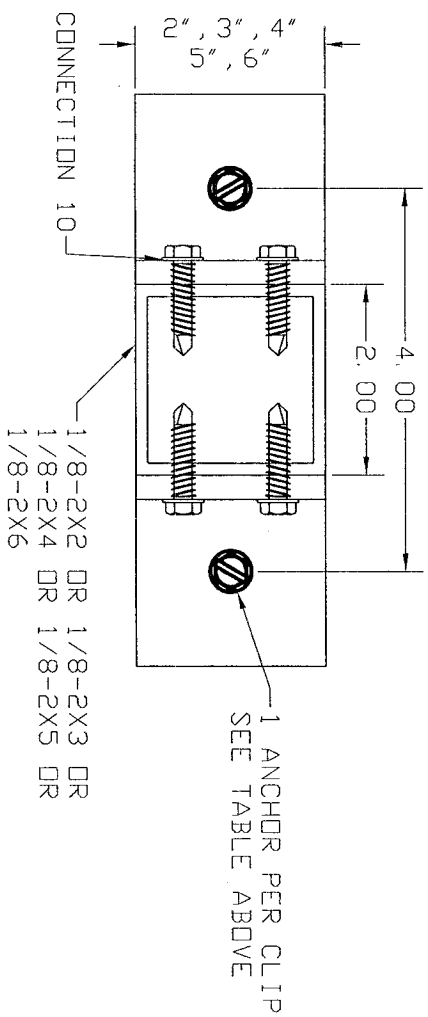
ANCHORS TO BE DESIGNED BASED ON THE MINIMUM MULLION SIZE SELECTED FROM TABLES 7 AND 8.

MULLION TYPE	TOTAL # OF ANCHOR
A	2
G	2
2X2	2
2X3	2
2X4	4
2X5	4
2X6	4

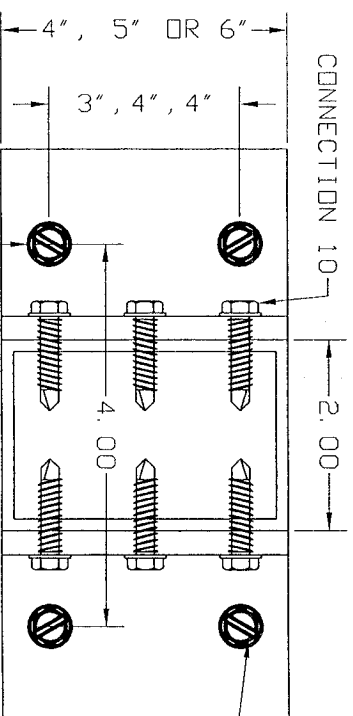
INTERMEDIATE MULLIONS



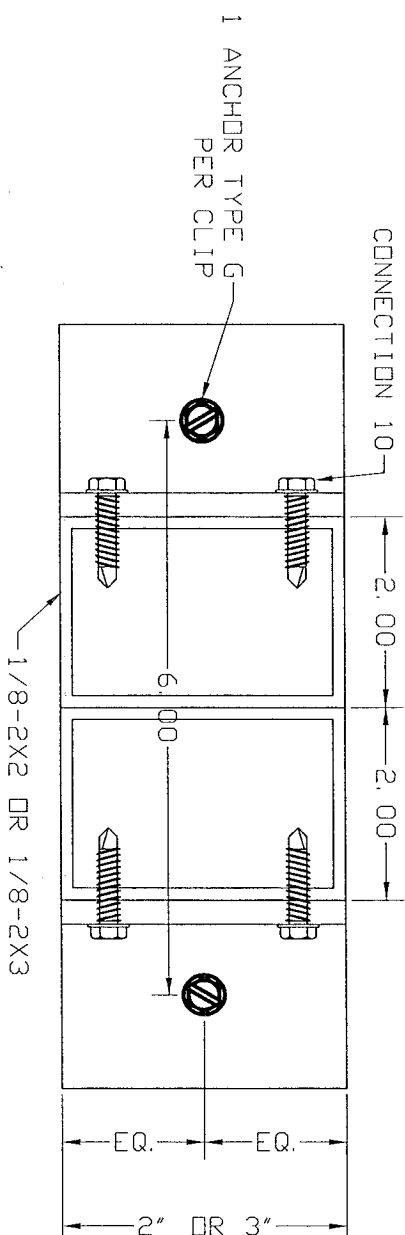
MULLION TYPE	TOTAL # OF ANCHOR
A	2
G	2
2X2	NA
2X3	NA
2X4	NA
2X5	NA
2X6	NA



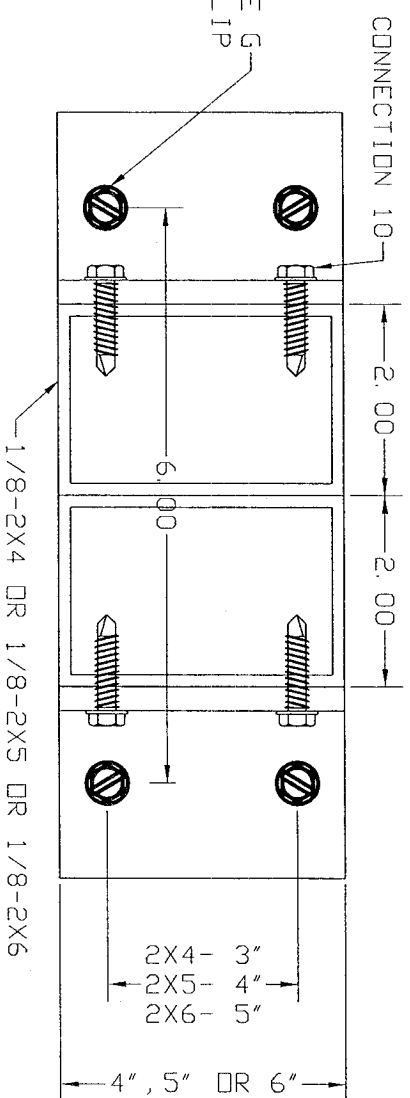
2 ANCHORS PER CLIP  
SEE TABLE ABOVE



2 ANCHOR TYPE A  
PER CLIP  
1/8-2X4 OR 1/8-2X5 OR  
1/8-2X6



2 ANCHOR TYPE G  
PER CLIP



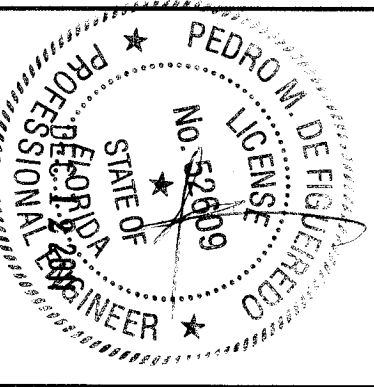
ANCHOR SCHEDULE					
ANCHOR TYPE	DESCRIPTION	MANUFACTURER	EMBEDMENT	ED	BASE MATERIAL
A	1/4" SS TAPCON	ITW	1 3/4"	2 1/2"	3000 PSI CONCRETE
G	5/16" TAPCON	ITW	2 1/4"	2 1/2"	3000 PSI CONCRETE

ANCHOR NOTES:  
1- 1/4" CARBON STEEL TAPCONS CAN BE USED AS AN ALTERNATE TO THE STAINLESS STEEL

Manufacturer:  
**CROCI NORTH AMERICA**  
11600 ADELMO LANE  
FORT MYERS, FL 33966  
Tel.: (239) 278-3066  
Fax: (239) 278-5977

PRODUCT:  
**ES 55 - ES 44**  
EXTRUDED ALUMINUM  
ROLLING SHUTTER

Engineering:  
**EngCo Inc.**  
CA 8116  
ENGCO@AOL.COM



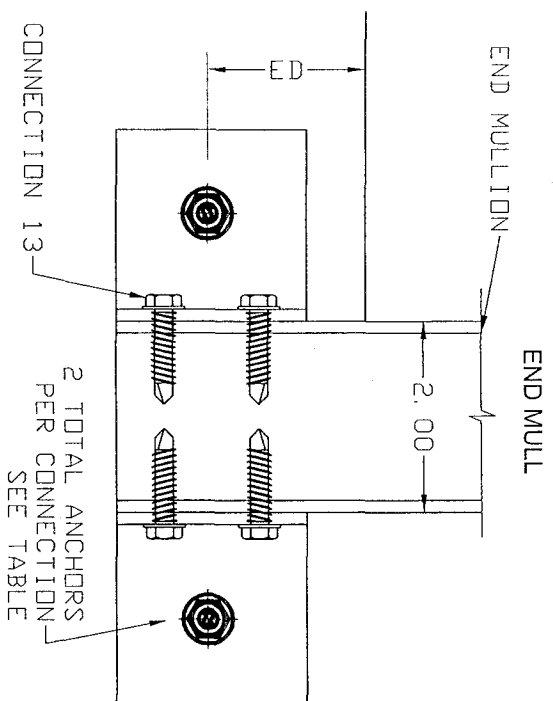
Engineer Seal  
Pedro De Figueredo, PE 52609  
Date: 11/12/2011  
Scale: NA  
Design by: PPMF

DRAFTING:  
**PK DRAFTING & MORE**

Drawing Number  
**11-239**

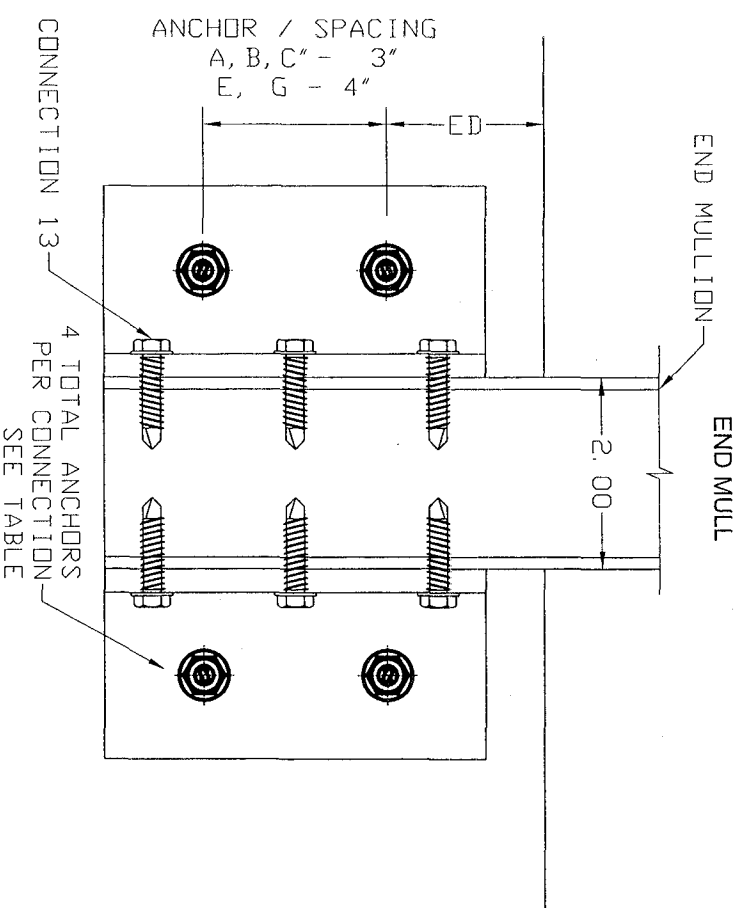
Sheet  
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CONNECTION 12  
CLIP ANCHORED TO WALL

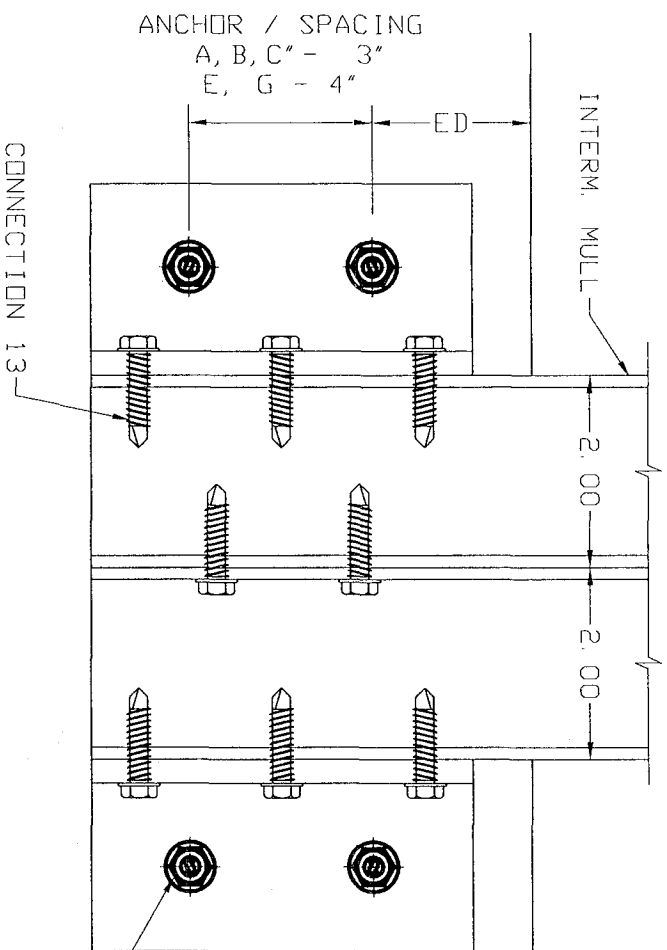


MULL TYPE	TOTAL # OF ANCHOR				
	A	B	C	G	E
2X2	2	4	2	2	2
2X3	2	-	2	2	4
2X4	4	-	4	4	-
2X5	4	-	4	4	-
2X6	4	-	4	4	-

ANCHORS TO BE DESIGNED BASED ON THE MINIMUM MULLION SIZE SELECTED FROM TABLES 7 AND 8.



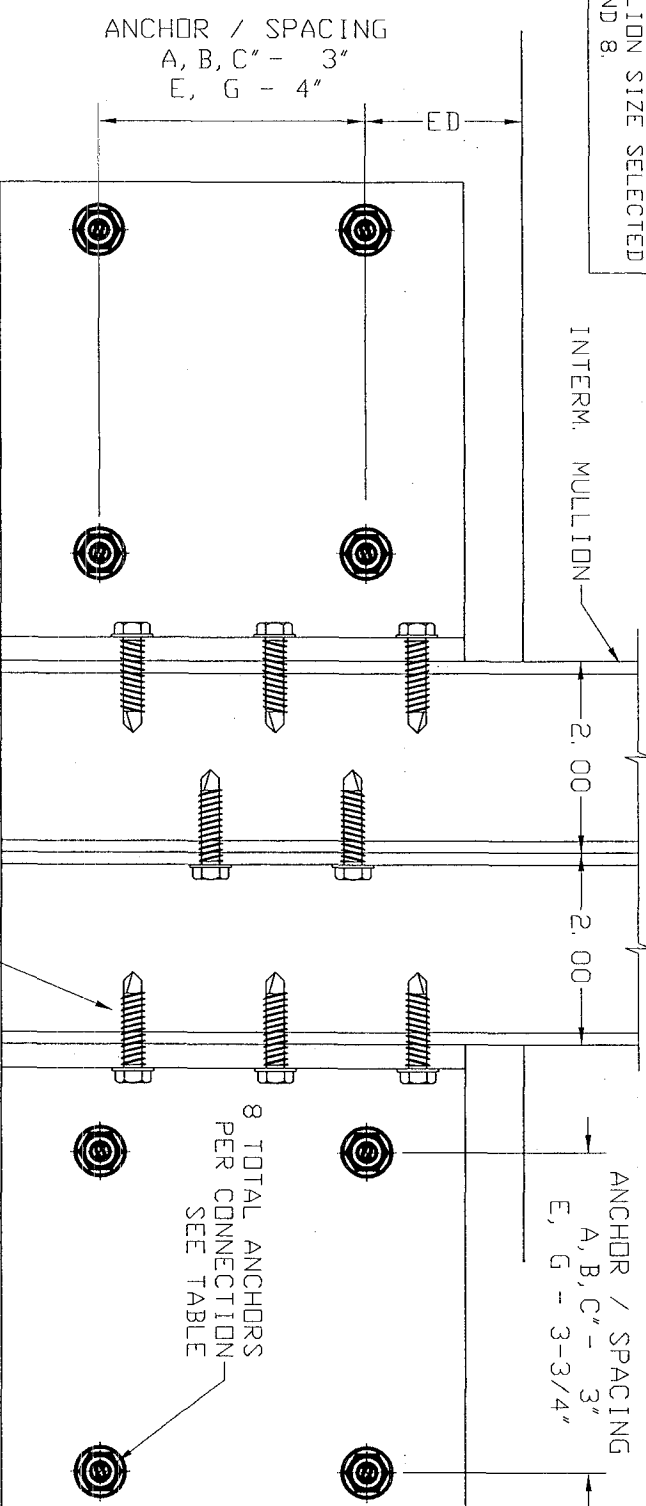
INTERMEDIATE MULLIONS



MULL TYPE	TOTAL # OF ANCHOR				
	A	B	C	G	E
2X2	4	8	4	4	4
2X3	4	-	4	4	8
2X4	8	-	8	8	-
2X5	8	-	8	8	-
2X6	8	-	8	8	-

4 TOTAL ANCHORS PER CONNECTION SEE TABLE

INTERMEDIATE MULLIONS



8 TOTAL ANCHORS PER CONNECTION SEE TABLE

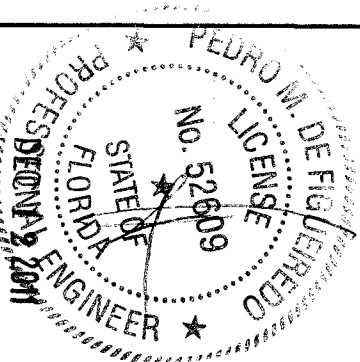
ANCHOR TYPE	DESCRIPTION	MANUFACTURER	EMBEDMENT	ED	BASE MATERIAL
A	1/4" SS TAPCON	ITW	1 3/4"	2 1/2"	3000 PSI CONCRETE
B	1/4" SS TAPCON	ITW	1 1/4"	2 1/2"	HOLLOW BLOCK
C	1/4"-14 SS HHSM	GENERIC	1 1/2"	1"	WOOD (SG = .46)
E	5/16" TAPCON	ITW	1 1/4"	4"	HOLLOW BLOCK
G	5/16" TAPCON	ITW	2 1/4"	4"	3000 PSI CONCRETE

ANCHOR NOTES:  
1- 1/4" TAPCONS CAN BE USED AS TYPE C INTO WOOD  
2- 1/4" CARBON STEEL TAPCONS CAN BE USED AS AN ALTERNATE TO THE STAINLESS STEEL  
3- METAL STRUCTURES ARE MADE OF MINIMUM 6063-T6 ALUMINUM OR ASTM A36 STEEL

Manufacturer:  
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PRODUCT:  
**ES 55 - ES 44**  
EXTRUDED ALUMINUM  
ROLLING SHUTTER

Engineering:  
**Eng'g Inc.**  
CA 8116  
ENGCO@AOL.COM



Engineer Seal  
Pedro De Figueroa, PE 52609  
Date: 11/12/2011  
Scale: NA  
Design by: PPMF

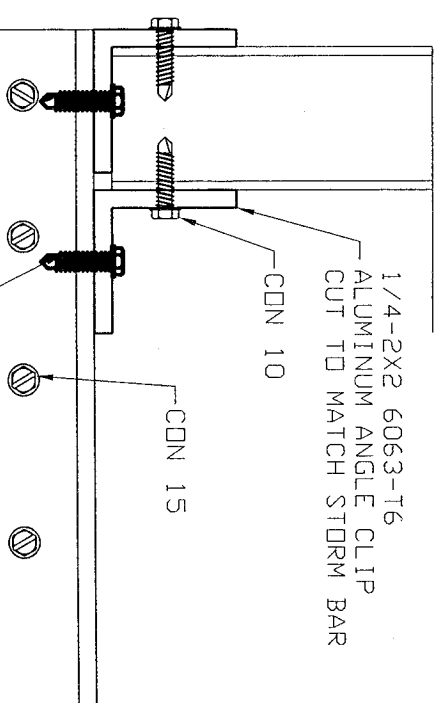
DRAFTING:  
**PK DRAFTING & MORE**

Drawing Number  
**11-239**

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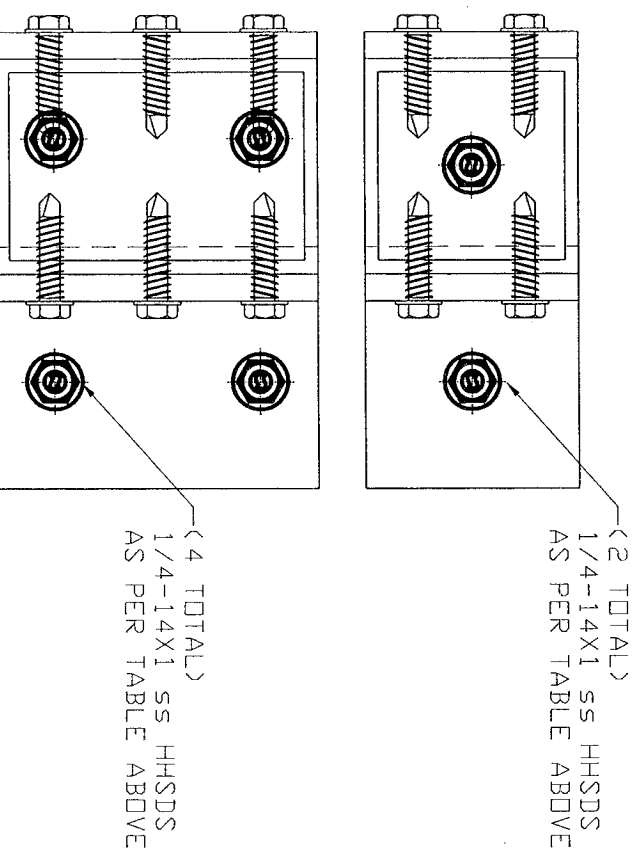
CONNECTION 14  
CLIP ANCHORED TO BUILT-OUT TUBE

END MULL



MULL TYPE	TOTAL # OF SCREWS
2X2	2
2X3	2
2X4	4
2X5	4
2X6	4

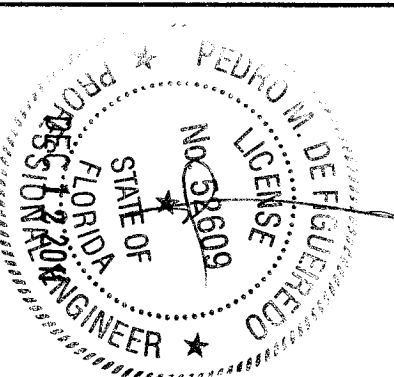
ANCHORS TO BE DESIGNED BASED ON THE MINIMUM MULLION SIZE SELECTED FROM TABLES 7 AND 8.



Manufacturer:  
**CROCI NORTH AMERICA**  
11600 ADELMO LANE  
FORT MYERS, FL 33966  
Tel.: (239) 278-3066  
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PRODUCT:  
**ES 55 - ES 44**  
EXTRUDED ALUMINUM ROLLING SHUTTER

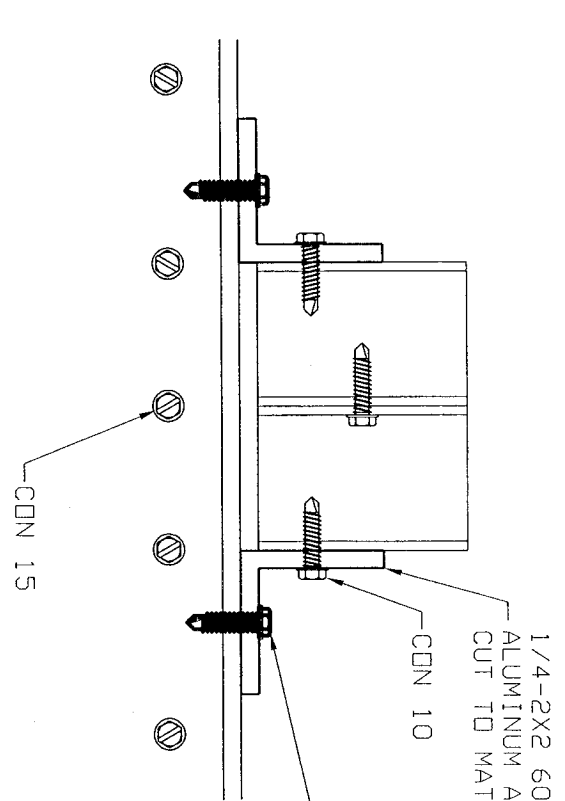
Engineering:  
**Eng'g Dr. Inc.**  
CA 8116  
ENGCO@AOL.COM



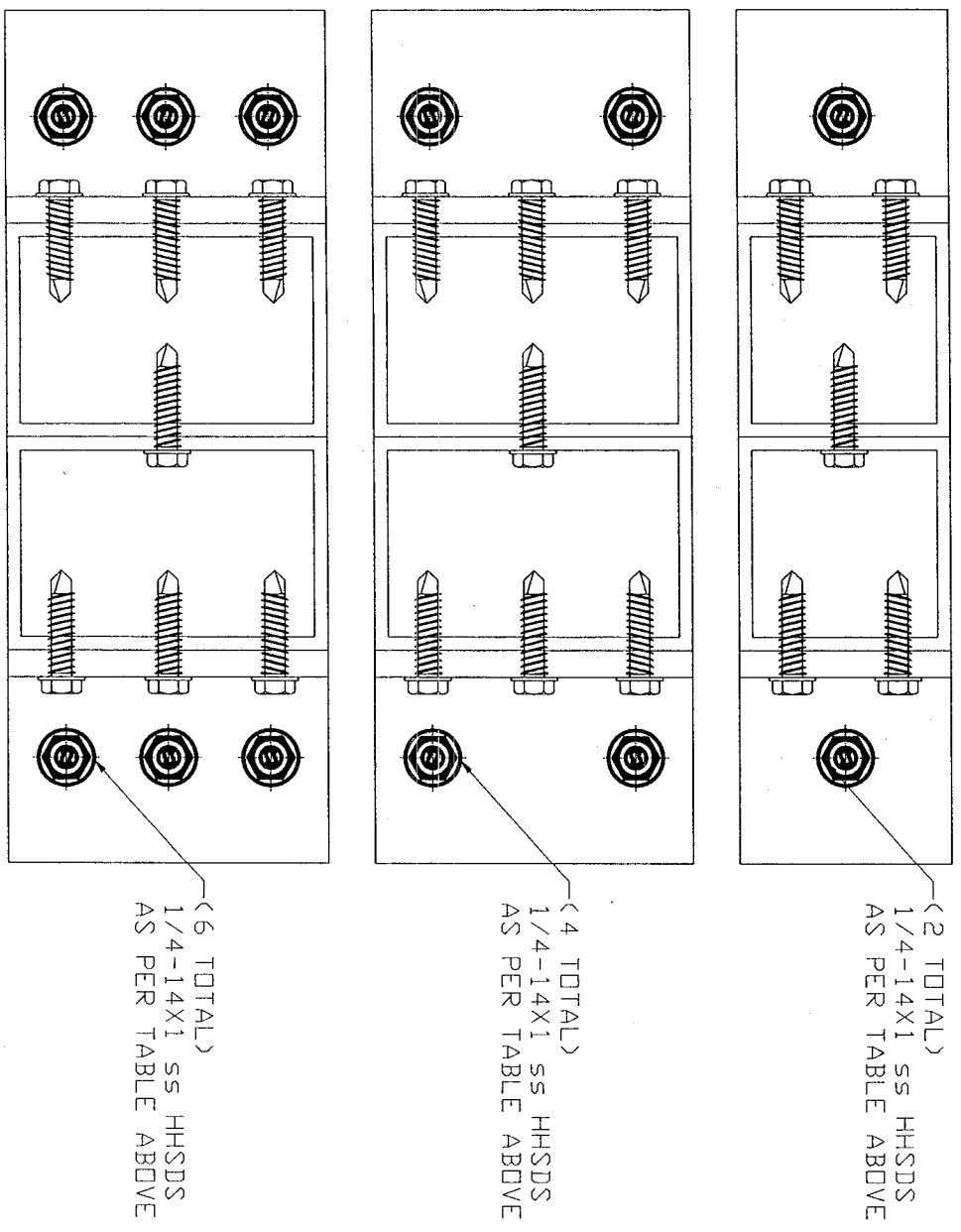
Engineer Seal  
Pedro De Figueroa, PE 52809  
Date: 11/12/2011  
Scale: NA  
Design by: PPMF

DRAFTING:  
**PK DRAFTING & MORE**  
Drawing Number  
**11-239**

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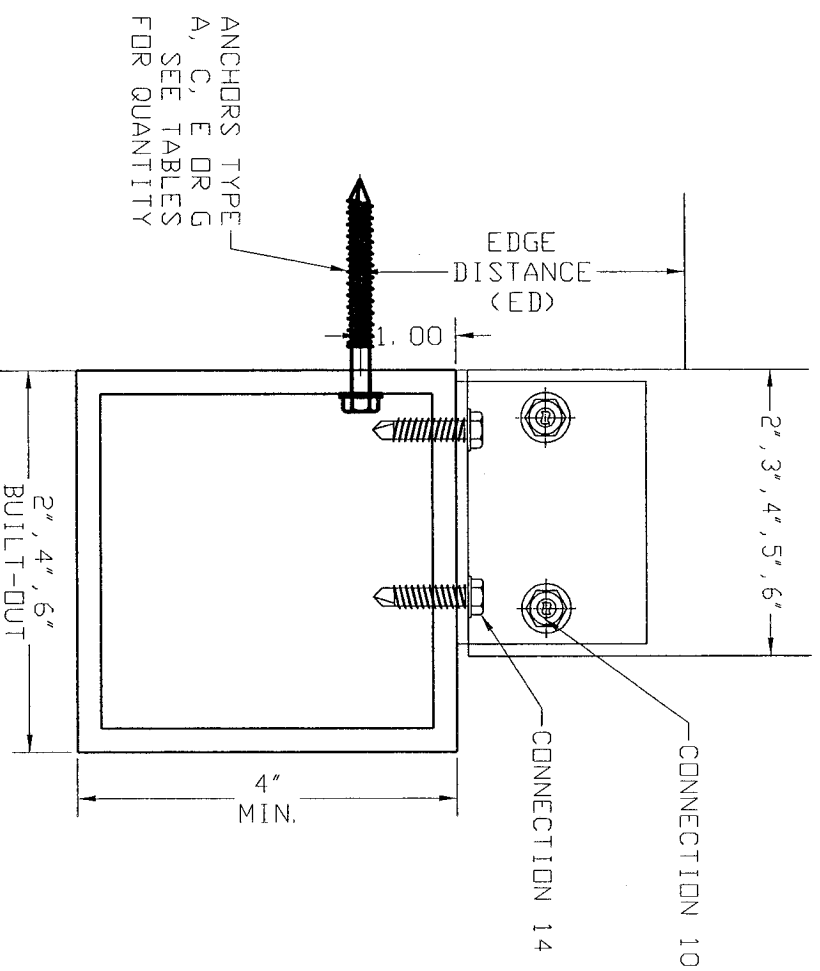


MULL TYPE	TOTAL # OF SCREWS
2X2	2
2X3	4
2X4	6
2X5	6
2X6	6



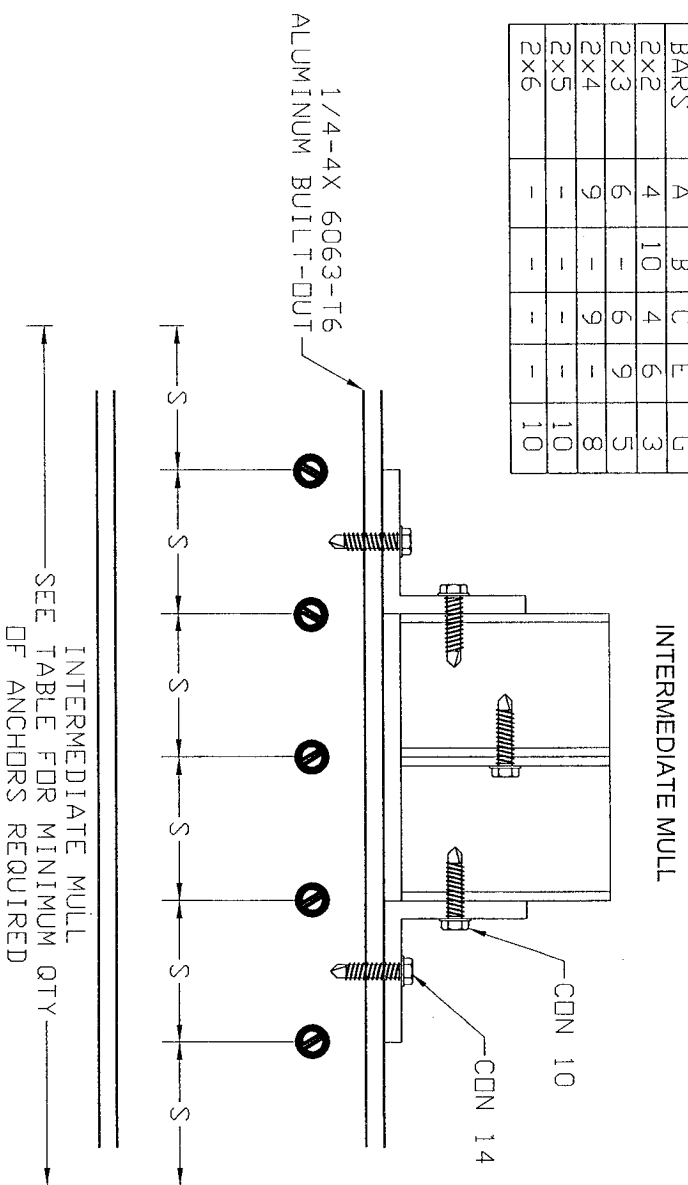


**CONNECTION 15  
BUILT-OUT WALL ANCHORAGE  
SUPPORTING MULLIONS**



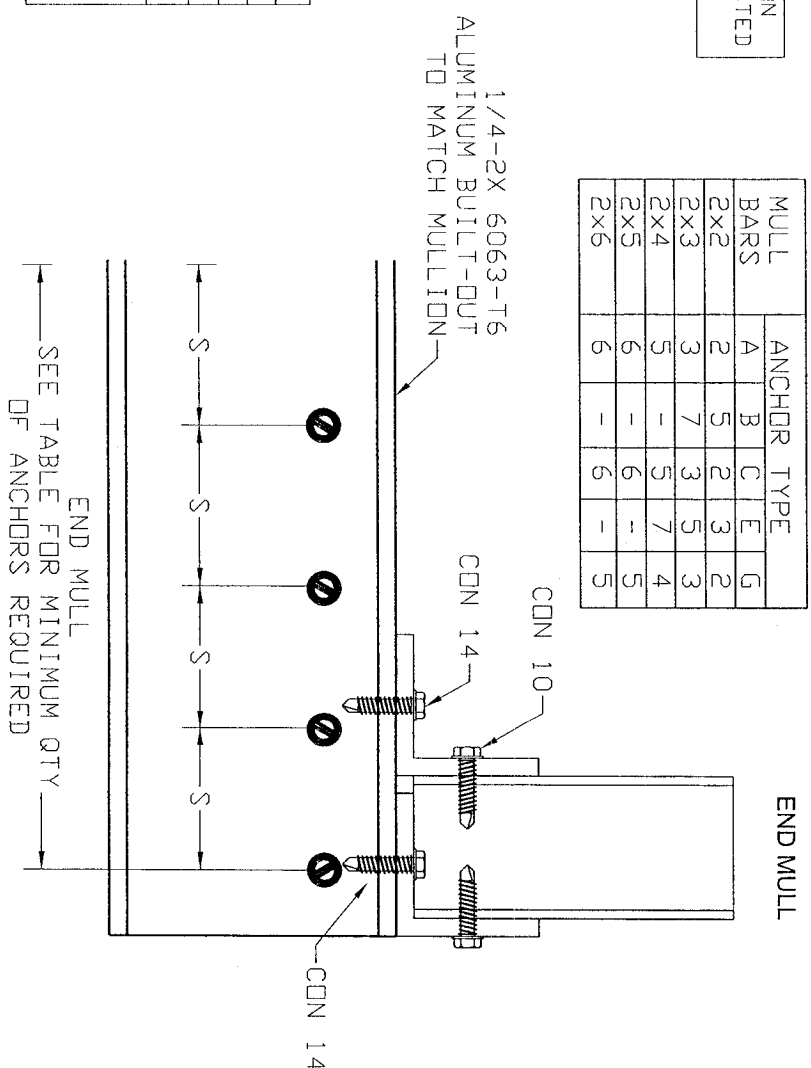
CONNECTION 15 -- INTERMEDIATE MULL  
MIN. NUMBER OF ANCHORS  
TO SECURE BUILT-OUT TUBE TO WALL

MULL BARS	ANCHOR TYPE						
	A	B	C	E	G		
2x2	4	10	4	6	3		
2x3	6	-	6	9	5		
2x4	9	-	9	-	8		
2x5	-	-	-	-	10		
2x6	-	-	-	-	10		



CONNECTION 15 -- END MULL  
MIN. NUMBER OF ANCHORS  
TO SECURE BUILT-OUT TUBE TO WALL

MULL BARS	ANCHOR TYPE						
	A	B	C	E	G		
2x2	2	5	2	3	2		
2x3	3	7	3	5	3		
2x4	5	-	5	7	4		
2x5	6	-	6	-	5		
2x6	6	-	6	-	5		



ANCHOR TYPE			
A	C	E	G
S	3.0	3.0	4.0
ED	2.5	1.0	4.0

S - ANCHOR SPACING  
ED - EDGE DISTANCE

ANCHORS TO BE DESIGNED BASED ON THE MINIMUM MULLION SIZE SELECTED FROM TABLES 7 AND 8.

ANCHOR SCHEDULE

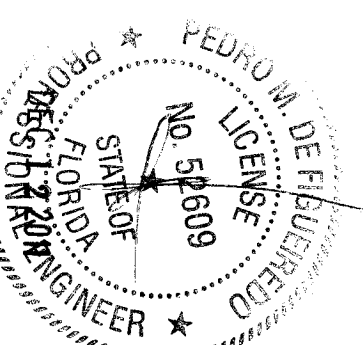
TYPE	DESCRIPTION	MANUFACTURER	EMBEDMENT	ED	BASE MATERIAL
A	1/4" SS TAPCON	ITW	1 3/4"	2 1/2"	3000 PSI CONCRETE
C	1/4"-14 SS HHSMS	GENERIC	1 1/2"	1"	WOOD (SG) = .46)
E	5/16" TAPCON	ITW	1 1/4"	4"	HOLLOW BLOCK
G	5/16" TAPCON	ITW	2 1/4"	4"	3000 PSI CONCRETE

ANCHOR NOTES:  
1- 1/4" TAPCONS CAN BE USED AS TYPE C INTO WOOD  
2- 1/4" CARBON STEEL TAPCONS CAN BE USED AS AN ALTERNATE TO THE STAINLESS STEEL  
3- METAL STRUCTURES ARE MADE OF MINIMUM 6063-T6 ALUMINUM OR ASTM A36 STEEL

Manufacturer:  
**CROCI NORTH AMERICA**  
11600 ADELMO LANE  
FORT MYERS, FL 33966  
Tel.: (239) 278-3066  
Fax: (239) 278-5977

PRODUCT:  
**ES 55 - ES 44**  
EXTRUDED ALUMINUM  
ROLLING SHUTTER

Engineering:  
**Eng Do Inc.**  
CA 8116  
ENGCO@AOL.COM



Engineer Seal  
Pedro De Figueiredo, PE 52609  
Date: 11/12/2011  
Scale: NA  
Design by: PPMF

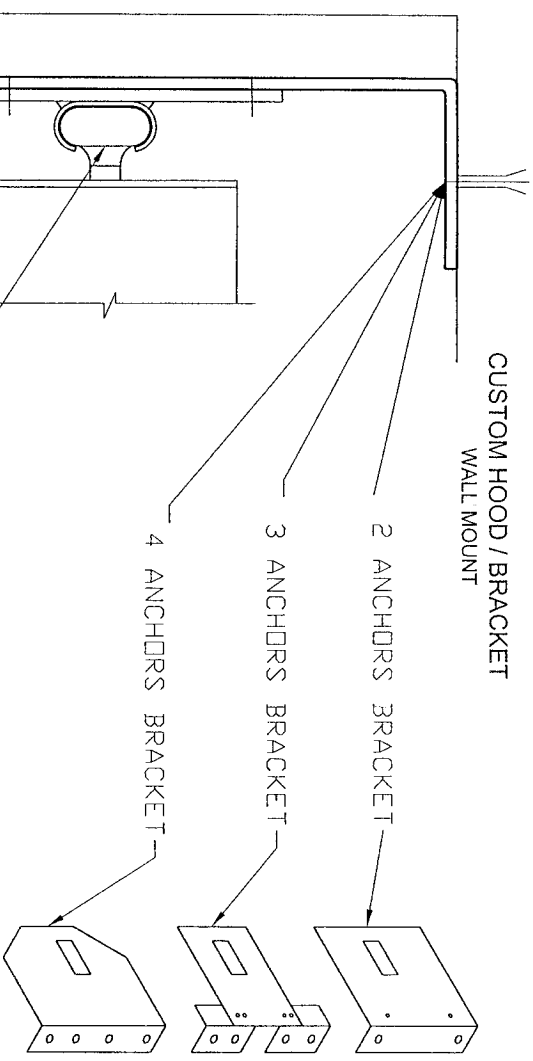
DRAFTING:  
**PK DRAFTING & MORE**

Drawing Number  
**11-239**

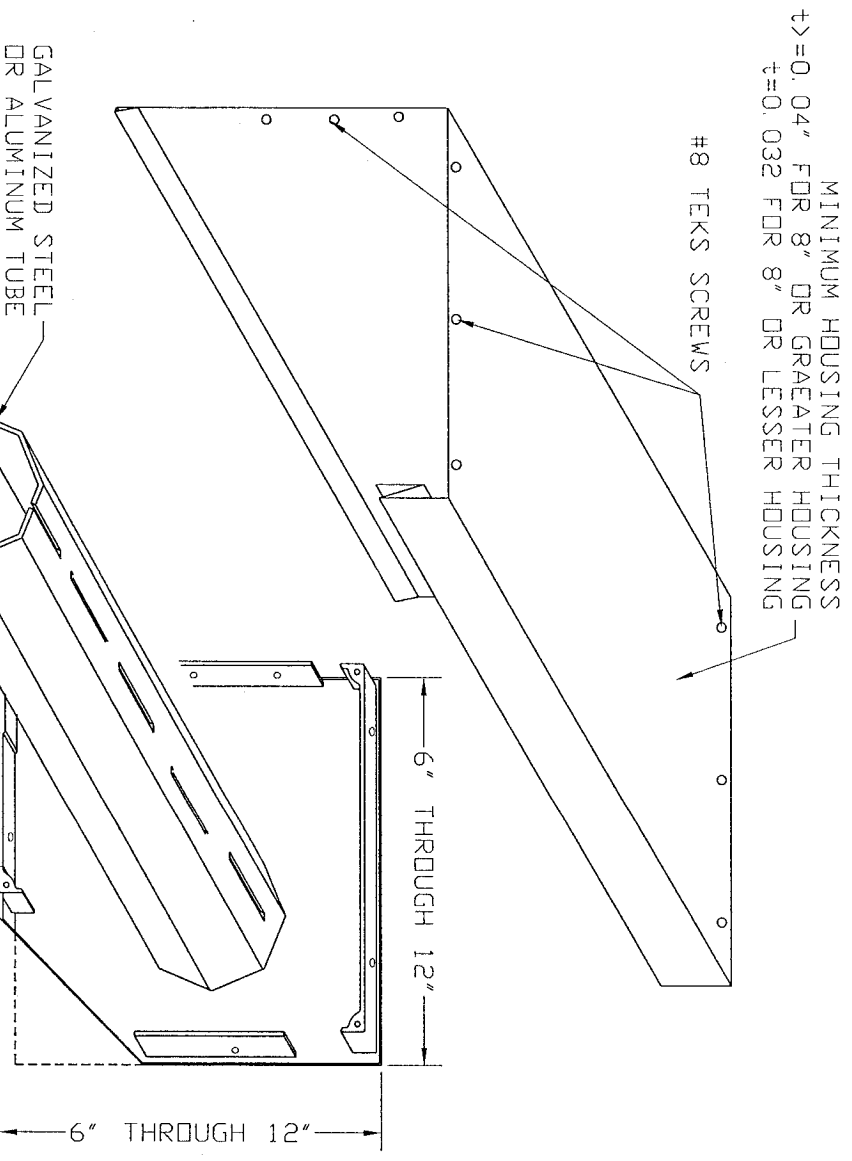
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**HOUSING ASSEMBLY**

CUSTOM HOOD / BRACKET  
WALL MOUNT

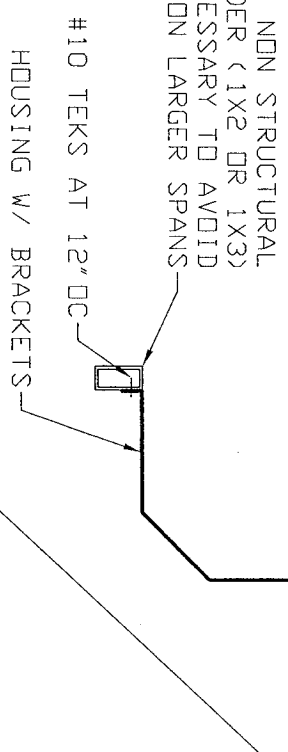


STD. HOOD / END CAP  
WALL MOUNT

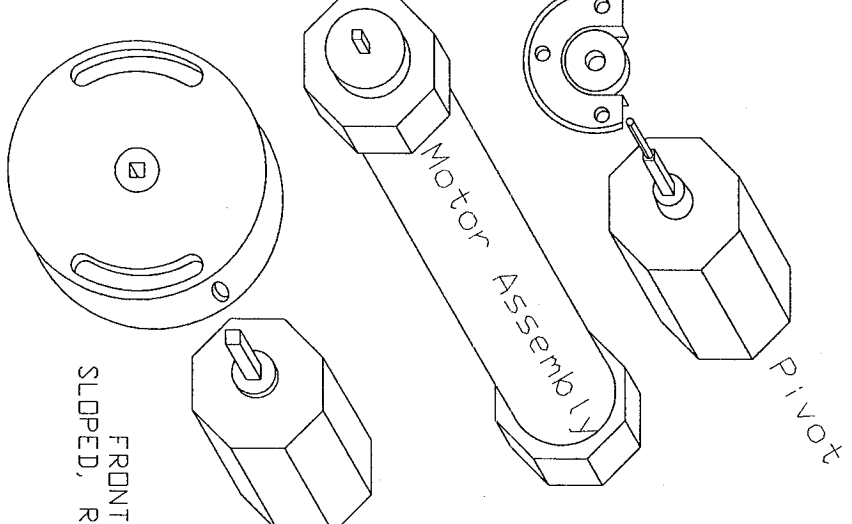
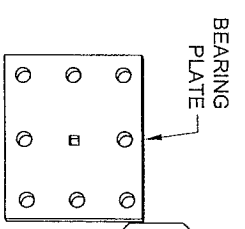
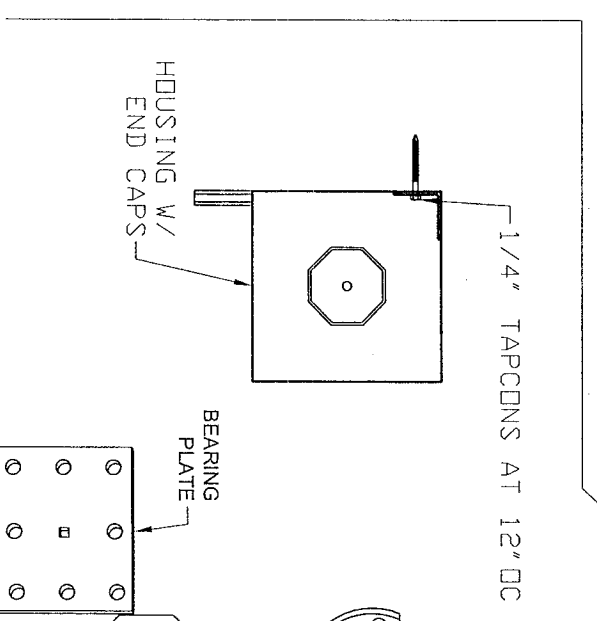


MINIMUM HOUSING THICKNESS  
t >= 0.04" FOR 8" OR GREATER HOUSING  
t = 0.032" FOR 8" OR LESSER HOUSING

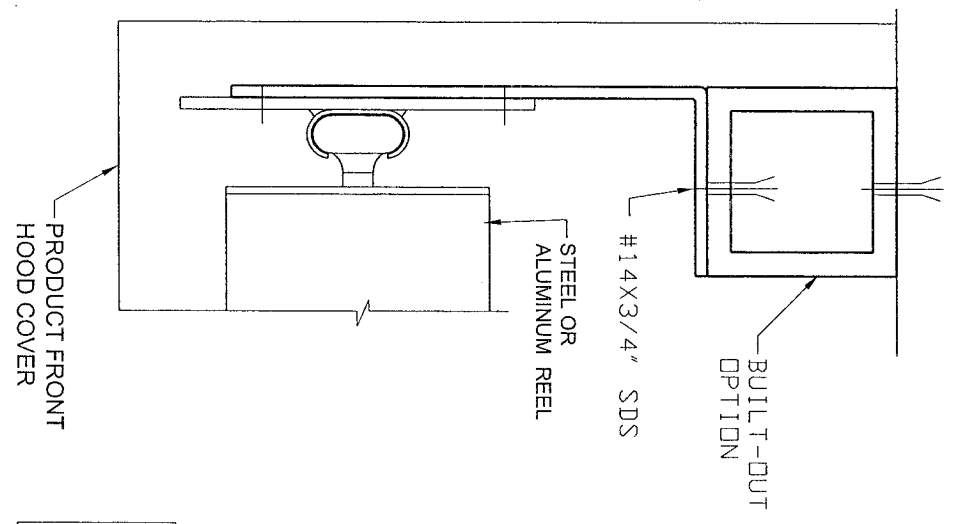
GALVANIZED STEEL  
OR ALUMINUM TUBE



NON STRUCTURAL  
HEADER (1X2 OR 1X3)  
USE WHEN NECESSARY TO AVOID  
HOOD SAGGING ON LARGER SPANS



FRONT HOOD OPTIONS  
SLOPED, ROUND & SQUARE

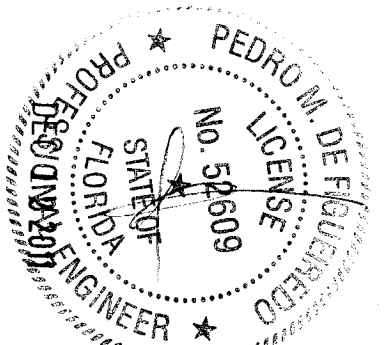


NOTE: THE ROLL-UP MECHANISM (GEARS,  
MOTORS, SUPPORTING END PLATES) ARE NOT  
PART OF THIS APPROVAL. MANUFACTURER IS  
RESPONSIBLE TO SPECIFY THESE COMPONENTS  
FOR PROPER PRODUCT OPERATION.

Manufacturer:  
**CROCI NORTH  
AMERICA**  
11600 ADELMO LANE  
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EXTRUDED ALUMINUM  
ROLLING SHUTTER

Engineering:  
**Engco Inc.**  
CA 8116  
ENGCO@AOL.COM



Engineer Seal  
Pedro De Figueroa, PE 52609

Date: 11/12/2011  
Scale: NA  
Design by: PPMF

DRAFTING:  
**PK DRAFTING & MORE**

Drawing Number  
**11-239**

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