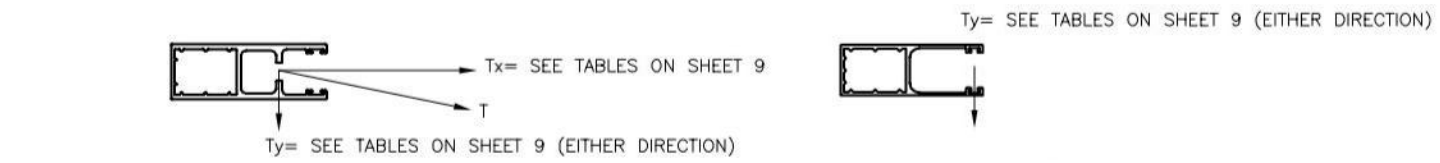


GENERAL NOTES:

- TKJ ENGINEERING, LLC. HAS NO CONTROL OF THE MANUFACTURING, PERFORMANCE, OR INSTALLATION OF THIS PRODUCT. THESE GENERIC PLANS WERE ENGINEERED IN ACCORDANCE WITH ACCEPTED ENGINEERING PRACTICES AND TEST DATA PROVIDED BY THE MANUFACTURER.
- THE ROLL-UP SHUTTERS SHOWN ON THIS PRODUCT EVALUATION DOCUMENT HAS BEEN DESIGNED IN ACCORDANCE WITH THE 2010 FLORIDA BUILDING CODE (FBC) AND THE 2009 INTERNATIONAL BUILDING CODE (IBC). THESE ROLL-UP SHUTTERS SHALL NOT BE INSTALLED IN HIGH VELOCITY HURRICANE ZONES (MIAMI-DADE COUNTY/BROWARD COUNTY). ROLL-UP SHUTTERS INSTALLED IN WIND ZONE 4 (SEE FBC SECTION 1609.1.2.4), OR ESSENTIAL FACILITIES SHALL MEET THE MINIMUM SEPARATION TO GLASS. DESIGN WIND LOADS SHALL BE DETERMINED AS PER SECTION 1609 OF THE ABOVE REFERENCED CODES, IN ACCORDANCE WITH ASCE 7, AND FOR A BASIC WIND SPEED AS REQUIRED BY THE JURISDICTION WHERE THE ROLL-UP SHUTTERS WILL BE INSTALLED. THE ROLL-UP SHUTTERS ADEQUACY FOR IMPACT, DEFLECTION, AND FATIGUE RESISTANCE HAS BEEN VERIFIED IN ACCORDANCE WITH SECTION 1609.1.2 OF THE ABOVE REFERENCED CODES AND AS PER ASTM E330, E1886 & E1996, AND TAS 201 AT FENESTRATION TESTING LABORATORY, INC. AND AMERICAN TEST LAB OF SOUTH FLORIDA PER THEIR REPORTS (SEE LIST OF REPORTS).
- LIMITATIONS OF USE:
 - THIS PRODUCT SHALL NOT BE USED IN HIGH VELOCITY HURRICANE ZONES (PER FBC),
 - THIS PRODUCT IS QUALIFIED AS "NON POROUS" THEREFORE GLASS SEPARATION IS NOT REQUIRED EXCEPT FOR THE FOLLOWING LOCATIONS.
 - ESSENTIAL FACILITIES AS DEFINED IN ASCE 7-10
 - IN WIND ZONE 4 WHERE THE SPECIFYING AUTHORITY HAS SPECIFIED OPTIONAL ADDITIONAL PASS/FAIL CRITERIA IN ACCORDANCE WITH ASTM E1996-09 SECTION 7.2 WIND ZONE 4 AS DEFINED IN ASTM E1996 WITH MODIFICATION BY THE FBC SECTION 1609.1.2.4 (LOCATIONS WITH BASIC WIND SPEED GREATER THAN 160 MPH).
 INSTALLATION IN THESE LOCATIONS SHALL MEET THE MINIMUM SEPARATION TO GLASS TABLES ON SHEET 9. THE SEPARATION TO GLASS MAY BE REDUCED BY USING STORM BARS ON SHEETS 18 TO 22
 - INSTALLATION WITH INTERMEDIATE, END, AND CORNER MULLIONS REQUIRE A FLORIDA PRODUCT APPROVAL FOR USE WITH THIS TYPE OF SHUTTER SYSTEM.
 - INSTALLATIONS SHALL NOT EXCEED THE MAXIMUM ALLOWABLE STRESS DESIGN (ASD) DESIGN RATINGS AND MAXIMUM SIZE LIMITS BELOW. ULTIMATE DESIGN WIND LOADS DETERMINED BY THE FBC AND ASCE 7-10 SHALL BE REDUCED TO ASD BY MULTIPLYING 0.6 (SEE FBC SECTION 1609.1.2.3).
 - 38 PSF MAX. PRESSURE @ 278" MAX. WIDTH
 - 140 PSF MAX. PRESSURE @ 96" MAX. WIDTH
 - SEE TABLES ON SHEETS 7 THROUGH 22
 - IMPACT LEVEL D; 9-1/4 LB LARGE MISSILE IMPACT.
 - ANCHORING OR LOADING CONDITIONS OTHER THAN THOSE SHOWN IN THESE DETAILS ARE NOT PART OF THIS APPROVAL
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE EXISTING STRUCTURE IS DESIGNED TO SUPPORT THE LOADS FROM THE SHUTTER SYSTEM AND MULLIONS. EXISTING STRUCTURES NOT ABLE TO SUPPORT THESE LOADS SHALL BE EVALUATED AS A SITE SPECIFIC PROJECT. SEE NOTE 4 OF PRODUCT EVALUATION NOTES.



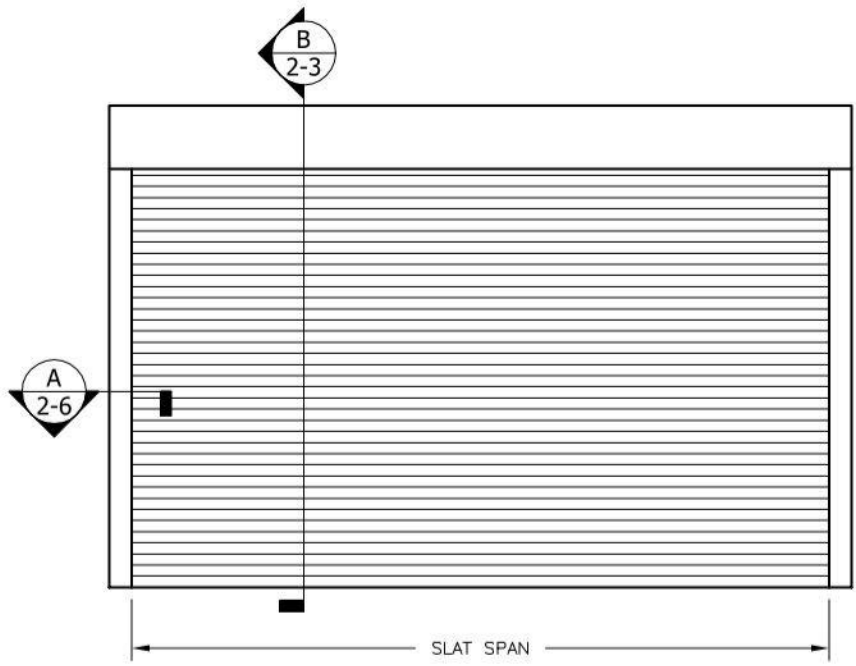
- ALL ALUMINUM EXTRUSIONS SHALL BE 6063-T6 ALLOY (UNLESS OTHERWISE NOTED OR CAN BE REPLACED WITH 6061-T6 ALLOY).
- SHUTTERS MAY BE MOTOR, TAPE PULLEY, OR GEAR DRIVEN.
- SHUTTER MANUFACTURE'S LABELS SHALL BE IN ACCORDANCE WITH SECTION 1715.8 OF THE FLORIDA BUILDING CODE.

PRODUCT EVALUATION NOTES:

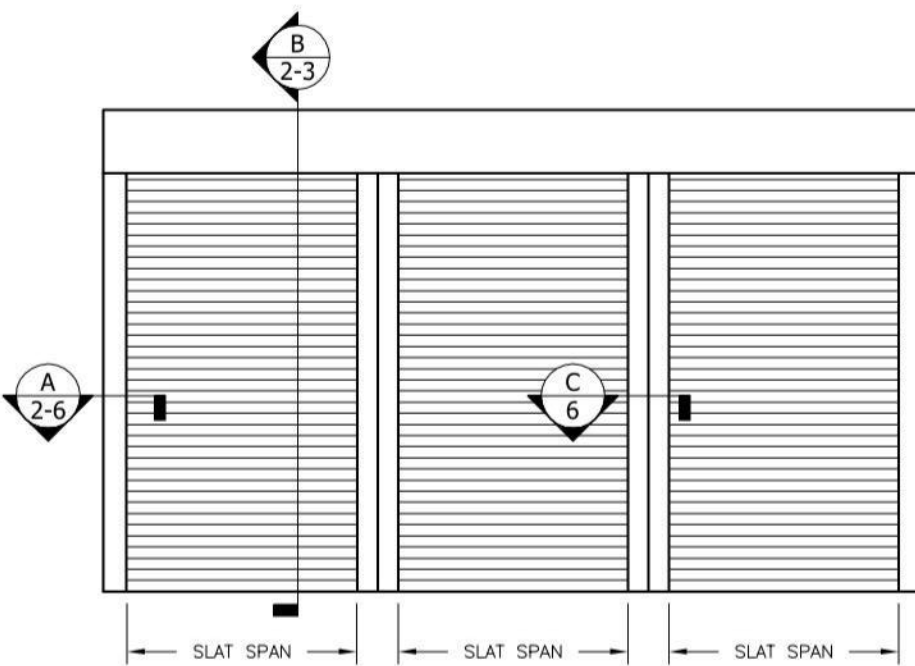
- THIS PRODUCT EVALUATION DOCUMENT (P.E.D.) PREPARED BY THIS ENGINEER IS GENERIC AND DOES NOT PROVIDE INFORMATION FOR A SITE SPECIFIC PROJECT; I.E. WHERE THE SITE CONDITIONS DEVIATE FROM THE P.E.D.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE SELECTION, PURCHASE, AND INSTALLATION OF THIS PRODUCT BASED ON THIS PRODUCT EVALUATION PROVIDED AND SHALL NOT DEVIATE FROM THE CONDITIONS DETAILED ON THIS DOCUMENT.
- THIS PRODUCT EVALUATION DOCUMENT WILL BE CONSIDERED INVALID IF ALTERED BY ANY MEANS.
- SITE SPECIFIC PROJECTS SHALL BE PREPARED BY A FLORIDA REGISTERED ENGINEER OR ARCHITECT WHICH WILL BECOME THE ENGINEER OF RECORD (E.O.R.) FOR THE PROJECT AND WHO WILL BE RESPONSIBLE FOR THE PROPER USE OF THE P.E.D. THE ENGINEER OF RECORD, ACTING AS A DELEGATED ENGINEER TO THE P.E.D. ENGINEER, SHALL SUBMIT SITE SPECIFIC DRAWINGS FOR REVIEW.

ANCHOR & FASTENING NOTES:

- ALL FASTENERS SHALL BE CORROSION RESISTANT COATED CARBON STEEL AS PER DIN 50018 OR STAINLESS STEEL 304 OR 316 SERIES WITH 50 KSI YIELD POINT AND 90 KSI ULTIMATE TENSILE STRENGTH.
- NO EMBEDMENT INTO NON-STRUCTURAL COMPONENTS SUCH AS, STUCCO, TILE, SIDING, ETC. SHALL BE CONSIDERED AS PART OF THE EMBEDMENT.
- THE ANCHOR SPACING AND DESIGN PRESSURES ARE VALID FOR EDGE DISTANCES AND MINIMUM EMBEDMENT SHOWN ON SHEET 9. THE MINIMUM EDGE DISTANCE FOR THE 1/4-14 & 5/16-24 DRILL-FLEX SCREW IS 1/2" AND SHALL BE ATTACHED TO 6063-T6 ALUMINUM OR A36 STEEL (OR BETTER).



TYPICAL SINGLE UNIT ELEVATION
SINGLE SPAN UNIT INSTALLATION - N.T.S.



TYPICAL MULTIPLE UNIT ELEVATION
INTERMEDIATE MULLION REQUIRED FOR INSTALLATION - N.T.S.

EVALUATION BASED ON:	
FENESTRATION TESTING LABORATORY, INC.	
LABORATORY No.	4760
DATE:	DECEMBER 1, 2005
REPORT NO.	5
FILE NUMBER	05-418
TESTING PROTOCOL:	E330, E1886 & E1996-02
MAXIMUM WIDTH TESTED=	120"
DESIGN PRESSURE =	140.0 PSF
LABORATORY No.	4744
DATE:	NOVEMBER 14, 2005
REPORT NO.	4
FILE NUMBER	05-418
TESTING PROTOCOL:	E330, E1886 & E1996-02
MAXIMUM WIDTH TESTED=	97"
DESIGN PRESSURE =	45 PSF
LABORATORY No.	4740
DATE:	NOVEMBER 14, 2005
REPORT NO.	3
FILE NUMBER	05-418
TESTING PROTOCOL:	E330, E1886-02 & E1996-02
MAXIMUM WIDTH TESTED=	120"
DESIGN PRESSURE =	23 PSF
LABORATORY No.	4644
DATE:	JUNE 17, 2005
REPORT NO.	2
FILE NUMBER	05-418
TESTING PROTOCOL:	E330, E1886-02 & E1996-02
MAXIMUM WIDTH TESTED=	281"
DESIGN PRESSURE =	60 PSF
LABORATORY No.	4596
DATE:	APRIL 29, 2005
REPORT NO.	1
FILE NUMBER	05-418
TESTING PROTOCOL:	E330, E1886-02 & E1996-02
MAXIMUM WIDTH TESTED=	242.5"
DESIGN PRESSURE =	80 PSF
LABORATORY No.	2760
DATE:	AUGUST 31, 2000
REPORT NO.	3
FILE NUMBER	00-256
TESTING PROTOCOL:	TAS 201
STORM BARS TESTED:	2x2x1/4, 2x3x1/8, 2x4x1/8, 2x4x1/4
AMERICAN TESTING LAB OF SOUTH FLORIDA, INC.	
LABORATORY No.	0928.01-09
DATE:	FEBRUARY 2, 2010
CERTIFICATION No.	09-0203.02
TESTING PROTOCOL:	E330-02, E1886-05 & E1996-05
MAXIMUM WIDTH TESTED=	204" & 120"
DESIGN PRESSURE =	62 PSF & 100 PSF

REVISIONS	DATE	#

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PHONE: 800.432.2204; FAX: 561.941.0852
WWW.AMSSHUTTER.ORG

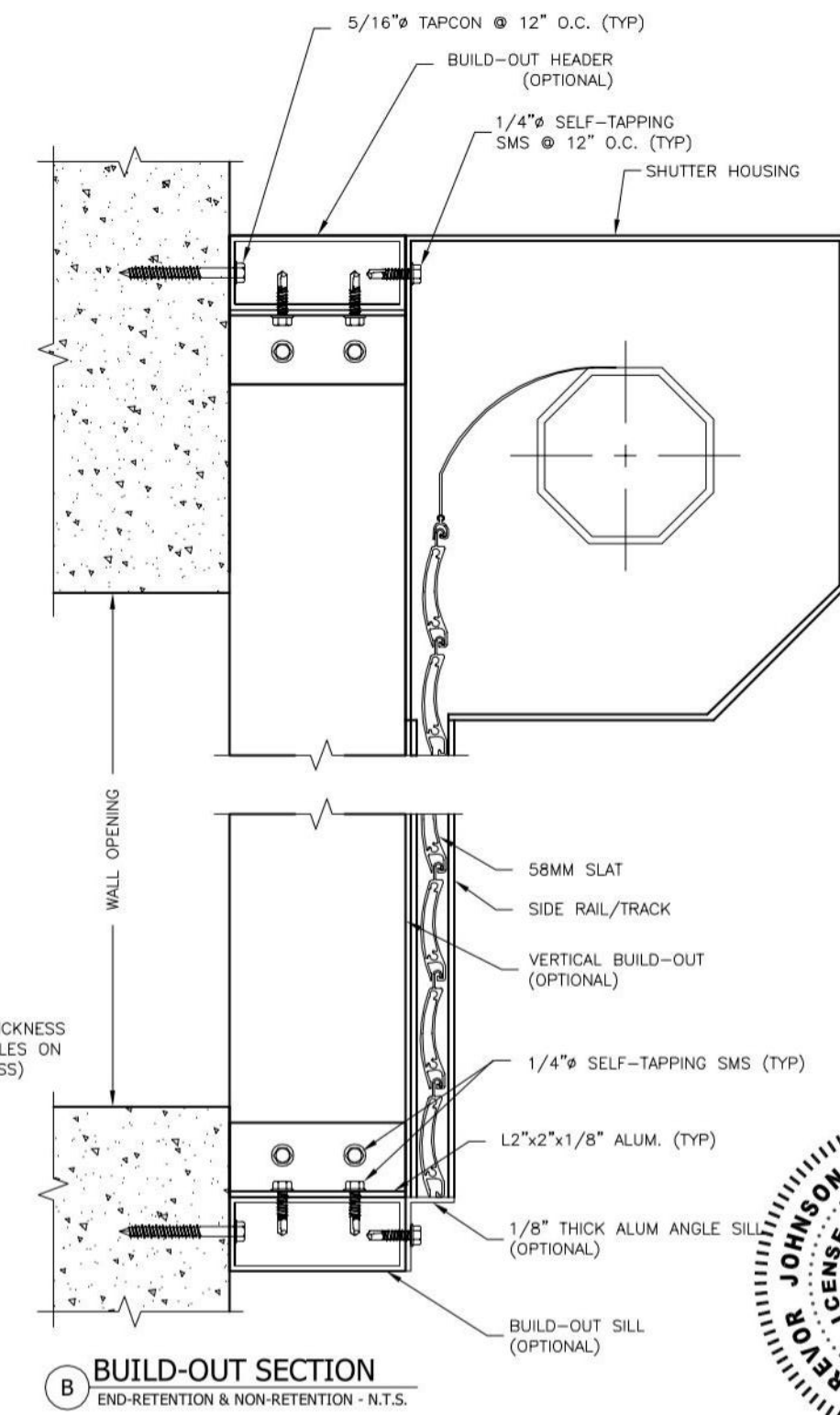
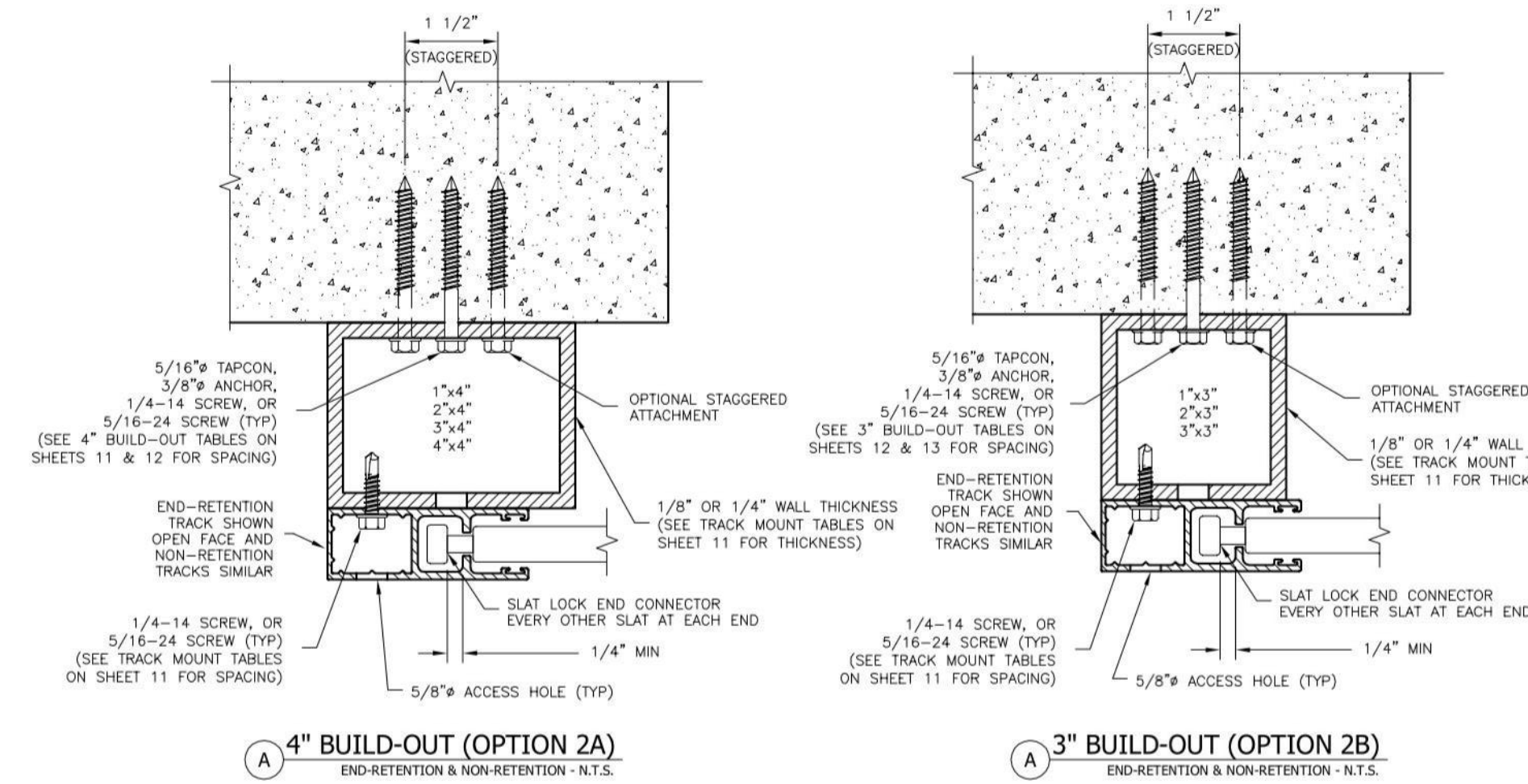
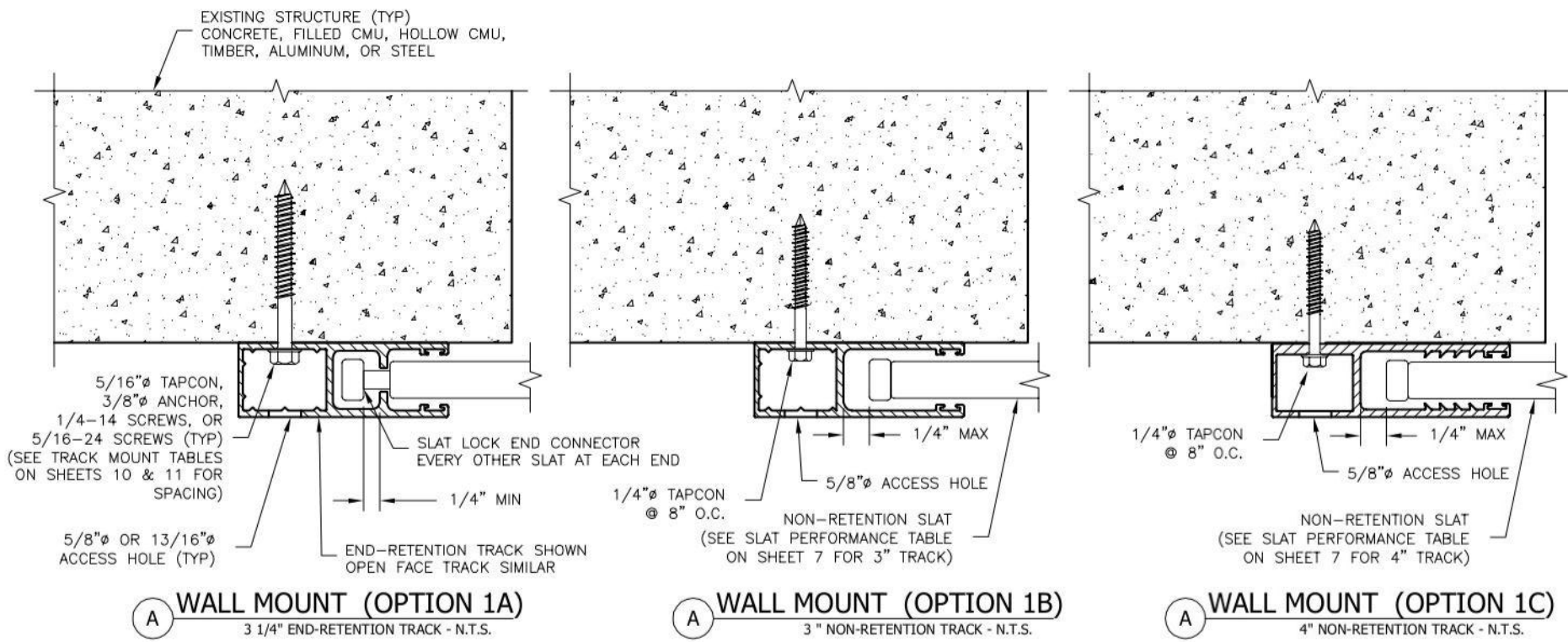
58MM BERTHA
END RETENTION / NON-RETENTION
ROLL-UP SHUTTER SYSTEM

TKJ Engineering, LLC.
1255 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 813.404.7649; EM: TKJENGINEERING@GMAIL.COM
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE:	4/24/12	TKJ	N.T.S.	12-0402
DRAWN BY:	TKJ	SCALE:	N.T.S.	PROJ. #:

TREVOR JOHNSON
LICENSE No. 65624
STATE OF FLORIDA
REGISTERED PROFESSIONAL ENGINEER
EXPIRES 12/31/13

1 OF 22



NOTE: ACCESS HOLES FOR 3/8" ANCHORS ARE 13/16"

REVISIONS	DATE	#

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**58MM BERTHA
END RETENTION / NON-RETENTION
ROLL-UP SHUTTER SYSTEM**

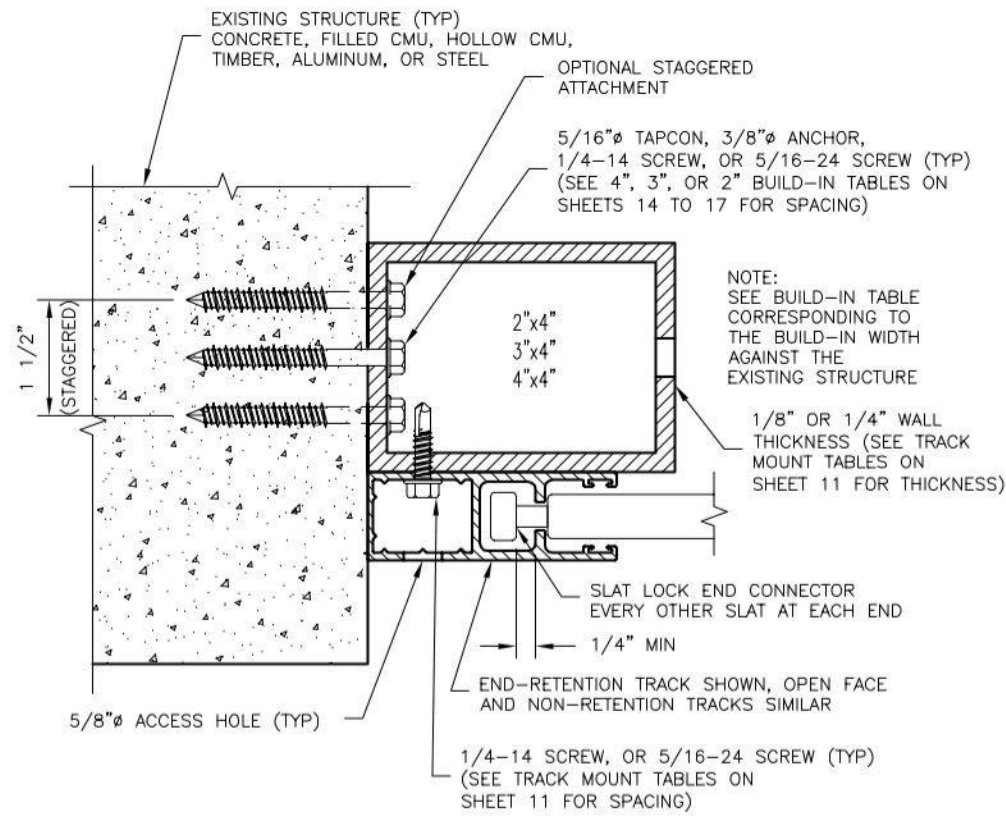
TK Engineering, LLC.
116 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 813.404.7649; EM: TKENGINEERING@GMAIL.COM
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 4/24/12
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 12-0402

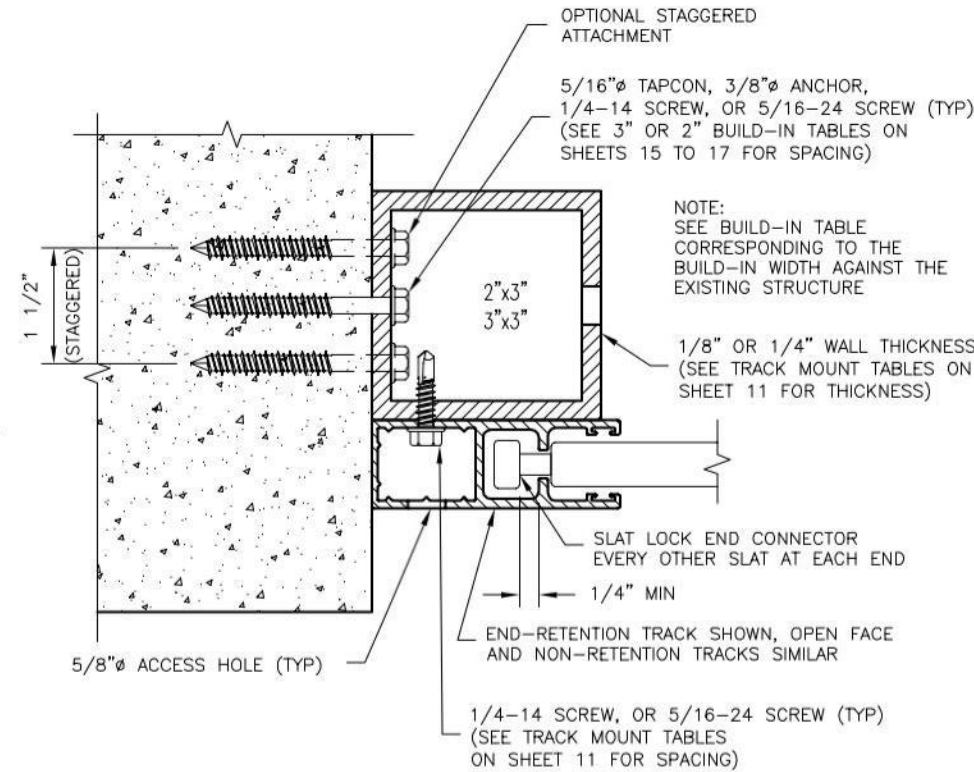
THIS IS TO CERTIFY THAT TO THE BEST OF MY KNOWLEDGE THESE PLANS & SPECIFICATIONS ARE IN COMPLIANCE WITH THE BUILDING CODE REQUIREMENTS

TREBOR JOHNSON
LICENSE
No. 65624
PROFESSIONAL ENGINEER
FLORIDA

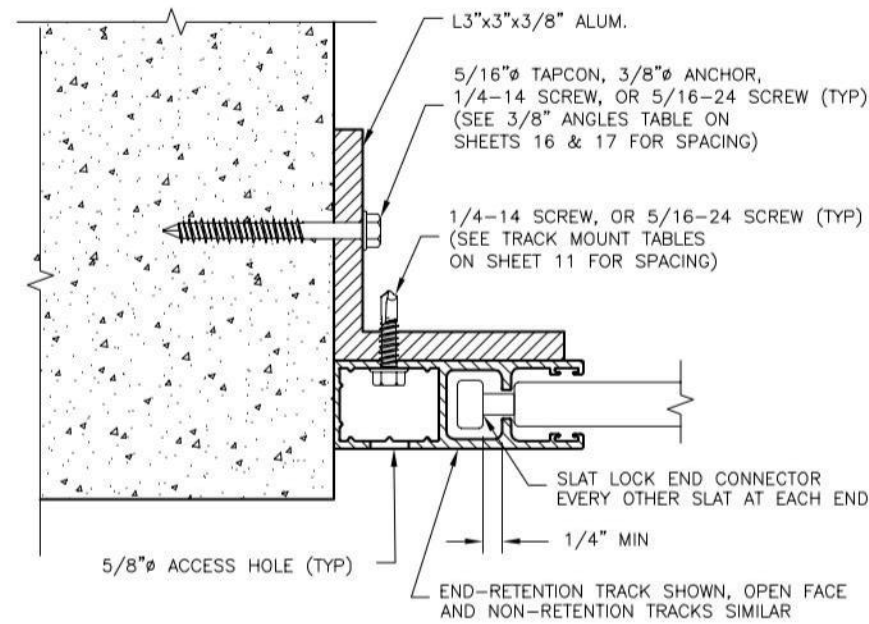
2 OF 22



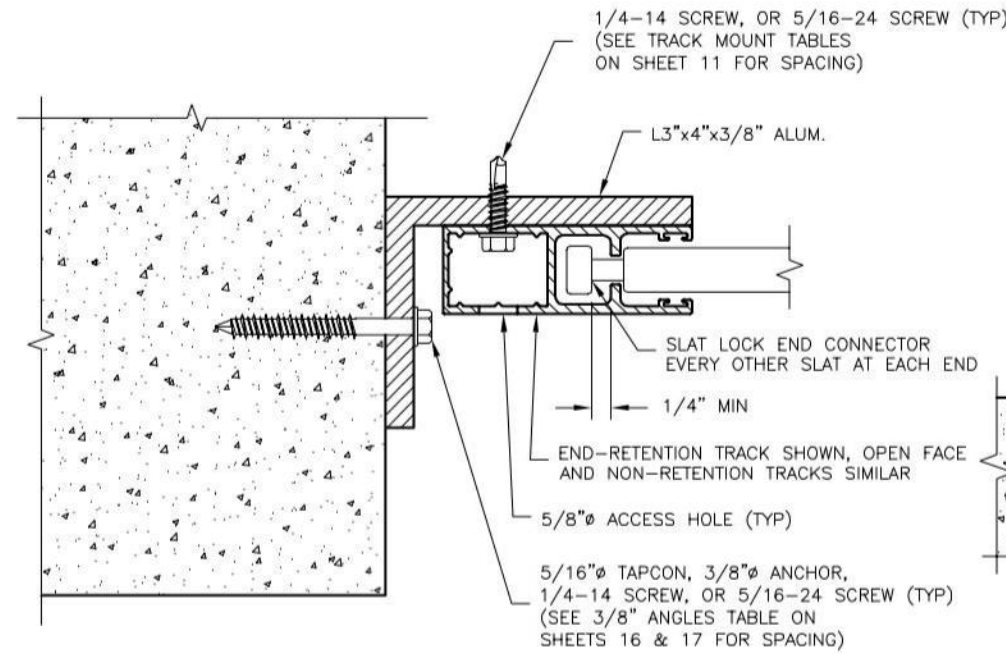
A 4", 3", OR 2" BUILD-IN (OPTION 3A)
END-RETENTION & NON-RETENTION - N.T.S.



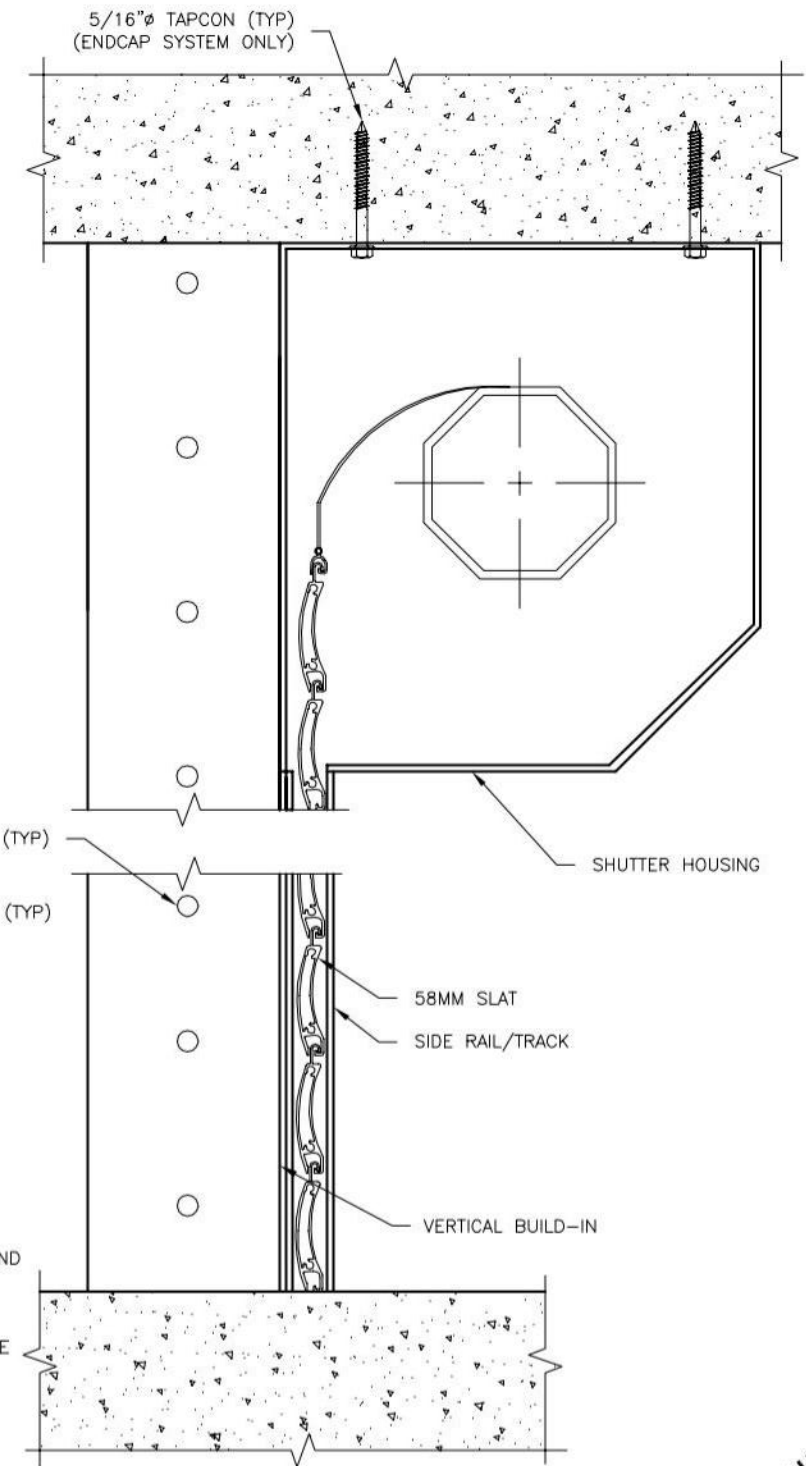
A 3", OR 2" BUILD-IN (OPTION 3B)
END-RETENTION & NON-RETENTION - N.T.S.



A L3x3x3/8 ANGLE BUILD-IN (OPTION 4A)
END-RETENTION & NON-RETENTION - N.T.S.



A L3x4x3/8 ANGLE BUILD-IN (OPTION 4B)
END-RETENTION & NON-RETENTION - N.T.S.



B BUILD-IN SECTION
END-RETENTION & NON-RETENTION - N.T.S.

NOTE: ACCESS HOLES FOR 3/8" ANCHORS ARE 13/16"

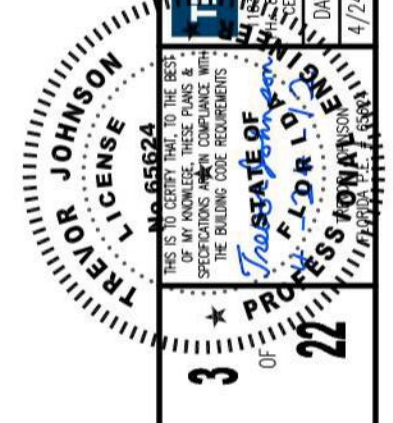
REVISIONS	DATE	#

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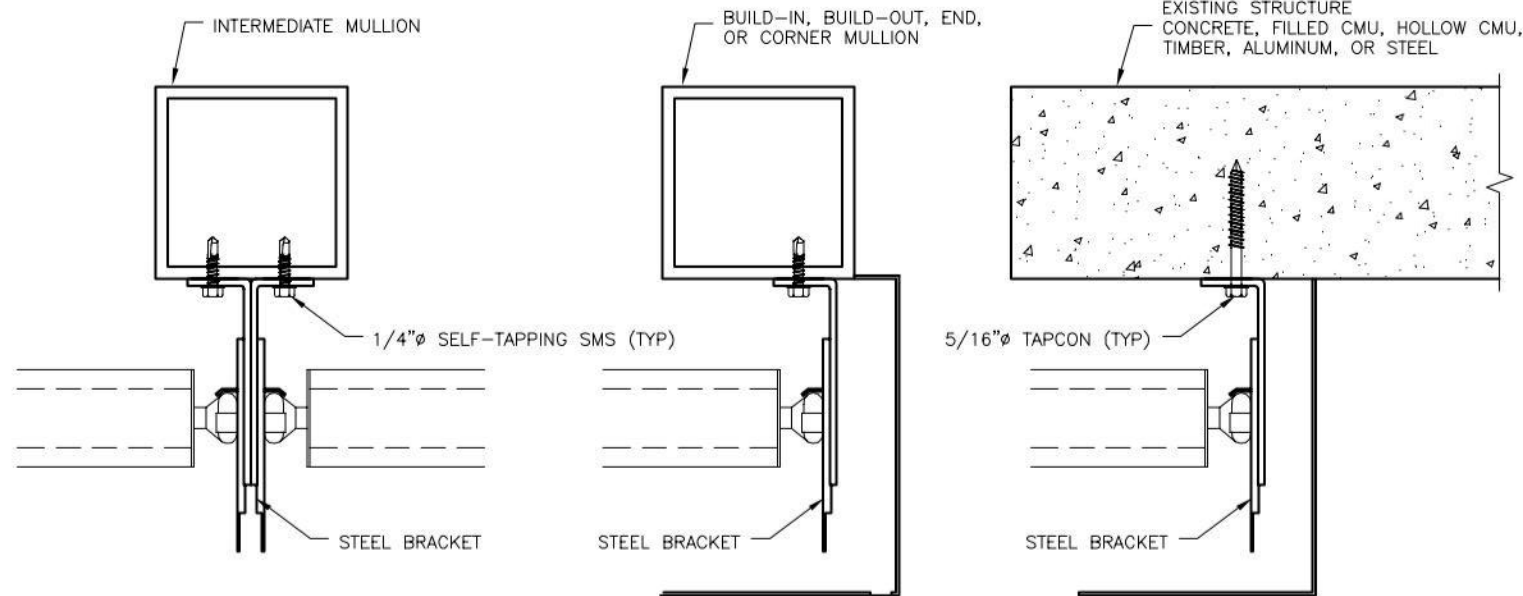
58MM BERTHA
END RETENTION / NON-RETENTION
ROLL-UP SHUTTER SYSTEM

TEJ Engineering, LLC.
1255 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
PH: 813.404.7649; EM: TKENGINEERING@GMAIL.COM
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

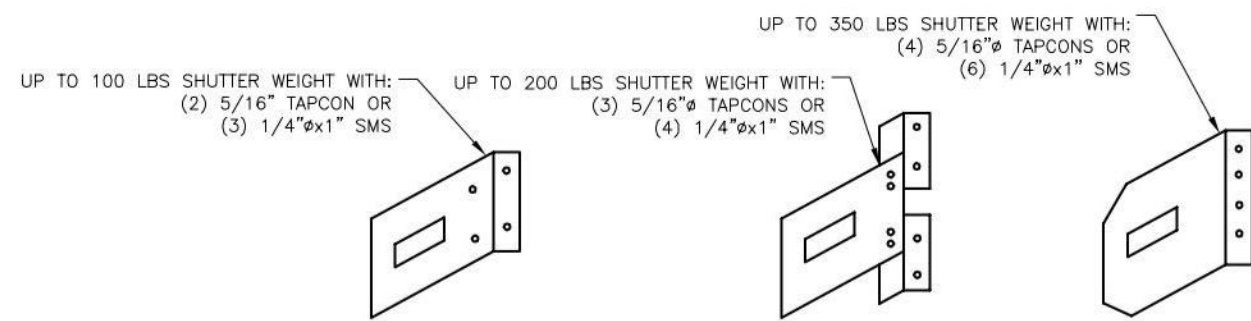
DATE: 4/24/12
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 12-0402



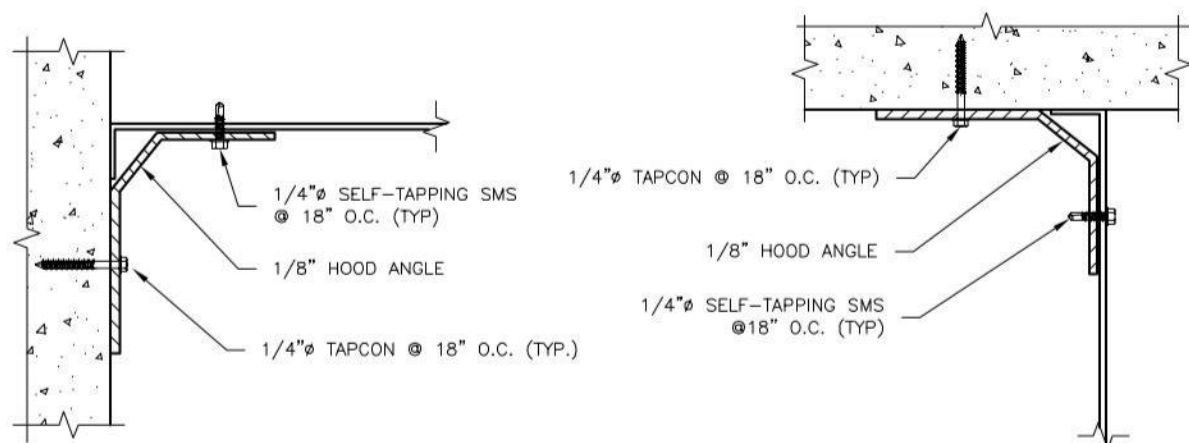
3 OF 22



MOUNTING BRACKET INSTALLATION
END-RETENTION & NON-RETENTION INSTALLATION - N.T.S.

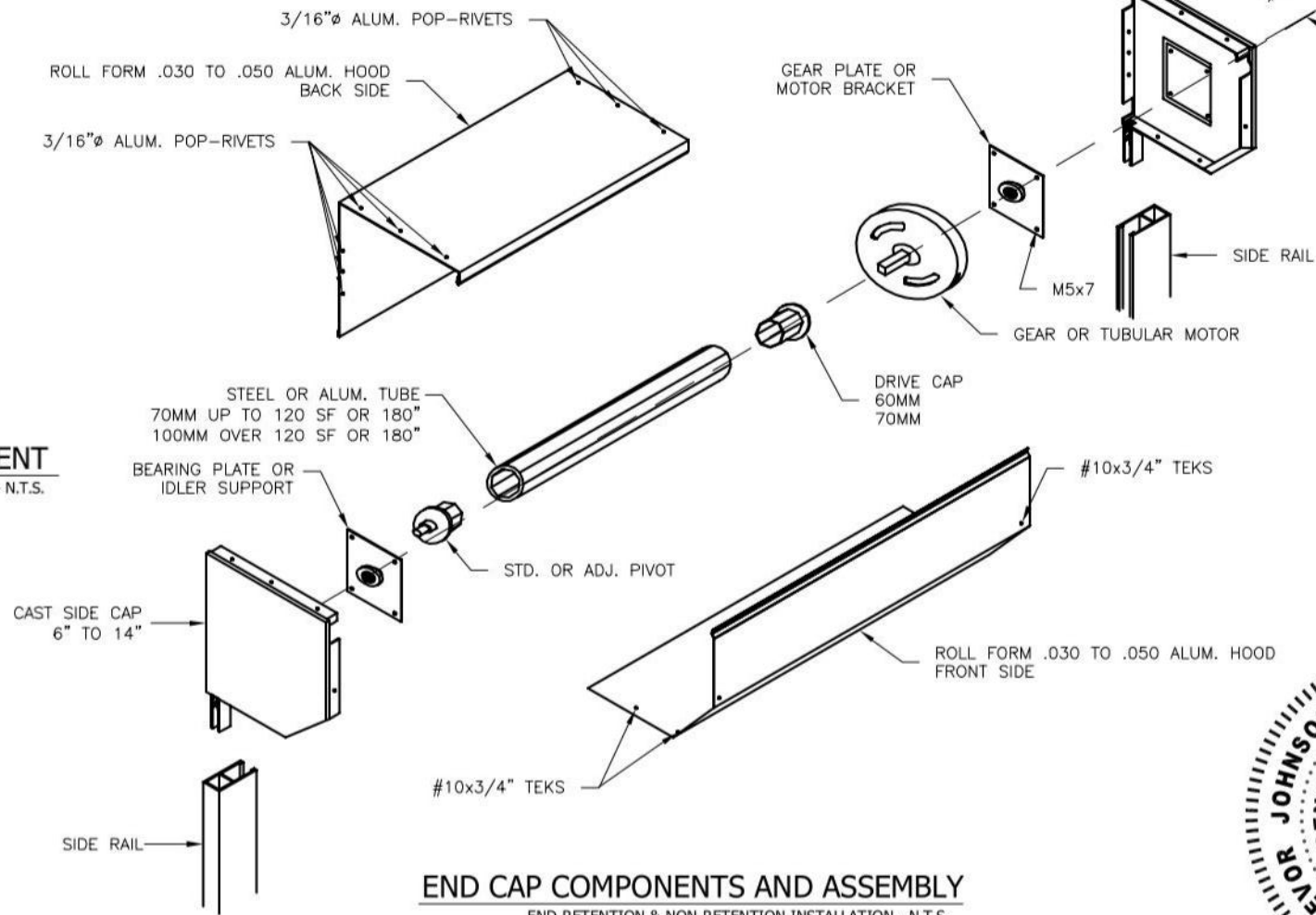


MOUNTING BRACKET
END-RETENTION & NON-RETENTION INSTALLATION - N.T.S.

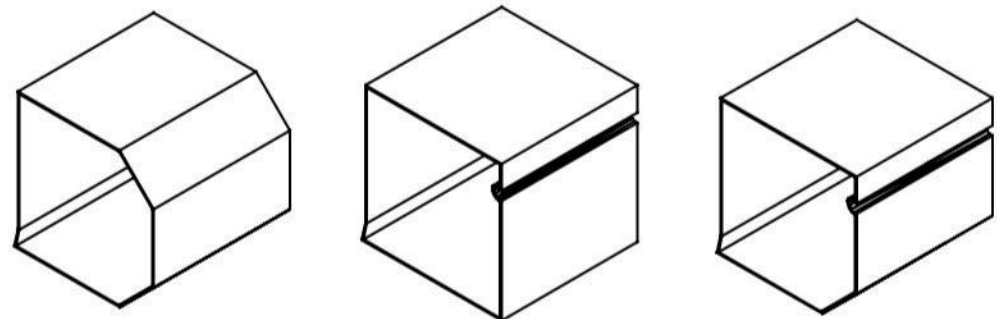


CUSTOM HOOD WALL ATTACHMENT
END-RETENTION & NON-RETENTION INSTALLATION - N.T.S.

CUSTOM HOOD CEILING ATTACHMENT
END-RETENTION & NON-RETENTION INSTALLATION - N.T.S.



END CAP COMPONENTS AND ASSEMBLY
END-RETENTION & NON-RETENTION INSTALLATION - N.T.S.



ALUMINUM HOOD COVER
END-RETENTION & NON-RETENTION INSTALLATION - N.T.S.

REVISIONS	DATE	#

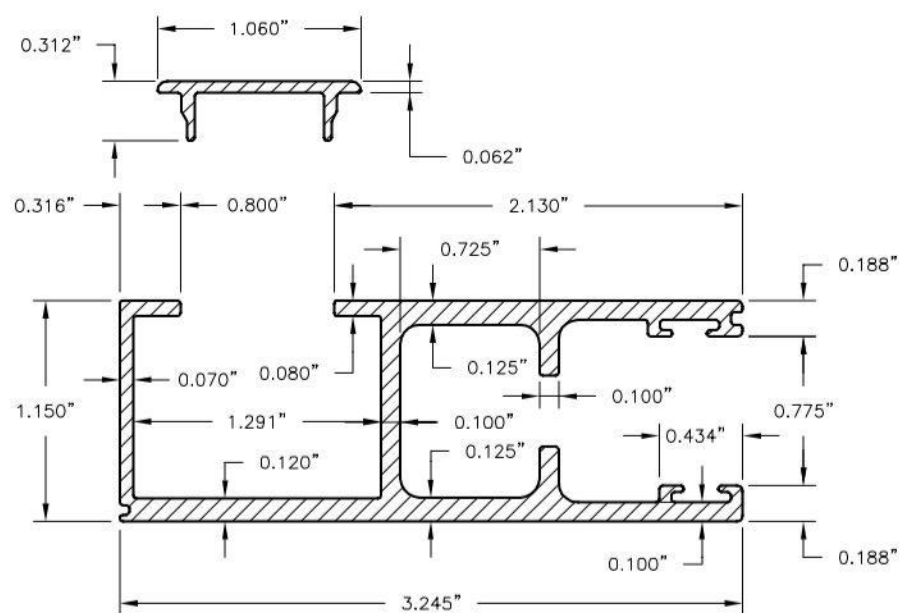
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4288 WESTROADS DRIVE, WEST PALM BEACH, FL, 33407
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**58MM BERTHA
END RETENTION / NON-RETENTION
ROLL-UP SHUTTER SYSTEM**

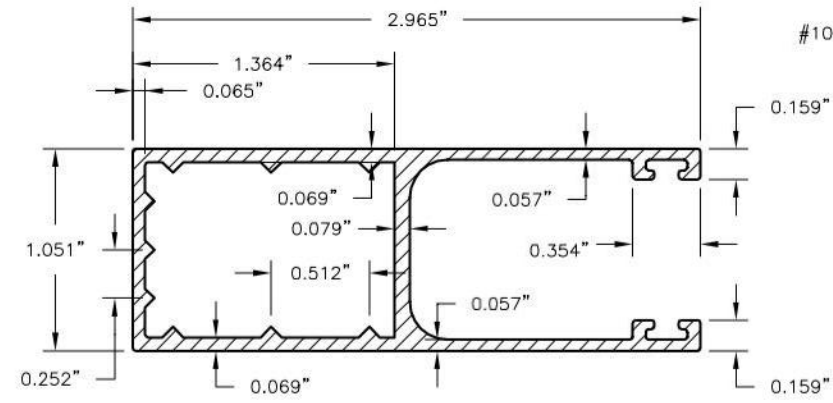
TJ Engineering, LLC.
1835 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 313.404.7649; EM: TKENGINEERING@GMAIL.COM
CERTIFICATE OF AUTHORIZATION NUMBER: 28882

DATE: 4/24/12
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 12-0402

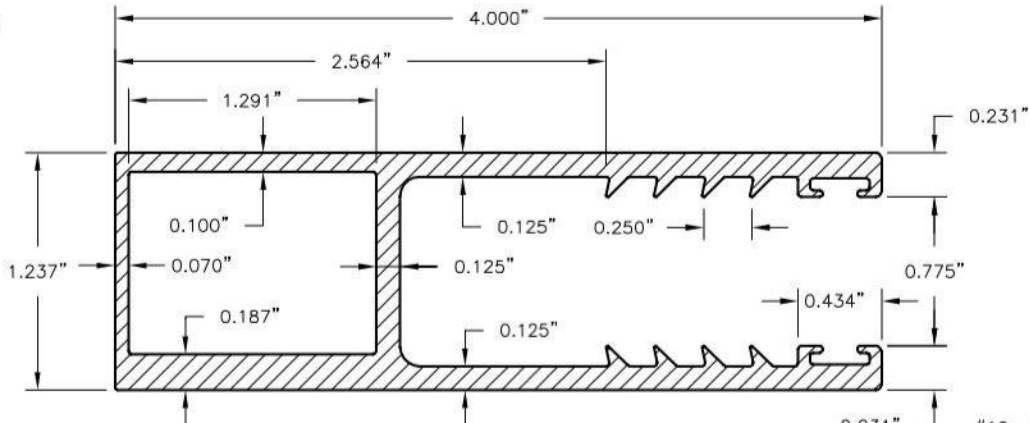




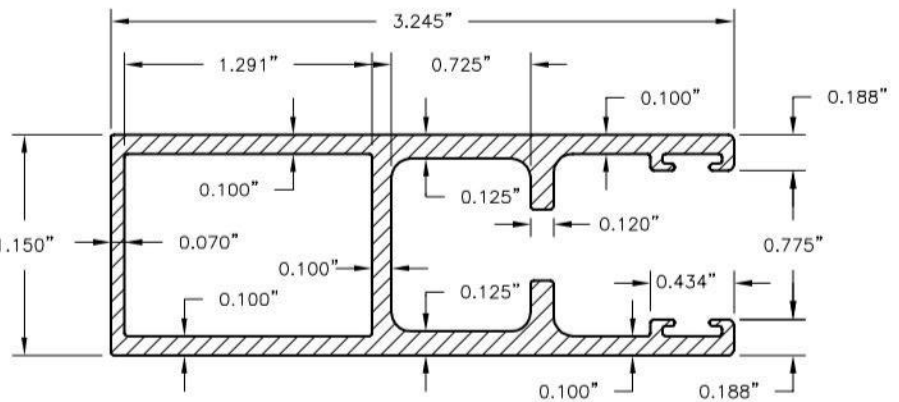
6063-T6 ALUMINUM 3 1/4" SIDE RAIL
3 1/4" END-RETENTION OPEN FACE TRACK - SCALE 1:1



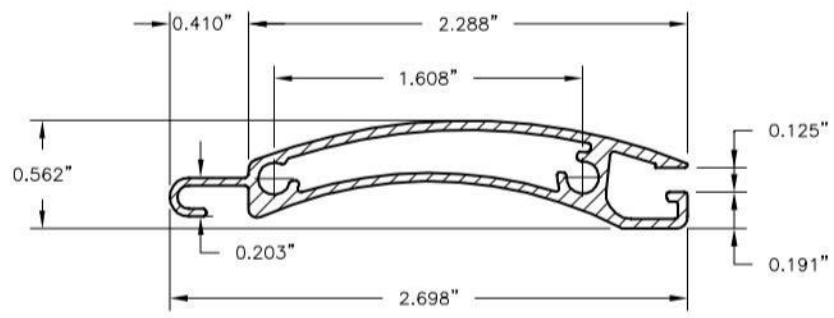
6063-T6 ALUMINUM 3" SIDE RAIL
3" NON-RETENTION TRACK - SCALE 1:1



6063-T6 ALUMINUM 4" SIDE RAIL
4" NON-RETENTION TRACK - SCALE 1:1

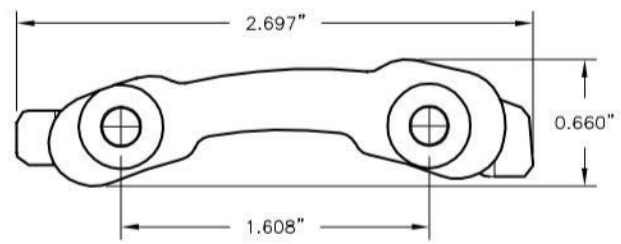


6063-T6 ALUMINUM 3 1/4" SIDE RAIL
3 1/4" END-RETENTION STANDARD TRACK - SCALE 1:1

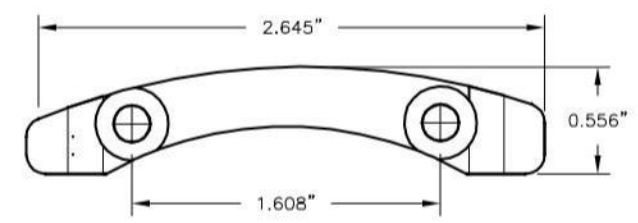


6063-T6 ALUMINUM 58MM SLAT
END-RETENTION & NON-RETENTION SLAT - SCALE 1:1

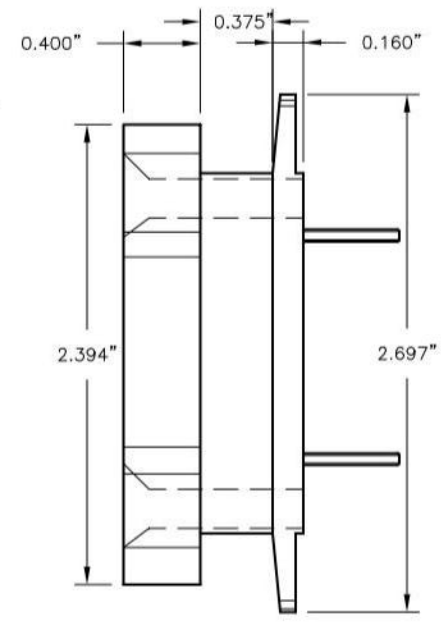
NOTES: MODULES OF ELASTICITY $E = 10,000$ KSI
MOMENT OF INERTIA $I = .046$ IN⁴/FT
SECTIONAL AREA $A = 1.713$ IN²/FT
SLACK (SLIP) Slack = $.25 \pm .04$ IN



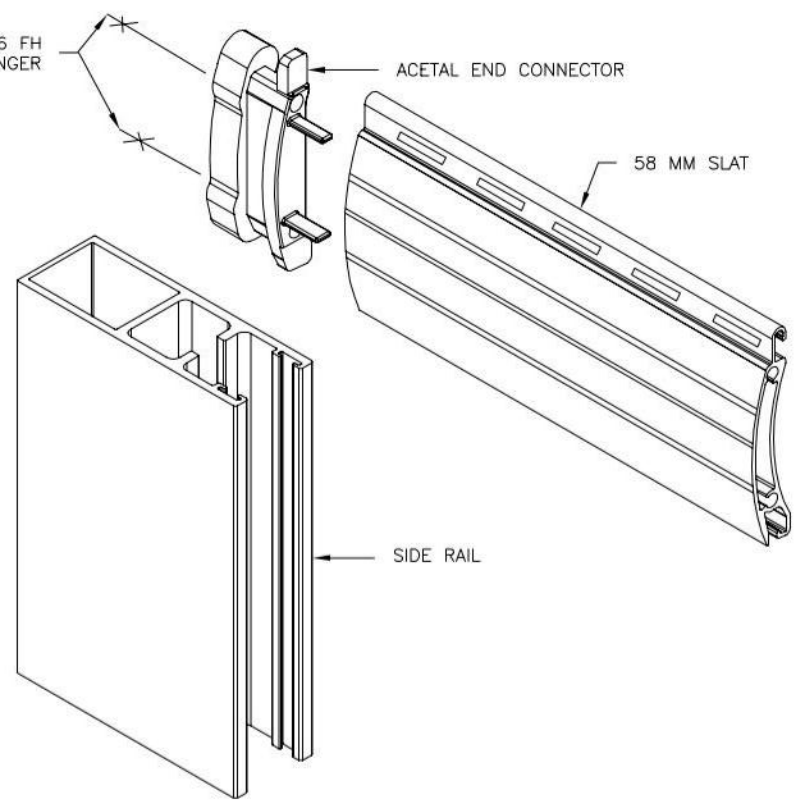
SLAT LOCK END CONNECTOR
END-RETENTION INSTALLATION - SCALE 1:1



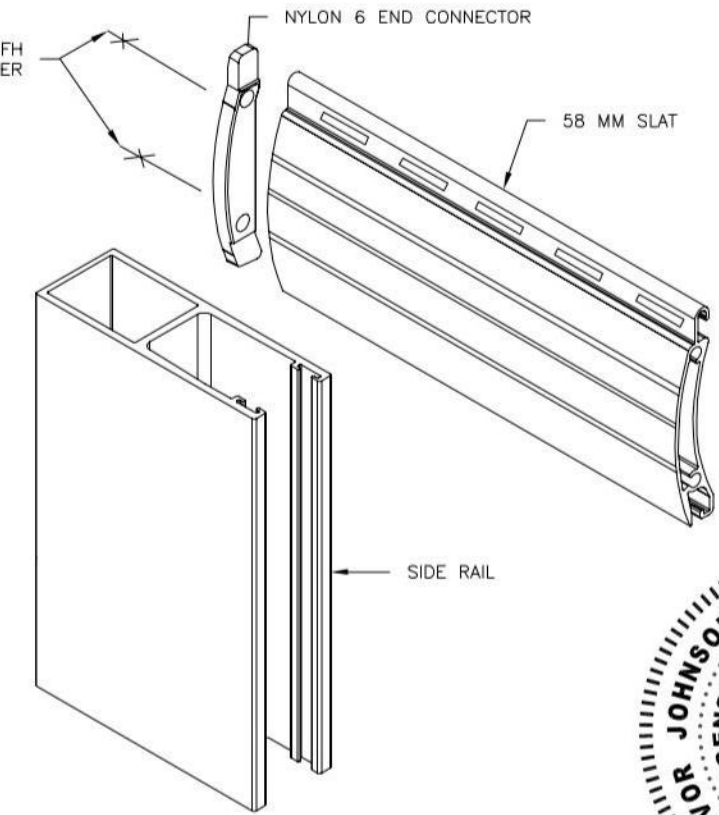
SLAT END CONNECTOR
NON-RETENTION INSTALLATION - SCALE 1:1



SLAT LOCK END CONNECTOR
END-RETENTION INSTALLATION - SCALE 1:1



END CONNECTOR DETAIL
END-RETENTION INSTALLATION - N.T.S.



END CONNECTOR DETAIL
NON-RETENTION INSTALLATION - N.T.S.

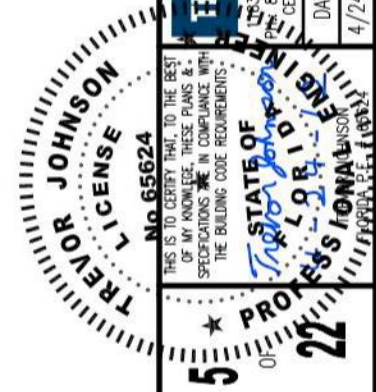
REVISIONS	DATE	#

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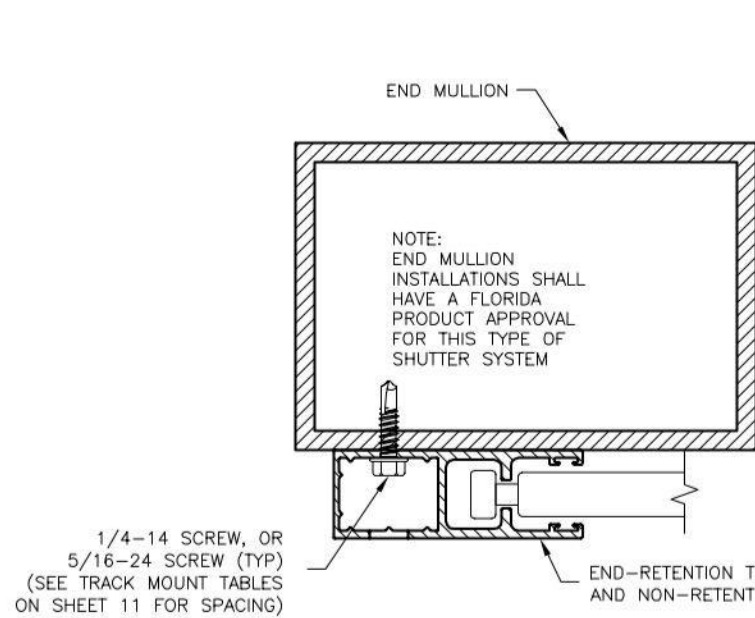
58MM BERTHA
END RETENTION / NON-RETENTION
ROLL-UP SHUTTER SYSTEM

TKJ Engineering, LLC.
17335 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
P: 813.404.7649; EM: TKJENGINEERING@GMAIL.COM
CERTIFICATE OF AUTHORIZATION NUMBER: 28882

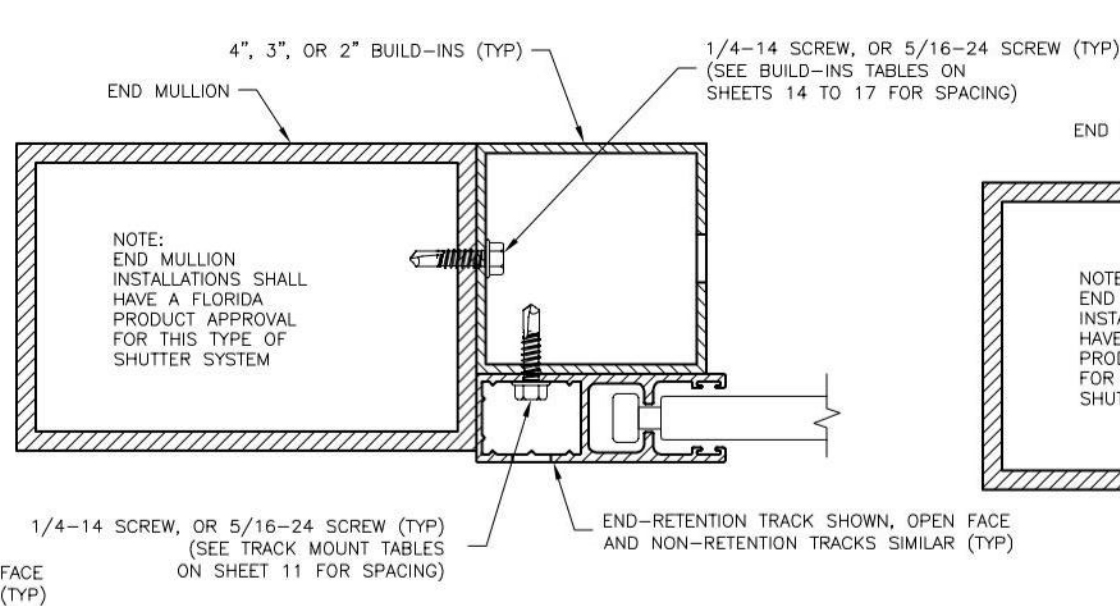
DATE:	DRAWN BY:	SCALE:	PROJ. #:
4/24/12	TKJ	N.T.S.	12-0402



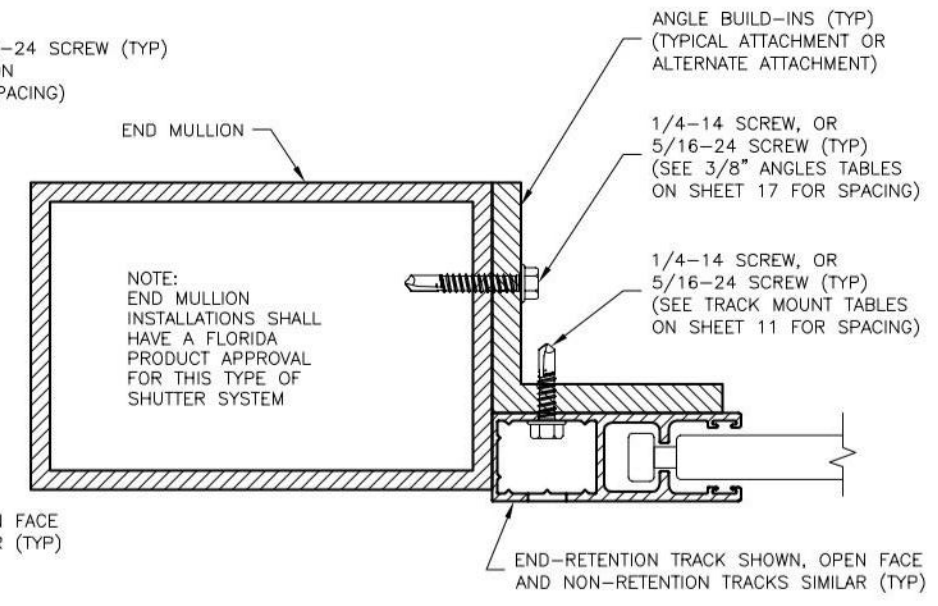
5 OF 22



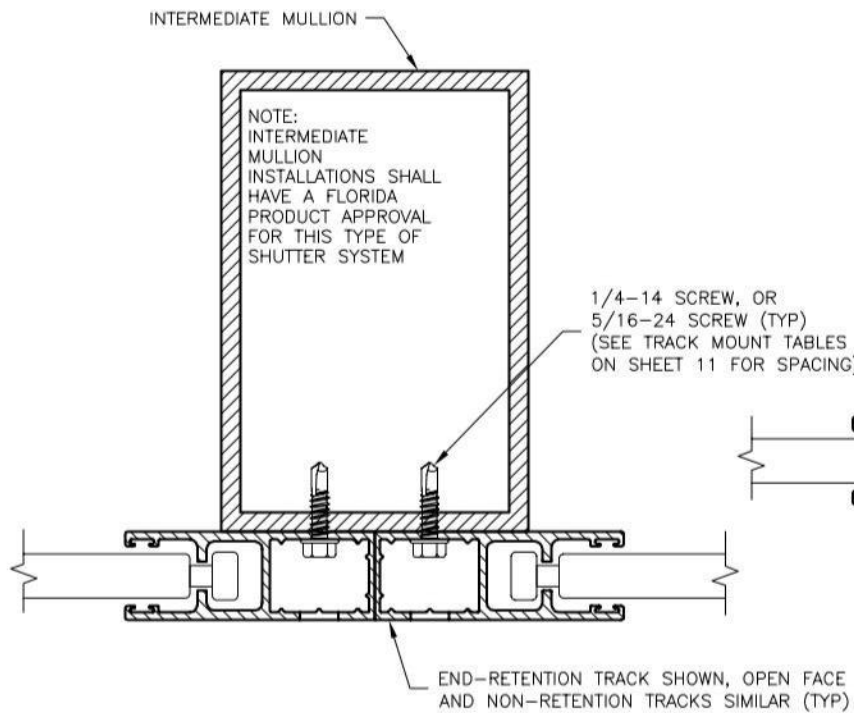
A TYPICAL END MULLION (OPTION 5A)
END-RETENTION & NON-RETENTION - N.T.S.



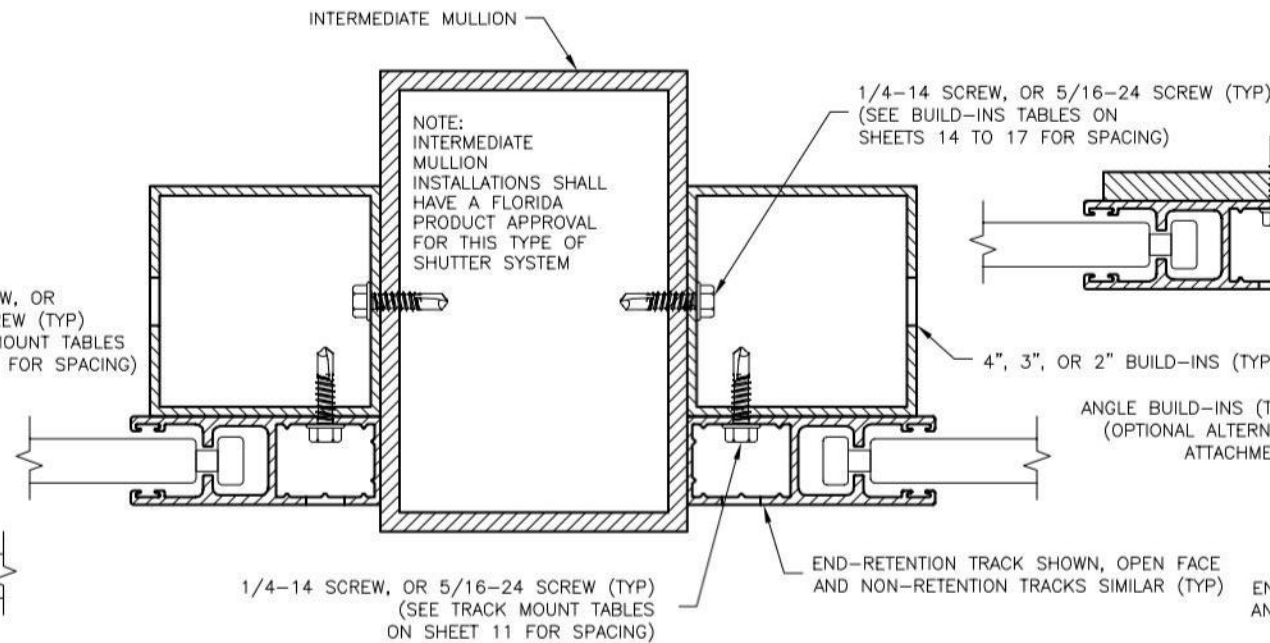
A END MULLION W/ BUILD-INS (OPTION 5B)
END-RETENTION & NON-RETENTION - N.T.S.



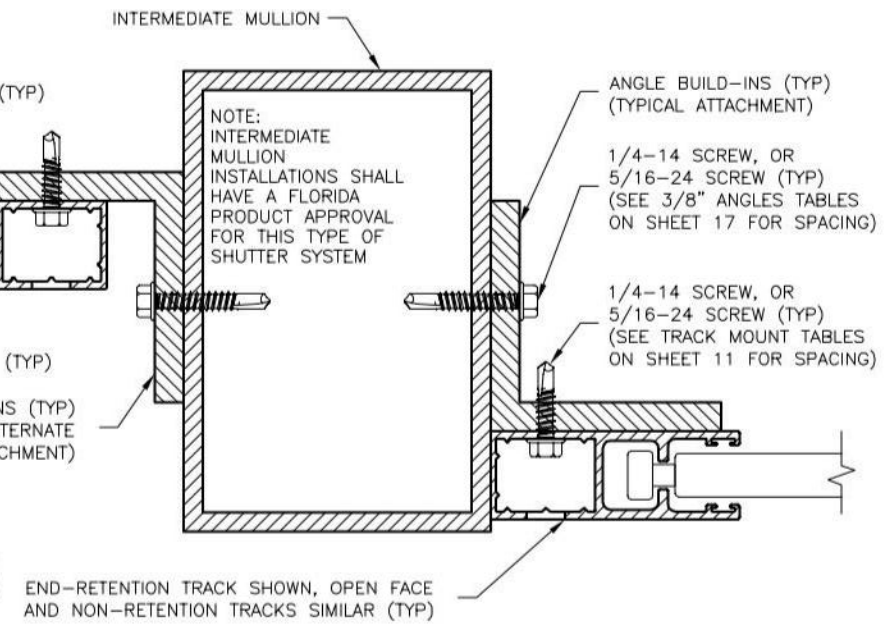
A END MULLION W/ ANGLES (OPTION 5C)
END-RETENTION & NON-RETENTION - N.T.S.



C TYPICAL INT. MULLION (OPTION 6A)
END-RETENTION & NON-RETENTION - N.T.S.



C INT. MULLION W/ BUILD-INS (OPTION 6B)
END-RETENTION & NON-RETENTION - N.T.S.



C INT. MULLION W/ ANGLES (OPTION 6C)
END-RETENTION & NON-RETENTION - N.T.S.

REVISIONS	DATE	#

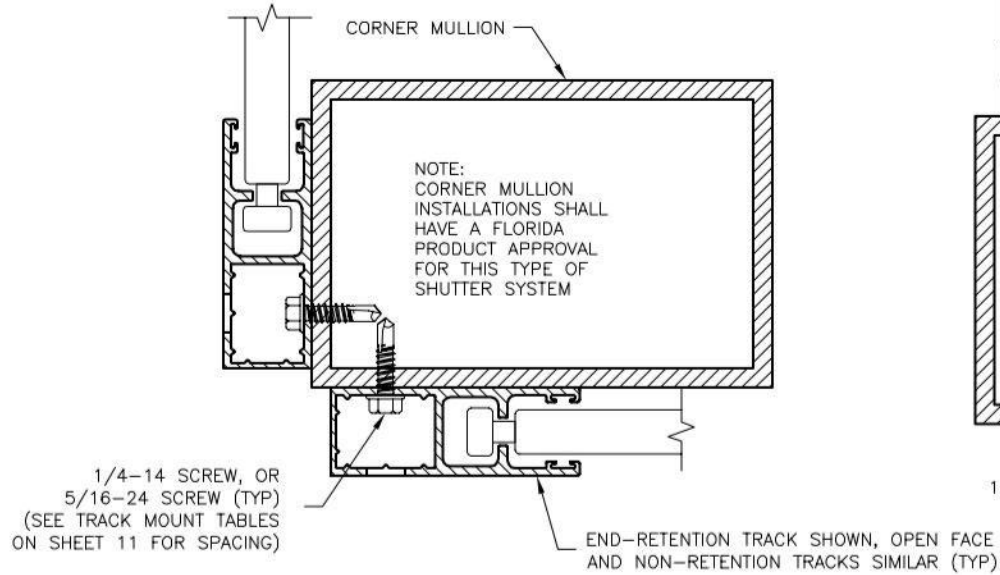
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4268 WESTROADS DRIVE, WEST PALM BEACH, FL, 33407
PHONE: 800.432.2204; FAX: 561.841.0852
WWW.AMSSHUTTER.ORG

**58MM BERTHA
END RETENTION / NON-RETENTION
ROLL-UP SHUTTER SYSTEM**

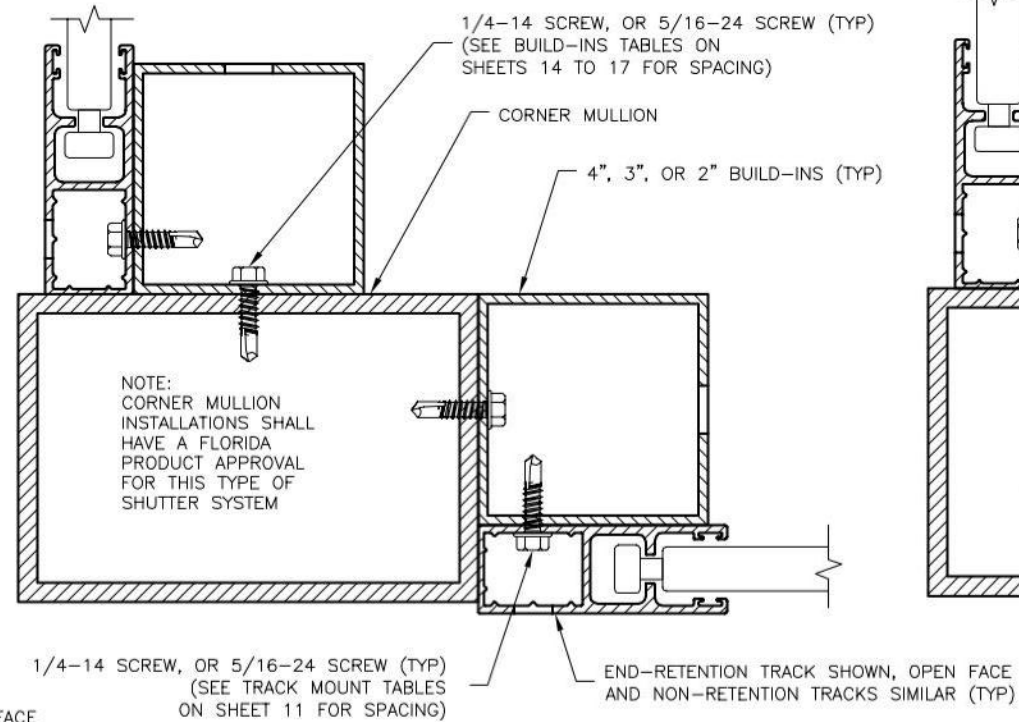
113 Engineering, LLC.
113 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 334.404.7649; EM: TKENGINEERING@GMAIL.COM
CERTIFICATE OF AUTHORIZATION NUMBER: 28382

DATE:	4/24/12
DRAWN BY:	TKJ
SCALE:	N.T.S.
PROJ. #:	12-0402

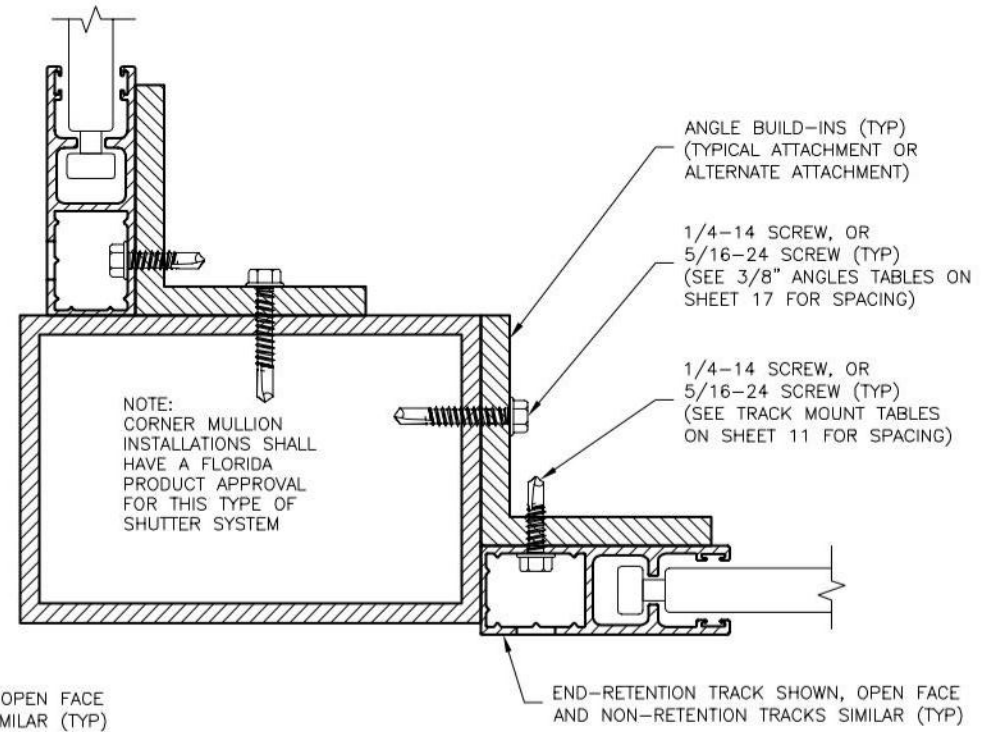
TREBOR JOHNSON
LICENSE
No. 65624
THIS IS TO CERTIFY THAT TO THE BEST OF MY KNOWLEDGE THESE PLANS & SPECIFICATIONS ARE IN COMPLIANCE WITH THE BUILDING CODE REQUIREMENTS
STATE OF FLORIDA
PROFESSIONAL ENGINEER
No. 50172
TREVOR JOHNSON
4/24/12



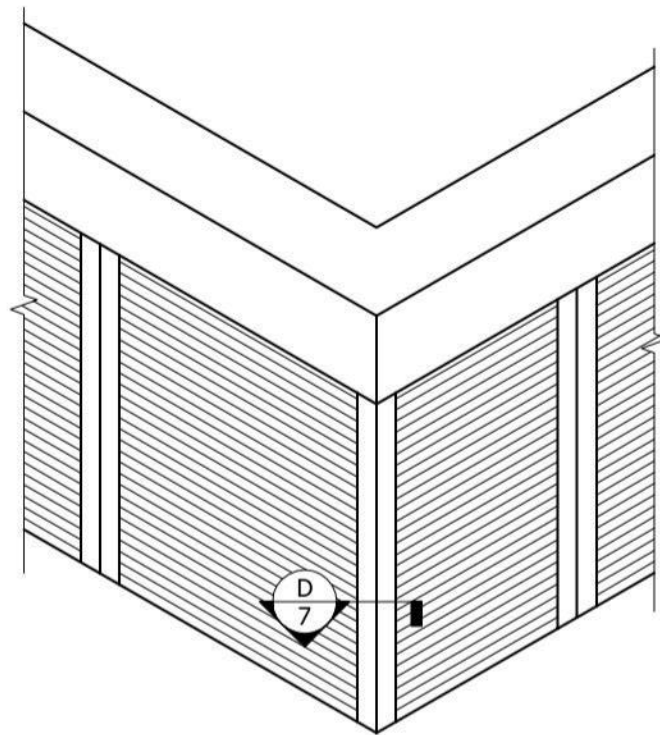
D TYPICAL CORNER MULLION (OPTION 7A)
END-RETENTION & NON-RETENTION - N.T.S.



D CORNER MULLION W/ BUILD-INS (OPTION 7B)
END-RETENTION & NON-RETENTION - N.T.S.



D CORNER MULLION W/ ANGLES (OPTION 7C)
END-RETENTION & NON-RETENTION - N.T.S.



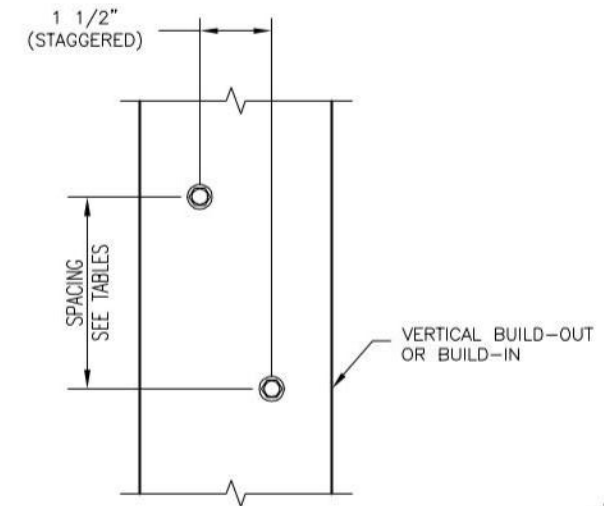
CORNER MULLION ELEVATION
SINGLE OR MULTIPLE MULLION INSTALLATIONS - N.T.S.

SLAT PERFORMANCE	
4" NON-RETENTION TRACK	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED AND FOR ANY CONFIGURATION	
SLAT SPAN	PRESSURE (PSF)
72"	65
76"	58
80"	52
84"	48
88"	43
92"	40
96"	36
100"	34
104"	31
108"	28
112"	25
116"	22
120"	20

NOTE: THE NON-RETENTION SLAT SPANS OR DESIGN WIND LOAD SHALL NOT EXCEED THE "SLAT PERFORMANCE" TABLES FOR ANY CONFIGURATION.

SLAT PERFORMANCE	
3" NON-RETENTION TRACK	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED AND FOR ANY CONFIGURATION	
SLAT SPAN	PRESSURE (PSF)
72"	65
76"	58
80"	52
84"	48
88"	40
92"	35
96"	30

NOTE: THE NON-RETENTION SLAT SPANS OR DESIGN WIND LOAD SHALL NOT EXCEED THE "SLAT PERFORMANCE" TABLES FOR ANY CONFIGURATION.



STAGGERED SPACING DETAIL
OPTIONAL ATTACHMENT INSTALLATION - N.T.S.

REVISIONS	DATE	#

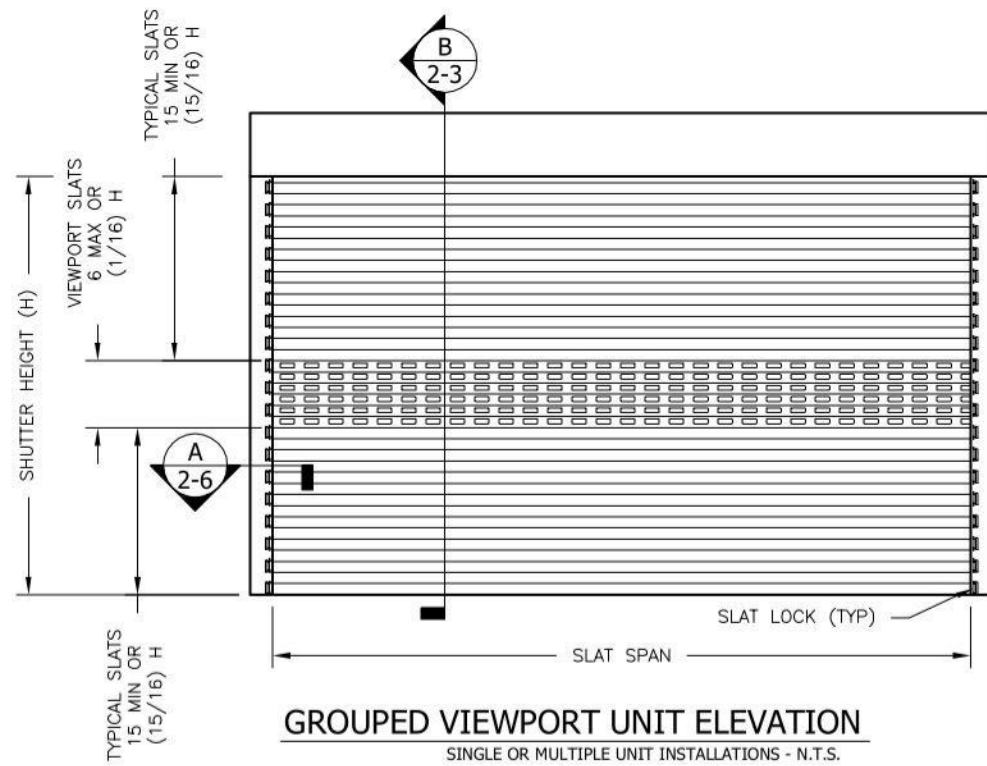
ASSA
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AMERICAN SHUTTER SYSTEM ASSOCIATION, INC.
4268 WESTROADS DRIVE, WEST PALM BEACH, FL, 33407
PHONE: 800.432.2204; FAX: 561.841.0852
WWW.AMSSHUTTER.ORG

58MM BERTHA
END RETENTION / NON-RETENTION
ROLL-UP SHUTTER SYSTEM

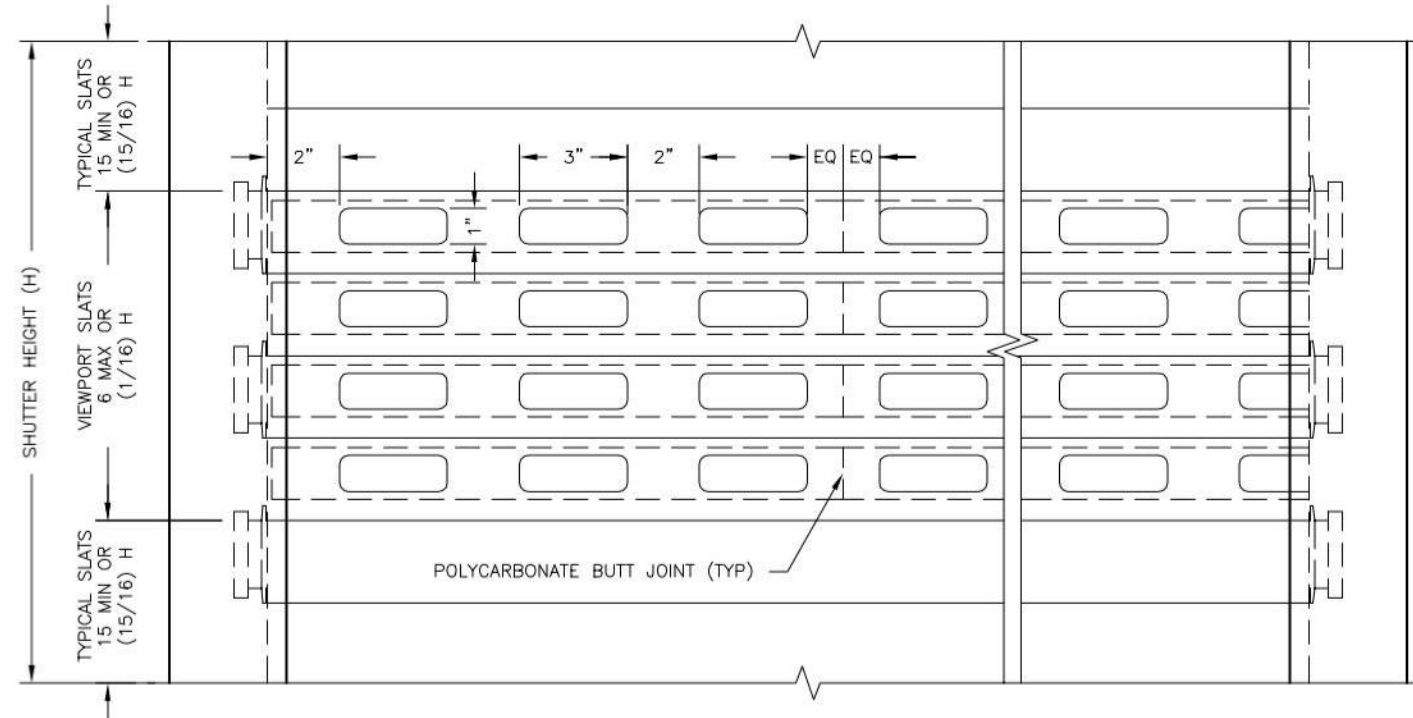
TEU Engineering, LLC.
1235 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 813.404.7649; EM: TKENGINEERING@GMAIL.COM
CERTIFICATE OF AUTHORIZATION NUMBER: 28882

DATE:	DRAWN BY:	SCALE:	PROJ. #:
4/24/12	TKJ	N.T.S.	12-0402

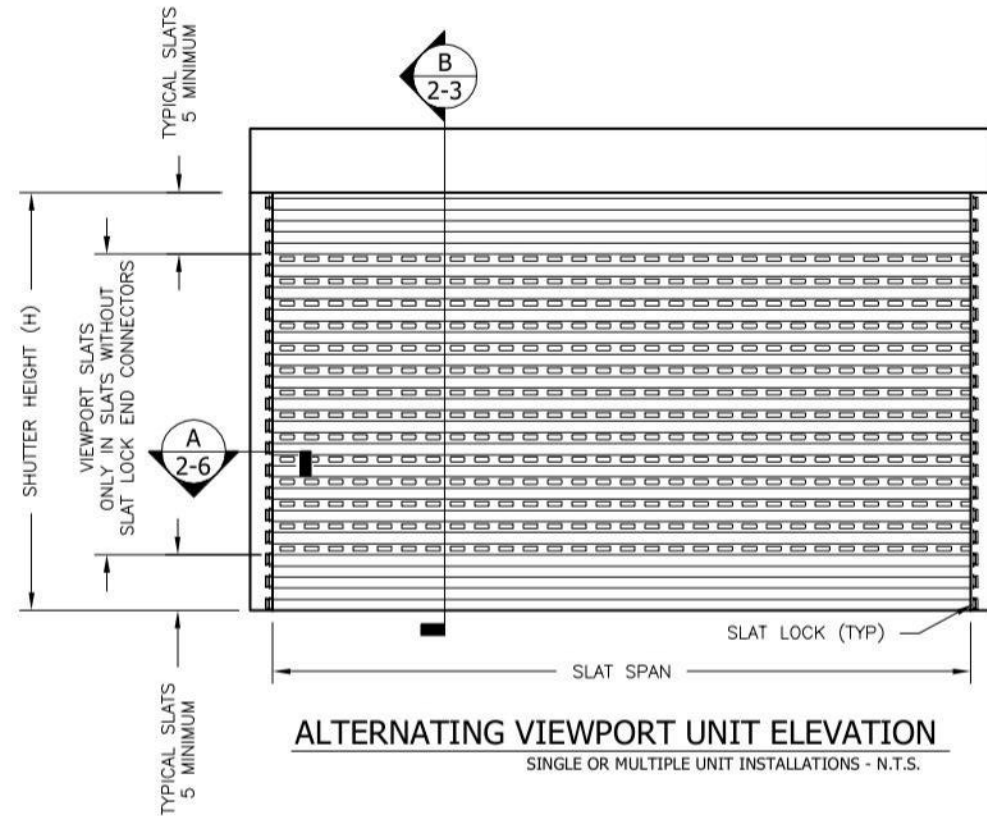
TREVOR JOHNSON
LICENSE
No. 65624
STATE OF FLORIDA
PROFESSIONAL ENGINEER
L.P.E. No. 10000
TREVOR JOHNSON
No. 22



GROUPED VIEWPORT UNIT ELEVATION
SINGLE OR MULTIPLE UNIT INSTALLATIONS - N.T.S.



TYPICAL VIEWPORT WINDOW DETAIL
GROUPED CONFIGURATION SHOWN ALTERNATING SIMILAR - N.T.S.

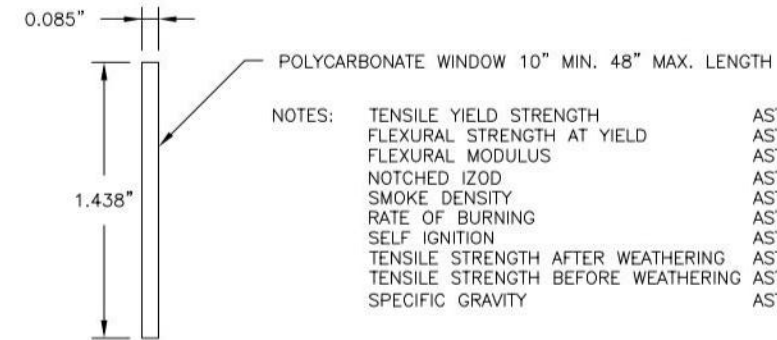


ALTERNATING VIEWPORT UNIT ELEVATION
SINGLE OR MULTIPLE UNIT INSTALLATIONS - N.T.S.

NOTE: FOR ATTACHMENT DETAILS SEE SHEETS 2 THRU 7

VIEWPORT SLAT PERFORMANCE	
END-RETENTION TRACKS ONLY	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 1"X3" POLYCARBONATE VIEWPORT WINDOWS FOR ANY CONFIGURATION	
SLAT SPAN	PRESSURE (PSF)
120"	100
126"	99
132"	97
138"	94
144"	91
150"	86
156"	81
162"	77
168"	73
174"	69
180"	66
186"	63
192"	60
198"	58
204"	55

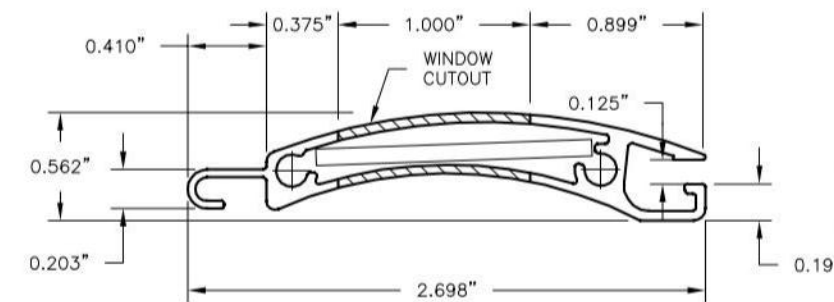
NOTE: THE VIEWPORT SLAT SPANS OR DESIGN WIND LOADS SHALL NOT EXCEED THE "VIEWPORT SLAT PERFORMANCE" TABLES FOR ANY CONFIGURATION.



NOTES:

TENSILE YIELD STRENGTH	ASTM D638	9,500 PSI
FLEXURAL STRENGTH AT YIELD	ASTM D790	13,400 PSI
FLEXURAL MODULUS	ASTM D790	345,000 PSI
NOTCHED IZOD	ASTM D256	17 FT-LB/IN
SMOKE DENSITY	ASTM D2843	64.5% MAX
RATE OF BURNING	ASTM D635	C-1 CLASS
SELF IGNITION	ASTM D1929	980° F
TENSILE STRENGTH AFTER WEATHERING	ASTM D638	8,840 PSI
TENSILE STRENGTH BEFORE WEATHERING	ASTM D638	8,880 PSI
SPECIFIC GRAVITY	ASTM D792	0.043 LB/IN ³

POLYCARBONATE VIEWPORT WINDOW
SABIC INNOVATIVE PLASTIC LEXAN 103 RESIN - SCALE 1:1



6063-T6 ALUMINUM 58MM SLAT
END-RETENTION VIEWPORT SLAT - SCALE 1:1

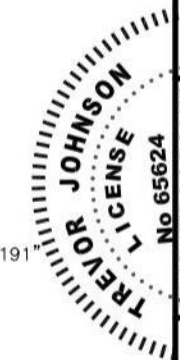
#	DATE	REVISIONS

ASSA
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58MM BERTHA
END RETENTION / NON-RETENTION
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TJK Engineering, LLC.
1333 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 404.7649; EM: TJKENGINEERING@GMAIL.COM
PROFESSIONAL ENGINEER LICENSE NO. 28582

DRAWN BY: SCALE: PROJ. #:
DATE: 4/24/12 TJK N.T.S. 12-0402



THIS IS TO CERTIFY THAT TO THE BEST OF MY KNOWLEDGE THESE PLANS & SPECIFICATIONS ARE IN COMPLIANCE WITH THE BUILDING CODE REQUIREMENTS

LOADS ON EXISTING STRUCTURE FROM SHUTTER SYSTEM												
T _x = PARALLEL LOADS (PLF)												
SLAT SPAN	PRESSURE (PSF)											
	140	130	120	110	100	90	80	70	60	50	40	30
36"	210	195	180	165	150	135	120	105	90	75	60	45
48"	280	260	240	220	200	180	160	140	120	100	80	60
60"	798	652	513	367	250	225	200	175	150	125	100	75
72"	1780	1595	1410	1225	1040	854	668	482	296	150	120	90
84"	2659	2427	2194	1970	1736	1502	1276	1042	806	571	334	105
96"	3483	3211	2938	2664	2382	2107	1823	1539	1262	976	689	401
108"	4296	3975	3654	3331	3007	2675	2349	2014	1686	1348	1009	670
120"	5096	4727	4365	3993	3619	3236	2860	2473	2085	1696	1304	911
132"	5893	5476	5065	4644	4221	3795	3368	2930	2490	2048	1594	1147
144"	-	-	5763	5293	4821	4345	3867	3377	2885	2389	1882	1372
156"	-	-	-	5941	5427	4902	4365	3832	3279	2730	2169	1595
168"	-	-	-	-	6025	5450	4871	4279	3681	3071	2447	1817
180"	-	-	-	-	-	5997	5368	4725	4076	3412	2733	2039
192"	-	-	-	-	-	-	5864	5171	4470	3753	3012	2261
204"	-	-	-	-	-	-	-	5623	4864	4094	3299	2484
216"	-	-	-	-	-	-	-	6067	5257	4435	3586	2707
228"	-	-	-	-	-	-	-	-	5649	4776	3865	2938
240"	-	-	-	-	-	-	-	-	6040	5108	4152	3162
252"	-	-	-	-	-	-	-	-	-	5447	4438	3385
264"	-	-	-	-	-	-	-	-	-	5786	4717	3609
276"	-	-	-	-	-	-	-	-	-	5002	3833	

LOADS ON EXISTING STRUCTURE FROM SHUTTER SYSTEM												
T _y = PERPENDICULAR LOADS (PLF)												
SLAT SPAN	PRESSURE (PSF)											
	140	130	120	110	100	90	80	70	60	50	40	30
36"	212	197	182	167	152	137	122	107	92	77	62	47
48"	282	262	242	222	202	182	162	142	122	102	82	62
60"	351	326	301	276	251	226	201	176	151	126	101	76
72"	421	391	361	331	301	271	241	211	181	150	121	91
84"	491	456	420	386	350	315	281	246	211	176	140	106
96"	560	520	481	441	400	361	320	280	241	201	161	121
108"	631	585	541	496	451	405	361	315	271	226	181	136
120"	701	650	601	551	501	450	401	350	300	250	200	151
132"	771	715	661	606	550	496	441	386	331	276	220	166
144"	-	-	721	660	600	540	481	420	360	301	240	180
156"	-	-	-	715	651	586	520	456	390	326	261	195
168"	-	-	-	-	701	631	561	491	421	351	280	210
180"	-	-	-	-	-	675	601	525	451	376	301	225
192"	-	-	-	-	-	-	640	560	480	401	320	240
204"	-	-	-	-	-	-	-	596	510	426	340	255
216"	-	-	-	-	-	-	-	631	540	451	361	270
228"	-	-	-	-	-	-	-	-	570	476	380	286
240"	-	-	-	-	-	-	-	-	600	500	400	301
252"	-	-	-	-	-	-	-	-	-	525	421	316
264"	-	-	-	-	-	-	-	-	-	551	440	330
276"	-	-	-	-	-	-	-	-	-	-	461	345

END-RETENTION TRACKS													
MINIMUM SEPARATION TO GLASS (INCHES) REQUIRED FOR INSTALLATION IN WIND ZONE 4 OR ESSENTIAL FACILITIES													
SLAT SPAN	PRESSURE (PSF)												
	140	130	120	110	100	90	80	70	60	50	40	30	
36"	2.3	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
48"	3.9	3.7	3.4	3.1	2.9	2.6	2.3	2.1	2.0	2.0	2.0	2.0	2.0
60"	4.8	4.7	4.6	4.5	4.4	4.2	4.1	3.8	3.3	2.8	2.3	2.0	2.0
72"	5.4	5.2	5.1	5.0	4.8	4.7	4.6	4.5	4.3	4.2	4.1	3.1	3.1
84"	5.9	5.8	5.6	5.5	5.3	5.2	5.0	4.9	4.8	4.6	4.5	4.3	4.3
96"	6.5	6.3	6.1	6.0	5.8	5.7	5.5	5.4	5.2	5.0	4.9	4.7	4.7
108"	7.1	6.9	6.7	6.6	6.4	6.2	6.0	5.8	5.6	5.5	5.3	5.1	5.1
120"	7.8	7.6	7.4	7.2	7.0	6.8	6.5	6.3	6.1	5.9	5.7	5.5	5.5
132"	8.6	8.3	8.1	7.9	7.6	7.4	7.1	6.9	6.6	6.4	6.1	5.9	5.9
144"	-	-	8.9	8.6	8.4	8.1	7.8	7.5	7.2	6.9	6.6	6.3	6.3
156"	-	-	-	9.5	9.2	8.8	8.5	8.2	7.8	7.4	7.1	6.7	6.7
168"	-	-	-	-	10.1	9.7	9.3	8.9	8.5	8.1	7.6	7.2	7.2
180"	-	-	-	-	-	10.7	10.2	9.7	9.2	8.7	8.2	7.7	7.7
192"	-	-	-	-	-	-	11.3	10.7	10.1	9.5	8.9	8.2	8.2
204"	-	-	-	-	-	-	-	11.8	11.0	10.3	9.6	8.9	8.9
216"	-	-	-	-	-	-	-	-	12.1	11.3	10.4	9.5	9.5
228"	-	-	-	-	-	-	-	-	13.3	12.3	11.3	10.2	10.2
240"	-	-	-	-	-	-	-	-	14.7	13.5	12.3	11.0	11.0
252"	-	-	-	-	-	-	-	-	-	14.8	13.3	11.9	11.9
264"	-	-	-	-	-	-	-	-	-	16.2	14.6	12.9	12.9
276"	-	-	-	-	-	-	-	-	-	-	15.9	13.9	13.9

NON-RETENTION TRACKS													
MINIMUM SEPARATION TO GLASS (INCHES) REQUIRED FOR INSTALLATION IN WIND ZONE 4 OR ESSENTIAL FACILITIES													
SLAT SPAN	PRESSURE (PSF)												
	65	60	55	50	45	40	35	30	25	20			
56"	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
60"	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
64"	2.9	2.7	2.4	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
68"	3.7	3.4	3.1	2.8	2.5	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0
72"	4.6	4.3	3.9	3.6	3.2	2.8	2.5	2.1	2.0	2.0	2.0	2.0	2.0
76"	-	5.3	4.9	4.4	4.0	3.5	3.1	2.6	2.2	2.0	2.0	2.0	2.0
80"	-	-	6.0	5.4	4.9	4.3	3.8	3.3	2.7	2.2	2.0	2.0	2.0
84"	-	-	-	6.6	5.9	5.3	4.6	4.0	3.3	2.6	2.0	2.0	2.0
88"	-	-	-	-	7.1	6.3	5.6	4.8	4.0	3.2	2.6	2.0	2.0
92"	-	-	-	-	-	7.6	6.6	5.7	4.7	3.8	3.0	2.4	2.0
96"	-	-	-	-	-	-	7.9	6.7	5.6	4.5	3.6	2.8	2.2
100"	-	-	-	-	-	-	-	7.9	6.6	5.3	4.2	3.3	2.6
104"	-	-	-	-	-	-	-	-	9.3	7.7	6.2	4.8	3.6
108"	-	-	-	-	-	-	-	-	-	9.0	7.2	5.6	4.2
112"	-	-	-	-	-	-	-	-	-	-	10.4	8.3	6.2
116"	-	-	-	-	-	-	-	-	-	-	-	9.6	7.2
120"	-	-	-	-	-	-	-	-	-	-	-	-	11.0

ANCHOR	Concrete & Filled		Hollow CMU		Wood	
	Min. Edge	Min Emb.	Min. Edge	Min Emb.	Min. Edge	Min Emb.
1/4" ULTRACON HFH	2"	2"	2"	1 1/4"	2"	2"
5/16" ULTRACON HFH	3 1/2"	2"	3 1/2"	1 1/4"	2"	2"
3/8" CONFLEX	3 3/4"	3 1/2"	-	-	-	-
1/4"-20 SIDEWALK BOLT W/ PANELMATE INSERT	3 1/2"	1 3/4"	3 1/2"	1 1/4"	2"	2"
1/4" PANELMATE PRO, PLUS, FEMALE, & TVAS	2 1/2"	2"	2 1/2"	1 1/4"	2"	2"
3/8" SIDEWALK BOLT W/ POWERS DROPIN	3 1/2"	1 1/2"	4"	1 1/4"	-	-



#	DATE	REVISIONS

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58MM BERTHA
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ROLL-UP SHUTTER SYSTEM

TK Engineering, LLC.
1425 NUTMAN CREEK DRIVE, RIVERVIEW, FL 33569
PHONE: 404.7649; EMAIL: TKENGINEERING@GMAIL.COM
PROFESSIONAL ENGINEER LICENSE NUMBER: 28882

DATE: 4/24/12
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 12-0402

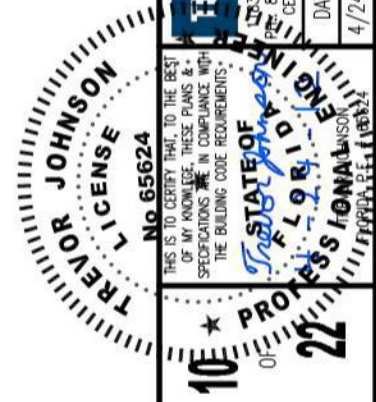
9 OF 22

TRACK MOUNT END-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16" ELCO ULTRACON HFH @ 6" O.C.			
SLAT SPAN	CONC. & FILLED CMU	HOLLOW CMU	TIMBER
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
54"	140	140	140
57"	140	126	140
60"	140	113	138
66"	140	92	111
72"	140	77	93
78"	126	65	78
84"	112	57	68
90"	100	50	59
96"	90	44	53
102"	82	40	47
108"	75	36	42
114"	69	33	39
120"	64	30	35
126"	59	28	32
132"	55	26	30
138"	52	24	28
144"	49	23	26
150"	46	21	24
156"	43	20	23
162"	41	19	22
168"	39	18	20
174"	37	17	19
180"	35	16	18
186"	34	15	17
192"	32	15	17
198"	31	14	16
204"	30	13	15
210"	29	13	15
216"	27	12	14
222"	26	12	13
228"	26	12	13
234"	25	11	12
240"	24	11	12

TRACK MOUNT END-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16" HFH ELCO ULTRACON @ 4" O.C.			
SLAT SPAN	CONC. & FILLED CMU	HOLLOW CMU	TIMBER
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
84"	140	77	92
90"	140	68	81
96"	130	61	72
102"	119	55	65
108"	109	50	59
114"	101	46	54
120"	94	43	50
126"	87	40	46
132"	82	37	43
138"	77	35	40
144"	72	32	38
150"	68	30	35
156"	65	29	33
162"	61	27	31
168"	58	26	30
174"	55	25	28
180"	53	23	27
186"	51	22	26
192"	48	21	24
198"	46	20	23
204"	45	20	22
210"	43	19	21
216"	41	18	21
222"	40	18	20
228"	38	17	19
234"	37	16	18
240"	36	16	18
246"	35	15	17
252"	34	15	17
258"	33	14	16
264"	32	14	15
270"	31	13	15
276"	30	13	15

TRACK MOUNT END-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONPLEX @ 8" O.C.	
SLAT SPAN	CONC. & FILLED CMU PRESSURE (PSF)
96"	140
102"	129
108"	119
114"	110
120"	102
126"	95
132"	89
138"	84
144"	79
150"	75
156"	71
162"	67
168"	64
174"	61
180"	58
186"	56
192"	53
198"	51
204"	49
210"	47
216"	46
222"	44
228"	42
234"	41
240"	40
246"	38
252"	37
258"	36
264"	35
270"	34
276"	33

NOTE: THE NON-RETENTION SLAT AND VIEWPORT SLAT SPANS OR DESIGN WIND LOADS SHALL NOT EXCEED THE "SLAT PERFORMANCE" TABLES ON SHEETS 7 AND 8 FOR ANY CONFIGURATION.



TKJ Engineering, LLC.
 17335 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
 PH: 813.404.7649; EM: TKJENGINEERING@GMAIL.COM
 CERTIFICATE OF AUTHORIZATION NUMBER: 28582
 DATE: 4/24/12
 DRAWN BY: TKJ
 SCALE: N.T.S.
 PROJ. #: 12-0402

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#	DATE	REVISIONS

TRACK MOUNT				
END-RETENTION & NON-RETENTION TRACKS				
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 1/4"-14 ELCO DRIL-FLEX.				
SLAT SPAN	@ 6" O.C. 1/8" AL/ST	@ 6" O.C. 1/4" AL/ST	@ 4" O.C. 1/8" AL/ST	@ 4" O.C. 1/4" AL/ST
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
84"	80	123	114	140
90"	72	111	103	140
96"	65	100	94	140
102"	60	91	86	132
108"	55	83	79	122
114"	51	77	73	113
120"	47	71	68	105
126"	44	66	64	98
132"	41	62	60	91
138"	38	58	56	86
144"	36	54	53	81
150"	34	51	50	76
156"	32	49	48	72
162"	31	46	45	69
168"	29	44	43	65
174"	28	42	41	62
180"	27	40	40	59
186"	26	38	38	57
192"	24	36	36	54
198"	23	35	35	52
204"	23	33	34	50
210"	22	32	32	48
216"	21	31	31	46
222"	20	30	30	45
228"	19	29	29	43
234"	19	28	28	42
240"	18	27	27	40
246"	18	26	26	39
252"	17	25	26	38
258"	17	24	25	37
264"	16	23	24	36
270"	16	23	23	34
276"	15	22	23	34

TRACK MOUNT			
END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16"-24 ELCO DRIL-FLEX.			
SLAT SPAN	@ 8" O.C. 1/4" AL/ST	@ 6" O.C. 1/4" AL/ST	@ 4" O.C. 1/4" AL/ST
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
84"	105	135	140
90"	94	121	140
96"	85	109	140
102"	77	100	140
108"	71	92	135
114"	65	85	125
120"	60	79	116
126"	56	73	109
132"	52	68	102
138"	49	64	96
144"	46	61	90
150"	43	57	85
156"	41	54	81
162"	39	51	77
168"	37	49	73
174"	35	46	70
180"	33	44	67
186"	32	42	64
192"	31	41	61
198"	29	39	59
204"	28	37	56
210"	27	36	54
216"	26	35	52
222"	25	33	50
228"	24	32	49
234"	23	31	47
240"	22	30	46
246"	22	29	44
252"	21	28	43
258"	20	27	41
264"	20	26	40
270"	19	26	39
276"	19	25	38

4" BUILD-OUTS			
END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16" ELCO ULTRACON HFH @ 6" O.C.			
SLAT SPAN	CONC. & FILLED CMU	HOLLOW CMU	TIMBER
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
57"	140	129	140
60"	140	111	130
63"	140	96	114
66"	130	84	100
69"	117	74	88
72"	105	66	79
75"	95	58	71
78"	87	52	64
81"	80	47	58
84"	74	43	53
87"	68	39	48
90"	63	36	45
93"	59	33	41
96"	55	30	38
99"	51	28	36
102"	48	26	33
105"	46	24	31
108"	43	22	29
111"	41	21	28
114"	39	20	26
117"	37	19	25
120"	35	18	23
123"	34	17	22
126"	32	16	21
129"	31	15	20
132"	29	14	19
135"	28	14	18
138"	27	13	17
141"	26	12	17
144"	25	12	16
147"	24	11	15
150"	23	11	15
153"	22	10	14

4" BUILD-OUTS			
END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16" HFH ELCO ULTRACON @ 4" O.C.			
SLAT SPAN	CONC. & FILLED CMU	HOLLOW CMU	TIMBER
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
60"	140	128	140
64"	140	107	132
68"	140	90	114
72"	140	78	99
76"	125	68	86
80"	112	59	76
84"	102	52	68
88"	92	47	62
92"	84	42	56
96"	78	38	51
100"	72	34	47
104"	67	31	43
108"	62	29	40
112"	58	27	37
116"	54	25	34
120"	51	23	32
124"	48	21	30
128"	46	20	28
132"	43	19	27
136"	41	18	25
140"	39	17	24
144"	37	16	23
148"	35	15	22
152"	34	14	21
156"	33	14	20
160"	31	13	19
164"	30	12	18
168"	29	12	17
172"	28	11	17
176"	27	11	16
180"	26	10	15
184"	25	10	15
188"	24	10	14

4" BUILD-OUTS	
END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLEX @ 8" O.C.	
SLAT SPAN	CONC. & FILLED CMU PRESSURE (PSF)
72"	140
76"	132
80"	119
84"	107
88"	98
92"	90
96"	83
100"	76
104"	71
108"	66
112"	62
116"	58
120"	55
124"	52
128"	49
132"	46
136"	44
140"	42
144"	40
148"	38
152"	36
156"	35
160"	33
164"	32
168"	31
172"	30
176"	29
180"	28
184"	27
188"	26
192"	25

NOTE: THE NON-RETENTION SLAT AND VIEWPORT SLAT SPANS OR DESIGN WIND LOADS SHALL NOT EXCEED THE "SLAT PERFORMANCE" TABLES ON SHEETS 7 AND 8 FOR ANY CONFIGURATION.

REVISIONS	DATE	#

ASSA
 "Knowledge is Your Best Protection"
 AMERICAN SHUTTER SYSTEM ASSOCIATION, INC.
 4268 WESTROADS DRIVE, WEST PALM BEACH, FL, 33407
 PHONE: 800.432.2204; FAX: 561.841.0852
 WWW.AMSSHUTTER.ORG

58MM BERTHA
 END RETENTION / NON-RETENTION
 ROLL-UP SHUTTER SYSTEM

TJ Engineering, LLC.
 1155 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
 PH: 213.404.7649; EM: TKENGINEERING@GMAIL.COM
 CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 4/24/12
 DRAWN BY: TKJ
 SCALE: N.T.S.
 PROJ. #: 12-0402

TREVOR JOHNSON
 LICENSE No. 65624
 STATE OF FLORIDA
 PROFESSIONAL ENGINEER
 11 OF 22

4" BUILD-OUTS END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLX @ 6" O.C.	
SLAT SPAN	CONC. & FILLED CMU PRESSURE (PSF)
96"	109
100"	101
104"	94
108"	88
112"	83
116"	78
120"	74
124"	70
128"	66
132"	63
136"	60
140"	57
144"	54
148"	52
152"	50
156"	48
160"	46
164"	44
168"	42
172"	41
176"	39
180"	38
184"	37
188"	35
192"	34
196"	33
200"	32
204"	31
210"	30
216"	29
222"	28

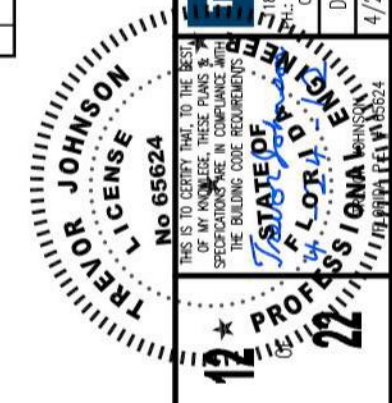
4" BUILD-OUTS END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLX @ 4" O.C.	
SLAT SPAN	CONC. & FILLED CMU PRESSURE (PSF)
108"	138
112"	130
116"	122
120"	116
124"	110
128"	104
132"	99
136"	95
140"	90
144"	87
148"	83
152"	79
156"	76
160"	73
164"	70
168"	68
172"	65
176"	63
180"	61
184"	59
188"	57
192"	55
196"	54
200"	52
204"	51
208"	49
212"	48
216"	46
222"	45
228"	43
237"	40

4" BUILD-OUTS END-RETENTION & NON-RETENTION TRACKS				
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 1/4"-14 ELCO DRIL-FLEX.				
SLAT SPAN	@ 6" O.C. 1/8" AL/ST	@ 6" O.C. 1/4" AL/ST	@ 4" O.C. 1/8" AL/ST	@ 4" O.C. 1/4" AL/ST
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
56"	140	140	140	140
60"	120	140	140	140
64"	100	140	119	140
68"	84	123	102	140
72"	72	107	88	140
76"	62	94	77	129
80"	54	84	68	115
84"	48	75	60	104
88"	43	68	54	95
92"	38	62	49	87
96"	34	56	44	80
100"	31	52	41	74
104"	28	48	37	68
108"	26	44	34	64
112"	24	41	32	60
116"	22	38	30	56
120"	20	36	28	53
124"	19	34	26	50
128"	18	32	24	47
132"	17	30	23	45
136"	16	29	22	42
140"	15	27	20	40
144"	14	26	19	38
148"	13	25	18	37
152"	13	23	18	35
156"	12	22	17	34
160"	11	21	16	32
164"	11	21	15	31
168"	10	20	15	30
172"	10	19	14	29
176"	10	18	14	28
180"	9	18	13	27
184"	9	17	13	26

4" BUILD-OUTS END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16"-24 ELCO DRIL-FLEX.			
SLAT SPAN	@ 8" O.C. 1/4" AL/ST	@ 6" O.C. 1/4" AL/ST	@ 4" O.C. 1/4" AL/ST
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
68"	109	131	140
72"	95	114	140
76"	83	101	139
80"	74	90	125
84"	66	81	114
88"	59	73	103
92"	53	67	95
96"	49	61	87
100"	44	56	81
104"	41	52	75
108"	38	48	70
112"	35	45	66
116"	33	42	62
120"	31	39	58
124"	29	37	55
128"	27	35	52
132"	25	33	49
136"	24	31	47
140"	23	30	45
144"	22	28	42
148"	21	27	41
152"	20	26	39
156"	19	25	37
160"	18	24	36
164"	17	23	34
168"	16	22	33
172"	16	21	32
176"	15	20	31
180"	14	19	30
184"	14	19	29
189"	13	18	27
196"	13	17	26
204"	12	16	24

3" BUILD-OUTS END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16" ELCO ULTRACON HFH @ 6" O.C.			
SLAT SPAN	CONC. & FILLED CMU	HOLLOW CMU	TIMBER
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
57"	140	129	140
60"	140	110	126
63"	137	95	110
66"	122	83	96
69"	110	73	85
72"	99	65	76
75"	90	58	68
78"	82	51	61
81"	75	46	56
84"	69	42	51
87"	63	38	47
90"	59	35	43
93"	55	32	40
96"	51	29	37
99"	48	27	34
102"	45	25	32
105"	42	23	30
108"	40	22	28
111"	38	21	26
114"	36	19	25
117"	34	18	24
120"	33	17	22
123"	31	16	21
126"	30	15	20
129"	28	14	19
132"	27	14	18
135"	26	13	17
138"	25	13	17
141"	24	12	16
144"	23	11	15
147"	22	11	15
150"	22	10	14
153"	21	10	14

NOTE: THE NON-RETENTION SLAT AND VIEWPORT SLAT SPANS OR DESIGN WIND LOADS SHALL NOT EXCEED THE "SLAT PERFORMANCE" TABLES ON SHEETS 7 AND 8 FOR ANY CONFIGURATION.



TKJ Engineering, LLC.
1835 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 813.404.7649; EM: TKJENGINEERING@GMAIL.COM
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 4/24/12
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 12-0402

**58MM BERTHA
END RETENTION / NON-RETENTION
ROLL-UP SHUTTER SYSTEM**



#	DATE	REVISIONS

3" BUILD-OUTS END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16" HFH ELCO ULTRACON @ 4" O.C.			
SLAT SPAN	CONC. & FILLED CMU	HOLLOW CMU	TIMBER
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
60"	140	125	140
64"	140	104	125
68"	140	88	107
72"	129	75	93
76"	114	65	82
80"	102	57	72
84"	92	50	64
88"	84	45	58
92"	76	40	52
96"	70	36	48
100"	65	33	44
104"	60	30	40
108"	56	28	37
112"	52	25	34
116"	49	23	32
120"	46	22	30
124"	44	20	28
128"	41	19	26
132"	39	18	25
136"	37	17	23
140"	35	16	22
144"	34	15	21
148"	32	14	20
152"	31	13	19
156"	29	13	18
160"	28	12	17
164"	27	12	17
168"	26	11	16
172"	25	11	15
176"	24	10	15
180"	23	10	14
184"	22	9	14
188"	22	9	13

3" BUILD-OUTS END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLEX @ 8" O.C.	
SLAT SPAN	CONC. & FILLED CMU
	PRESSURE (PSF)
72"	135
76"	120
80"	107
84"	97
88"	88
92"	81
96"	74
100"	69
104"	64
108"	59
112"	56
116"	52
120"	49
124"	46
128"	44
132"	41
136"	39
140"	37
144"	36
148"	34
152"	32
156"	31
160"	30
164"	29
168"	28
172"	26
176"	26
180"	25
184"	24
188"	23
192"	22

3" BUILD-OUTS END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLEX @ 6" O.C.	
SLAT SPAN	CONC. & FILLED CMU
	PRESSURE (PSF)
84"	124
88"	113
92"	104
96"	96
100"	89
104"	83
108"	78
112"	73
116"	69
120"	65
124"	61
128"	58
132"	55
136"	52
140"	50
144"	48
148"	45
152"	43
156"	42
160"	40
164"	38
168"	37
172"	36
176"	34
180"	33
184"	32
188"	31
192"	30
198"	29
204"	27
210"	26

3" BUILD-OUTS END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLEX @ 4" O.C.	
SLAT SPAN	CONC. & FILLED CMU
	PRESSURE (PSF)
96"	140
100"	133
104"	124
108"	117
112"	110
116"	104
120"	98
124"	93
128"	88
132"	84
136"	80
140"	76
144"	73
148"	70
152"	67
156"	64
160"	62
164"	60
168"	57
172"	55
176"	53
180"	52
184"	50
188"	48
192"	47
196"	45
200"	44
204"	43
216"	39
228"	36
237"	34

3" BUILD-OUTS END-RETENTION & NON-RETENTION TRACKS				
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 1/4"-14 ELCO DRIL-FLEX.				
SLAT SPAN	@ 6" O.C. 1/8" AL/ST	@ 6" O.C. 1/4" AL/ST	@ 4" O.C. 1/8" AL/ST	@ 4" O.C. 1/4" AL/ST
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
56"	140	140	140	140
60"	118	140	136	140
64"	98	134	114	140
68"	82	115	98	140
72"	70	100	84	131
76"	61	88	73	117
80"	53	79	64	105
84"	47	70	57	95
88"	41	63	51	86
92"	37	58	46	79
96"	33	52	42	72
100"	30	48	39	67
104"	27	44	35	62
108"	25	41	33	58
112"	23	38	30	54
116"	21	36	28	50
120"	20	33	26	47
124"	18	31	24	45
128"	17	29	23	42
132"	16	28	21	40
136"	15	26	20	38
140"	14	25	19	36
144"	13	24	18	34
148"	13	23	17	33
152"	12	22	16	31
156"	11	21	16	30
160"	11	20	15	29
164"	10	19	14	28
168"	10	18	14	27
172"	10	17	13	26
176"	9	17	13	25
180"	9	16	12	24
184"	8	16	12	23

3" BUILD-OUTS END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16"-24 ELCO DRIL-FLEX.			
SLAT SPAN	@ 8" O.C. 1/4" AL/ST	@ 6" O.C. 1/4" AL/ST	@ 4" O.C. 1/4" AL/ST
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
68"	104	122	140
72"	90	107	140
76"	79	94	126
80"	70	83	113
84"	62	75	102
88"	56	68	93
92"	50	62	85
96"	46	56	78
100"	42	52	72
104"	38	48	67
108"	35	44	63
112"	33	41	59
116"	31	39	55
120"	29	36	52
124"	27	34	49
128"	25	32	46
132"	24	30	44
136"	22	29	42
140"	21	27	40
144"	20	26	38
148"	19	25	36
152"	18	24	35
156"	17	22	33
160"	17	22	32
164"	16	21	31
168"	15	20	29
172"	15	19	28
176"	14	18	27
180"	14	18	26
184"	13	17	25
189"	13	16	24
196"	12	15	23
204"	11	14	22

NOTE: THE NON-RETENTION SLAT AND VIEWPORT SLAT SPANS OR DESIGN WIND LOADS SHALL NOT EXCEED THE "SLAT PERFORMANCE" TABLES ON SHEETS 7 AND 8 FOR ANY CONFIGURATION.

#	DATE	REVISIONS

ASSA
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**58MM BERTHA
 END RETENTION / NON-RETENTION
 ROLL-UP SHUTTER SYSTEM**

TEU Engineering, LLC.
 17055 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
 TEL: 813.404.7649; EM: TKENGINEERING@GMAIL.COM
 CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 4/24/12
 DRAWN BY: TKJ
 SCALE: N.T.S.
 PROJ. #: 12-0402

TREVOR JOHNSON
 LICENSE No. 65624
 THIS IS TO CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE, THESE PLANS & SPECIFICATIONS ARE IN COMPLIANCE WITH THE BUILDING CODE REQUIREMENTS.

13 OF 22

4" BUILD-INS			
END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16" ELCO ULTRACON HFH @ 6" O.C.			
SLAT SPAN	CONC. & FILLED CMU	HOLLOW CMU	TIMBER
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
57"	140	123	140
60"	140	107	130
63"	140	93	115
66"	133	82	103
69"	121	73	93
72"	110	65	84
75"	100	58	76
78"	93	53	70
81"	86	48	64
84"	80	43	59
87"	74	40	55
90"	69	37	51
93"	65	34	47
96"	61	32	45
99"	58	29	42
102"	55	27	39
105"	52	25	37
108"	49	24	35
111"	47	23	33
114"	44	21	32
117"	43	20	30
120"	41	19	29
123"	39	18	27
126"	37	17	26
129"	36	16	25
132"	34	16	24
135"	33	15	23
138"	32	14	22
141"	31	14	21
144"	30	13	21
147"	29	13	20
150"	28	12	19
153"	27	12	19

4" BUILD-INS			
END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16" HFH ELCO ULTRACON @ 4" O.C.			
SLAT SPAN	CONC. & FILLED CMU	HOLLOW CMU	TIMBER
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
60"	140	124	140
64"	140	105	140
68"	140	90	122
72"	140	78	108
76"	134	68	96
80"	121	61	87
84"	111	54	79
88"	102	49	72
92"	94	44	66
96"	87	40	61
100"	81	37	56
104"	75	34	52
108"	71	31	49
112"	66	29	46
116"	62	27	43
120"	59	25	41
124"	56	24	38
128"	53	22	36
132"	51	21	34
136"	48	20	33
140"	46	19	31
144"	44	18	30
148"	42	17	28
152"	40	16	27
156"	39	16	26
160"	37	15	25
164"	36	14	24
168"	34	14	23
172"	33	13	22
176"	32	13	22
180"	31	12	21
184"	30	12	20
188"	29	11	19

4" BUILD-INS	
END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLEX @ 8" O.C.	
SLAT SPAN	CONC. & FILLED CMU
	PRESSURE (PSF)
72"	136
76"	122
80"	110
84"	101
88"	92
92"	85
96"	79
100"	73
104"	68
108"	64
112"	60
116"	56
120"	53
124"	50
128"	48
132"	45
136"	43
140"	41
144"	39
148"	38
152"	36
156"	35
160"	33
164"	32
168"	31
172"	30
176"	29
180"	28
184"	27
188"	26
192"	25

4" BUILD-INS	
END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLEX @ 6" O.C.	
SLAT SPAN	CONC. & FILLED CMU
	PRESSURE (PSF)
84"	129
88"	119
92"	110
96"	102
100"	95
104"	89
108"	84
112"	79
116"	74
120"	70
124"	67
128"	63
132"	60
136"	57
140"	55
144"	53
148"	50
152"	48
156"	46
160"	45
164"	43
168"	41
172"	40
176"	39
180"	37
184"	36
188"	35
192"	34
198"	32
204"	31
210"	30

4" BUILD-INS	
END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLEX @ 4" O.C.	
SLAT SPAN	CONC. & FILLED CMU
	PRESSURE (PSF)
96"	140
100"	140
104"	134
108"	126
112"	119
116"	113
120"	107
124"	102
128"	97
132"	92
136"	88
140"	85
144"	81
148"	78
152"	75
156"	72
160"	69
164"	67
168"	65
172"	62
176"	60
180"	58
184"	56
188"	55
192"	53
196"	51
200"	50
204"	49
216"	45
228"	41
237"	39

4" BUILD-INS				
END-RETENTION & NON-RETENTION TRACKS				
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 1/4"-14 ELCO DRIL-FLEX.				
SLAT SPAN	@ 6" O.C.	@ 6" O.C.	@ 4" O.C.	@ 4" O.C.
	1/8" AL/ST	1/4" AL/ST	1/8" AL/ST	1/4" AL/ST
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
56"	133	140	140	140
60"	109	140	126	140
64"	91	132	107	140
68"	77	115	92	140
72"	66	101	79	135
76"	57	89	69	121
80"	50	80	62	109
84"	44	73	55	100
88"	39	66	49	91
92"	35	60	44	84
96"	32	55	41	78
100"	29	51	37	72
104"	27	47	34	67
108"	24	44	31	63
112"	22	41	29	59
116"	21	39	27	56
120"	19	36	25	52
124"	18	34	24	50
128"	17	32	22	47
132"	16	31	21	45
136"	15	29	20	43
140"	14	28	19	41
144"	13	27	18	39
148"	12	25	17	37
152"	12	24	16	36
156"	11	23	16	34
160"	11	22	15	33
164"	10	21	14	32
168"	10	20	14	30
172"	9	20	13	29
176"	9	19	13	28
180"	9	18	12	27
184"	8	18	12	26

NOTE: THE NON-RETENTION SLAT AND VIEWPORT SLAT SPANS OR DESIGN WIND LOADS SHALL NOT EXCEED THE "SLAT PERFORMANCE" TABLES ON SHEETS 7 AND 8 FOR ANY CONFIGURATION.

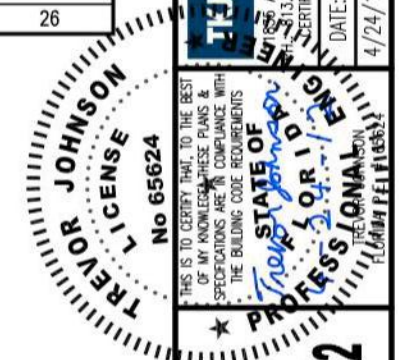
REVISIONS	DATE	#

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58MM BERTHA
END RETENTION / NON-RETENTION
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 14357 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
 TEL: 813.404.7649; EM: TKENGINEERING@GMAIL.COM
 CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 4/24/12
 DRAWN BY: TKJ
 SCALE: N.T.S.
 PROJ. #: 12-0402



4" BUILD-INS			
END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16"-24 ELCO DRIL-FLEX.			
SLAT SPAN	@ 8" O.C. 1/4" AL/ST	@ 6" O.C. 1/4" AL/ST	@ 4" O.C. 1/4" AL/ST
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
68"	101	120	140
72"	88	106	140
76"	78	94	128
80"	69	84	115
84"	62	76	105
88"	56	70	97
92"	51	63	89
96"	47	58	82
100"	43	54	76
104"	40	50	71
108"	37	47	67
112"	34	43	63
116"	32	41	59
120"	30	39	56
124"	28	36	53
128"	27	34	50
132"	25	33	48
136"	24	31	45
140"	23	29	43
144"	22	28	41
148"	21	27	40
152"	20	26	38
156"	19	25	36
160"	18	24	35
164"	17	23	34
168"	17	22	33
172"	16	21	31
176"	15	20	30
180"	15	19	29
184"	14	19	28
189"	14	18	27
196"	13	17	26
204"	12	16	24

3" BUILD-INS			
END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16" ELCO ULTRACON HFH @ 6" O.C.			
SLAT SPAN	CONC. & FILLED CMU	HOLLOW CMU	TIMBER
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
57"	140	119	140
60"	140	102	124
63"	137	89	109
66"	123	78	98
69"	112	69	87
72"	102	62	79
75"	93	56	72
78"	86	50	66
81"	79	46	60
84"	73	41	56
87"	69	38	52
90"	64	35	48
93"	60	32	45
96"	56	30	42
99"	53	28	39
102"	50	26	37
105"	47	24	35
108"	45	23	33
111"	43	21	31
114"	41	20	30
117"	39	19	28
120"	37	18	27
123"	36	17	26
126"	34	16	25
129"	33	16	23
132"	31	15	22
135"	30	14	22
138"	29	13	21
141"	28	13	20
144"	27	12	19
147"	26	12	19
150"	25	11	18
153"	25	11	17

3" BUILD-INS			
END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16" HFH ELCO ULTRACON @ 4" O.C.			
SLAT SPAN	CONC. & FILLED CMU	HOLLOW CMU	TIMBER
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
60"	140	118	140
64"	140	99	131
68"	140	85	114
72"	135	74	100
76"	121	65	89
80"	110	57	80
84"	100	51	73
88"	92	46	66
92"	85	41	61
96"	79	38	56
100"	73	35	52
104"	68	32	48
108"	64	29	45
112"	60	27	42
116"	56	25	40
120"	53	24	37
124"	51	22	35
128"	48	21	33
132"	46	20	31
136"	43	19	30
140"	41	18	29
144"	40	17	27
148"	38	16	26
152"	36	15	25
156"	35	15	24
160"	34	14	23
164"	32	13	22
168"	31	13	21
172"	30	12	20
176"	29	12	20
180"	28	11	19
184"	27	11	18
188"	26	10	18

3" BUILD-INS	
END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLX @ 8" O.C.	
SLAT SPAN	CONC. & FILLED CMU
	PRESSURE (PSF)
72"	140
76"	126
80"	114
84"	104
88"	96
92"	88
96"	82
100"	76
104"	71
108"	67
112"	63
116"	59
120"	56
124"	53
128"	50
132"	48
136"	46
140"	43
144"	41
148"	40
152"	38
156"	37
160"	35
164"	34
168"	33
172"	32
176"	30
180"	29
184"	28
188"	27
192"	27

3" BUILD-INS	
END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLX @ 6" O.C.	
SLAT SPAN	CONC. & FILLED CMU
	PRESSURE (PSF)
84"	134
88"	123
92"	114
96"	106
100"	99
104"	93
108"	87
112"	82
116"	78
120"	73
124"	70
128"	66
132"	63
136"	60
140"	58
144"	55
148"	53
152"	51
156"	49
160"	47
164"	45
168"	44
172"	42
176"	41
180"	39
184"	38
188"	37
192"	36
198"	34
204"	33
210"	31

3" BUILD-INS	
END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLX @ 4" O.C.	
SLAT SPAN	CONC. & FILLED CMU
	PRESSURE (PSF)
96"	140
100"	140
104"	138
108"	130
112"	123
116"	116
120"	110
124"	105
128"	100
132"	95
136"	91
140"	87
144"	84
148"	80
152"	77
156"	74
160"	72
164"	69
168"	67
172"	65
176"	62
180"	60
184"	59
188"	57
192"	55
196"	53
200"	52
204"	50
216"	46
228"	43
237"	41

NOTE: THE NON-RETENTION SLAT AND VIEWPORT SLAT SPANS OR DESIGN WIND LOADS SHALL NOT EXCEED THE "SLAT PERFORMANCE" TABLES ON SHEETS 7 AND 8 FOR ANY CONFIGURATION.

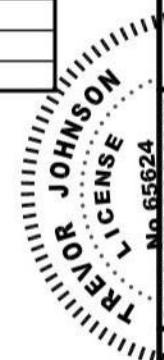
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 1455 NUTMAN CREEK DRIVE, RIVERVIEW, FL 33569
 TEL: 615.404.7649; EM: TKENGINEERING@GMAIL.COM
 PROFESSIONAL ENGINEER'S AUTHORIZATION NUMBER: 28582

DRAWN BY: SCALE: PROJ. #:
 DATE: 4/24/12 N.T.S. 12-0402



THIS IS TO CERTIFY THAT TO THE BEST OF MY KNOWLEDGE, THESE PLANS & SPECIFICATIONS ARE IN COMPLIANCE WITH THE BUILDING CODE REQUIREMENTS.

TREVOR JOHNSON
 LICENSE
 No. 65624
 PROFESSIONAL ENGINEER
 STATE OF FLORIDA
 4/24/12

3" BUILD-INS END-RETENTION & NON-RETENTION TRACKS				
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 1/4"-14 ELCO DRIL-FLEX.				
SLAT SPAN	@ 6" O.C. 1/8" AL/ST	@ 6" O.C. 1/4" AL/ST	@ 4" O.C. 1/8" AL/ST	@ 4" O.C. 1/4" AL/ST
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
56"	133	140	140	140
60"	110	140	128	140
64"	92	135	109	140
68"	78	118	93	140
72"	67	104	81	139
76"	58	93	71	125
80"	51	83	63	113
84"	45	76	57	103
88"	40	69	51	95
92"	36	63	46	87
96"	33	58	42	81
100"	30	54	39	75
104"	27	50	36	70
108"	25	47	33	66
112"	23	43	31	62
116"	22	41	29	58
120"	20	38	27	55
124"	19	36	25	52
128"	18	34	24	50
132"	17	33	22	47
136"	16	31	21	45
140"	15	29	20	43
144"	14	28	19	41
148"	13	27	18	39
152"	13	26	17	38
156"	12	25	17	36
160"	11	24	16	35
164"	11	23	15	33
168"	11	22	15	32
172"	10	21	14	31
176"	10	20	13	30
180"	9	20	13	29
184"	9	19	13	28

3" BUILD-INS END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16"-24 ELCO DRIL-FLEX.			
SLAT SPAN	@ 8" O.C. 1/4" AL/ST	@ 6" O.C. 1/4" AL/ST	@ 4" O.C. 1/4" AL/ST
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
68"	104	123	140
72"	91	109	140
76"	80	97	132
80"	72	88	119
84"	65	79	109
88"	59	72	100
92"	53	66	92
96"	49	61	86
100"	45	57	80
104"	42	52	75
108"	39	49	70
112"	36	46	66
116"	34	43	62
120"	32	41	58
124"	30	38	56
128"	28	36	53
132"	27	34	50
136"	26	33	48
140"	24	31	46
144"	23	30	44
148"	22	28	42
152"	21	27	40
156"	20	26	39
160"	19	25	37
164"	19	24	36
168"	18	23	34
172"	17	22	33
176"	17	22	32
180"	16	21	31
184"	15	20	30
189"	15	19	29
196"	14	18	27
204"	13	17	26

2" BUILD-INS W/ 1/4" WALLS & 3/8" ANGLES END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16" ELCO ULTRACON HFH @ 6" O.C.			
SLAT SPAN	CONC. & FILLED CMU	HOLLOW CMU	TIMBER
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
57"	140	112	132
60"	140	97	115
63"	126	84	102
66"	113	74	90
69"	102	65	81
72"	93	58	73
75"	85	52	67
78"	78	47	61
81"	72	43	56
84"	67	39	51
87"	62	36	48
90"	58	33	44
93"	54	30	41
96"	51	28	38
99"	48	26	36
102"	45	24	34
105"	43	23	32
108"	41	21	30
111"	39	20	28
114"	37	19	27
117"	35	18	26
120"	34	17	25
123"	32	16	23
126"	31	15	22
129"	30	14	21
132"	28	14	21
135"	27	13	20
138"	26	13	19
141"	25	12	18
144"	24	12	18
147"	24	11	17
150"	23	11	16
153"	22	10	16

2" BUILD-INS W/ 1/4" WALLS & 3/8" ANGLES END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16" HFH ELCO ULTRACON @ 4" O.C.			
SLAT SPAN	CONC. & FILLED CMU	HOLLOW CMU	TIMBER
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
60"	140	110	139
64"	140	93	120
68"	136	79	104
72"	121	69	92
76"	109	60	82
80"	98	53	73
84"	89	47	66
88"	82	42	60
92"	76	38	55
96"	70	35	51
100"	65	32	47
104"	61	29	44
108"	57	27	41
112"	53	25	38
116"	50	23	36
120"	48	22	34
124"	45	20	32
128"	43	19	30
132"	41	18	29
136"	39	17	27
140"	37	16	26
144"	35	15	25
148"	34	15	24
152"	32	14	23
156"	31	13	22
160"	30	13	21
164"	29	12	20
168"	28	12	19
172"	27	11	18
176"	26	11	18
180"	25	10	17
184"	24	10	17
188"	23	10	16

NOTE: THE NON-RETENTION SLAT AND VIEWPORT SLAT SPANS OR DESIGN WIND LOADS SHALL NOT EXCEED THE "SLAT PERFORMANCE" TABLES ON SHEETS 7 AND 8 FOR ANY CONFIGURATION.

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 DRAWN BY: TKJ
 SCALE: N.T.S.
 PROJ. #: 12-0402



16 OF 22

2" BUILD-INS W/ 1/4" WALLS & 3/8" ANGLES END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLEX @ 8" O.C.	
SLAT SPAN	CONC. & FILLED CMU
	PRESSURE (PSF)
68"	140
72"	126
76"	113
80"	102
84"	93
88"	85
92"	79
96"	73
100"	68
104"	63
108"	59
112"	56
116"	52
120"	50
124"	47
128"	44
132"	42
136"	40
140"	39
144"	37
148"	35
152"	34
156"	32
160"	31
164"	30
168"	29
172"	28
176"	27
180"	26
184"	25
188"	24

2" BUILD-INS W/ 1/4" WALLS & 3/8" ANGLES END-RETENTION & NON-RETENTION TRACKS	
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 3/8" ELCO CONFLEX @ 6" O.C.	
SLAT SPAN	CONC. & FILLED CMU
	PRESSURE (PSF)
72"	140
76"	140
80"	129
84"	118
88"	108
92"	100
96"	93
100"	87
104"	82
108"	77
112"	72
116"	68
120"	64
124"	61
128"	58
132"	55
136"	53
140"	51
144"	48
148"	46
152"	45
156"	43
160"	41
164"	40
168"	38
172"	37
176"	36
180"	34
192"	31
204"	29
216"	26

2" BUILD-INS W/ 1/4" WALLS & 3/8" ANGLES END-RETENTION & NON-RETENTION TRACKS				
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 1/4"-14 ELCO DRIL-FLEX.				
SLAT SPAN	@ 6" O.C. 1/8" AL/ST	@ 6" O.C. 1/4" AL/ST	@ 4" O.C. 1/8" AL/ST	@ 4" O.C. 1/4" AL/ST
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
56"	125	140	140	140
60"	103	140	119	140
64"	86	124	101	140
68"	73	108	86	140
72"	62	95	75	124
76"	54	84	66	112
80"	48	76	58	101
84"	42	68	52	92
88"	37	62	47	85
92"	34	57	42	78
96"	30	52	39	72
100"	28	48	35	67
104"	25	45	33	63
108"	23	42	30	59
112"	22	39	28	55
116"	20	37	26	52
120"	19	35	25	49
124"	17	33	23	47
128"	16	31	22	44
132"	15	29	20	42
136"	14	28	19	40
140"	14	27	18	38
144"	13	25	17	36
148"	12	24	17	35
152"	12	23	16	34
156"	11	22	15	32
160"	11	21	14	31
164"	10	20	14	30
168"	10	20	13	29
172"	9	19	13	28
176"	9	18	12	27
180"	9	18	12	26
184"	8	17	11	25

2" BUILD-INS W/ 1/4" WALLS & 3/8" ANGLES END-RETENTION & NON-RETENTION TRACKS			
MAXIMUM DESIGN PRESSURE OF A SINGLE UNIT SLAT WALL FOR ANY HEIGHT ATTACHED WITH 5/16"-24 ELCO DRIL-FLEX.			
SLAT SPAN	@ 8" O.C. 1/4" AL/ST	@ 6" O.C. 1/4" AL/ST	@ 4" O.C. 1/4" AL/ST
	PRESSURE (PSF)	PRESSURE (PSF)	PRESSURE (PSF)
68"	95	112	140
72"	84	99	131
76"	74	88	117
80"	66	79	106
84"	59	72	97
88"	54	65	89
92"	49	60	82
96"	45	55	76
100"	41	51	71
104"	38	47	66
108"	35	44	62
112"	33	41	58
116"	31	39	55
120"	29	36	52
124"	27	35	49
128"	26	33	47
132"	24	31	44
136"	23	29	42
140"	22	28	40
144"	21	27	39
148"	20	26	37
152"	19	24	35
156"	18	23	34
160"	17	23	33
164"	17	22	32
168"	16	21	30
172"	16	20	29
176"	15	19	28
180"	14	19	27
184"	14	18	26
189"	13	17	25
196"	13	16	24
204"	12	15	23

NOTE: THE NON-RETENTION SLAT AND VIEWPORT SLAT SPANS OR DESIGN WIND LOADS SHALL NOT EXCEED THE "SLAT PERFORMANCE" TABLES ON SHEETS 7 AND 8 FOR ANY CONFIGURATION.

#	DATE	REVISIONS

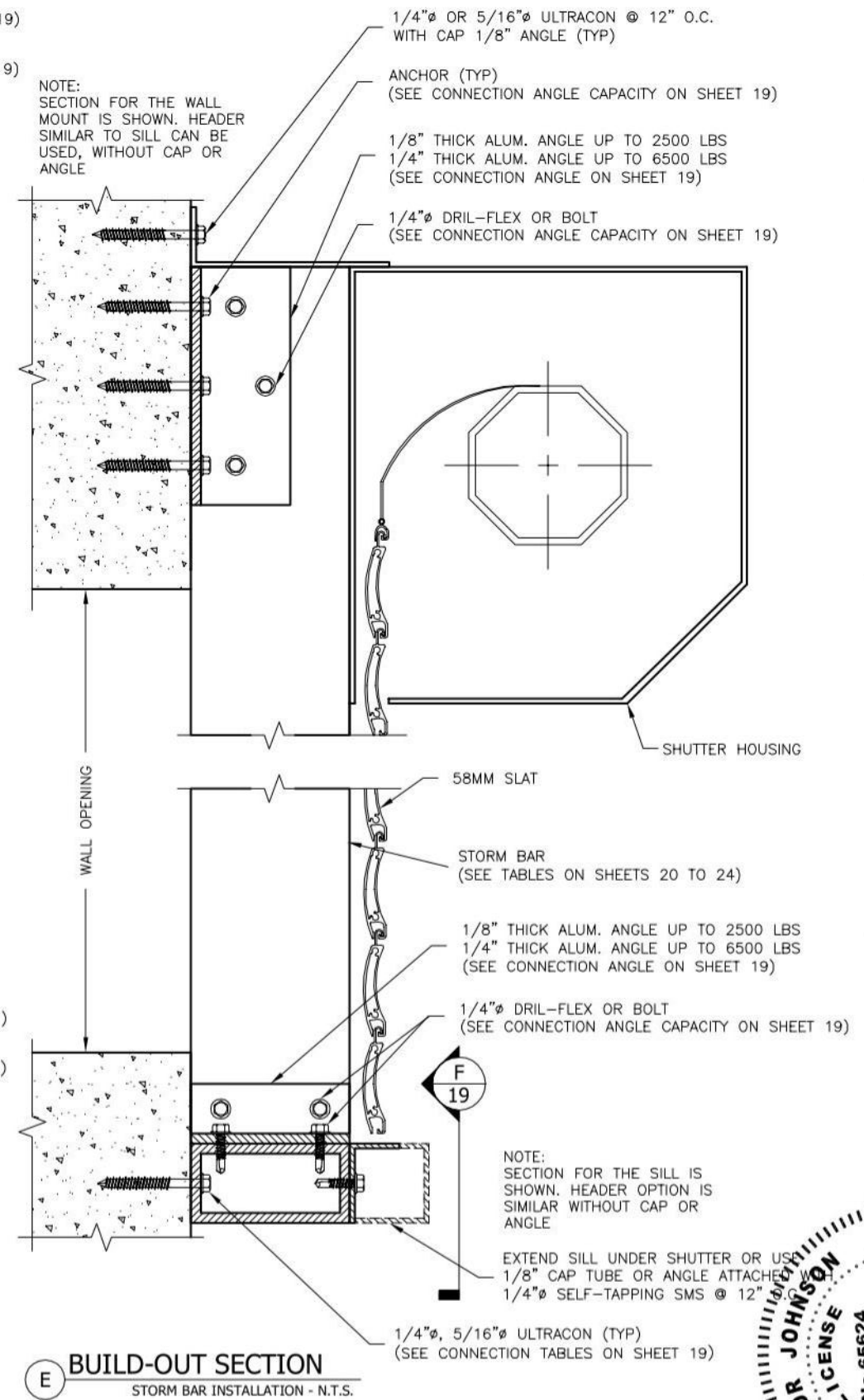
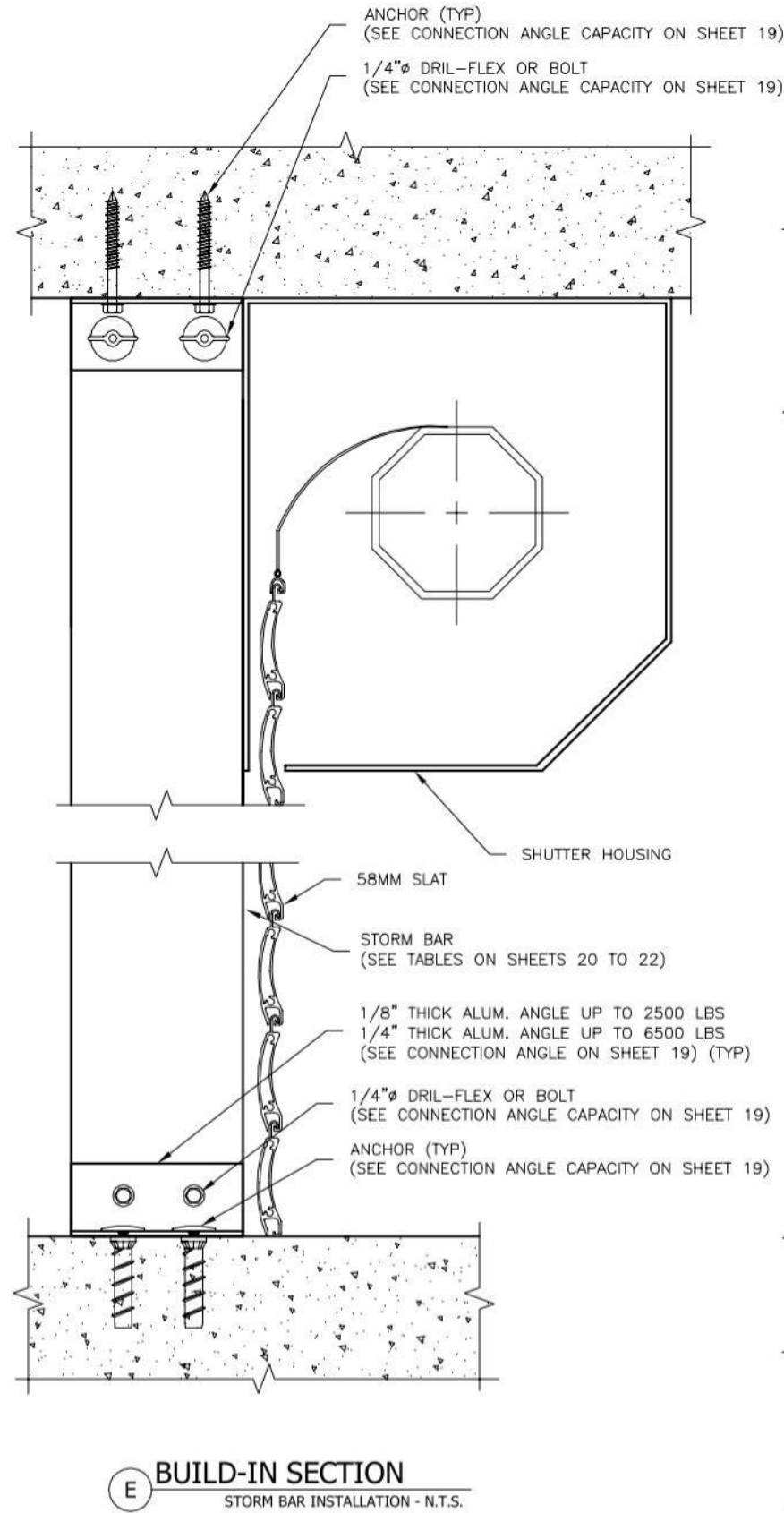
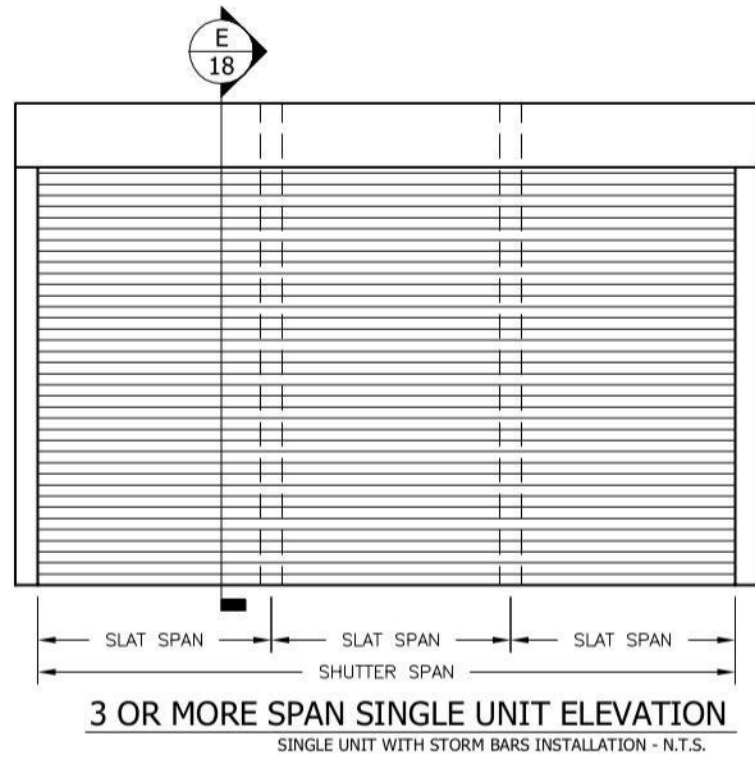
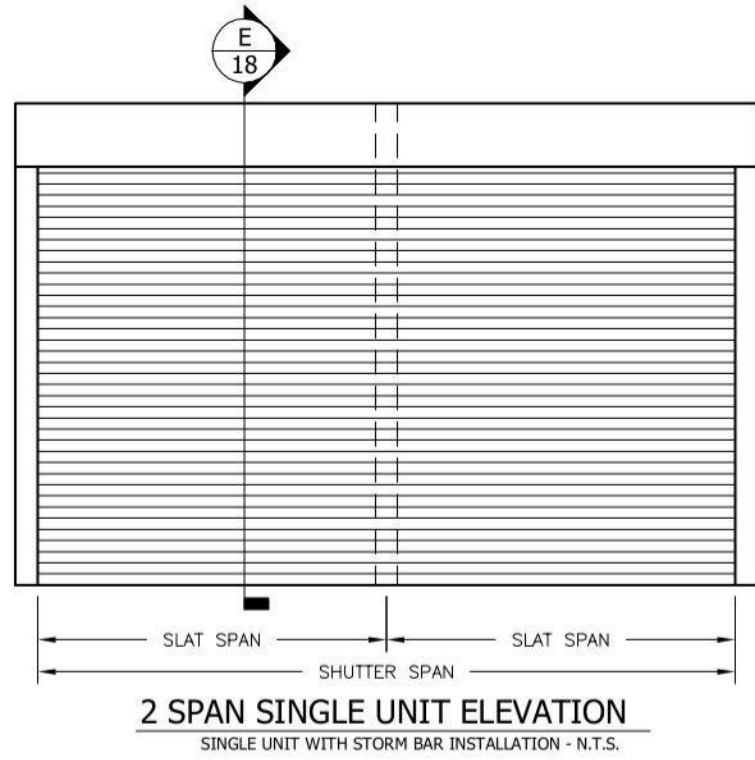
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 PHONE: 800.432.2204, FAX: 561.841.0852
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**58MM BERTHA
 END RETENTION / NON-RETENTION
 ROLL-UP SHUTTER SYSTEM**

TKJ Engineering, LLC.
 11835 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
 PH: 813.404.7649; EM: TKJENGINEERING@GMAIL.COM
 CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 4/24/12
 DRAWN BY: TKJ
 SCALE: N.T.S.
 PROJ. #: 12-0402

TREVOR JOHNSON
 LICENSE No 65624
 PROFESSIONAL ENGINEER
 STATE OF FLORIDA
 17 OF 22



- NOTES:
- STORM BARS CAN BE USED ON MULTIPLE UNIT INSTALLATIONS
 - STORM BARS CAN BE USED TO REDUCE MINIMUM SEPARATION TO GLASS

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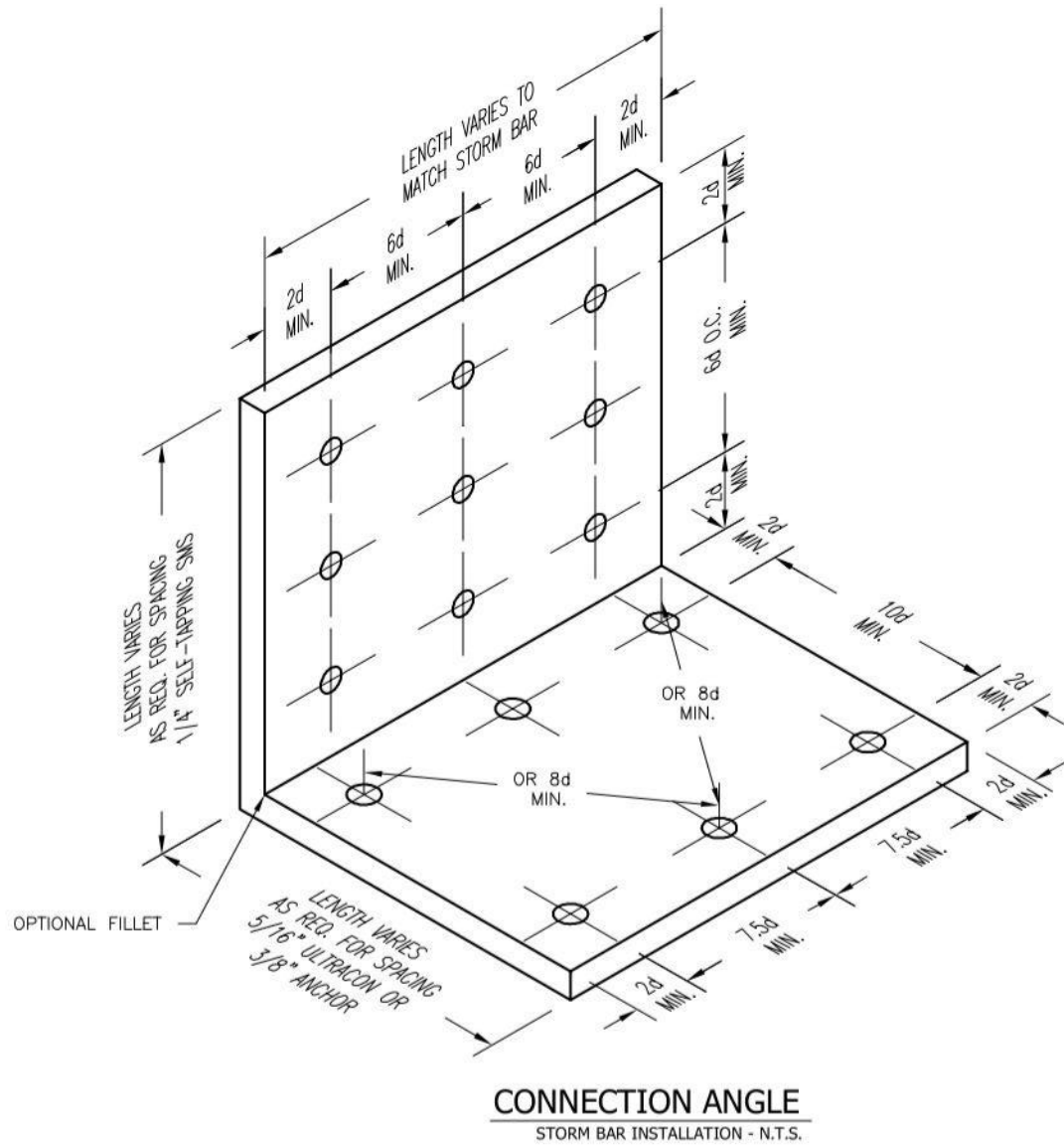
TJ Engineering, LLC.
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TEL: 813.404.7649; EM: TJEENGINEERING@GMAIL.COM
CERTIFICATE OF AUTHORIZATION NUMBER: 28882

DATE: 4/24/12
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 12-0402

TREOR JOHNSON
LICENSE
No. 65624
THIS IS TO CERTIFY THAT TO THE BEST OF MY KNOWLEDGE THESE PLANS & SPECIFICATIONS ARE IN COMPLIANCE WITH THE BUILDING CODE REQUIREMENTS

STATE OF FLORIDA
PROFESSIONAL ENGINEER

18 OF 22

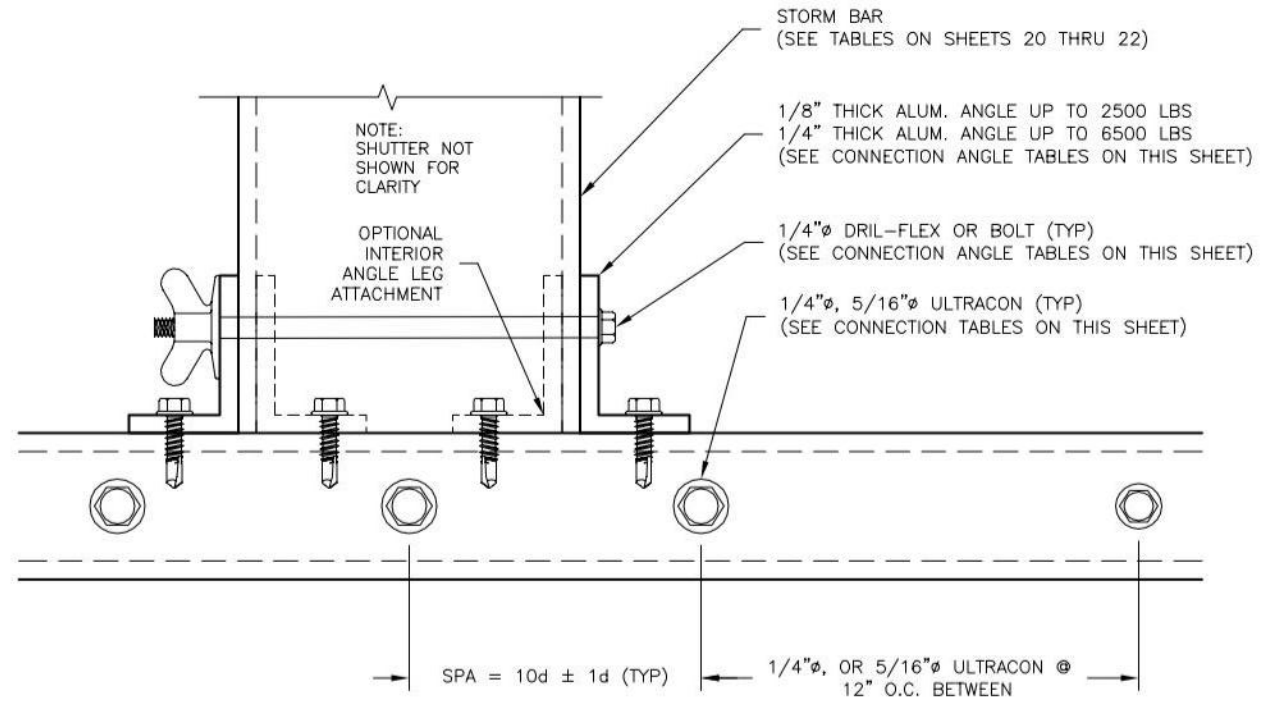


CONNECTION ANGLE

STORM BAR INSTALLATION - N.T.S.

NOTES:

- SEE STORM BAR CONNECTION CAPACITY TABLE FOR REQUIRED ANCHORS, USE CENTER ANCHOR SPACING AND LOCATIONS WHEN REQUIRED.
- SEE STORM BAR END LOAD ON MAXIMUM DESIGN PRESSURE STORM BAR TABLES FOR THE REQUIRED MINIMUM CONNECTION CAPACITY



(F) BUILD-OUT SILL/HEADER CONNECTION
OPTIONAL STORM BAR INSTALLATION - N.T.S.

BUILD-OUT SILL/HEADER CONNECTION CAPACITY					
CONCRETE & FILLED CMU		HOLLOW CMU		WOOD	
DESIGN LOAD (LBS)	ANCHORS REQUIRED EACH ANGLE	DESIGN LOAD (LBS)	ANCHORS REQUIRED EACH ANGLE	DESIGN LOAD (LBS)	ANCHORS REQUIRED EACH ANGLE
1890	(3) 1/4" ULTRACON	1050	(3) 1/4" ULTRACON	900	(3) 1/4" ULTRACON
2520	(4) 1/4" ULTRACON	1400	(4) 1/4" ULTRACON	1200	(4) 1/4" ULTRACON
2080	(2) 5/16" ULTRACON	1290	(3) 5/16" ULTRACON	1770	(3) 5/16" ULTRACON
3120	(3) 5/16" ULTRACON	1720	(4) 5/16" ULTRACON	2360	(4) 5/16" ULTRACON
4160	(4) 5/16" ULTRACON	2150	(5) 5/16" ULTRACON	2950	(5) 5/16" ULTRACON
5200	(5) 5/16" ULTRACON	2580	(6) 5/16" ULTRACON	3540	(6) 5/16" ULTRACON
-	-	3440	(8) 5/16" ULTRACON	4720	(8) 5/16" ULTRACON

CONNECTION ANGLE CAPACITY (2 REQUIRED)									
CONCRETE & FILLED CMU		HOLLOW CMU		WOOD		1/8" MIN ALUMINUM		1/4" MIN ALUMINUM	
DESIGN LOAD (LBS)	ANCHORS REQUIRED EACH ANGLE	DESIGN LOAD (LBS)	ANCHORS REQUIRED EACH ANGLE	DESIGN LOAD (LBS)	ANCHORS REQUIRED EACH ANGLE	DESIGN LOAD (LBS)	ANCHORS REQUIRED EACH ANGLE	DESIGN LOAD (LBS)	ANCHORS REQUIRED EACH ANGLE
1260	(1) 1/4" ANCHORS	700	(1) 1/4" ANCHORS	600	(1) 1/4" ANCHORS	1320	(1) 1/4-14 DRIL-FLEX	2120	(1) 1/4-14 DRIL-FLEX
2520	(2) 1/4" ANCHORS	1400	(2) 1/4" ANCHORS	1200	(2) 1/4" ANCHORS	2640	(2) 1/4-14 DRIL-FLEX	4240	(2) 1/4-14 DRIL-FLEX
2080	(1) 5/16" ULTRACON	860	(1) 5/16" ULTRACON	1180	(1) 5/16" ULTRACON	3960	(3) 1/4-14 DRIL-FLEX	6360	(3) 1/4-14 DRIL-FLEX
4160	(2) 5/16" ULTRACON	1720	(2) 5/16" ULTRACON	2360	(2) 5/16" ULTRACON	1240	(1) 1/4 THRU BOLT	2500	(1) 1/4 THRU BOLT
2020	(1) 3/8" DROPIN	2580	(3) 5/16" ULTRACON	3540	(3) 5/16" ULTRACON	2480	(2) 1/4 THRU BOLT	5000	(2) 1/4 THRU BOLT
4040	(2) 3/8" DROPIN	3440	(4) 5/16" ULTRACON	4720	(4) 5/16" ULTRACON	3760	(2) 3/8 THRU BOLT	3760	(1) 3/8 THRU BOLT

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CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 4/24/12
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 12-0402

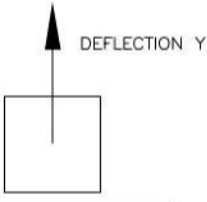


MAXIMUM DESIGN PRESSURE OF A 2"x2"x1/4" STORM BAR (6063-T6) - 2 SPANS				
AVERAGE SPAN WIDTH UP TO	STORM BAR LENGTH UP TO	DESIGN PRESSURE (PSF)	STORM BAR END LOAD (LB)	STORM BAR DEFLECTION Y (IN)
30"	42"	140	766	1.2
	48"	140	875	1.5
	54"	140	984	1.8
	60"	117	914	2.1
	66"	96	825	2.4
	72"	81	759	2.8
	78"	67	680	3.1
	84"	54	591	3.4
	90"	44	516	3.4
	96"	36	450	3.4
36"	42"	140	919	1.2
	48"	140	1050	1.5
	54"	120	1013	1.8
	60"	97	909	2.1
	66"	80	825	2.4
	72"	68	765	2.8
	78"	56	683	3.1
	84"	45	591	3.4
	90"	37	520	3.4
	96"	30	450	3.4
42"	42"	140	1072	1.2
	48"	130	1138	1.5
	54"	103	1014	1.8
	60"	83	908	2.1
	66"	69	830	2.4
	72"	58	761	2.8
	78"	48	683	3.1
	84"	39	597	3.4
	90"	31	509	3.4
	96"	26	455	3.4
48"	42"	140	1225	1.2
	48"	114	1140	1.5
	54"	90	1013	1.8
	60"	73	913	2.1
	66"	60	825	2.4
	72"	51	765	2.8
	78"	42	683	3.1
	84"	34	595	3.4
	90"	27	506	3.4
	96"	23	460	3.4

MAXIMUM DESIGN PRESSURE OF A 2"x3"x1/8" STORM BAR (6063-T6) - 2 SPANS				
AVERAGE SPAN WIDTH UP TO	STORM BAR LENGTH UP TO	DESIGN PRESSURE (PSF)	STORM BAR END LOAD (LB)	STORM BAR DEFLECTION Y (IN)
30"	42"	140	766	1.0
	48"	140	875	1.2
	54"	140	984	1.4
	60"	125	977	1.7
	66"	103	885	1.8
	72"	87	816	1.8
	78"	74	752	1.8
	84"	64	700	1.8
	90"	56	656	1.8
	96"	49	613	1.8
36"	42"	140	919	1.0
	48"	140	1050	1.2
	54"	129	1088	1.4
	60"	104	975	1.7
	66"	86	887	1.8
	72"	72	810	1.8
	78"	62	756	1.8
	84"	53	696	1.8
	90"	46	647	1.8
	96"	41	615	1.8
42"	42"	140	1072	1.0
	48"	140	1225	1.2
	54"	110	1083	1.4
	60"	89	973	1.7
	66"	74	890	1.8
	72"	62	814	1.8
	78"	53	754	1.8
	84"	46	704	1.8
	90"	40	656	1.8
	96"	35	613	1.8
48"	42"	140	1225	1.0
	48"	122	1220	1.2
	54"	97	1091	1.4
	60"	78	975	1.7
	66"	65	894	1.8
	72"	54	810	1.8
	78"	46	748	1.8
	84"	40	700	1.8
	90"	35	656	1.8
	96"	31	620	1.8

MAXIMUM DESIGN PRESSURE OF A 2"x4"x1/8" STORM BAR (6063-T6) - 2 SPANS				
AVERAGE SPAN WIDTH UP TO	STORM BAR LENGTH UP TO	DESIGN PRESSURE (PSF)	STORM BAR END LOAD (LB)	STORM BAR DEFLECTION Y (IN)
30"	66"	140	1203	1.1
	72"	132	1238	1.1
	78"	113	1148	1.1
	84"	97	1061	1.1
	90"	85	996	1.1
	96"	74	925	1.1
	102"	66	877	1.1
	108"	59	830	1.1
	114"	53	787	1.1
	120"	48	750	1.1
36"	66"	131	1351	1.1
	72"	110	1238	1.1
	78"	94	1146	1.1
	84"	81	1063	1.1
	90"	71	998	1.1
	96"	62	930	1.1
	102"	55	877	1.1
	108"	49	827	1.1
	114"	44	784	1.1
	120"	40	750	1.1
42"	66"	112	1348	1.1
	72"	94	1234	1.1
	78"	81	1152	1.1
	84"	69	1057	1.1
	90"	60	984	1.1
	96"	53	928	1.1
	102"	47	874	1.1
	108"	42	827	1.1
	114"	38	790	1.1
	120"	34	744	1.1
48"	66"	98	1348	1.1
	72"	83	1245	1.1
	78"	70	1138	1.1
	84"	61	1068	1.1
	90"	53	994	1.1
	96"	47	940	1.1
	102"	41	871	1.1
	108"	37	833	1.1
	114"	33	784	1.1
	120"	30	750	1.1

MAXIMUM DESIGN PRESSURE OF A 2"x4"x1/8" STORM BAR (6063-T6) - 2 SPANS				
AVERAGE SPAN WIDTH UP TO	STORM BAR LENGTH UP TO	DESIGN PRESSURE (PSF)	STORM BAR END LOAD (LB)	STORM BAR DEFLECTION Y (IN)
54"	54"	131	1658	1.0
	60"	106	1491	1.1
	66"	87	1346	1.1
	72"	73	1232	1.1
	78"	63	1152	1.1
	84"	54	1063	1.1
	90"	47	991	1.1
	96"	41	923	1.1
	102"	37	885	1.1
	108"	33	835	1.1
60"	48"	140	1750	0.8
	54"	118	1659	1.0
	60"	95	1484	1.1
	66"	79	1358	1.1
	72"	66	1238	1.1
	78"	56	1138	1.1
	84"	49	1072	1.1
	90"	42	984	1.1
	96"	37	925	1.1
	102"	33	877	1.1
66"	42"	140	1684	0.7
	48"	135	1856	0.8
	54"	107	1655	1.0
	60"	87	1495	1.1
	66"	72	1361	1.1
	72"	60	1238	1.1
	78"	51	1140	1.1
	84"	44	1059	1.1
	90"	38	980	1.1
	96"	34	935	1.1
72"	42"	140	1838	0.7
	48"	124	1860	0.8
	54"	98	1654	1.0
	60"	79	1481	1.1
	66"	66	1361	1.1
	72"	55	1238	1.1
	78"	47	1146	1.1
	84"	40	1050	1.1
	90"	35	984	1.1
	96"	31	930	1.1



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

#	DATE	REVISIONS

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 CERTIFICATE OF AUTHORIZATION NUMBER: 28882

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 SCALE: N.T.S.
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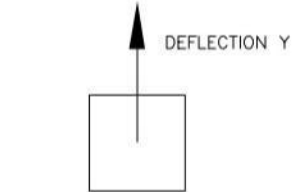
TREVOR JOHNSON
 LICENSE No 65624
 PROFESSIONAL ENGINEER
 STATE OF FLORIDA
 20 OF 22

MAXIMUM DESIGN PRESSURE OF A 2"X4"X1/4" STORM BAR (6063-T6) - 2 SPANS				
AVERAGE SPAN WIDTH UP TO	STORM BAR LENGTH UP TO	DESIGN PRESSURE (PSF)	STORM BAR END LOAD (LB)	STORM BAR DEFLECTION Y (IN)
48"	66"	140	1925	0.8
	75"	136	2125	0.8
	84"	108	1890	0.8
	93"	88	1705	0.8
	102"	73	1551	0.8
	111"	62	1434	1.0
	120"	53	1325	1.1
	129"	46	1236	1.3
	138"	40	1150	1.5
147"	35	1072	1.7	
54"	66"	140	2166	0.8
	75"	121	2127	0.8
	84"	96	1890	0.8
	93"	79	1722	0.8
	102"	65	1554	0.8
	111"	55	1431	1.0
	120"	47	1322	1.1
	129"	41	1240	1.3
	138"	36	1164	1.5
147"	31	1068	1.7	
60"	66"	140	2406	0.8
	75"	109	2129	0.8
	84"	87	1903	0.8
	93"	71	1720	0.8
	102"	59	1567	0.8
	111"	50	1445	1.0
	120"	42	1313	1.1
	129"	37	1243	1.3
	138"	32	1150	1.5
147"	28	1072	1.7	
72"	66"	117	2413	0.8
	75"	91	2133	0.8
	84"	72	1890	0.8
	93"	59	1715	0.8
	102"	49	1562	0.8
	111"	41	1422	1.0
	120"	35	1313	1.1
	129"	31	1250	1.3
	138"	27	1164	1.5
147"	24	1103	1.7	

MAXIMUM DESIGN PRESSURE OF A 2"X4"X1/4" STORM BAR (6063-T6) - 2 SPANS				
AVERAGE SPAN WIDTH UP TO	STORM BAR LENGTH UP TO	DESIGN PRESSURE (PSF)	STORM BAR END LOAD (LB)	STORM BAR DEFLECTION Y (IN)
78"	54"	140	2559	0.7
	60"	131	2661	0.8
	66"	108	2413	0.8
	72"	91	2218	0.8
	78"	77	2033	0.8
	84"	67	1905	0.8
	90"	58	1767	0.8
	96"	51	1658	0.8
	102"	45	1554	0.8
	108"	40	1463	0.9
84"	54"	140	2756	0.7
	60"	121	2647	0.8
	66"	100	2406	0.8
	72"	84	2205	0.8
	78"	72	2048	0.8
	84"	62	1899	0.8
	90"	54	1772	0.8
	96"	47	1645	0.8
	102"	42	1562	0.8
	108"	37	1457	0.9
90"	54"	140	2953	0.7
	60"	113	2648	0.8
	66"	94	2423	0.8
	72"	79	2222	0.8
	78"	67	2041	0.8
	84"	58	1903	0.8
	90"	50	1758	0.8
	96"	44	1650	0.8
	102"	39	1554	0.8
	108"	35	1477	0.9
96"	48"	140	2800	0.6
	54"	131	2948	0.7
	60"	106	2650	0.8
	66"	88	2420	0.8
	72"	74	2220	0.8
	78"	63	2048	0.8
	84"	54	1890	0.8
	90"	47	1763	0.8
	96"	41	1640	0.8
	102"	37	1573	0.8

MAXIMUM DESIGN PRESSURE OF A 2"X2"X1/4" STORM BAR (6063-T6) - 3 OR MORE SPANS					
AVERAGE SPAN WIDTH UP TO	STORM BAR LENGTH UP TO	DESIGN PRESSURE (PSF)	STORM BAR END LOAD (LB)	STORM BAR DEFLECTION Y (IN)	
30"	42"	140	704	1.2	
	48"	140	805	1.5	
	54"	140	906	1.8	
	60"	128	920	2.1	
	66"	105	830	2.4	
	72"	89	768	2.8	
	78"	74	691	3.1	
	84"	59	594	3.4	
	90"	48	518	3.4	
	96"	40	460	3.4	
	36"	42"	140	845	1.2
		48"	140	966	1.5
54"		131	1017	1.8	
60"		106	914	2.1	
66"		88	835	2.4	
72"		74	766	2.8	
78"		61	684	3.1	
84"		49	592	3.4	
90"		40	518	3.4	
96"		33	455	3.4	
42"		42"	140	986	1.2
		48"	140	1127	1.5
	54"	113	1023	1.8	
	60"	91	916	2.1	
	66"	75	830	2.4	
	72"	63	761	2.8	
	78"	53	693	3.1	
	84"	42	592	3.4	
	90"	34	513	3.4	
	96"	28	451	3.4	
	48"	42"	140	1127	1.2
		48"	125	1150	1.5
54"		98	1014	1.8	
60"		80	920	2.1	
66"		66	835	2.4	
72"		55	759	2.8	
78"		46	688	3.1	
84"		37	596	3.4	
90"		30	518	3.4	
96"		25	460	3.4	

MAXIMUM DESIGN PRESSURE OF A 2"X3"X1/8" STORM BAR (6063-T6) - 3 OR MORE SPANS					
AVERAGE SPAN WIDTH UP TO	STORM BAR LENGTH UP TO	DESIGN PRESSURE (PSF)	STORM BAR END LOAD (LB)	STORM BAR DEFLECTION Y (IN)	
30"	42"	140	704	1.0	
	48"	140	805	1.2	
	54"	140	906	1.4	
	60"	137	985	1.7	
	66"	113	893	1.8	
	72"	95	819	1.8	
	78"	81	757	1.8	
	84"	70	704	1.8	
	90"	61	658	1.8	
	96"	53	610	1.8	
	36"	42"	140	845	1.0
		48"	140	966	1.2
54"		140	1087	1.4	
60"		114	983	1.7	
66"		94	892	1.8	
72"		79	818	1.8	
78"		68	762	1.8	
84"		58	700	1.8	
90"		51	660	1.8	
96"		45	621	1.8	
42"		42"	140	986	1.0
		48"	140	1127	1.2
	54"	121	1096	1.4	
	60"	98	986	1.7	
	66"	81	897	1.8	
	72"	68	821	1.8	
	78"	58	759	1.8	
	84"	50	704	1.8	
	90"	43	649	1.8	
	96"	38	612	1.8	
	48"	42"	140	1127	1.0
		48"	134	1233	1.2
54"		106	1097	1.4	
60"		86	989	1.7	
66"		71	898	1.8	
72"		59	814	1.8	
78"		51	762	1.8	
84"		44	708	1.8	
90"		38	656	1.8	
96"		33	607	1.8	



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

#	DATE	REVISIONS

ASSA
 "Knowledge is Your Best Protection"
 AMERICAN SHUTTER SYSTEM ASSOCIATION, INC.
 4268 WESTROADS DRIVE, WEST PALM BEACH, FL, 33407
 PHONE: 800.432.2204; FAX: 561.841.0852
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58MM BERTHA
END RETENTION / NON-RETENTION
ROLL-UP SHUTTER SYSTEM

TEU Engineering, LLC.
 1235 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
 TEL: 813.404.7649; EM: TKENGIN@GMAIL.COM
 CERTIFICATE OF AUTHORIZATION NUMBER: 28882

DATE: 4/24/12
 DRAWN BY: TKJ
 SCALE: N.T.S.
 PROJ. #: 12-0402

TREVOR JOHNSON
 LICENSE No. 65624
 THIS IS TO CERTIFY THAT TO THE BEST OF MY KNOWLEDGE, THESE PLANS & SPECIFICATIONS ARE IN COMPLIANCE WITH THE BUILDING CODE REQUIREMENTS.

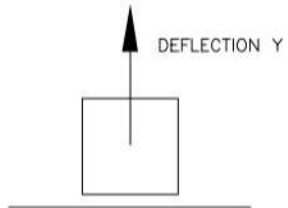
TREVOR JOHNSON
 PROFESSIONAL ENGINEER
 FLORIDA
 LICENSE NO. 65624

MAXIMUM DESIGN PRESSURE OF A 2"x4"x1/8" STORM BAR (6063-T6) - 3 OR MORE SPANS				
AVERAGE SPAN WIDTH UP TO	STORM BAR LENGTH UP TO	DESIGN PRESSURE (PSF)	STORM BAR END LOAD (LB)	STORM BAR DEFLECTION Y (IN)
30"	66"	140	1107	1.1
	72"	140	1208	1.1
	78"	123	1149	1.1
	84"	106	1067	1.1
	90"	93	1003	1.1
	96"	81	932	1.1
	102"	72	880	1.1
	108"	64	828	1.1
	114"	58	792	1.1
	120"	52	748	1.1
36"	66"	140	1328	1.1
	72"	121	1252	1.1
	78"	103	1155	1.1
	84"	89	1075	1.1
	90"	77	996	1.1
	96"	68	938	1.1
	102"	60	880	1.1
	108"	54	838	1.1
	114"	48	787	1.1
	120"	43	742	1.1
42"	66"	123	1361	1.1
	72"	103	1244	1.1
	78"	88	1151	1.1
	84"	76	1071	1.1
	90"	66	996	1.1
	96"	58	934	1.1
	102"	51	872	1.1
	108"	46	833	1.1
	114"	41	784	1.1
	120"	37	745	1.1
48"	66"	108	1366	1.1
	72"	90	1242	1.1
	78"	77	1151	1.1
	84"	66	1063	1.1
	90"	58	1001	1.1
	96"	51	938	1.1
	102"	45	880	1.1
	108"	40	828	1.1
	114"	36	787	1.1
	120"	33	759	1.1

MAXIMUM DESIGN PRESSURE OF A 2"x4"x1/8" STORM BAR (6063-T6) - 3 OR MORE SPANS				
AVERAGE SPAN WIDTH UP TO	STORM BAR LENGTH UP TO	DESIGN PRESSURE (PSF)	STORM BAR END LOAD (LB)	STORM BAR DEFLECTION Y (IN)
54"	54"	140	1630	1.0
	60"	116	1501	1.1
	66"	96	1366	1.1
	72"	80	1242	1.1
	78"	68	1144	1.1
	84"	59	1069	1.1
	90"	51	990	1.1
	96"	45	932	1.1
	102"	40	880	1.1
	108"	36	838	1.1
60"	48"	140	1610	0.8
	54"	129	1669	1.0
	60"	104	1495	1.1
	66"	86	1360	1.1
	72"	72	1242	1.1
	78"	62	1159	1.1
	84"	53	1067	1.1
	90"	46	992	1.1
	96"	41	943	1.1
	102"	36	880	1.1
66"	42"	140	1550	0.7
	48"	140	1771	0.8
	54"	117	1665	1.0
	60"	95	1502	1.1
	66"	78	1357	1.1
	72"	66	1252	1.1
	78"	56	1151	1.1
	84"	48	1063	1.1
	90"	42	996	1.1
	96"	37	936	1.1
72"	42"	140	1691	0.7
	48"	136	1877	0.8
	54"	107	1661	1.0
	60"	87	1501	1.1
	66"	72	1366	1.1
	72"	60	1242	1.1
	78"	51	1144	1.1
	84"	44	1063	1.1
	90"	39	1009	1.1
	96"	34	938	1.1

MAXIMUM DESIGN PRESSURE OF A 2"x4"x1/4" STORM BAR (6063-T6) - 3 OR MORE SPANS				
AVERAGE SPAN WIDTH UP TO	STORM BAR LENGTH UP TO	DESIGN PRESSURE (PSF)	STORM BAR END LOAD (LB)	STORM BAR DEFLECTION Y (IN)
48"	66"	140	1771	0.8
	75"	140	2013	0.8
	84"	118	1900	0.8
	93"	97	1729	0.8
	102"	80	1564	0.8
	111"	68	1447	1.0
	120"	58	1334	1.1
	129"	50	1236	1.3
	138"	44	1164	1.5
	147"	39	1099	1.7
54"	66"	140	1992	0.8
	75"	132	2135	0.8
	84"	105	1902	0.8
	93"	86	1725	0.8
	102"	71	1562	0.8
	111"	60	1436	1.0
	120"	52	1346	1.1
	129"	45	1252	1.3
	138"	39	1160	1.5
	147"	34	1078	1.7
60"	66"	140	2214	0.8
	75"	119	2138	0.8
	84"	95	1912	0.8
	93"	77	1716	0.8
	102"	64	1564	0.8
	111"	54	1436	1.0
	120"	46	1323	1.1
	129"	40	1236	1.3
	138"	35	1157	1.5
	147"	31	1092	1.7
72"	66"	128	2429	0.8
	75"	99	2135	0.8
	84"	79	1908	0.8
	93"	64	1711	0.8
	102"	54	1584	0.8
	111"	45	1436	1.0
	120"	39	1346	1.1
	129"	33	1224	1.3
	138"	29	1151	1.5
	147"	26	1099	1.7

MAXIMUM DESIGN PRESSURE OF A 2"x4"x1/4" STORM BAR (6063-T6) - 3 OR MORE SPANS				
AVERAGE SPAN WIDTH UP TO	STORM BAR LENGTH UP TO	DESIGN PRESSURE (PSF)	STORM BAR END LOAD (LB)	STORM BAR DEFLECTION Y (IN)
78"	54"	140	2355	0.7
	60"	140	2616	0.8
	66"	118	2426	0.8
	72"	99	2220	0.8
	78"	85	2065	0.8
	84"	73	1910	0.8
	90"	63	1766	0.8
	96"	56	1674	0.8
	102"	49	1557	0.8
	108"	44	1480	0.9
84"	54"	140	2536	0.7
	60"	133	2677	0.8
	66"	110	2435	0.8
	72"	92	2222	0.8
	78"	79	2067	0.8
	84"	68	1916	0.8
	90"	59	1781	0.8
	96"	52	1674	0.8
	102"	46	1574	0.8
	108"	41	1485	0.9
90"	54"	140	2717	0.7
	60"	124	2674	0.8
	66"	102	2419	0.8
	72"	86	2225	0.8
	78"	73	2046	0.8
	84"	63	1902	0.8
	90"	55	1779	0.8
	96"	48	1656	0.8
	102"	43	1576	0.8
	108"	38	1475	0.9
96"	48"	140	2576	0.6
	54"	140	2898	0.7
	60"	116	2668	0.8
	66"	96	2429	0.8
	72"	81	2236	0.8
	78"	69	2063	0.8
	84"	59	1900	0.8
	90"	52	1794	0.8
	96"	45	1656	0.8
	102"	40	1564	0.8



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DRAWN BY: SCALE: PROJ. #:
 DATE: 4/24/12 TKJ N.T.S. 12-0402

TREOR JOHNSON
 LICENSE No 65624
 STATE OF FLORIDA
 PROFESSIONAL ENGINEER

THIS IS TO CERTIFY THAT TO THE BEST OF MY KNOWLEDGE THESE PLANS & SPECIFICATIONS ARE IN COMPLIANCE WITH THE BUILDING CODE REQUIREMENTS