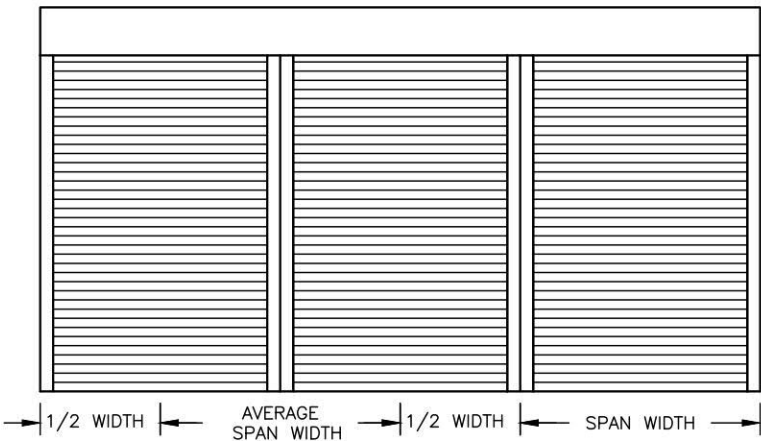
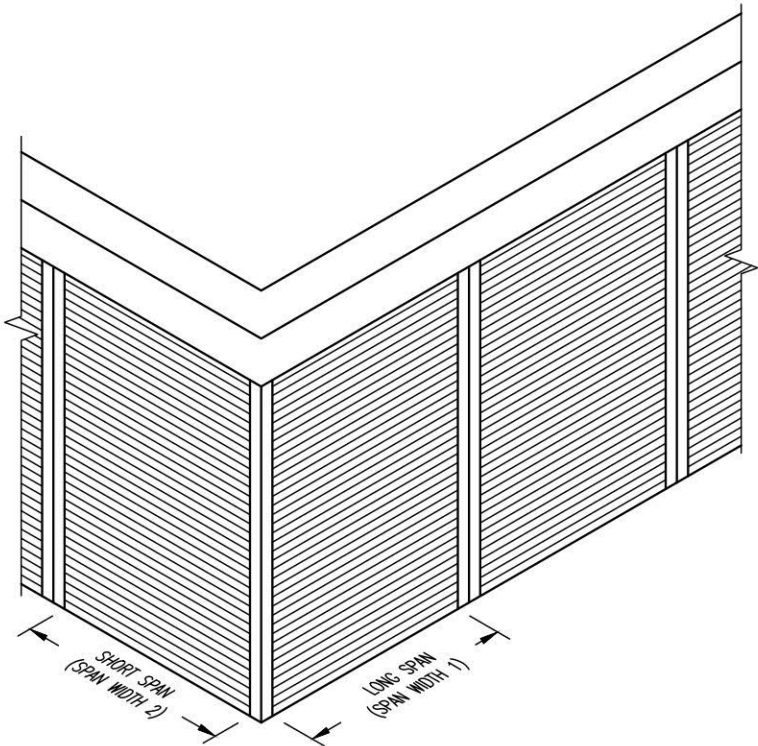




INTERMEDIATE AND END MULLION - ELEVATION
SINGLE OR MULTIPLE MULLION INSTALLATIONS - N.T.S.

- NOTES:
- THE DIFFERENCE IN ADJCENT SLAT SPANS OF AN INTERMEDIATE MULLION SHALL NOT EXCEED 25% EXCEPT WHERE CORNER MULLION TABLES ARE USED FOR INTERMEDIATE MULLIONS
 - SEE TABLES FOR MAXIMUM DESIGN PRESSURES FOR SLAT SPAN WIDTHS AND MULLION LENGTHS
 - INTERMEDIATE MULLIONS ARE NOT REQUIRED WITH CORNER MULLIONS OR END MULLIONS



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

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 SHUTTER MULLIONS SHOWN ON THIS PRODUCT EVALUATION DOCUMENT HAS BEEN DESIGNED IN ACCORDANCE WITH THE 2023 (8TH EDITION) FLORIDA BUILDING CODE (FBC) AND THE 2021 INTERNATIONAL BUILDING CODE (IBC). THESE ROLL-UP SHUTTER MULLIONS CAN BE INSTALLED IN HIGH VELOCITY HURRICANE ZONES (MIAMI-DADE COUNTY/BROWARD COUNTY) AND IN WIND ZONE 4 (SEE FBC SECTION 1609.1.2.2). DESIGN WIND LOADS SHALL BE DETERMINED AS PER SECTION 1609 OF THE ABOVE REFERENCED CODES, IN ACCORDANCE WITH ASCE 7-22, AND FOR A BASIC WIND SPEED AS REQUIRED BY THE JURISDICTION WHERE THE ROLL-UP SHUTTER MULLIONS WILL BE INSTALLED. THE ROLL-UP SHUTTER MULLIONS ADEQUACY FOR IMPACT HAS BEEN VERIFIED IN ACCORDANCE WITH SECTION 1609.1.2 OF THE ABOVE REFERENCED CODES AND AS PER ASTM E1886 & E1996 AND TAS 201 AT AMERICAN TEST LAB OF SOUTH FLORIDA PER THEIR REPORTS (SEE LIST OF REPORTS).
- LIMITATIONS OF USE:
 - THIS PRODUCT CAN BE USED IN HIGH VELOCITY HURRICANE ZONES (SEE FBC SECTION 202).
 - IN HIGH VELOCITY HURRICANE ZONE, WIND ZONE 4 REGIONS, AND ESSENTIAL FACILITIES THE DEFLECTION FROM THE MULLIONS SHALL BE ACCOUNTED FOR IN THE SEPARATION TO GLASS (PER FBC 1616.3) FOR THE MULLION AND SHUTTER. SEE EQUATIONS ON THIS SHEET FOR SHUTTER DEFLECTION ADJUSTMENTS.
 - THIS PRODUCT EVALUATION DOCUMENT IS FOR ROLL-UP SHUTTER MULLIONS ONLY. ALL SHUTTERS AND SHUTTER COMPONENTS SHOWN ARE FOR REFERENCE/ILLUSTRATION PURPOSES. ALL END-RETENTION AND NON RETENTION SHUTTERS USED IN COMBINATION WITH THESE MULLIONS SHALL HAVE A SEPARATE PRODUCT APPROVAL AND ALLOW THE USE OF MULLIONS. THESE ROLL-UP SHUTTER MULLIONS SHALL NOT BE USED WITH WINDOWS OR DOORS AND CAN BE USED TO SUPPLEMENT MULLIONS INCLUDED WITH THE ROLL-UP SHUTTERS PRODUCT APPROVAL.
 - INSTALLATIONS SHALL NOT EXCEED THE MAXIMUM ALLOWABLE STRESS DESIGN (ASD) DESIGN RATINGS AND MAXIMUM SIZE PROVIDED IN THESE DRAWINGS. ULTIMATE DESIGN WIND LOADS DETERMINED BY THE FBC AND ASCE 7-22 SHALL BE REDUCED TO ASD BY MULTIPLYING 0.6 (SEE FBC SECTION 1609.1.2.4).
 - SHUTTER SLAT LIMITS: MODULES OF ELASTICITY, $E < 11,000$ KSI
MOMENT OF INERTIA, $I > 0.040$ IN⁴/FT
SECTIONAL AREA, $A < 1.800$ IN²/FT
MINIMUM SLACK (SLIP), $Slack > 0.20$ IN
 - 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
 - THIS PRODUCT SHALL ONLY BE USED IN CONJUNCTION WITH ASSA ROLL SHUTTER SYSTEMS. OTHER PRODUCTS REQUIRE WRITTEN AUTHORIZATION FROM ASSA AND SHALL BE EVALUATED AS A SITE SPECIFIC PROJECT. SEE NOTE 4 OF PRODUCT EVALUATION NOTES.
 - INCREASE IN ALLOWABLE STRESS (1.33) HAS NOT BEEN INCORPORATED INTO THE DESIGN OF THIS PRODUCT.
- 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).

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 BELOW.

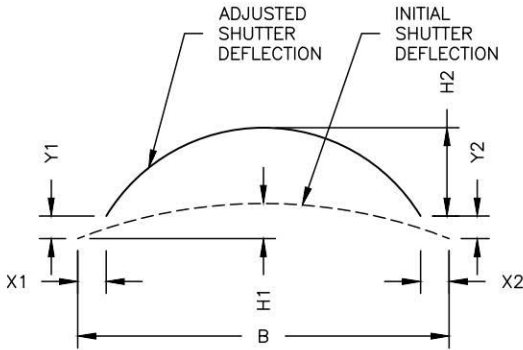
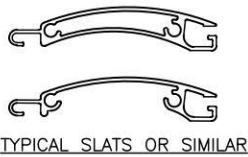
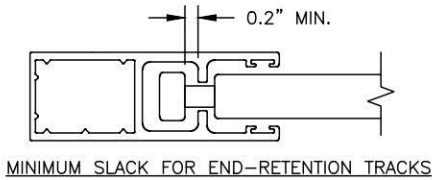
ANCHOR	Concrete & Filled CMU (3500 PSI)		Hollow CMU (1800 PSI)		Wood (S.G. = .55)	
	Min. Edge	Min Emb.	Min. Edge	Min Emb.	Min. Edge	Min Emb.
1/4" ULTRACON HFH	2"	2"	2"	1 1/4"	2"	2"
5/16" ULTRACON HFH	3 1/2"	2"	3 1/2"	1 1/4"	2"	2"
3/8" CONFLX	3 3/4"	3 1/2"	-	-	-	-
3/8" STAINLESS STEEL W/ RAMSET G5	3 1/2"	3 3/8"	-	-	-	-
1/2" STAINLESS STEEL W/ RAMSET G5	4"	4 1/2"	-	-	-	-

LIST OF REPORTS:

AMERICAN TEST LAB OF SOUTH FLORIDA

ATLSF REPORT # 0404.01-08
DATE: APRIL 4, 2008
TEST PROTOCOL: E1886-05, E1996-05, TAS 201
MULLIONS: 4x6x1/4x144

ATLSF REPORT # 0323.01-09
DATE: APRIL 16, 2009
TEST PROTOCOL: E1886-05, E1996-05, TAS 201
MULLIONS: 3x4x1/8x144, 4x4x1/8x144
4x4x1/4x144, 4x6x1/8x144



ADJUSTED TOTAL DEFLECTION = $H2 + Y$

$H2 = \frac{\sqrt{4 \cdot H1^2 - 3 \cdot X^2} + 6 \cdot B \cdot X}{2}$

$X = X1 + X2$

$Y = \frac{Y1 + Y2}{2}$

B = SHUTTER SPAN (INCHES)
X1 = LEFT MULLION DEFLECTION IN X DIRECTION
X2 = RIGHT MULLION DEFLECTION IN X DIRECTION
Y1 = LEFT MULLION DEFLECTION IN Y DIRECTION
Y2 = RIGHT MULLION DEFLECTION IN Y DIRECTION
H1 = INITIAL SHUTTER DEFLECTION
H2 = SHUTTER DEFLECTION WITH MULLION DEFLECTION

ADJUSTED DEFLECTION EQUATIONS NOTES

SEE MULLION TABLES FOR MULLION X AND Y DEFLECTIONS

SEE SHUTTER APPROVAL FOR MINIMUM SEPARATION TO GLASS FOR INITIAL SHUTTER DEFLECTION

REVISES

DATE

#

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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.AMSHUTTER.ORG

ROLL-UP SHUTTER MULLIONS

TKJ Engineering, LLC.

11935 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 813.404.7649; EM: TKJENGINEERING@VERIZON.NET
FLORIDA CERTIFICATE OF AUTHORIZATION NUMBER: 28582

PROJ. #:
SCALE:
DRAWN BY:
DATE: 10/17/23

TKJ
N.T.S.
23-0402

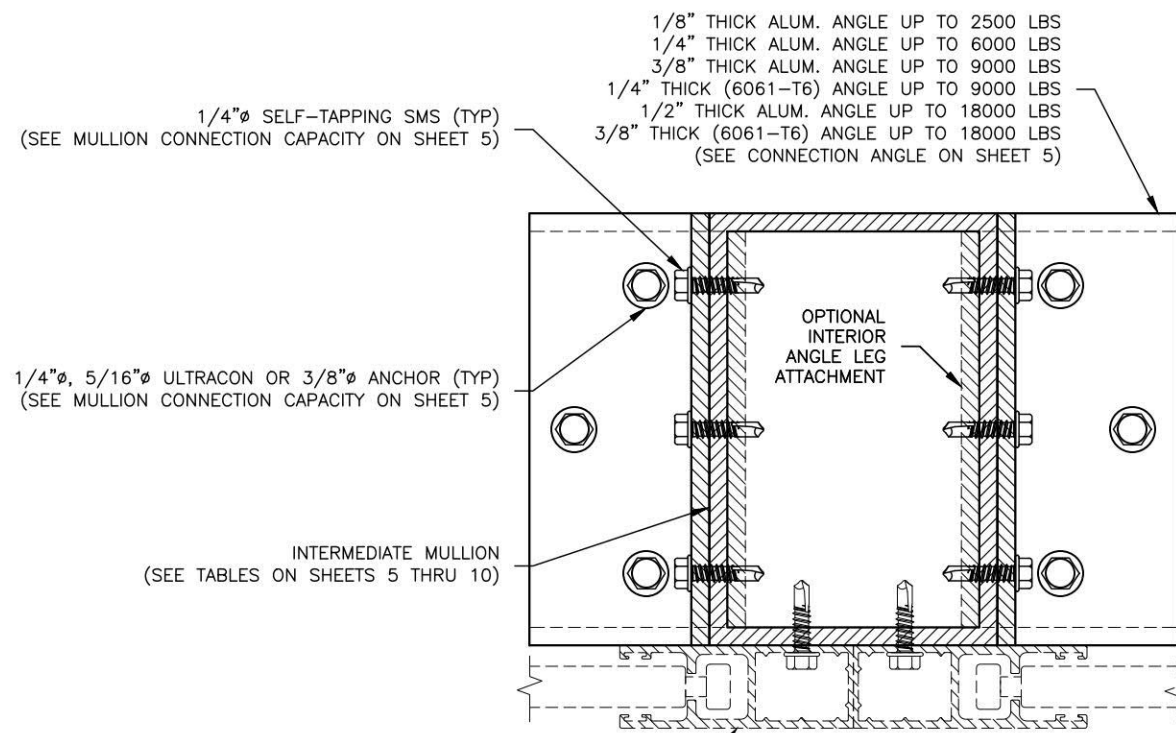
THIS IS TO CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE PLANS & SPECIFICATIONS ARE IN COMPLIANCE WITH THE BUILDING CODE REQUIREMENTS

REVISED

STATE OF FLORIDA

PROFESSIONAL ENGINEER

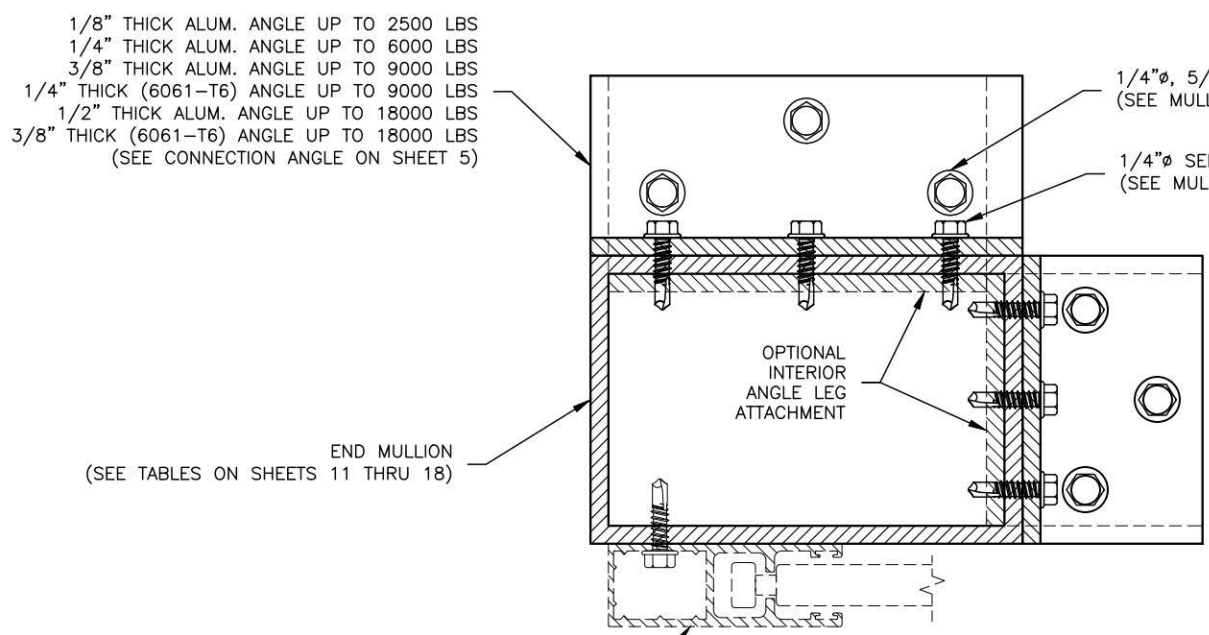
1 OF 2



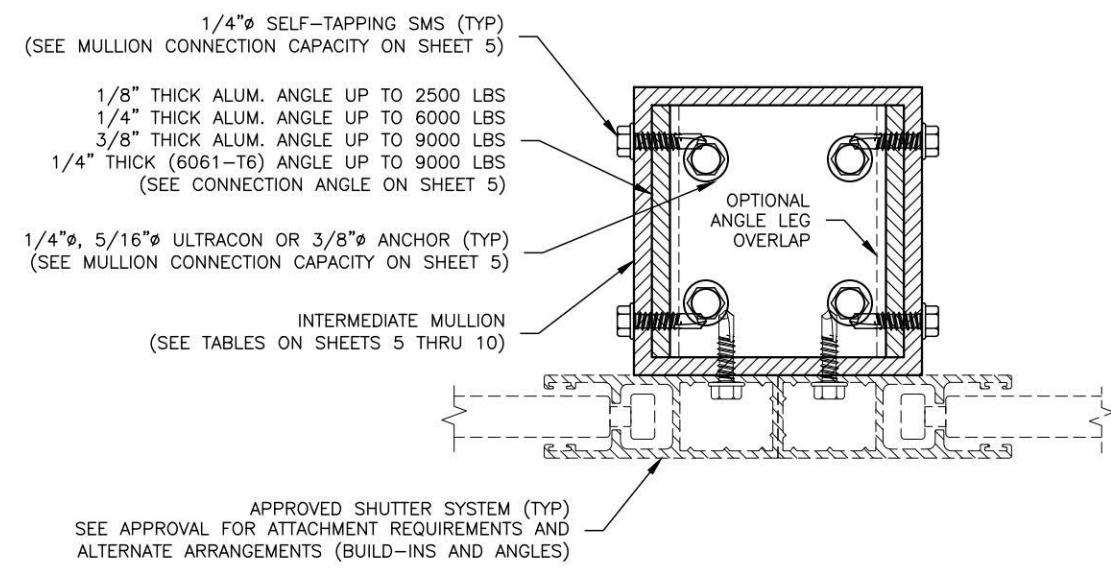
INTERMEDIATE MULLION CONNECTION
TYPICAL MULLION INSTALLATION - N.T.S.

NOTES:

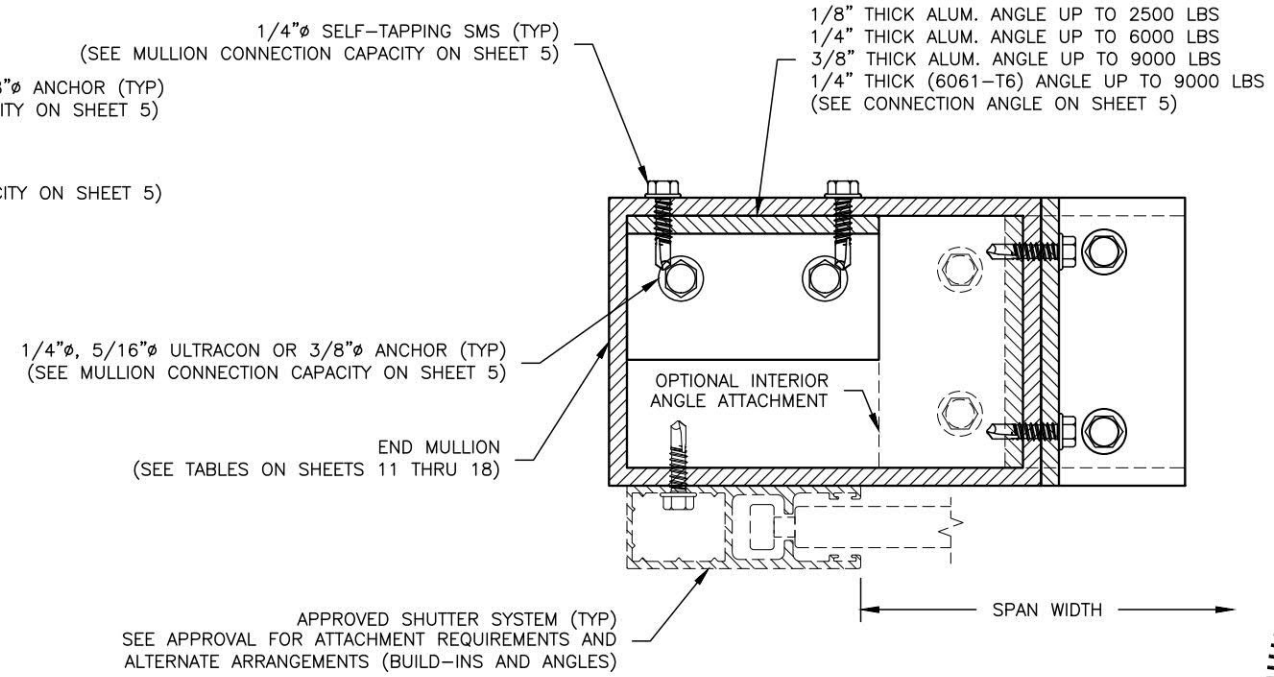
1. ANCHOR AND FASTENER SPACING MUST MEET THE REQUIREMENTS SHOWN ON THE CONNECTION ANGLE DETAIL ON SHEET 5. THE CONNECTIONS AND OPTIONAL CONNECTIONS SHOWN ARE NOT APPLICABLE WHERE THE MINIMUM SPACING REQUIREMENTS ARE EXCEEDED
2. INTERIOR ANGLE LEG ATTACHMENT CAN BE USED IN COMBINATION WITH INTERIOR ATTACHMENT



END MULLION CONNECTION
TYPICAL MULLION INSTALLATION - N.T.S.



INTERMEDIATE MULLION CONNECTION
INTERIOR ATTACHMENT MULLION INSTALLATION - N.T.S.



END MULLION CONNECTION
INTERIOR ATTACHMENT MULLION INSTALLATION - N.T.S.

#	DATE	REVISIONS

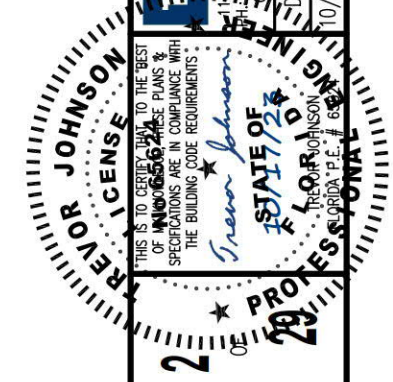
ASSA

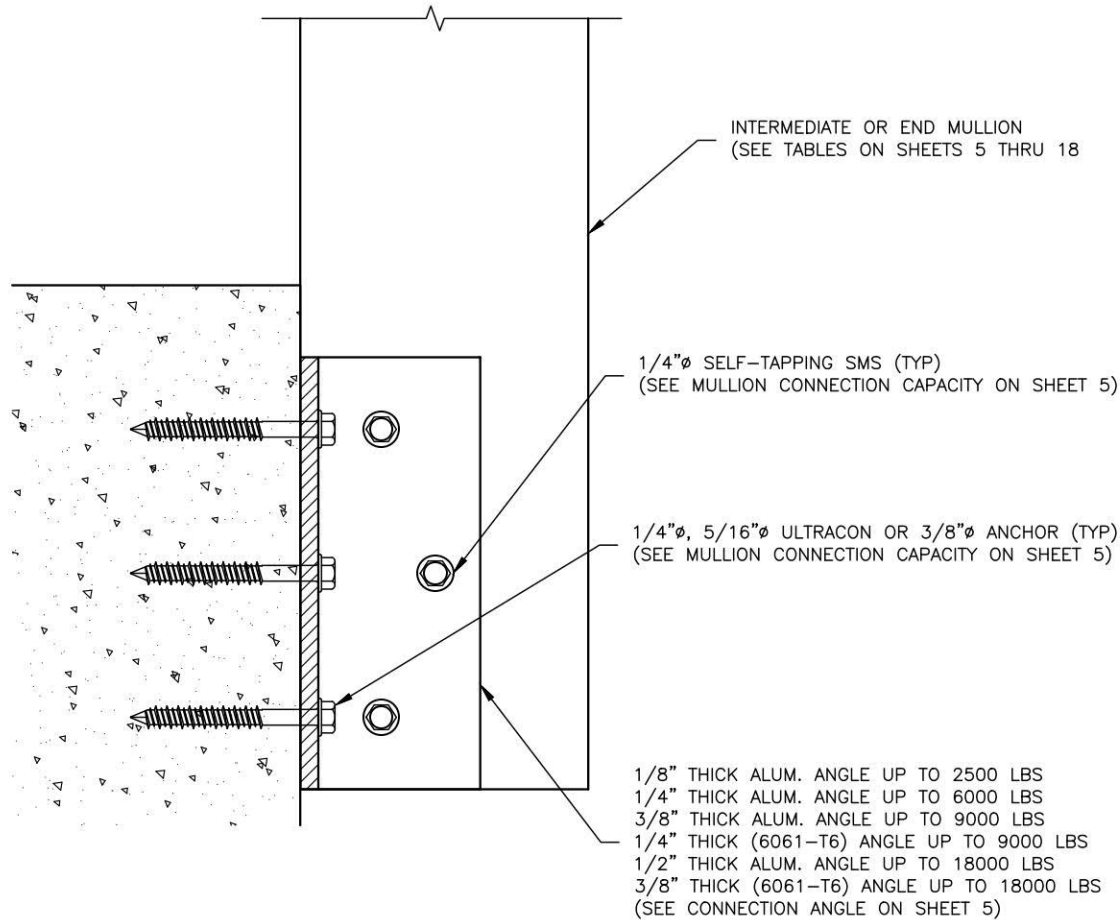
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4268 WESTROADS DRIVE, WEST PALM BEACH, FL 33407
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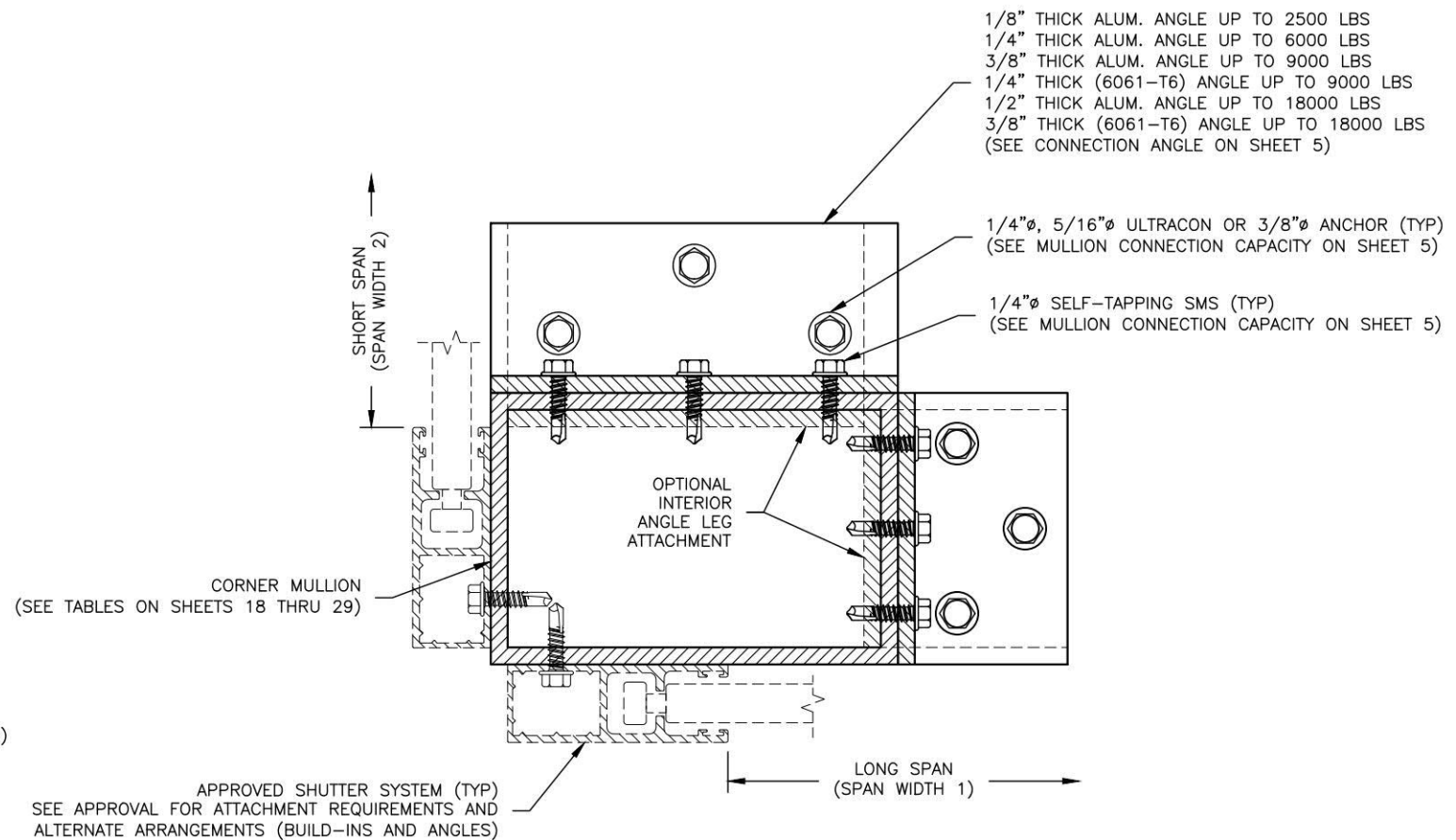
**ROLL-UP SHUTTER
MULLIONS**

TKJ Engineering, LLC.	1335 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569	PROJ. #:	23-0402
	TEL: 281.340.7649; EM: TKJENGINEERING@VERIZON.NET	SCALE:	N.T.S.
	SPECIFICATION OF AUTHORIZATION NUMBER: 28562	DRAWN BY:	TKJ
		DATE:	10/17/23

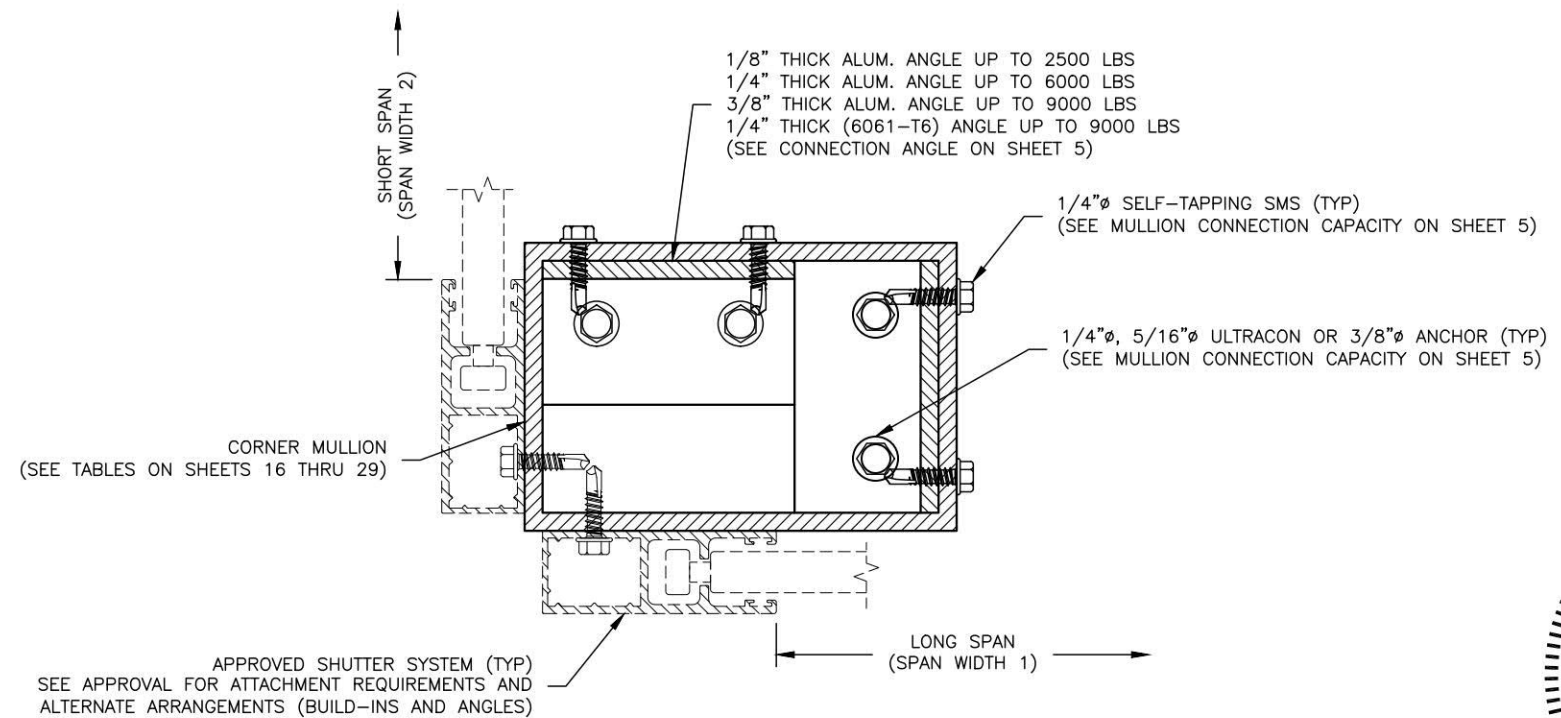




WALL MOUNTED CONNECTION
OPTIONAL MULLION INSTALLATION - N.T.S.



END MULLION CONNECTION
TYPICAL MULLION INSTALLATION - N.T.S.



END MULLION CONNECTION
INTERIOR ATTACHMENT MULLION INSTALLATION - N.T.S.

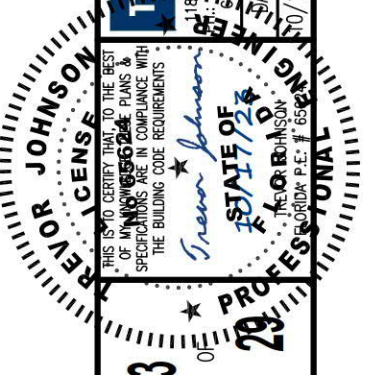
NOTE: INTERIOR ANGLE LEG ATTACHMENT CAN BE USED IN COMBINATION WITH INTERIOR ATTACHMENT

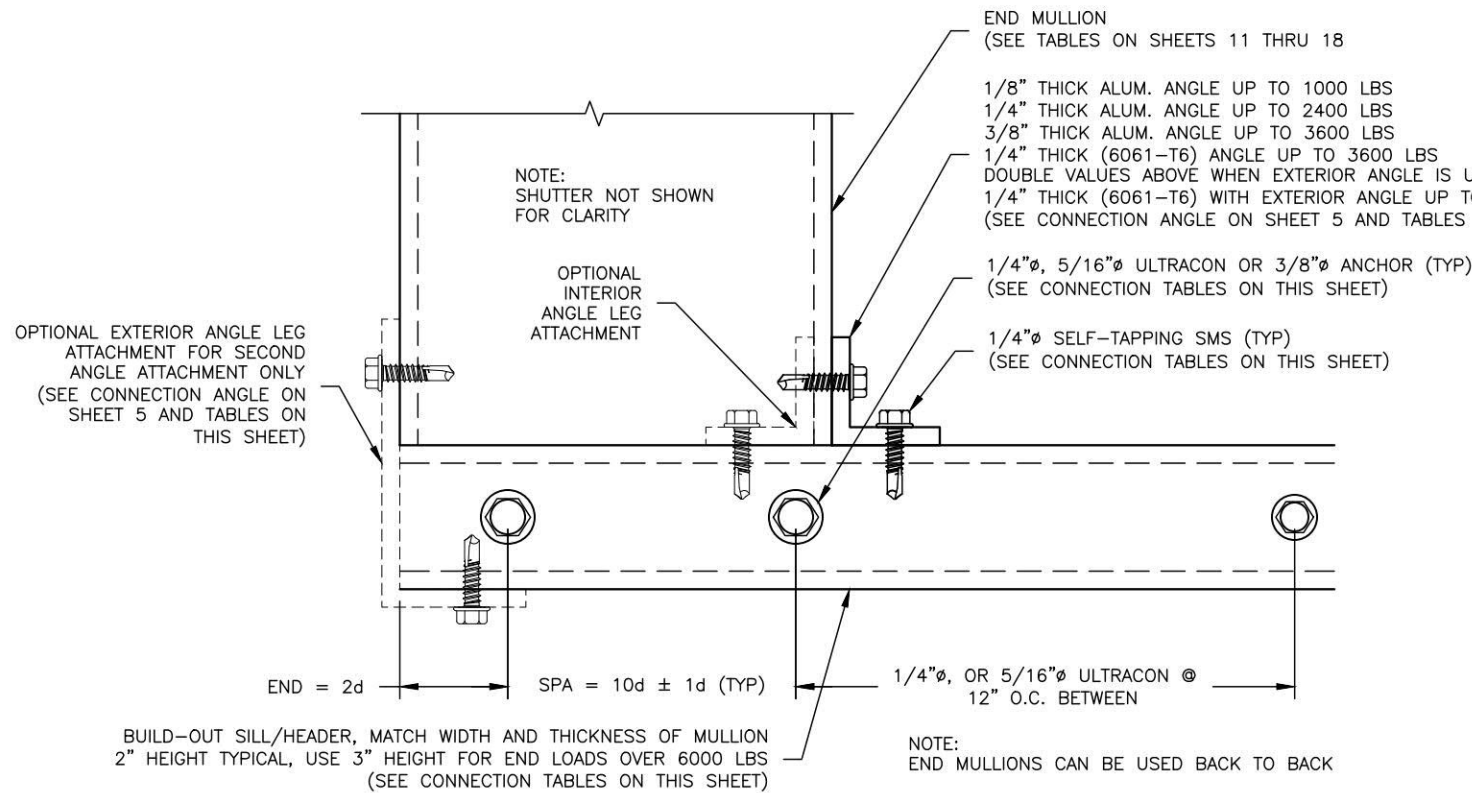
#	DATE	REVISIONS

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ROLL-UP SHUTTER MULLIONS

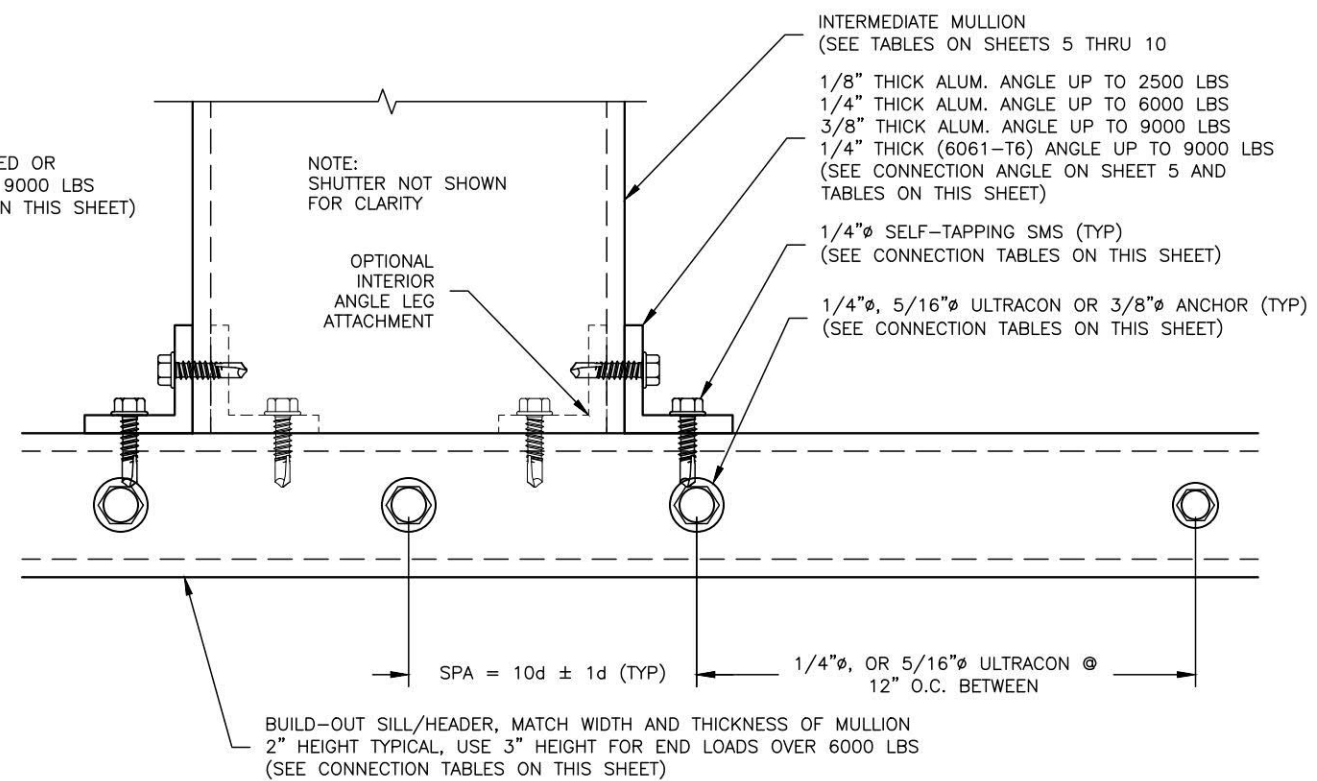
TKJ Engineering, LLC.	11235 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569 TEL: 813.404.7649; EM: TKJENGINEERING@VERIZON.NET CERTIFICATE OF AUTHORIZATION NUMBER: 28582	PROJ. #:	23-0402
DATE:	10/17/23	SCALE:	N.T.S.
DRAWN BY:	TKJ		





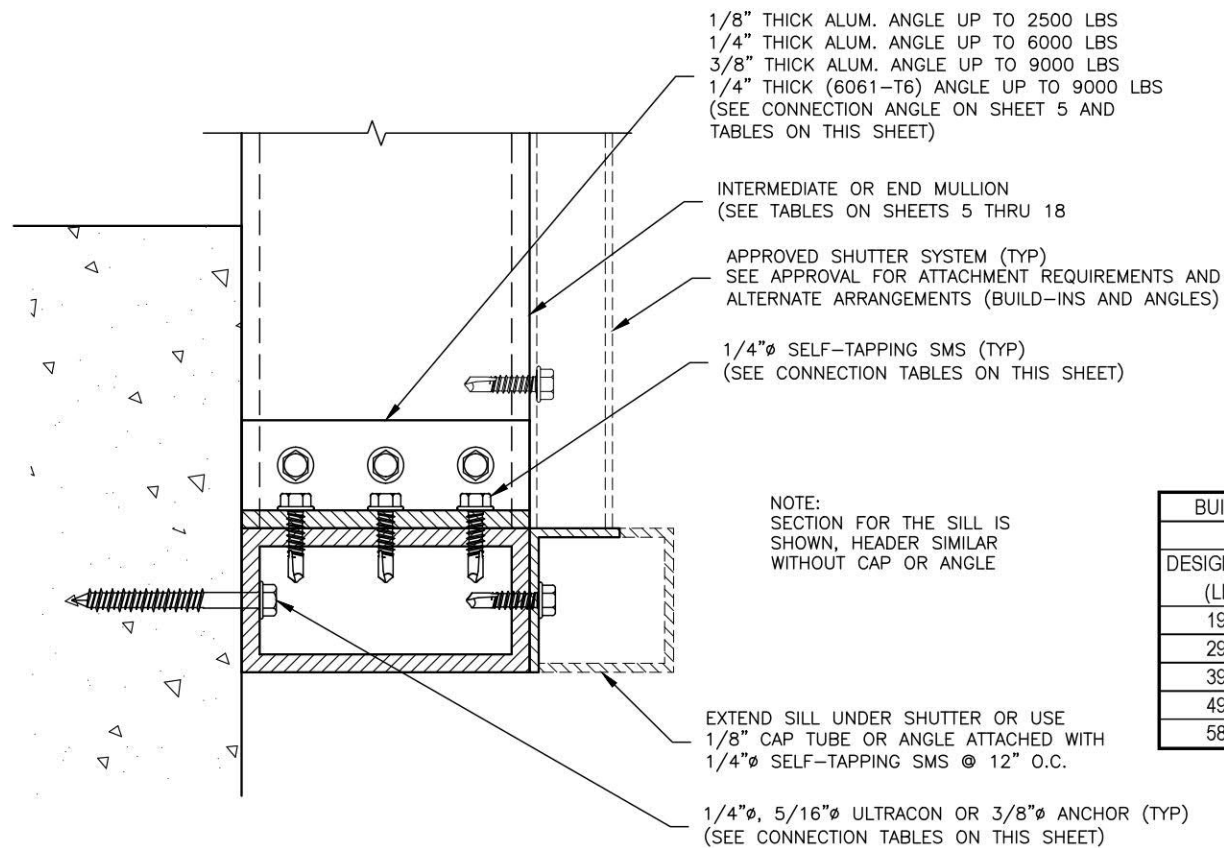
BUILD-OUT SILL/HEADER CONNECTION

OPTIONAL END MULLION INSTALLATION - N.T.S.



BUILD-OUT SILL/HEADER CONNECTION

OPTIONAL INTERMEDIATE MULLION INSTALLATION - N.T.S.



BUILD-OUT SILL/HEADER SECTION

OPTIONAL END AND INTERMEDIATE MULLION 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
2080	(2) 5/16" ULTRACON	1050	(3) 1/4" ULTRACON	900	(3) 1/4" ULTRACON
3120	(3) 5/16" ULTRACON	1400	(4) 1/4" ULTRACON	1200	(4) 1/4" ULTRACON
4160	(4) 5/16" ULTRACON	1290	(3) 5/16" ULTRACON	1770	(3) 5/16" ULTRACON
6240	(6) 5/16" ULTRACON	1720	(4) 5/16" ULTRACON	2360	(4) 5/16" ULTRACON
4500	(2) 3/8" ANCHOR	2150	(5) 5/16" ULTRACON	2950	(5) 5/16" ULTRACON
6750	(3) 3/8" ANCHOR	2580	(6) 5/16" ULTRACON	3540	(6) 5/16" ULTRACON
9000	(4) 3/8" ANCHOR	3440	(8) 5/16" ULTRACON	4720	(8) 5/16" ULTRACON

BUILD-OUT SILL/HEADER CONNECTION ANGLE CAPACITY (2 REQUIRED)			
1/8" MIN. ALUMINUM		1/4" MIN. ALUMINUM	
DESIGN LOAD (LBS)	ANCHORS REQUIRED EACH ANGLE	DESIGN LOAD (LBS)	ANCHORS REQUIRED EACH ANGLE
1960	(2) 1/4-14 DRIL-FLEX	3200	(2) 1/4-14 DRIL-FLEX
2940	(3) 1/4-14 DRIL-FLEX	4800	(3) 1/4-14 DRIL-FLEX
3920	(4) 1/4-14 DRIL-FLEX	6400	(4) 1/4-14 DRIL-FLEX
4900	(5) 1/4-14 DRIL-FLEX	9600	(6) 1/4-14 DRIL-FLEX
5880	(6) 1/4-14 DRIL-FLEX	12800	(8) 1/4-14 DRIL-FLEX

BUILD-OUT SILL/HEADER CONNECTION ANGLE CAPACITY (1 REQUIRED)			
1/8" MIN. ALUMINUM		1/4" MIN. ALUMINUM	
DESIGN LOAD (LBS)	ANCHORS REQUIRED EACH ANGLE	DESIGN LOAD (LBS)	ANCHORS REQUIRED EACH ANGLE
490	(2) 1/4-14 DRIL-FLEX	800	(2) 1/4-14 DRIL-FLEX
735	(3) 1/4-14 DRIL-FLEX	1200	(3) 1/4-14 DRIL-FLEX
980	(4) 1/4-14 DRIL-FLEX	1600	(4) 1/4-14 DRIL-FLEX
1225	(5) 1/4-14 DRIL-FLEX	2400	(6) 1/4-14 DRIL-FLEX
1470	(6) 1/4-14 DRIL-FLEX	3200	(8) 1/4-14 DRIL-FLEX
1960	(8) 1/4-14 DRIL-FLEX	4000	(10) 1/4-14 DRIL-FLEX

NOTE:
ADD MULLION END LOADS TOGETHER FROM BOTH MULLIONS
(ABOVE AND BELOW) WHEN A SHARED SILL/HEADER IS USED

REVISIONS

DATE

#

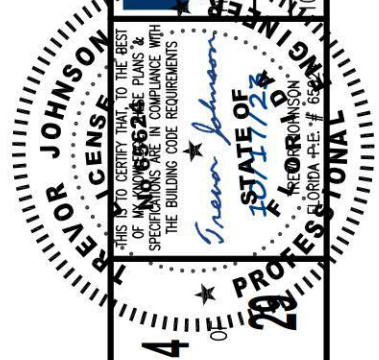
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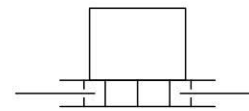
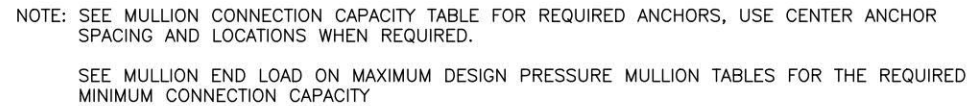
**ROLL-UP SHUTTER
MULLIONS**

TJK Engineering, LLC.

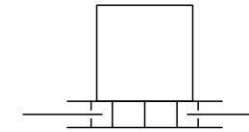
1125 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 813.404.7649; EM: TKEENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 10/17/23
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 23-0402

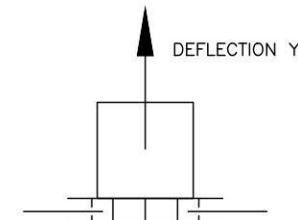




MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 3"x4"x1/8" MULLION (6063-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
60"	72"	93	1395	0.54
	84"	68	1190	0.73
	96"	52	1040	0.96
	108"	41	923	1.21
	120"	32	800	1.44
72"	60"	111	1665	0.37
	72"	77	1386	0.54
	84"	57	1197	0.74
	96"	43	1032	0.95
	108"	34	918	1.20
84"	60"	95	1663	0.37
	72"	66	1386	0.54
	84"	49	1201	0.74
	96"	37	1036	0.95
	108"	29	914	1.20
96"	48"	130	2080	0.24
	60"	83	1660	0.37
	72"	58	1392	0.54
	84"	43	1204	0.74
	96"	33	1056	0.97
108"	48"	116	2088	0.24
	60"	74	1665	0.37
	72"	51	1377	0.54
	84"	38	1197	0.74
	96"	29	1044	0.96
120"	48"	104	2080	0.24
	60"	67	1675	0.38
	72"	46	1380	0.54
	84"	34	1190	0.73
	96"	26	1040	0.96
132"	48"	95	2090	0.24
	60"	61	1678	0.38
	72"	42	1386	0.54
	84"	31	1194	0.74
	96"	24	1056	0.97



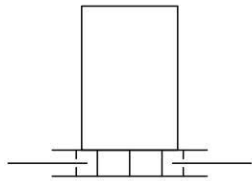
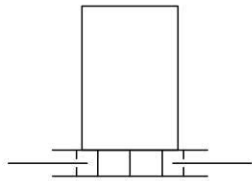
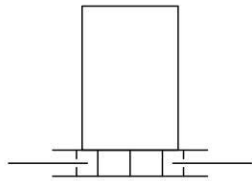
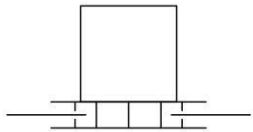
MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"x4"x1/8" MULLION (6063-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
60"	72"	135	2025	0.41
	84"	99	1733	0.55
	96"	76	1520	0.72
	108"	60	1350	0.91
	120"	49	1225	1.14
72"	72"	112	2016	0.40
	84"	83	1743	0.55
	96"	63	1512	0.72
	108"	50	1350	0.91
	120"	40	1200	1.11
84"	72"	96	2016	0.40
	84"	71	1740	0.55
	96"	54	1512	0.72
	108"	43	1355	0.92
	120"	35	1225	1.14
96"	72"	84	2016	0.40
	84"	62	1736	0.55
	96"	47	1504	0.71
	108"	37	1332	0.90
	120"	30	1200	1.11
108"	66"	89	2203	0.34
	78"	64	1872	0.48
	90"	48	1620	0.63
	102"	37	1415	0.81
	114"	30	1283	1.02
120"	60"	97	2425	0.28
	72"	67	2010	0.40
	84"	50	1750	0.56
	96"	38	1520	0.72
	108"	30	1350	0.91
132"	60"	88	2420	0.28
	72"	61	2013	0.40
	84"	45	1733	0.55
	96"	34	1496	0.71
	108"	27	1337	0.90



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING
MINIMUM SEPARATION TO GLASS

MULLION CONNECTION ANGLE CAPACITY (2 REQUIRED)											
CONCRETE		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	DESIGN LOAD (LBS)	ANCHORS REQUIRED EACH ANGLE
3900	(1) 3/8" RAMSET G5	4160	(2) 5/16" ULTRACON	1400	(2) 1/4" ULTRACON	1200	(2) 1/4" ULTRACON	2640	(2) 1/4-14 DRIL-FLEX	4240	(2) 1/4-14 DRIL-FLEX
7800	(2) 3/8" RAMSET G5	6240	(3) 5/16" ULTRACON	2100	(3) 1/4" ULTRACON	1800	(3) 1/4" ULTRACON	3960	(3) 1/4-14 DRIL-FLEX	6360	(3) 1/4-14 DRIL-FLEX
11700	(3) 3/8" RAMSET G5	8320	(4) 5/16" ULTRACON	1720	(2) 5/16" ULTRACON	2360	(2) 5/16" ULTRACON	5280	(4) 1/4-14 DRIL-FLEX	8480	(4) 1/4-14 DRIL-FLEX
7020	(1) 1/2" RAMSET G5	9000	(2) 3/8" ANCHOR	2580	(3) 5/16" ULTRACON	3540	(3) 5/16" ULTRACON	6600	(5) 1/4-14 DRIL-FLEX	12720	(6) 1/4-14 DRIL-FLEX
14040	(2) 1/2" RAMSET G5	13500	(3) 3/8" ANCHOR	3440	(4) 5/16" ULTRACON	4720	(4) 5/16" ULTRACON	7920	(6) 1/4-14 DRIL-FLEX	16960	(8) 1/4-14 DRIL-FLEX
21060	(3) 1/2" RAMSET G5	18000	(4) 3/8" ANCHOR	5160	(6) 5/16" ULTRACON	7080	(6) 5/16" ULTRACON	10560	(8) 1/4-14 DRIL-FLEX	21200	(10) 1/4-14 DRIL-FLEX

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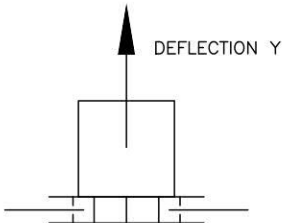


MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"X4"X1/4" MULLION (6063-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
60"	96"	138	2760	0.72
	108"	109	2453	0.91
	120"	88	2200	1.12
	132"	73	2008	1.36
	144"	61	1830	1.61
72"	96"	115	2760	0.72
	108"	91	2457	0.91
	120"	74	2220	1.13
	132"	61	2013	1.37
	144"	51	1836	1.62
84"	96"	99	2772	0.72
	108"	78	2457	0.91
	120"	63	2205	1.12
	132"	52	2002	1.36
	144"	44	1848	1.63
96"	96"	86	2752	0.72
	108"	68	2448	0.91
	120"	55	2200	1.12
	132"	46	2024	1.37
	144"	38	1824	1.61
108"	96"	77	2772	0.72
	108"	61	2471	0.92
	120"	49	2205	1.12
	132"	41	2030	1.38
	144"	34	1836	1.62
120"	84"	90	3150	0.55
	96"	69	2760	0.72
	108"	54	2430	0.90
	120"	44	2200	1.12
	132"	36	1980	1.34
132"	84"	82	3157	0.55
	96"	63	2772	0.72
	108"	50	2475	0.92
	120"	40	2200	1.12
	132"	33	1997	1.35

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"X6"X1/8" MULLION (6063-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
60"	96"	131	2620	0.48
	108"	104	2340	0.61
	120"	84	2100	0.75
	132"	69	1898	0.90
	144"	58	1740	1.07
72"	96"	109	2616	0.48
	108"	86	2322	0.60
	120"	70	2100	0.75
	132"	58	1914	0.91
	144"	49	1764	1.09
84"	96"	94	2632	0.48
	108"	74	2331	0.61
	120"	60	2100	0.75
	132"	50	1925	0.92
	144"	42	1764	1.09
96"	96"	82	2624	0.48
	108"	65	2340	0.61
	120"	52	2080	0.74
	132"	43	1892	0.90
	144"	36	1728	1.07
108"	96"	73	2628	0.48
	108"	58	2349	0.61
	120"	47	2115	0.76
	132"	39	1931	0.92
	144"	32	1728	1.07
120"	84"	86	3010	0.37
	96"	66	2640	0.48
	108"	52	2340	0.61
	120"	42	2100	0.75
	132"	35	1925	0.92
132"	84"	78	3003	0.37
	96"	60	2640	0.48
	108"	47	2327	0.61
	120"	38	2090	0.75
	132"	32	1936	0.92

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"X6"X1/4" MULLION (6063-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
120"	96"	122	4880	0.48
	108"	97	4365	0.61
	120"	78	3900	0.75
	132"	65	3575	0.91
	144"	54	3240	1.07
132"	96"	111	4884	0.48
	108"	88	4356	0.61
	120"	71	3905	0.75
	132"	59	3570	0.91
	144"	49	3234	1.07
144"	96"	102	4896	0.48
	108"	81	4374	0.61
	120"	65	3900	0.75
	132"	54	3564	0.91
	144"	45	3240	1.07
156"	96"	94	4888	0.48
	108"	74	4329	0.60
	120"	60	3900	0.75
	132"	50	3575	0.91
	144"	42	3276	1.09
180"	96"	82	4920	0.48
	108"	64	4320	0.60
	120"	52	3900	0.75
	132"	43	3548	0.91
	144"	36	3240	1.07
192"	96"	76	4864	0.48
	108"	60	4320	0.60
	120"	49	3920	0.75
	132"	40	3520	0.90
	144"	34	3264	1.08
204"	96"	72	4896	0.48
	108"	57	4361	0.61
	120"	46	3910	0.75
	132"	38	3553	0.91
	144"	32	3264	1.08

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"X6"X1/4" MULLION (6063-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
216"	96"	68	4896	0.48
	108"	54	4374	0.61
	120"	43	3870	0.74
	132"	36	3564	0.91
	144"	30	3240	1.07
228"	96"	64	4864	0.48
	108"	51	4361	0.61
	120"	41	3895	0.75
	132"	34	3553	0.91
	144"	29	3306	1.10
240"	96"	61	4880	0.48
	108"	48	4320	0.60
	120"	39	3900	0.75
	132"	32	3520	0.90
	144"	27	3240	1.07
252"	84"	76	5586	0.37
	96"	58	4872	0.48
	108"	46	4347	0.61
	120"	37	3885	0.74
	132"	31	3581	0.91
264"	84"	73	5621	0.37
	96"	56	4928	0.48
	108"	44	4356	0.61
	120"	36	3960	0.76
	132"	29	3509	0.90
276"	84"	69	5555	0.37
	96"	53	4876	0.48
	108"	42	4347	0.61
	120"	34	3910	0.75
	132"	28	3542	0.90
288"	84"	67	5628	0.37
	96"	51	4896	0.48
	108"	40	4320	0.60
	120"	33	3960	0.76
	132"	27	3564	0.91



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

REVISIONS

DATE

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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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ROLL-UP SHUTTER
MULLIONS

TKJ Engineering, LLC.

1125 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 813.404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 10/17/23

SCALE: N.T.S.

PROJ. #: 23-0402

DRAWN BY: TKJ

REVOR JOHNSON

PROFESSIONAL ENGINEER

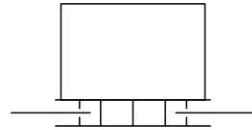
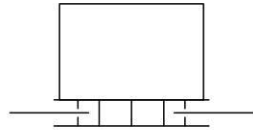
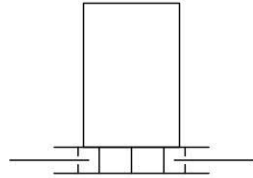
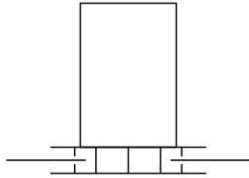
FLORIDA P.E. # 6562

STATE OF FLORIDA

10/17/23

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

TKJ

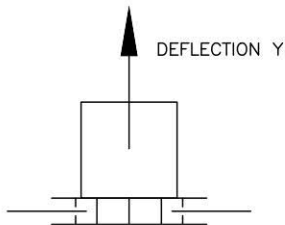


MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"x8"x1/4" MULLION (6063-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
132"	96"	150	6600	0.32
	108"	134	6633	0.46
	120"	108	5940	0.56
	132"	89	5385	0.68
	144"	75	4950	0.81
144"	96"	150	7200	0.35
	108"	122	6588	0.45
	120"	99	5940	0.56
	132"	82	5412	0.68
	144"	69	4968	0.81
156"	96"	143	7436	0.36
	108"	113	6611	0.46
	120"	92	5980	0.57
	132"	76	5434	0.68
	144"	64	4992	0.82
168"	96"	133	7448	0.36
	108"	105	6615	0.46
	120"	85	5950	0.56
	132"	70	5390	0.68
	144"	59	4956	0.81
180"	96"	124	7440	0.36
	108"	98	6615	0.46
	120"	79	5925	0.56
	132"	66	5445	0.68
	144"	55	4950	0.81
192"	96"	116	7424	0.36
	108"	92	6624	0.46
	120"	74	5920	0.56
	132"	61	5368	0.68
	144"	52	4992	0.82
204"	96"	109	7412	0.36
	108"	86	6579	0.45
	120"	70	5950	0.56
	132"	58	5423	0.68
	144"	49	4998	0.82

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"x8"x1/4" MULLION (6063-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
216"	96"	103	7416	0.36
	108"	82	6642	0.46
	120"	66	5940	0.56
	132"	55	5445	0.68
	144"	46	4968	0.81
228"	96"	98	7448	0.36
	108"	77	6584	0.45
	120"	63	5985	0.57
	132"	52	5434	0.68
	144"	44	5016	0.82
240"	96"	93	7440	0.36
	108"	73	6570	0.45
	120"	60	6000	0.57
	132"	49	5390	0.68
	144"	41	4920	0.80
252"	96"	89	7476	0.36
	108"	70	6615	0.46
	120"	57	5985	0.57
	132"	47	5429	0.68
	144"	39	4914	0.80
264"	96"	85	7480	0.36
	108"	67	6633	0.46
	120"	54	5940	0.56
	132"	45	5445	0.68
	144"	38	5016	0.82
276"	96"	81	7452	0.36
	108"	64	6624	0.46
	120"	52	5980	0.57
	132"	43	5440	0.68
	144"	36	4968	0.81
288"	96"	78	7488	0.36
	108"	61	6588	0.45
	120"	50	6000	0.57
	132"	41	5412	0.68
	144"	34	4896	0.80

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"x6"x1/8" MULLION (6063-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
60"	96"	105	2100	0.72
	108"	83	1868	0.91
	120"	67	1675	1.12
	132"	56	1540	1.37
	144"	47	1410	1.63
72"	96"	88	2112	0.72
	108"	69	1863	0.91
	120"	56	1680	1.12
	132"	46	1518	1.35
	144"	39	1404	1.62
84"	96"	75	2100	0.72
	108"	59	1859	0.91
	120"	48	1680	1.12
	132"	40	1540	1.37
	144"	33	1386	1.60
96"	96"	66	2112	0.72
	108"	52	1872	0.91
	120"	42	1680	1.12
	132"	35	1540	1.37
	144"	29	1392	1.61
108"	84"	76	2394	0.55
	96"	58	2088	0.71
	108"	46	1863	0.91
	120"	37	1665	1.11
	132"	31	1535	1.37
120"	84"	69	2415	0.55
	96"	53	2120	0.73
	108"	42	1890	0.92
	120"	34	1700	1.14
	132"	28	1540	1.37
132"	72"	85	2805	0.41
	84"	62	2387	0.55
	96"	48	2112	0.72
	108"	38	1881	0.92
	120"	31	1705	1.14

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"x6"x1/4" MULLION (6063-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
96"	96"	121	3872	0.72
	108"	95	3420	0.91
	120"	77	3080	1.12
	132"	64	2816	1.37
	144"	54	2592	1.63
108"	96"	107	3852	0.72
	108"	85	3443	0.91
	120"	69	3105	1.13
	132"	57	2822	1.37
	144"	48	2592	1.63
120"	96"	96	3840	0.72
	108"	76	3420	0.91
	120"	62	3100	1.13
	132"	51	2805	1.36
	144"	43	2580	1.62
132"	96"	88	3872	0.72
	108"	69	3416	0.91
	120"	56	3080	1.12
	132"	46	2783	1.35
	144"	39	2574	1.62
144"	96"	80	3840	0.72
	108"	64	3456	0.92
	120"	51	3060	1.12
	132"	43	2838	1.38
	144"	36	2592	1.63
156"	96"	74	3848	0.72
	108"	59	3452	0.92
	120"	47	3055	1.11
	132"	39	2789	1.35
	144"	33	2574	1.62
168"	96"	69	3864	0.72
	108"	54	3402	0.90
	120"	44	3080	1.12
	132"	36	2772	1.34
	144"	31	2604	1.64



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

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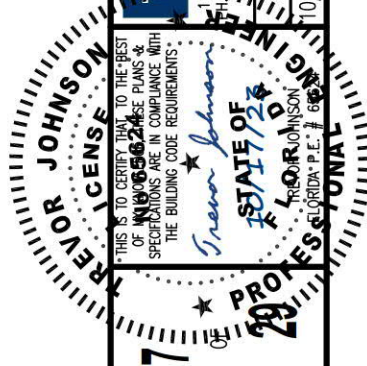
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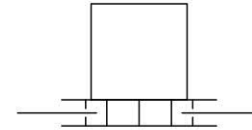
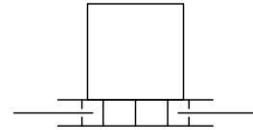
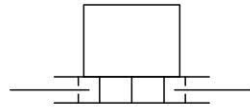
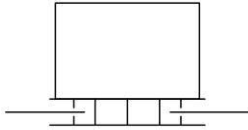
ROLL-UP SHUTTER
MULLIONS

TKJ Engineering, LLC.

1235 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 813.404.7649; EMAIL: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 10/17/23
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 23-0402



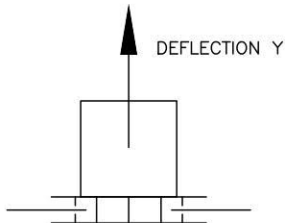


MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"x8"x1/4" MULLION (6063-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
120"	96"	124	4960	0.72
	108"	98	4410	0.91
	120"	79	3950	1.12
	132"	66	3630	1.37
	144"	55	3300	1.62
132"	96"	113	4972	0.72
	108"	89	4406	0.91
	120"	72	3960	1.12
	132"	60	3630	1.37
	144"	50	3300	1.62
144"	96"	103	4944	0.72
	108"	82	4428	0.92
	120"	66	3960	1.12
	132"	55	3630	1.37
	144"	46	3312	1.62
156"	96"	95	4940	0.72
	108"	75	4388	0.91
	120"	61	3965	1.12
	132"	50	3575	1.35
	144"	42	3276	1.61
168"	96"	89	4984	0.72
	108"	70	4410	0.91
	120"	57	3990	1.13
	132"	47	3619	1.37
	144"	39	3276	1.61
180"	96"	83	4980	0.72
	108"	65	4388	0.91
	120"	53	3975	1.13
	132"	44	3630	1.37
	144"	37	3330	1.63
192"	96"	77	4928	0.72
	108"	61	4392	0.91
	120"	50	4000	1.13
	132"	41	3608	1.36
	144"	34	3264	1.60

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 3"x4"x1/8" MULLION (6061-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
60"	72"	130	1950	0.76
	84"	93	1628	1.00
	96"	62	1240	1.14
	108"	44	990	1.30
	120"	32	800	1.44
72"	60"	150	2250	0.51
	72"	108	1944	0.76
	84"	77	1617	1.00
	96"	52	1248	1.15
	108"	36	972	1.27
84"	60"	133	2328	0.52
	72"	93	1953	0.76
	84"	66	1617	1.00
	96"	44	1232	1.13
	108"	31	977	1.28
96"	48"	150	2400	0.28
	60"	117	2340	0.53
	72"	81	1944	0.76
	84"	58	1624	1.00
	96"	39	1248	1.15
108"	48"	150	2700	0.31
	60"	104	2340	0.53
	72"	72	1944	0.76
	84"	51	1607	0.99
	96"	34	1224	1.13
120"	48"	146	2920	0.34
	60"	93	2325	0.52
	72"	65	1950	0.76
	84"	46	1610	0.99
	96"	31	1240	1.14
132"	48"	133	2926	0.34
	60"	85	2338	0.53
	72"	59	1947	0.76
	84"	42	1617	1.00
	96"	28	1232	1.13

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"x4"x1/8" MULLION (6061-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
60"	96"	106	2120	1.01
	108"	84	1890	1.28
	120"	62	1550	1.44
	132"	46	1265	1.56
	144"	36	1080	1.73
72"	96"	88	2112	1.00
	108"	70	1890	1.28
	120"	51	1530	1.42
	132"	39	1287	1.59
	144"	30	1080	1.73
84"	84"	99	2426	0.77
	96"	76	2128	1.01
	108"	60	1890	1.28
	120"	44	1540	1.43
	132"	33	1271	1.57
96"	84"	87	2436	0.77
	96"	66	2112	1.00
	108"	52	1872	1.27
	120"	39	1560	1.45
	132"	29	1276	1.57
108"	72"	105	2835	0.57
	84"	77	2426	0.77
	96"	59	2124	1.01
	108"	47	1904	1.29
	120"	34	1530	1.42
120"	72"	94	2820	0.56
	84"	69	2415	0.77
	96"	53	2120	1.01
	108"	42	1890	1.28
	120"	31	1550	1.44
132"	72"	86	2838	0.57
	84"	63	2426	0.77
	96"	48	2112	1.00
	108"	38	1881	1.27
	120"	28	1540	1.43

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"x4"x1/4" MULLION (6061-T6)				
AVERAGE SPAN WDTN UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
60"	96"	150	3000	0.78
	108"	150	3375	1.25
	120"	112	2800	1.43
	132"	84	2310	1.57
	144"	65	1950	1.72
72"	96"	150	3600	0.94
	108"	127	3429	1.27
	120"	93	2790	1.42
	132"	70	2310	1.57
	144"	54	1944	1.71
84"	96"	138	3864	1.01
	108"	109	3434	1.28
	120"	80	2800	1.43
	132"	60	2310	1.57
	144"	46	1932	1.70
96"	96"	121	3872	1.01
	108"	95	3420	1.27
	120"	70	2800	1.43
	132"	53	2332	1.58
	144"	41	1968	1.73
108"	96"	107	3852	1.01
	108"	85	3443	1.28
	120"	62	2790	1.42
	132"	47	2327	1.58
	144"	36	1944	1.71
120"	96"	97	3880	1.01
	108"	76	3420	1.27
	120"	56	2800	1.43
	132"	42	2310	1.57
	144"	32	1920	1.69
132"	96"	88	3872	1.01
	108"	69	3416	1.27
	120"	51	2805	1.43
	132"	38	2299	1.56
	144"	29	1914	1.69



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

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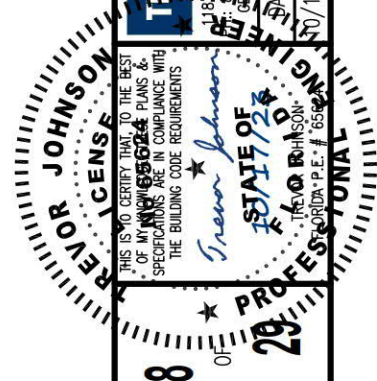
ROLL-UP SHUTTER MULLIONS



TKJ Engineering, LLC.

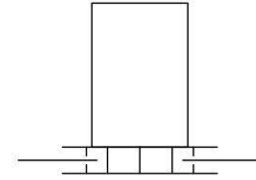
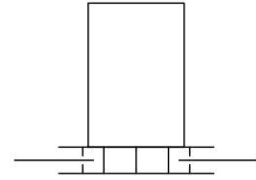
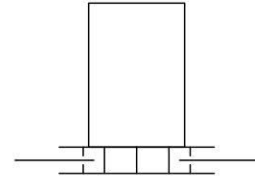
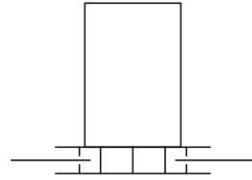
11333 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
PH: 53.404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 10/17/23
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 23-0402



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

Trevor Johnson
STATE OF FLORIDA
PROFESSIONAL ENGINEER
LICENSE NO. 65624
EXPIRATION DATE 12/31/24

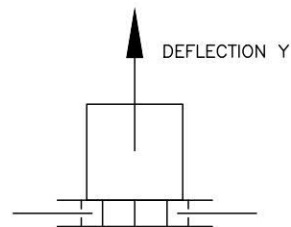


MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"X6"X1/8" MULLION (6061-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
60"	96"	150	3000	0.55
	108"	145	3263	0.85
	120"	118	2950	1.05
	132"	97	2668	1.27
	144"	82	2460	1.52
72"	96"	150	3600	0.66
	108"	121	3267	0.85
	120"	98	2940	1.05
	132"	81	2673	1.27
	144"	68	2448	1.51
84"	96"	131	3668	0.67
	108"	104	3276	0.85
	120"	84	2940	1.05
	132"	69	2657	1.26
	144"	58	2436	1.50
96"	96"	115	3680	0.67
	108"	91	3276	0.85
	120"	73	2920	1.04
	132"	61	2684	1.28
	144"	51	2448	1.51
108"	96"	102	3672	0.67
	108"	81	3281	0.85
	120"	65	2925	1.05
	132"	54	2673	1.27
	144"	45	2430	1.50
120"	96"	92	3680	0.67
	108"	73	3285	0.86
	120"	59	2950	1.05
	132"	49	2695	1.28
	144"	41	2460	1.52
132"	96"	83	3652	0.67
	108"	66	3267	0.85
	120"	53	2915	1.04
	132"	44	2662	1.27
	144"	37	2442	1.51

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"X6"X1/4" MULLION (6061-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
132"	96"	150	6600	0.65
	108"	123	6089	0.85
	120"	100	5500	1.05
	132"	82	4961	1.27
	144"	69	4554	1.51
144"	96"	143	6864	0.67
	108"	113	6102	0.85
	120"	91	5460	1.05
	132"	75	4950	1.26
	144"	63	4536	1.50
156"	96"	132	6864	0.67
	108"	104	6084	0.85
	120"	84	5460	1.05
	132"	70	5005	1.28
	144"	59	4602	1.52
168"	96"	122	6832	0.67
	108"	97	6111	0.85
	120"	78	5460	1.05
	132"	65	5005	1.28
	144"	54	4536	1.50
180"	96"	114	6840	0.67
	108"	90	6075	0.85
	120"	73	5475	1.05
	132"	60	4950	1.26
	144"	51	4590	1.52
192"	96"	107	6848	0.67
	108"	85	6120	0.86
	120"	68	5440	1.04
	132"	57	5016	1.28
	144"	48	4608	1.53
204"	96"	101	6868	0.67
	108"	80	6120	0.86
	120"	64	5440	1.04
	132"	53	4956	1.26
	144"	45	4590	1.52

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"X6"X1/4" MULLION (6061-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
216"	96"	95	6840	0.67
	108"	75	6075	0.85
	120"	61	5490	1.05
	132"	50	4950	1.26
	144"	42	4536	1.50
228"	96"	90	6840	0.67
	108"	71	6071	0.85
	120"	58	5510	1.06
	132"	48	5016	1.28
	144"	40	4560	1.51
240"	96"	86	6880	0.68
	108"	68	6120	0.86
	120"	55	5500	1.05
	132"	45	4950	1.26
	144"	38	4560	1.51
252"	96"	82	6888	0.68
	108"	64	6048	0.85
	120"	52	5460	1.05
	132"	43	4967	1.27
	144"	36	4536	1.50
264"	96"	78	6864	0.67
	108"	61	6039	0.84
	120"	50	5500	1.05
	132"	41	4961	1.27
	144"	35	4620	1.53
276"	96"	74	6808	0.67
	108"	59	6107	0.85
	120"	48	5520	1.06
	132"	39	4934	1.26
	144"	33	4554	1.51
288"	96"	71	6816	0.67
	108"	56	6048	0.85
	120"	46	5520	1.06
	132"	38	5016	1.28
	144"	32	4608	1.53

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"X8"X1/4" MULLION (6061-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
132"	96"	150	6600	0.32
	108"	150	7425	0.51
	120"	150	8250	0.78
	132"	125	7563	0.95
	144"	105	6930	1.13
144"	96"	150	7200	0.35
	108"	150	8100	0.56
	120"	139	8340	0.79
	132"	115	7590	0.95
	144"	96	6912	1.13
156"	96"	150	7800	0.38
	108"	150	8775	0.60
	120"	128	8320	0.79
	132"	106	7579	0.95
	144"	89	6942	1.13
168"	96"	150	8400	0.41
	108"	147	9261	0.64
	120"	119	8330	0.79
	132"	98	7546	0.95
	144"	83	6972	1.14
180"	96"	150	9000	0.44
	108"	137	9248	0.64
	120"	111	8325	0.79
	132"	92	7590	0.95
	144"	77	6930	1.13
192"	96"	150	9600	0.46
	108"	129	9288	0.64
	120"	104	8320	0.79
	132"	86	7568	0.95
	144"	72	6912	1.13
204"	96"	150	10200	0.49
	108"	121	9257	0.64
	120"	98	8330	0.79
	132"	81	7574	0.95
	144"	68	6936	1.13



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

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**ROLL-UP SHUTTER
MULLIONS**

TKJ Engineering, LLC.

11333 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 513.404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 10/17/23
SCALE: N.T.S.
PROJ. #: 23-0402

DRAWN BY: TKJ

DATE: 10/17/23

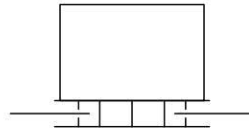
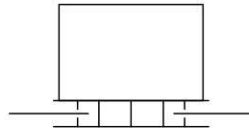
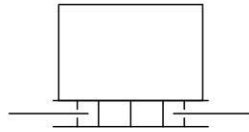
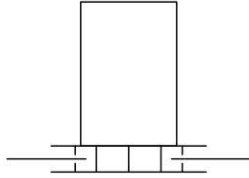
PROJ. #: 23-0402

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DATE: 10/17/23

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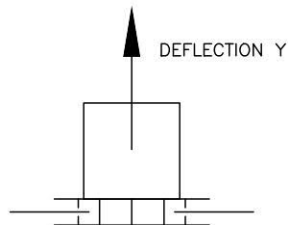


MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"x8"x1/4" MULLION (6061-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
216"	96"	145	10440	0.51
	108"	114	9234	0.64
	120"	93	8370	0.79
	132"	77	7623	0.96
	144"	64	6912	1.13
228"	96"	137	10412	0.50
	108"	108	9234	0.64
	120"	88	8360	0.79
	132"	72	7524	0.95
	144"	61	6954	1.14
240"	96"	130	10400	0.50
	108"	103	9270	0.64
	120"	83	8300	0.78
	132"	69	7590	0.95
	144"	58	6960	1.14
252"	96"	124	10416	0.50
	108"	98	9261	0.64
	120"	79	8295	0.78
	132"	66	7623	0.96
	144"	55	6930	1.13
264"	96"	118	10384	0.50
	108"	94	9306	0.64
	120"	76	8360	0.79
	132"	63	7623	0.96
	144"	53	6996	1.14
276"	96"	113	10396	0.50
	108"	89	9212	0.63
	120"	72	8280	0.78
	132"	60	7590	0.95
	144"	50	6900	1.13
288"	96"	109	10464	0.51
	108"	86	9288	0.64
	120"	69	8280	0.78
	132"	57	7524	0.95
	144"	48	6912	1.13

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"x6"x1/8" MULLION (6061-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
60"	96"	147	2940	1.01
	108"	116	2610	1.27
	120"	85	2125	1.42
	132"	64	1760	1.57
	144"	49	1470	1.70
72"	96"	123	2952	1.01
	108"	97	2619	1.28
	120"	71	2130	1.42
	132"	54	1782	1.59
	144"	41	1476	1.71
84"	96"	105	2940	1.01
	108"	83	2615	1.27
	120"	61	2135	1.43
	132"	46	1771	1.58
	144"	35	1470	1.70
96"	96"	92	2944	1.01
	108"	73	2628	1.28
	120"	53	2120	1.42
	132"	40	1760	1.57
	144"	31	1488	1.72
108"	96"	82	2952	1.01
	108"	65	2633	1.28
	120"	47	2115	1.41
	132"	36	1782	1.59
	144"	27	1458	1.68
120"	84"	96	3360	0.77
	96"	74	2960	1.01
	108"	58	2610	1.27
	120"	43	2150	1.44
	132"	32	1760	1.57
132"	84"	87	3350	0.77
	96"	67	2948	1.01
	108"	53	2624	1.28
	120"	39	2145	1.43
	132"	29	1755	1.56

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"x6"x1/4" MULLION (6061-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
96"	96"	150	4800	0.90
	108"	133	4788	1.27
	120"	98	3920	1.43
	132"	74	3256	1.58
	144"	57	2736	1.72
108"	96"	150	5400	1.01
	108"	119	4820	1.28
	120"	87	3915	1.43
	132"	65	3218	1.56
	144"	50	2700	1.70
120"	96"	135	5400	1.01
	108"	107	4815	1.28
	120"	78	3900	1.42
	132"	59	3245	1.57
	144"	45	2700	1.70
132"	96"	123	5412	1.01
	108"	97	4802	1.28
	120"	71	3905	1.42
	132"	54	3267	1.58
	144"	41	2706	1.70
144"	96"	113	5424	1.01
	108"	89	4806	1.28
	120"	65	3900	1.42
	132"	49	3234	1.57
	144"	38	2736	1.72
156"	96"	104	5408	1.01
	108"	82	4797	1.27
	120"	60	3900	1.42
	132"	45	3218	1.56
	144"	35	2730	1.72
168"	96"	96	5376	1.00
	108"	76	4788	1.27
	120"	56	3920	1.43
	132"	42	3234	1.57
	144"	32	2688	1.69

MAXIMUM DESIGN PRESSURE OF A INTERMEDIATE 4"x8"x1/4" MULLION (6061-T6)				
AVERAGE SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)
120"	96"	150	6000	0.87
	108"	137	6165	1.27
	120"	101	5050	1.43
	132"	76	4180	1.58
	144"	58	3480	1.71
132"	96"	150	6600	0.96
	108"	125	6188	1.28
	120"	92	5060	1.43
	132"	69	4175	1.58
	144"	53	3498	1.71
144"	96"	145	6960	1.01
	108"	114	6156	1.27
	120"	84	5040	1.43
	132"	63	4158	1.57
	144"	49	3528	1.73
156"	96"	134	6968	1.01
	108"	105	6143	1.27
	120"	78	5070	1.44
	132"	58	4147	1.57
	144"	45	3510	1.72
168"	96"	124	6944	1.01
	108"	98	6174	1.28
	120"	72	5040	1.43
	132"	54	4158	1.57
	144"	42	3528	1.73
180"	96"	116	6960	1.01
	108"	91	6143	1.27
	120"	67	5025	1.42
	132"	50	4125	1.56
	144"	39	3510	1.72
192"	96"	108	6912	1.00
	108"	86	6192	1.28
	120"	63	5040	1.43
	132"	47	4136	1.56
	144"	36	3456	1.69



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

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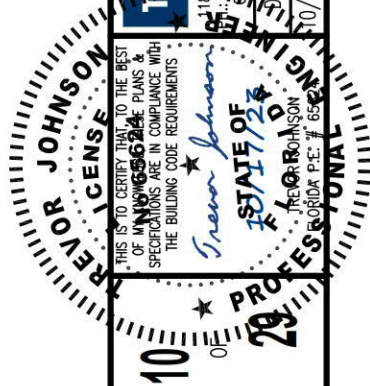
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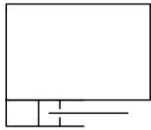
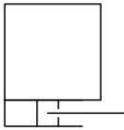
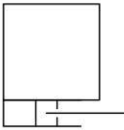
**ROLL-UP SHUTTER
MULLIONS**

TKJ Engineering, LLC.

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TEL: 215.404.7649; EM: TKJENGINEERING@VERIZON.NET
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SCALE: N.T.S.
PROJ. #: 23-0402

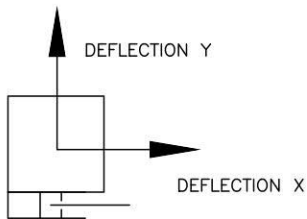




MAXIMUM DESIGN PRESSURE OF AN END 4"x4"x1/8" MULLION (6005-T5)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
60"	96"	150	2335	0.75	0.54
	108"	145	2131	1.11	0.53
	120"	108	1726	1.26	0.27
	132"	92	1542	1.65	0.20
	144"	63	1413	1.54	0.34
72"	96"	102	2346	0.59	0.69
	108"	95	2129	0.88	0.77
	120"	71	1725	1.00	0.23
	132"	71	1639	1.47	0.48
	144"	59	1437	1.85	0.44
84"	96"	73	2449	0.49	0.80
	108"	66	2145	0.71	0.92
	120"	60	1943	0.99	0.90
	132"	58	1841	1.40	1.08
	144"	50	1614	1.72	0.94
96"	96"	54	2462	0.42	0.85
	108"	49	2192	0.61	1.03
	120"	44	1970	0.83	1.03
	132"	42	1822	1.17	1.26
	144"	40	1725	1.58	1.36
108"	84"	48	2819	0.25	0.72
	96"	42	2484	0.37	0.89
	108"	38	2210	0.53	1.14
	120"	34	1994	0.73	1.18
	132"	32	1837	1.01	1.41
120"	60"	60	3932	0.09	0.40
	66"	53	3576	0.11	0.50
	72"	48	3348	0.15	0.59
	78"	43	3043	0.18	0.68
	84"	39	2813	0.22	0.75
132"	48"	72	4937	0.05	0.27
	54"	60	4396	0.06	0.34
	60"	52	4013	0.08	0.42
	66"	45	3618	0.11	0.50
	72"	40	3329	0.14	0.59

MAXIMUM DESIGN PRESSURE OF AN END 4"x4"x1/4" MULLION (6005-T5)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
72"	96"	150	4532	0.47	0.87
	108"	135	4048	0.68	1.02
	120"	125	3732	0.96	1.17
	132"	114	3401	1.29	1.17
	144"	108	3204	1.74	1.33
84"	96"	109	4590	0.40	0.93
	108"	97	4117	0.57	1.10
	120"	89	3756	0.80	1.33
	132"	82	3457	1.08	1.47
	144"	77	3255	1.44	1.58
96"	96"	84	4654	0.35	0.98
	108"	75	4209	0.51	1.22
	120"	67	3819	0.69	1.37
	132"	60	3555	0.94	1.59
	144"	53	3263	1.23	1.75
108"	96"	68	4725	0.32	1.03
	108"	59	4219	0.45	1.23
	120"	51	3873	0.62	1.44
	132"	43	3518	0.82	1.70
	144"	39	3305	1.09	2.03
120"	96"	56	4761	0.30	1.03
	108"	48	4241	0.41	1.23
	120"	40	3866	0.56	1.51
	132"	34	3562	0.75	1.78
	144"	30	3249	0.95	1.92
132"	78"	63	5825	0.16	0.73
	84"	57	5476	0.20	0.83
	90"	52	5128	0.24	0.94
	96"	47	4771	0.28	1.02
	102"	44	4545	0.33	1.17
144"	66"	70	6871	0.10	0.53
	72"	61	6305	0.12	0.61
	78"	55	5900	0.15	0.73
	84"	49	5453	0.18	0.83
	90"	45	5164	0.22	0.95

MAXIMUM DESIGN PRESSURE OF AN END 4"x6"x1/8" MULLION (6005-T5)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
72"	96"	122	3707	0.51	0.51
	108"	111	3292	0.74	0.60
	120"	101	2899	1.02	0.66
	132"	93	2618	1.38	0.68
	144"	82	2375	1.83	0.70
84"	96"	90	3889	0.44	0.58
	108"	80	3423	0.62	0.68
	120"	72	3057	0.85	0.74
	132"	67	2771	1.16	0.87
	144"	61	2465	1.50	0.86
96"	96"	69	3972	0.38	0.61
	108"	61	3543	0.54	0.72
	120"	55	3143	0.75	0.88
	132"	51	2923	1.02	0.99
	144"	46	2568	1.30	1.05
108"	96"	56	4088	0.35	0.64
	108"	49	3670	0.49	0.76
	120"	43	3212	0.66	0.90
	132"	40	3001	0.90	1.07
	144"	36	2667	1.15	1.17
120"	84"	55	4720	0.22	0.52
	96"	46	4111	0.32	0.67
	108"	40	3687	0.45	0.80
	120"	36	3376	0.62	0.97
	132"	31	2938	0.78	1.03
132"	78"	52	5131	0.17	0.47
	84"	47	4805	0.21	0.53
	90"	43	4505	0.26	0.60
	96"	39	4188	0.30	0.67
	102"	36	3932	0.36	0.74
144"	60"	68	6712	0.09	0.28
	66"	58	6089	0.11	0.34
	72"	51	5603	0.14	0.41
	78"	46	5271	0.17	0.47
	84"	41	4859	0.20	0.55



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

THE DEFLECTION IN THE X DIRECTION CAN BE NEGLECTED ON NON-RETENSION SHUTTERS
AND WHEN STORM-BARS ARE USED TO REDUCE SHUTTER DEFLECTIONS.

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

ROLL-UP SHUTTER
MULLIONS

TKJ Engineering, LLC.

11333 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 813.404.7649; EM: TKJENGINEERING@VERIZON.NET
PROF. CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 11/17/23

SCALE: N.T.S.

DRAWN BY: TKJ

PROJ. #: 23-0402

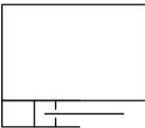
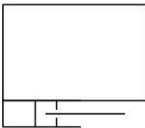
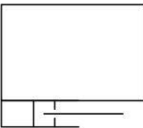
THIS IS TO CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE PLANS & SPECIFICATIONS ARE IN COMPLIANCE WITH THE BUILDING CODE REQUIREMENTS

REVOR JOHNSON

PROFESSIONAL ENGINEER

FLORIDA P.E. # 85622

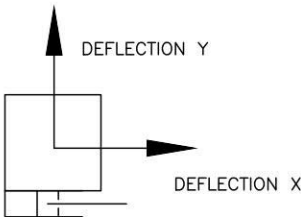
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MAXIMUM DESIGN PRESSURE OF AN END 4"x6"x1/4" MULLION (6005-T5)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
84"	96"	146	7589	0.38	0.63
	108"	127	6744	0.54	0.77
	120"	112	6027	0.72	0.91
	132"	101	5478	0.95	1.02
	144"	93	5056	1.24	1.15
96"	96"	117	7818	0.35	0.66
	108"	100	6884	0.48	0.82
	120"	88	6228	0.65	0.95
	132"	79	5706	0.85	1.09
	144"	72	5234	1.10	1.27
108"	96"	96	7916	0.33	0.67
	108"	82	7071	0.45	0.83
	120"	71	6311	0.59	0.98
	132"	64	5812	0.78	1.18
	144"	57	5278	0.99	1.32
120"	96"	81	7996	0.31	0.70
	108"	69	7173	0.42	0.86
	120"	60	6502	0.56	1.02
	132"	53	5918	0.72	1.19
	144"	47	5332	0.91	1.39
132"	96"	70	8100	0.29	0.71
	108"	59	7211	0.39	0.88
	120"	51	6526	0.52	1.05
	132"	45	5968	0.67	1.25
	144"	40	5417	0.85	1.48
144"	96"	61	8144	0.28	0.72
	108"	51	7257	0.37	0.88
	120"	44	6556	0.49	1.06
	132"	39	6010	0.64	1.30
	144"	34	5433	0.79	1.45
156"	96"	54	8203	0.27	0.73
	108"	45	7315	0.36	0.89
	120"	39	6622	0.47	1.11
	132"	34	6020	0.61	1.32
	144"	30	5501	0.76	1.54

MAXIMUM DESIGN PRESSURE OF AN END 4"x8"x1/4" MULLION (6005-T5)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	96"	150	11421	0.36	0.49
	108"	130	10148	0.49	0.61
	120"	112	9056	0.64	0.72
	132"	99	8221	0.83	0.85
	144"	89	7533	1.06	0.98
108"	96"	128	11590	0.34	0.51
	108"	108	10352	0.46	0.63
	120"	93	9283	0.60	0.76
	132"	81	8381	0.77	0.89
	144"	72	7658	0.97	1.01
120"	96"	109	11741	0.32	0.51
	108"	92	10529	0.43	0.64
	120"	78	9370	0.56	0.78
	132"	69	8620	0.73	0.92
	144"	61	7894	0.91	1.05
132"	96"	95	11928	0.31	0.53
	108"	79	10579	0.41	0.66
	120"	68	9581	0.54	0.80
	132"	59	8674	0.69	0.95
	144"	52	7949	0.86	1.09
144"	96"	84	12096	0.30	0.53
	108"	70	10799	0.40	0.66
	120"	59	9672	0.51	0.79
	132"	51	8730	0.65	0.94
	144"	45	7981	0.81	1.13
156"	96"	75	12209	0.29	0.54
	108"	62	10826	0.38	0.68
	120"	52	9681	0.49	0.80
	132"	45	8804	0.62	0.96
	144"	40	8193	0.78	1.10
168"	96"	67	12243	0.28	0.54
	108"	55	10834	0.36	0.67
	120"	47	9835	0.48	0.82
	132"	41	9034	0.61	0.98
	144"	36	8252	0.76	1.18

MAXIMUM DESIGN PRESSURE OF AN END 4"x6"x3/8" MULLION (6005-T5)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	96"	150	11195	0.35	0.68
	108"	136	9981	0.48	0.84
	120"	118	8962	0.63	1.01
	132"	105	8203	0.82	1.20
	144"	94	7463	1.04	1.39
108"	96"	132	11288	0.32	0.69
	108"	112	10071	0.44	0.87
	120"	97	9141	0.58	1.04
	132"	86	8356	0.76	1.24
	144"	76	7581	0.95	1.42
120"	96"	113	11473	0.31	0.72
	108"	95	10213	0.42	0.89
	120"	82	9281	0.55	1.06
	132"	72	8451	0.71	1.27
	144"	64	7763	0.89	1.48
132"	96"	97	11509	0.29	0.72
	108"	81	10262	0.39	0.88
	120"	70	9302	0.52	1.08
	132"	62	8590	0.67	1.30
	144"	55	7910	0.85	1.52
144"	96"	86	11686	0.28	0.73
	108"	72	10453	0.38	0.91
	120"	61	9373	0.49	1.10
	132"	53	8528	0.63	1.30
	144"	47	7859	0.79	1.52
156"	96"	76	11690	0.27	0.74
	108"	64	10558	0.37	0.92
	120"	54	9424	0.47	1.13
	132"	47	8603	0.61	1.35
	144"	42	8011	0.77	1.60
168"	96"	68	11747	0.26	0.75
	108"	57	10581	0.35	0.93
	120"	49	9645	0.46	1.14
	132"	42	8738	0.58	1.31
	144"	37	7983	0.73	1.61



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

THE DEFLECTION IN THE X DIRECTION CAN BE NEGLECTED ON NON-RETENSION SHUTTERS
AND WHEN STORM-BARS ARE USED TO REDUCE SHUTTER DEFLECTIONS.

TKJ Engineering, LLC.

1133 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 53.404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 10/17/23
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 23-0402



12 OF 29

ROLL-UP SHUTTER MULLIONS

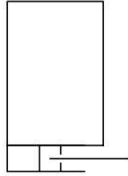
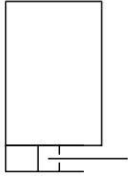
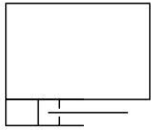
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AMERICAN SHUTTER SYSTEM ASSOCIATION, INC.
4268 WESTROADS DRIVE, WEST PALM BEACH, FL 33407
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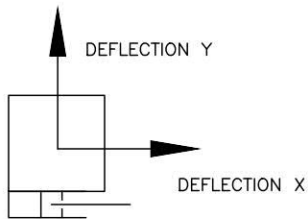
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MAXIMUM DESIGN PRESSURE OF AN END 4"x6"x1/2" MULLION (6005-T5)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
108"	96"	150	14358	0.33	0.72
	108"	139	12802	0.45	0.89
	120"	120	11599	0.59	1.08
	132"	105	10536	0.76	1.28
	144"	94	9755	0.96	1.49
120"	96"	142	14552	0.32	0.73
	108"	118	12911	0.42	0.90
	120"	102	11763	0.56	1.10
	132"	88	10635	0.71	1.28
	144"	79	9890	0.90	1.53
132"	96"	123	14640	0.30	0.74
	108"	103	13127	0.41	0.93
	120"	88	11886	0.53	1.12
	132"	76	10794	0.67	1.30
	144"	68	10020	0.85	1.56
144"	96"	108	14740	0.29	0.74
	108"	90	13216	0.39	0.92
	120"	77	11932	0.51	1.14
	132"	67	10941	0.65	1.35
	144"	59	10099	0.81	1.55
156"	96"	96	14837	0.28	0.74
	108"	80	13279	0.37	0.94
	120"	68	11966	0.49	1.15
	132"	59	10983	0.62	1.36
	144"	52	10087	0.77	1.62
168"	96"	87	14981	0.27	0.76
	108"	72	13366	0.36	0.96
	120"	61	12080	0.47	1.15
	132"	53	11112	0.60	1.36
	144"	47	10301	0.76	1.63
180"	96"	78	14930	0.26	0.77
	108"	65	13425	0.35	0.95
	120"	55	12139	0.46	1.16
	132"	48	11142	0.58	1.42
	144"	42	10287	0.73	1.63

MAXIMUM DESIGN PRESSURE OF AN END 4"x6"x1/8" MULLION (6005-T5)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
72"	96"	130	3578	0.29	0.83
	108"	120	3285	0.43	0.97
	120"	112	3032	0.61	1.10
	132"	104	2830	0.82	1.09
	144"	97	2674	1.09	1.22
84"	96"	93	3593	0.24	0.93
	108"	84	3243	0.35	1.08
	120"	79	3046	0.50	1.30
	132"	74	2857	0.69	1.41
	144"	68	2617	0.89	1.41
96"	96"	70	3605	0.21	0.95
	108"	63	3244	0.30	1.20
	120"	58	3007	0.42	1.38
	132"	52	2797	0.58	1.58
	144"	48	2669	0.77	1.72
108"	96"	55	3612	0.18	0.97
	108"	50	3331	0.27	1.24
	120"	44	2994	0.37	1.50
	132"	39	2836	0.51	1.71
	144"	36	2635	0.67	1.93
120"	72"	64	4706	0.08	0.60
	84"	53	4120	0.12	0.80
	96"	45	3625	0.17	1.01
	108"	40	3323	0.24	1.23
	120"	34	3014	0.33	1.51
132"	72"	54	4697	0.07	0.60
	78"	49	4414	0.09	0.71
	84"	44	4069	0.11	0.80
	90"	41	3864	0.13	0.95
	96"	38	3652	0.16	1.07
144"	72"	47	4741	0.07	0.61
	78"	42	4382	0.08	0.72
	84"	38	4105	0.10	0.81
	90"	35	3861	0.12	0.96
	96"	32	3603	0.14	1.07

MAXIMUM DESIGN PRESSURE OF AN END 4"x6"x1/4" MULLION (6005-T5)					
SPAN WDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
84"	96"	146	6799	0.20	1.00
	108"	129	6149	0.29	1.22
	120"	112	5626	0.40	1.50
	132"	99	5223	0.53	1.70
	144"	89	4900	0.70	1.96
96"	96"	114	6826	0.18	1.04
	108"	98	6176	0.25	1.29
	120"	82	5639	0.35	1.52
	132"	71	5274	0.47	1.84
	144"	63	4876	0.60	2.09
108"	96"	93	6901	0.17	1.07
	108"	77	6182	0.23	1.32
	120"	63	5681	0.31	1.54
	132"	53	5296	0.42	1.90
	144"	47	4908	0.54	2.14
120"	96"	77	6866	0.15	1.09
	108"	62	6200	0.21	1.32
	120"	51	5738	0.29	1.61
	132"	43	5203	0.37	1.87
	144"	36	4922	0.49	2.20
132"	84"	79	7808	0.10	0.85
	96"	66	6956	0.14	1.10
	108"	52	6188	0.20	1.38
	120"	42	5762	0.27	1.67
	132"	35	5243	0.35	1.96
144"	84"	68	7770	0.10	0.85
	93"	59	7076	0.12	1.05
	102"	51	6535	0.16	1.23
	111"	42	6101	0.20	1.48
	120"	35	5660	0.25	1.66
156"	84"	60	7772	0.09	0.87
	93"	52	7123	0.12	1.04
	102"	44	6571	0.15	1.27
	111"	36	6090	0.19	1.49
	120"	30	5721	0.24	1.69



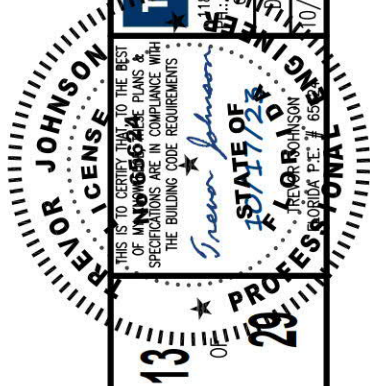
NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

THE DEFLECTION IN THE X DIRECTION CAN BE NEGLECTED ON NON-RETENSION SHUTTERS
AND WHEN STORM-BARS ARE USED TO REDUCE SHUTTER DEFLECTIONS.

TKJ Engineering, LLC.

1125 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
PH: 313.404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 10/17/23
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 23-0402



ASSA

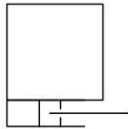
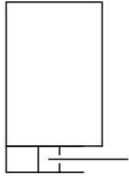
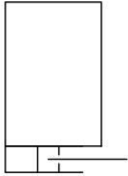
"Knowledge is Your Best Protection"
AMERICAN SHUTTER SYSTEM ASSOCIATION, INC.
4268 WESTROADS DRIVE, WEST PALM BEACH, FL 33407
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ROLL-UP SHUTTER
MULLIONS

#

DATE

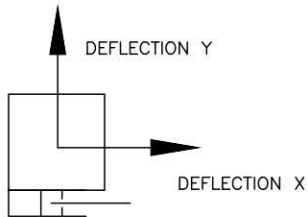
REVISIONS



MAXIMUM DESIGN PRESSURE OF AN END 4"x8"x1/4" MULLION (6005-T5)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
84"	96"	150	8905	0.12	1.06
	108"	150	8112	0.17	1.30
	120"	129	7472	0.24	1.58
	132"	113	6984	0.32	1.87
	144"	100	6501	0.42	2.11
96"	96"	143	8950	0.11	1.07
	108"	119	8098	0.16	1.31
	120"	97	7470	0.21	1.61
	132"	82	6916	0.28	1.88
	144"	72	6463	0.36	2.24
108"	96"	116	8913	0.10	1.09
	108"	94	8061	0.14	1.34
	120"	76	7470	0.19	1.62
	132"	63	6932	0.25	1.92
	144"	55	6450	0.33	2.31
120"	96"	98	9005	0.10	1.10
	108"	76	8150	0.13	1.36
	120"	61	7373	0.17	1.67
	132"	51	6925	0.23	1.98
	144"	43	6465	0.30	2.37
132"	96"	83	8940	0.09	1.10
	108"	65	8192	0.12	1.40
	120"	51	7418	0.16	1.66
	132"	42	6944	0.22	2.05
	144"	34	6433	0.27	2.34
144"	96"	72	8932	0.08	1.11
	108"	55	8163	0.12	1.41
	120"	43	7465	0.16	1.72
	132"	35	6931	0.20	2.07
	144"	29	6323	0.25	2.32
156"	84"	77	10081	0.06	0.86
	96"	64	8997	0.08	1.14
	108"	48	8110	0.11	1.40
	120"	37	7434	0.15	1.72
	132"	30	6791	0.19	2.04

MAXIMUM DESIGN PRESSURE OF AN END 4"x6"x3/8" MULLION (6005-T5)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
84"	96"	150	9640	0.19	1.07
	108"	150	8679	0.27	1.33
	120"	135	7970	0.36	1.59
	132"	117	7343	0.48	1.82
	144"	103	6854	0.63	2.08
96"	96"	150	9656	0.17	1.08
	108"	124	8722	0.24	1.33
	120"	102	8034	0.33	1.65
	132"	86	7409	0.43	1.94
	144"	75	6853	0.55	2.24
108"	96"	126	9750	0.16	1.10
	108"	99	8749	0.22	1.39
	120"	79	7982	0.29	1.63
	132"	67	7438	0.39	1.97
	144"	57	6939	0.50	2.26
120"	96"	106	9779	0.15	1.12
	108"	82	8768	0.20	1.39
	120"	65	8030	0.27	1.72
	132"	53	7402	0.36	2.02
	144"	45	6978	0.46	2.40
132"	96"	91	9802	0.14	1.14
	108"	68	8791	0.19	1.43
	120"	54	8045	0.26	1.72
	132"	44	7408	0.33	2.01
	144"	36	6994	0.43	2.44
144"	96"	78	9786	0.13	1.15
	108"	59	8848	0.18	1.43
	120"	46	8093	0.24	1.71
	132"	37	7395	0.31	2.11
	144"	30	6984	0.40	2.40
156"	84"	85	11100	0.09	0.89
	96"	69	9863	0.13	1.15
	108"	51	8859	0.18	1.46
	120"	40	8074	0.23	1.78
	132"	32	7522	0.30	2.07

MAXIMUM DESIGN PRESSURE OF AN END 4"x4"x1/8" MULLION (6061-T6)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
72"	96"	107	2505	0.62	0.76
	108"	98	2261	0.90	0.81
	120"	92	2095	1.29	0.88
	132"	72	1704	1.49	0.48
	144"	59	1500	1.87	0.44
84"	96"	76	2574	0.51	0.87
	108"	70	2345	0.76	1.02
	120"	63	2064	1.04	1.02
	132"	60	1944	1.45	1.16
	144"	50	1725	1.82	1.10
96"	96"	56	2567	0.43	0.92
	108"	51	2362	0.63	1.03
	120"	48	2177	0.91	1.28
	132"	44	1957	1.22	1.37
	144"	41	1827	1.61	1.36
108"	96"	44	2616	0.38	0.97
	108"	40	2410	0.56	1.14
	120"	36	2124	0.77	1.34
	132"	34	2006	1.07	1.55
	144"	31	1788	1.38	1.62
120"	72"	50	3483	0.15	0.61
	84"	42	3049	0.24	0.81
	96"	35	2607	0.34	0.95
	108"	32	2377	0.50	1.28
	120"	28	2115	0.67	1.31
132"	66"	47	3775	0.11	0.52
	72"	42	3495	0.14	0.61
	78"	38	3227	0.18	0.73
	84"	35	3053	0.22	0.82
	90"	32	2860	0.27	0.89
144"	54"	55	4642	0.06	0.37
	60"	47	4181	0.08	0.45
	66"	41	3818	0.11	0.54
	72"	37	3592	0.14	0.64
	78"	33	3304	0.17	0.73



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

THE DEFLECTION IN THE X DIRECTION CAN BE NEGLECTED ON NON-RETENSION SHUTTERS
AND WHEN STORM-BARS ARE USED TO REDUCE SHUTTER DEFLECTIONS.

REVISIONS

DATE

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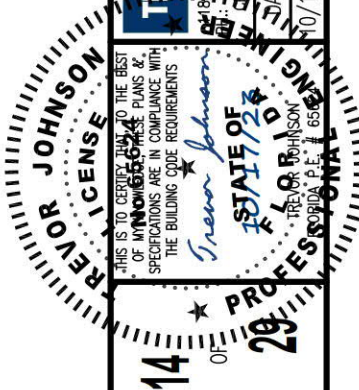
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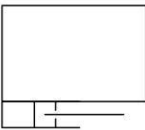
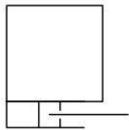
**ROLL-UP SHUTTER
MULLIONS**

TEJ Engineering, LLC.

1550 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 313.404.7649; EM: TKENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 10/17/23
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 23-0402

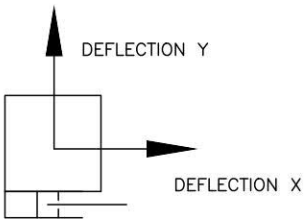




MAXIMUM DESIGN PRESSURE OF AN END 4"x4"x1/4" MULLION (6061-T6)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
84"	96"	115	4900	0.42	0.98
	108"	102	4373	0.60	1.19
	120"	92	3973	0.83	1.33
	132"	85	3665	1.14	1.60
	144"	78	3424	1.48	1.58
96"	96"	89	4939	0.38	1.05
	108"	79	4490	0.54	1.27
	120"	67	4075	0.73	1.50
	132"	60	3755	0.99	1.73
	144"	53	3445	1.29	1.98
108"	96"	72	5016	0.34	1.09
	108"	60	4459	0.47	1.30
	120"	51	4125	0.65	1.54
	132"	43	3781	0.87	1.83
	144"	39	3540	1.14	2.03
120"	96"	59	5020	0.31	1.09
	108"	48	4515	0.43	1.31
	120"	40	4162	0.60	1.63
	132"	34	3751	0.78	1.93
	144"	30	3522	1.03	2.26
132"	84"	60	5718	0.21	0.88
	96"	51	5149	0.30	1.12
	108"	40	4522	0.40	1.36
	120"	32	4158	0.55	1.60
	132"	27	3780	0.72	1.93
144"	84"	52	5742	0.19	0.89
	90"	47	5374	0.23	0.99
	96"	44	5175	0.28	1.14
	102"	38	4795	0.33	1.28
	108"	34	4537	0.38	1.42
156"	78"	51	6223	0.15	0.77
	84"	46	5803	0.19	0.90
	90"	42	5520	0.23	0.99
	96"	38	5125	0.26	1.13
	102"	33	4819	0.31	1.30

MAXIMUM DESIGN PRESSURE OF AN END 4"x6"x1/8" MULLION (6061-T6)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
84"	96"	94	4090	0.46	0.61
	108"	83	3619	0.64	0.71
	120"	76	3265	0.90	0.84
	132"	70	2927	1.22	0.95
	144"	65	2715	1.60	0.97
96"	96"	73	4253	0.41	0.64
	108"	64	3720	0.57	0.79
	120"	57	3339	0.78	0.88
	132"	52	3024	1.04	0.99
	144"	48	2732	1.36	1.12
108"	96"	59	4354	0.37	0.66
	108"	51	3821	0.51	0.82
	120"	46	3486	0.71	0.98
	132"	41	3120	0.92	1.07
	144"	38	2866	1.22	1.26
120"	96"	49	4413	0.34	0.69
	108"	42	3865	0.47	0.86
	120"	37	3510	0.64	0.97
	132"	33	3124	0.83	1.15
	144"	31	2965	1.11	1.35
132"	84"	49	5008	0.22	0.55
	96"	41	4397	0.32	0.70
	108"	35	3893	0.43	0.86
	120"	31	3535	0.59	1.03
	132"	27	3151	0.75	1.12
144"	84"	43	5078	0.21	0.57
	90"	39	4774	0.25	0.64
	96"	36	4544	0.30	0.70
	102"	32	4139	0.35	0.75
	108"	31	4062	0.42	0.90
156"	78"	42	5464	0.17	0.50
	84"	38	5129	0.20	0.58
	90"	34	4754	0.24	0.66
	96"	31	4474	0.28	0.72
	102"	29	4293	0.34	0.82

MAXIMUM DESIGN PRESSURE OF AN END 4"x6"x1/4" MULLION (6061-T6)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
84"	96"	150	8059	0.41	0.67
	108"	134	7148	0.56	0.82
	120"	117	6367	0.75	0.94
	132"	106	5797	1.00	1.09
	144"	97	5294	1.30	1.25
96"	96"	123	8227	0.37	0.69
	108"	105	7291	0.51	0.83
	120"	92	6550	0.68	1.00
	132"	82	5930	0.89	1.16
	144"	75	5465	1.15	1.35
108"	96"	102	8386	0.35	0.72
	108"	87	7479	0.47	0.88
	120"	76	6755	0.63	1.06
	132"	67	6122	0.82	1.22
	144"	60	5567	1.04	1.42
120"	96"	85	8401	0.32	0.71
	108"	73	7565	0.44	0.90
	120"	63	6772	0.58	1.10
	132"	56	6255	0.76	1.26
	144"	50	5693	0.96	1.48
132"	96"	74	8539	0.31	0.75
	108"	62	7573	0.41	0.91
	120"	54	6891	0.55	1.11
	132"	47	6220	0.70	1.30
	144"	42	5762	0.89	1.48
144"	96"	65	8675	0.30	0.74
	108"	54	7624	0.39	0.94
	120"	47	6944	0.52	1.15
	132"	41	6306	0.67	1.36
	144"	37	5909	0.86	1.58
156"	96"	57	8642	0.28	0.75
	108"	48	7725	0.38	0.96
	120"	41	6946	0.50	1.16
	132"	36	6362	0.64	1.39
	144"	32	5857	0.81	1.63



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

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AND WHEN STORM-BARS ARE USED TO REDUCE SHUTTER DEFLECTIONS.

#	DATE	REVISIONS



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4268 WESTROADS DRIVE, WEST PALM BEACH, FL 33407
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WWW.AMSSHUTTER.ORG

ROLL-UP SHUTTER MULLIONS



TKJ Engineering, LLC.

11959 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 313.404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

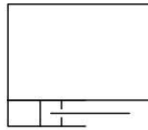
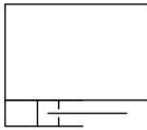
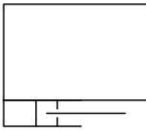
DATE:	PROJ. #:
10/17/23	23-0402
DRAWN BY:	SCALE:
TKJ	N.T.S.

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

Steven Johnson
STEVEN JOHNSON
P.E.
FLORIDA P.E. # 6562

STATE OF FLORIDA
PROFESSIONAL ENGINEER

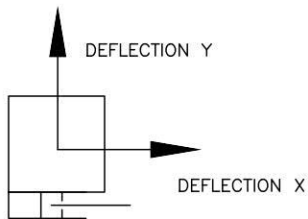
15 OF 29



MAXIMUM DESIGN PRESSURE OF AN END 4"X8"X1/4" MULLION (6061-T6)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	96"	150	12040	0.38	0.52
	108"	137	10647	0.51	0.64
	120"	118	9543	0.67	0.76
	132"	104	8642	0.87	0.90
	144"	93	7918	1.11	1.03
108"	96"	136	12262	0.36	0.53
	108"	114	10906	0.48	0.65
	120"	98	9765	0.63	0.80
	132"	86	8863	0.81	0.95
	144"	77	8189	1.03	1.09
120"	96"	116	12427	0.34	0.55
	108"	97	11030	0.46	0.68
	120"	83	9951	0.60	0.81
	132"	73	9101	0.77	0.97
	144"	64	8226	0.96	1.13
132"	96"	100	12509	0.32	0.55
	108"	84	11207	0.43	0.68
	120"	72	10105	0.57	0.84
	132"	62	9114	0.72	0.98
	144"	55	8370	0.91	1.17
144"	96"	89	12709	0.31	0.56
	108"	74	11347	0.42	0.70
	120"	63	10234	0.54	0.84
	132"	55	9353	0.70	1.01
	144"	48	8506	0.86	1.17
156"	96"	79	12798	0.30	0.56
	108"	65	11342	0.40	0.70
	120"	56	10343	0.53	0.86
	132"	48	9289	0.66	1.03
	144"	42	8534	0.82	1.18
168"	96"	71	12909	0.29	0.57
	108"	59	11514	0.39	0.71
	120"	50	10362	0.51	0.88
	132"	43	9427	0.64	1.02
	144"	38	8674	0.80	1.23

MAXIMUM DESIGN PRESSURE OF AN END 4"X6"X3/8" MULLION (6061-T6)					
SPAN WDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	96"	150	11806	0.37	0.72
	108"	143	10453	0.50	0.89
	120"	125	9498	0.67	1.07
	132"	110	8623	0.86	1.24
	144"	99	7911	1.10	1.45
108"	96"	140	11906	0.34	0.74
	108"	119	10693	0.47	0.91
	120"	102	9579	0.61	1.10
	132"	90	8730	0.79	1.31
	144"	80	8006	1.00	1.50
120"	96"	120	12115	0.33	0.75
	108"	100	10737	0.44	0.92
	120"	86	9700	0.58	1.12
	132"	76	8893	0.75	1.35
	144"	67	8126	0.93	1.54
132"	96"	103	12140	0.31	0.75
	108"	87	10921	0.42	0.94
	120"	75	9913	0.55	1.15
	132"	65	8999	0.70	1.36
	144"	58	8319	0.89	1.59
144"	96"	91	12272	0.30	0.77
	108"	76	10978	0.40	0.95
	120"	65	9934	0.52	1.16
	132"	57	9120	0.68	1.39
	144"	50	8361	0.84	1.58
156"	96"	81	12383	0.29	0.77
	108"	68	11136	0.39	0.97
	120"	58	10068	0.51	1.18
	132"	50	9133	0.64	1.40
	144"	44	8357	0.80	1.66
168"	96"	73	12498	0.28	0.78
	108"	61	11216	0.38	0.98
	120"	51	9986	0.48	1.17
	132"	45	9231	0.62	1.45
	144"	40	8616	0.79	1.68

MAXIMUM DESIGN PRESSURE OF AN END 4"X6"X1/2" MULLION (6061-T6)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
108"	96"	150	15164	0.35	0.75
	108"	147	13469	0.47	0.93
	120"	127	12253	0.62	1.12
	132"	111	11115	0.80	1.35
	144"	98	10192	1.00	1.53
120"	96"	150	15291	0.34	0.77
	108"	125	13623	0.45	0.95
	120"	107	12308	0.59	1.15
	132"	94	11280	0.75	1.38
	144"	83	10398	0.94	1.58
132"	96"	130	15382	0.32	0.77
	108"	109	13781	0.43	0.97
	120"	93	12491	0.56	1.16
	132"	81	11425	0.72	1.38
	144"	71	10432	0.89	1.62
144"	96"	115	15557	0.31	0.79
	108"	96	13951	0.41	0.98
	120"	82	12635	0.54	1.19
	132"	71	11528	0.69	1.42
	144"	63	10691	0.86	1.67
156"	96"	102	15615	0.30	0.78
	108"	85	13953	0.40	0.99
	120"	72	12604	0.51	1.19
	132"	63	11595	0.66	1.45
	144"	55	10650	0.82	1.67
168"	96"	92	15701	0.29	0.80
	108"	76	14054	0.38	0.98
	120"	65	12759	0.50	1.21
	132"	56	11590	0.63	1.46
	144"	49	10697	0.79	1.69
180"	96"	83	15764	0.28	0.80
	108"	69	14136	0.37	1.00
	120"	59	12882	0.49	1.22
	132"	51	11785	0.62	1.46
	144"	43	10916	0.78	1.73



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

THE DEFLECTION IN THE X DIRECTION CAN BE NEGLECTED ON NON-RETENSION SHUTTERS
AND WHEN STORM-BARS ARE USED TO REDUCE SHUTTER DEFLECTIONS.

#	DATE	REVISIONS



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AMERICAN SHUTTER SYSTEM ASSOCIATION, INC.
4268 WESTROADS DRIVE, WEST PALM BEACH, FL 33407
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ROLL-UP SHUTTER MULLIONS



TKJ Engineering, LLC.

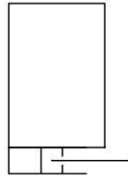
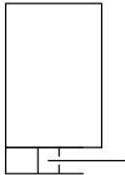
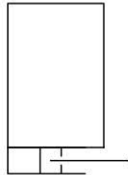
11335 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 53.404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 10/17/23
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 23-0402

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

Kevin Johnson
STATE OF
FLORIDA
PROFESSIONAL
ENGINEER
P.E. # 65624

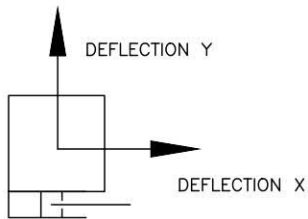
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MAXIMUM DESIGN PRESSURE OF AN END 4"x6"x1/8" MULLION (6061-T6)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
72"	96"	136	3786	0.30	0.90
	108"	125	3449	0.44	1.07
	120"	116	3217	0.63	1.16
	132"	111	3075	0.88	1.30
	144"	102	2870	1.15	1.34
84"	96"	97	3770	0.25	0.99
	108"	89	3486	0.37	1.18
	120"	82	3228	0.52	1.35
	132"	75	2936	0.70	1.41
	144"	69	2816	0.95	1.61
96"	96"	73	3796	0.22	1.00
	108"	66	3450	0.31	1.24
	120"	58	3186	0.44	1.38
	132"	52	3012	0.61	1.71
	144"	48	2785	0.80	1.88
108"	96"	58	3836	0.19	1.03
	108"	51	3488	0.28	1.30
	120"	44	3202	0.39	1.50
	132"	39	3010	0.53	1.82
	144"	36	2809	0.70	2.07
120"	72"	67	4919	0.08	0.64
	84"	55	4275	0.12	0.83
	96"	48	3879	0.18	1.08
	108"	40	3482	0.25	1.33
	120"	34	3204	0.35	1.60
132"	72"	57	4935	0.07	0.64
	78"	51	4581	0.09	0.73
	84"	47	4321	0.11	0.87
	90"	43	4055	0.14	0.99
	96"	40	3891	0.17	1.07
144"	72"	49	4938	0.07	0.63
	78"	45	4698	0.09	0.75
	84"	40	4289	0.11	0.87
	90"	37	4074	0.13	1.00
	96"	34	3828	0.15	1.13

MAXIMUM DESIGN PRESSURE OF AN END 4"x6"x1/4" MULLION (6061-T6)					
SPAN WDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
84"	96"	150	7134	0.21	1.07
	108"	132	6475	0.30	1.29
	120"	112	5924	0.41	1.56
	132"	99	5521	0.56	1.80
	144"	89	5216	0.74	2.09
96"	96"	120	7214	0.19	1.08
	108"	98	6495	0.27	1.37
	120"	82	5993	0.36	1.62
	132"	71	5520	0.48	1.89
	144"	63	5192	0.64	2.22
108"	96"	97	7210	0.17	1.10
	108"	77	6586	0.24	1.38
	120"	63	6024	0.33	1.63
	132"	53	5512	0.43	1.90
	144"	47	5170	0.56	2.31
120"	96"	81	7221	0.16	1.13
	108"	62	6523	0.22	1.43
	120"	51	6039	0.30	1.69
	132"	43	5517	0.39	1.98
	144"	36	5228	0.52	2.40
132"	84"	83	8181	0.11	0.89
	96"	68	7346	0.15	1.16
	108"	52	6520	0.21	1.42
	120"	42	5974	0.28	1.77
	132"	35	5605	0.37	2.09
144"	84"	73	8271	0.10	0.90
	93"	63	7556	0.13	1.08
	102"	51	6992	0.17	1.31
	111"	42	6488	0.21	1.53
	120"	35	6046	0.26	1.77
156"	84"	64	8247	0.10	0.90
	93"	55	7520	0.13	1.07
	102"	44	6994	0.16	1.32
	111"	36	6533	0.21	1.55
	120"	30	6011	0.25	1.77

MAXIMUM DESIGN PRESSURE OF AN END 4"x8"x1/4" MULLION (6061-T6)					
SPAN WDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
84"	96"	150	9420	0.13	1.11
	108"	150	8538	0.18	1.38
	120"	129	7888	0.25	1.65
	132"	113	7337	0.34	1.98
	144"	100	6935	0.44	2.29
96"	96"	150	9433	0.12	1.12
	108"	119	8542	0.16	1.40
	120"	97	7880	0.22	1.71
	132"	82	7272	0.29	2.00
	144"	72	6811	0.38	2.29
108"	96"	122	9431	0.11	1.14
	108"	94	8540	0.15	1.41
	120"	76	7806	0.20	1.69
	132"	63	7287	0.26	2.02
	144"	55	6829	0.34	2.44
120"	96"	101	9504	0.10	1.16
	108"	76	8589	0.14	1.45
	120"	61	7862	0.19	1.77
	132"	51	7326	0.25	2.13
	144"	43	6827	0.31	2.44
132"	96"	86	9441	0.09	1.15
	108"	65	8599	0.13	1.49
	120"	51	7851	0.17	1.79
	132"	42	7305	0.23	2.15
	144"	34	6830	0.29	2.48
144"	96"	74	9480	0.09	1.19
	108"	55	8640	0.12	1.48
	120"	43	7853	0.16	1.80
	132"	35	7200	0.21	2.14
	144"	29	6760	0.27	2.48
156"	84"	82	10632	0.06	0.92
	96"	65	9509	0.09	1.20
	108"	48	8648	0.12	1.49
	120"	37	7846	0.16	1.85
	132"	30	7284	0.20	2.13



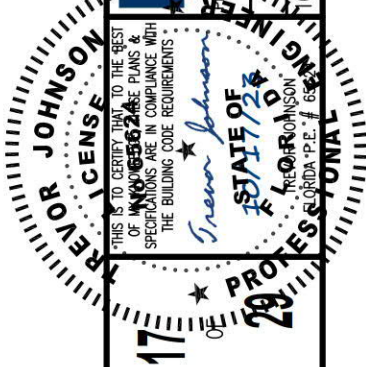
NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

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TKJ Engineering, LLC.

1125 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 813.404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

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SCALE: N.T.S.
PROJ. #: 23-0402



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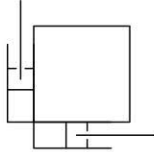
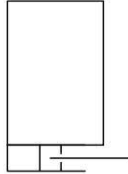
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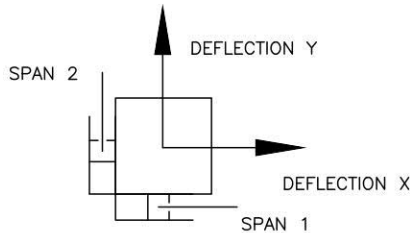
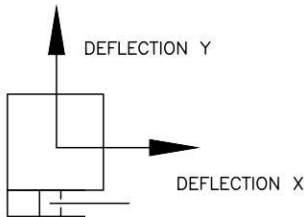
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MAXIMUM DESIGN PRESSURE OF AN END 4"X6"X3/8" MULLION (6061-T6)					
SPAN WIDTH UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
84"	96"	150	10120	0.20	1.12
	108"	150	9182	0.28	1.39
	120"	135	8382	0.38	1.65
	132"	117	7767	0.51	1.92
	144"	103	7306	0.66	2.22
96"	96"	150	10169	0.18	1.13
	108"	124	9246	0.25	1.40
	120"	102	8446	0.34	1.74
	132"	86	7778	0.45	2.06
	144"	75	7324	0.59	2.39
108"	96"	129	10309	0.17	1.17
	108"	99	9261	0.23	1.44
	120"	79	8446	0.31	1.76
	132"	67	7796	0.41	2.06
	144"	57	7280	0.52	2.45
120"	96"	107	10315	0.16	1.17
	108"	82	9335	0.22	1.46
	120"	65	8539	0.29	1.80
	132"	53	7804	0.38	2.16
	144"	45	7318	0.48	2.51
132"	96"	91	10311	0.15	1.19
	108"	68	9317	0.21	1.51
	120"	54	8518	0.27	1.79
	132"	44	7844	0.35	2.20
	144"	36	7385	0.45	2.57
144"	96"	78	10357	0.14	1.20
	108"	59	9328	0.19	1.50
	120"	46	8582	0.26	1.84
	132"	37	7826	0.33	2.18
	144"	30	7418	0.43	2.55
156"	84"	90	11650	0.10	0.93
	96"	69	10348	0.14	1.22
	108"	51	9386	0.19	1.54
	120"	40	8531	0.25	1.84
	132"	32	7921	0.32	2.27

MAXIMUM DESIGN PRESSURE OF A CORNER 4"X4"X1/8" MULLION (6005-T5)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
60"	48"	96"	95	100	2176	0.58	0.38
		108"	86	90	1953	0.81	0.56
		120"	59	62	1664	0.63	0.63
		132"	49	52	1715	1.07	0.72
		144"	36	38	1551	0.96	1.21
72"	48"	96"	84	91	2383	0.58	0.68
		108"	72	78	2069	0.72	0.75
		120"	55	60	1777	0.76	0.88
		132"	41	45	1591	0.95	0.79
		144"	37	40	1459	1.15	0.85
72"	72"	96"	73	73	2323	0.58	0.58
		108"	55	55	2138	0.73	0.73
		120"	46	46	1779	0.84	0.84
		132"	38	38	1516	0.74	0.74
		144"	26	26	1562	1.13	1.13
96"	48"	84"	53	60	2668	0.22	0.71
		96"	48	54	2383	0.46	0.90
		108"	41	46	2191	0.60	0.91
		120"	37	42	1957	0.77	1.03
		132"	33	37	1760	0.97	1.06
96"	72"	84"	48	51	2629	0.28	0.62
		96"	43	46	2348	0.41	0.80
		108"	38	40	2018	0.52	0.87
		120"	35	37	1847	0.62	0.96
		132"	26	28	1717	1.01	0.67
96"	96"	72"	42	42	2745	0.35	0.35
		84"	38	38	2465	0.49	0.49
		96"	35	35	2197	0.62	0.62
		108"	34	34	2073	0.84	0.84
		120"	28	28	1735	0.72	0.72
120"	48"	72"	42	48	3195	0.15	0.57
		78"	38	44	2963	0.18	0.66
		84"	34	39	2694	0.21	0.71
		90"	33	38	2662	0.28	0.85
		96"	30	35	2414	0.32	0.95



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

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TKJ Engineering, LLC.

1125 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569

TEL: 813.404.7649; FAX: 813.404.7649; E-MAIL: TKJENGINEERING@VERIZON.NET

CERTIFICATE OF AUTHORIZATION NUMBER: 28582

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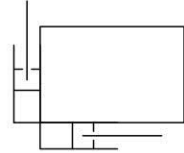
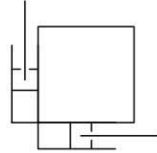
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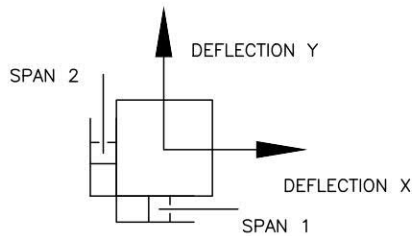
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MAXIMUM DESIGN PRESSURE OF A CORNER 4"X4"X1/4" MULLION (6005-T5)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	48"	96"	72	81	4513	0.33	0.96
		108"	65	73	4152	0.48	1.19
		120"	57	64	3638	0.54	1.39
		132"	52	59	3496	0.84	1.55
		144"	46	52	3154	1.06	1.84
96"	72"	96"	67	71	4455	0.40	0.94
		108"	59	63	3996	0.48	1.10
		120"	53	56	3763	0.74	1.32
		132"	48	51	3384	0.94	1.54
		144"	43	46	3036	1.09	1.52
96"	96"	96"	49	49	4063	0.68	0.68
		108"	45	45	3744	0.83	0.83
		120"	42	42	3478	0.97	0.97
		132"	40	40	3329	1.11	1.11
		144"	38	38	3202	1.32	1.32
120"	48"	84"	61	70	5399	0.20	0.81
		96"	51	59	4715	0.27	1.03
		108"	42	48	4100	0.41	1.24
		120"	36	42	3826	0.58	1.49
		132"	31	36	3484	0.69	1.72
120"	72"	84"	56	62	5171	0.22	0.79
		96"	47	52	4626	0.33	0.97
		108"	41	45	4151	0.42	1.23
		120"	34	38	3853	0.57	1.47
		132"	29	32	3319	0.54	1.75
120"	96"	72"	50	53	5228	0.31	0.45
		84"	42	44	4530	0.41	0.62
		96"	37	39	4120	0.48	0.80
		108"	34	36	3838	0.65	1.01
		120"	31	33	3536	0.68	1.24
120"	120"	72"	41	41	5055	0.37	0.37
		84"	35	35	4522	0.51	0.51
		96"	30	30	3979	0.65	0.65
		108"	27	27	3594	0.86	0.86
		120"	25	25	3432	0.97	0.97

MAXIMUM DESIGN PRESSURE OF A CORNER 4"X6"X1/8" MULLION (6005-T5)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	48"	96"	61	69	3935	0.35	0.59
		108"	53	60	3405	0.44	0.72
		120"	45	51	3028	0.81	0.72
		132"	40	45	2623	0.87	0.86
		144"	38	43	2474	1.33	0.94
96"	72"	96"	57	61	3822	0.38	0.60
		108"	48	51	3329	0.55	0.67
		120"	43	46	2955	0.69	0.80
		132"	40	43	2734	0.95	0.90
		144"	35	37	2268	0.83	0.93
96"	96"	96"	42	42	3322	0.67	0.41
		108"	39	39	3063	0.78	0.54
		120"	37	37	2903	0.90	0.65
		132"	35	35	2690	1.13	0.77
		144"	31	31	2415	1.28	0.68
120"	48"	84"	51	59	4723	0.21	0.53
		96"	40	46	3952	0.32	0.62
		108"	35	40	3543	0.45	0.76
		120"	29	34	2996	0.38	0.88
		132"	27	31	2793	0.62	1.01
120"	72"	84"	47	52	4590	0.25	0.49
		96"	38	42	3856	0.29	0.61
		108"	32	35	3296	0.30	0.74
		120"	30	33	3122	0.45	0.95
		132"	25	28	2733	0.91	1.02
120"	96"	72"	42	44	4372	0.30	0.28
		84"	36	38	3928	0.40	0.38
		96"	32	34	3524	0.52	0.54
		108"	29	31	3274	0.52	0.67
		120"	27	28	2994	0.63	0.88
120"	120"	72"	34	34	4109	0.39	0.23
		81"	30	30	3792	0.46	0.29
		90"	27	27	3452	0.61	0.36
		99"	25	25	3227	0.71	0.46
		108"	23	23	2975	0.83	0.55



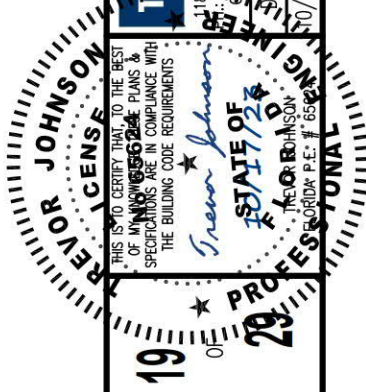
NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

THE DEFLECTION IN THE X DIRECTION CAN BE NEGLECTED ON NON-RETENSION SHUTTERS
AND WHEN STORM-BARS ARE USED TO REDUCE SHUTTER DEFLECTIONS.

TKJ Engineering, LLC.

11235 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 813.404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 10/17/23
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 23-0402



ASSA
"Knowledge is Your Best Protection"

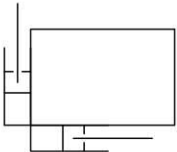
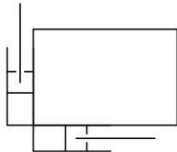
AMERICAN SHUTTER SYSTEM ASSOCIATION, INC.
4268 WESTROADS DRIVE, WEST PALM BEACH, FL 33407
PHONE: 800.432.2204; FAX: 561.841.0852
WWW.AMSHUTTER.ORG

ROLL-UP SHUTTER
MULLIONS

REVISIONS

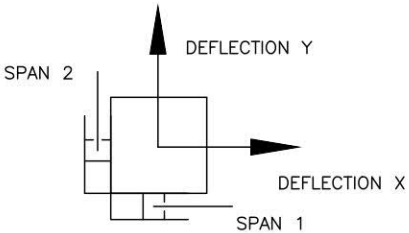
DATE

#



MAXIMUM DESIGN PRESSURE OF A CORNER 4"x8"x1/4" MULLION (6005-T5)							
SPAN WIDTH 1 UP TO	SPAN WDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	96"	96"	63	63	6272	0.70	0.43
		108"	56	56	5651	0.84	0.54
		120"	52	52	5299	1.07	0.67
		132"	49	49	5024	1.26	0.82
		144"	46	46	4654	1.56	0.97
120"	48"	96"	73	84	7904	0.31	0.67
		108"	62	71	7032	0.39	0.84
		120"	54	62	6355	0.48	1.02
		132"	48	55	5768	0.76	1.24
		144"	41	47	5243	0.89	1.31
120"	72"	96"	66	73	7489	0.36	0.65
		108"	58	64	6885	0.40	0.82
		120"	50	55	6249	0.60	0.99
		132"	44	49	5685	0.71	1.16
		144"	39	43	5142	0.81	1.29
120"	96"	96"	49	52	6440	0.59	0.50
		108"	44	46	5932	0.68	0.66
		120"	40	42	5491	0.87	0.83
		132"	37	39	5230	0.94	0.97
		144"	35	37	4953	1.08	1.27
120"	120"	96"	40	40	6103	0.67	0.42
		108"	35	35	5556	0.83	0.51
		120"	32	32	5171	1.07	0.66
		132"	29	29	4755	1.22	0.79
		144"	27	27	4463	1.43	0.94
144"	48"	96"	56	66	8021	0.24	0.71
		108"	48	56	7245	0.33	0.90
		120"	40	47	6473	0.52	1.05
		132"	35	41	5885	0.65	1.24
		144"	31	36	5392	0.74	1.44
144"	72"	96"	54	61	8019	0.28	0.68
		108"	45	51	7115	0.41	0.88
		120"	38	43	6304	0.50	1.03
		132"	33	37	5717	0.47	1.21
		144"	30	34	5341	0.70	1.40

MAXIMUM DESIGN PRESSURE OF A CORNER 4"x8"x1/4" MULLION (6005-T5)							
SPAN WIDTH 1 UP TO	SPAN WDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	96"	96"	77	77	8500	0.73	0.29
		108"	68	68	7750	0.88	0.39
		120"	61	61	7100	1.06	0.46
		132"	57	57	6693	1.32	0.60
		144"	53	53	6299	1.47	0.69
120"	48"	96"	100	115	11656	0.27	0.51
		108"	81	93	10152	0.43	0.62
		120"	69	80	9128	0.53	0.74
		132"	60	69	8267	0.55	0.87
		144"	55	63	7731	0.80	1.06
120"	72"	96"	83	91	10437	0.46	0.45
		108"	74	82	9825	0.50	0.59
		120"	66	73	9050	0.61	0.75
		132"	58	64	8300	0.69	0.89
		144"	49	54	7313	0.89	1.00
120"	96"	96"	62	65	8956	0.62	0.35
		108"	54	57	8165	0.76	0.45
		120"	49	52	7670	0.95	0.57
		132"	45	47	7179	1.08	0.71
		144"	41	43	6675	1.17	0.85
120"	120"	96"	51	51	8445	0.72	0.29
		108"	44	44	7628	0.88	0.38
		120"	39	39	6965	1.13	0.48
		132"	35	35	6415	1.27	0.58
		144"	32	32	5989	1.48	0.67
144"	48"	96"	76	89	11760	0.30	0.52
		108"	63	74	10436	0.36	0.64
		120"	55	64	9564	0.46	0.81
		132"	44	52	8224	0.61	0.88
		144"	40	47	7733	0.86	1.06
144"	72"	96"	69	78	11145	0.37	0.49
		108"	61	69	10402	0.41	0.65
		120"	50	56	9134	0.54	0.75
		132"	43	49	8238	0.61	0.91
		144"	39	44	7730	0.83	1.07



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

THE DEFLECTION IN THE X DIRECTION CAN BE NEGLECTED ON NON-RETENSION SHUTTERS
AND WHEN STORM-BARS ARE USED TO REDUCE SHUTTER DEFLECTIONS.

#	DATE	REVISIONS



"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

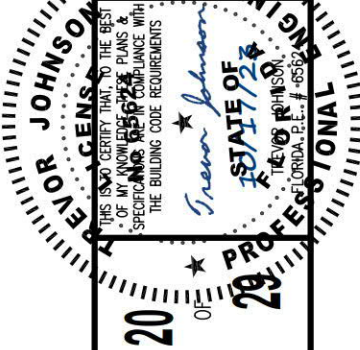
ROLL-UP SHUTTER MULLIONS



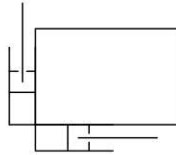
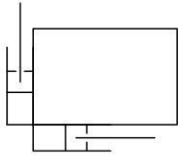
TKJ Engineering, LLC.

11835 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 313.404.7649; EM: TKJENGINEERING@VERIZON.NET
FL CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 12/17/23
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 23-0402

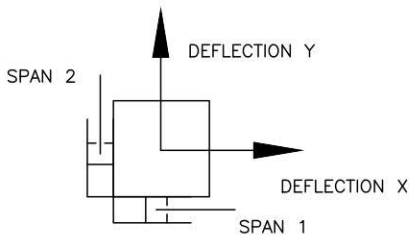


20 OF 29



MAXIMUM DESIGN PRESSURE OF A CORNER 4"X6"X3/8" MULLION (6005-T5)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	48"	96"	139	150	10958	0.35	0.68
		108"	115	130	9522	0.38	0.82
		120"	102	115	8689	0.50	1.01
		132"	88	99	7887	0.82	1.14
		144"	80	90	7323	1.03	1.34
96"	72"	96"	107	114	9602	0.55	0.55
		108"	96	102	8866	0.67	0.70
		120"	87	93	8217	0.73	0.89
		132"	81	86	7793	0.87	1.09
		144"	72	77	7054	1.05	1.24
96"	96"	96"	81	81	8763	0.72	0.43
		108"	71	71	7931	0.91	0.53
		120"	65	65	7406	1.11	0.67
		132"	60	60	6909	1.34	0.84
		144"	56	56	6567	1.55	0.94
120"	48"	96"	103	119	11373	0.28	0.71
		108"	84	97	9995	0.44	0.85
		120"	72	83	8984	0.54	1.03
		132"	64	74	8274	0.66	1.25
		144"	56	65	7497	0.73	1.41
120"	72"	96"	85	94	10292	0.45	0.62
		108"	75	83	9451	0.53	0.80
		120"	68	75	8890	0.57	1.02
		132"	59	65	8033	0.62	1.20
		144"	54	60	7598	0.95	1.42
120"	96"	96"	65	68	9124	0.60	0.49
		108"	56	59	8198	0.75	0.63
		120"	51	54	7709	0.93	0.80
		132"	47	49	7215	1.12	0.99
		144"	43	45	6754	1.24	1.16
120"	120"	96"	54	54	8738	0.72	0.43
		108"	47	47	7970	0.91	0.54
		120"	41	41	7165	1.13	0.66
		132"	37	37	6660	1.29	0.80
		144"	34	34	6187	1.62	0.95

MAXIMUM DESIGN PRESSURE OF A CORNER 4"X6"X3/8" MULLION (6005-T5)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
144"	72"	96"	70	79	10815	0.35	0.67
		108"	62	70	10060	0.39	0.89
		120"	54	61	9228	0.49	1.08
		132"	45	51	8163	0.65	1.24
		144"	40	45	7515	0.78	1.46
144"	96"	96"	54	59	9438	0.55	0.54
		108"	47	51	8625	0.64	0.70
		120"	42	46	8024	0.81	0.89
		132"	39	42	7635	0.92	1.15
		144"	36	39	7274	1.06	1.36
144"	120"	96"	45	47	8842	0.66	0.48
		108"	39	41	8103	0.82	0.62
		120"	34	35	7354	0.93	0.72
		132"	31	32	6876	1.12	0.95
		144"	28	29	6384	1.35	1.10
144"	144"	96"	39	39	8616	0.73	0.42
		108"	33	33	7714	0.89	0.53
		120"	29	29	7028	1.14	0.67
		132"	26	26	6557	1.28	0.82
		144"	23	23	5973	1.46	0.92
168"	48"	96"	64	76	11697	0.26	0.75
		108"	52	61	10234	0.27	0.92
		120"	46	54	9599	0.48	1.11
		132"	38	45	8413	0.61	1.33
		144"	33	39	7723	0.74	1.47
168"	72"	96"	59	68	11210	0.28	0.70
		108"	49	56	10044	0.36	0.88
		120"	42	48	9080	0.45	1.10
		132"	37	42	8397	0.58	1.30
		144"	31	36	7391	0.50	1.51
168"	96"	96"	47	52	9907	0.47	0.59
		108"	40	44	8882	0.57	0.77
		120"	36	40	8365	0.68	0.98
		132"	32	36	7738	0.74	1.21
		144"	30	33	7463	0.81	1.50



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

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AND WHEN STORM-BARS ARE USED TO REDUCE SHUTTER DEFLECTIONS.

#	DATE	REVISIONS



"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.AMSHUTTER.ORG

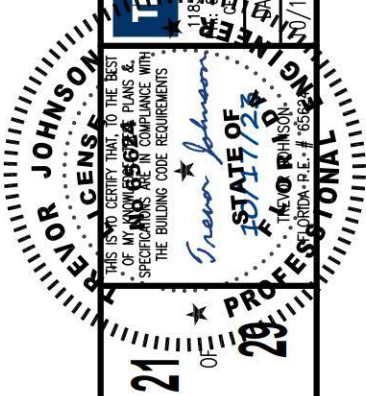
ROLL-UP SHUTTER
MULLIONS



TKJ Engineering, LLC.

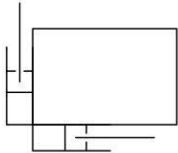
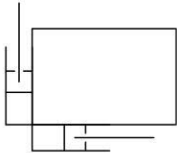
11859 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 813.404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 05/17/23
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 23-0402



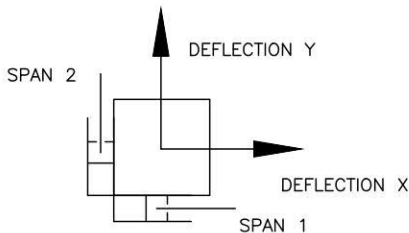
THIS IS TO CERTIFY THAT, TO THE BEST
OF MY KNOWLEDGE AND BELIEF, THE PLANS &
SPECIFICATIONS ARE IN COMPLIANCE WITH
THE BUILDING CODE REQUIREMENTS

TREVOR JOHNSON
PROFESSIONAL ENGINEER
STATE OF FLORIDA
LICENSE NO. 15562
EXPIRATION DATE 12/31/24



MAXIMUM DESIGN PRESSURE OF A CORNER 4"X6"X1/2" MULLION (6005-T5)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	48"	96"	150	150	13917	0.31	0.70
		108"	144	150	12334	0.47	0.85
		120"	126	142	11240	0.60	1.04
		132"	111	125	10200	0.73	1.23
		144"	100	113	9421	0.84	1.44
96"	72"	96"	126	134	11853	0.59	0.54
		108"	112	119	10907	0.71	0.70
		120"	103	110	10304	0.86	0.90
		132"	95	101	9689	1.02	1.09
		144"	87	93	9027	1.15	1.33
96"	96"	96"	98	98	11096	0.74	0.44
		108"	85	85	10033	0.91	0.54
		120"	76	76	9195	1.16	0.67
		132"	70	70	8615	1.41	0.83
		144"	65	65	8130	1.65	1.00
120"	48"	96"	127	146	14271	0.31	0.72
		108"	108	124	12882	0.41	0.91
		120"	89	103	11399	0.55	1.08
		132"	77	89	10307	0.68	1.26
		144"	69	80	9611	0.81	1.47
120"	72"	96"	101	111	12583	0.48	0.61
		108"	89	98	11632	0.58	0.79
		120"	80	88	10887	0.64	0.99
		132"	73	80	10262	0.75	1.24
		144"	64	71	9361	0.90	1.42
120"	96"	96"	79	83	11440	0.65	0.50
		108"	68	71	10326	0.80	0.63
		120"	61	64	9616	1.00	0.80
		132"	55	58	8928	1.19	0.98
		144"	50	53	8372	1.28	1.15
120"	120"	96"	66	66	10991	0.76	0.43
		108"	56	56	9827	0.91	0.55
		120"	50	50	9151	1.13	0.68
		132"	45	45	8482	1.40	0.85
		144"	40	40	7767	1.57	0.94

MAXIMUM DESIGN PRESSURE OF A CORNER 4"X6"X1/2" MULLION (6005-T5)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
144"	72"	96"	84	95	13267	0.42	0.65
		108"	74	83	12346	0.49	0.85
		120"	66	74	11537	0.52	1.09
		132"	57	64	10465	0.59	1.29
		144"	49	55	9476	0.82	1.51
144"	96"	96"	66	72	11827	0.59	0.54
		108"	57	62	10750	0.71	0.71
		120"	51	55	10058	0.84	0.89
		132"	45	49	9220	0.93	1.10
		144"	41	45	8653	1.06	1.33
144"	120"	96"	55	57	11070	0.66	0.48
		108"	47	49	10041	0.84	0.60
		120"	42	44	9412	1.04	0.76
		132"	37	39	8600	1.27	0.92
		144"	34	35	8077	1.49	1.12
144"	144"	96"	48	48	10830	0.72	0.42
		108"	41	41	9804	0.93	0.54
		120"	36	36	9003	1.19	0.69
		132"	32	32	8372	1.39	0.82
		144"	28	28	7586	1.55	0.95
168"	48"	96"	80	94	14665	0.27	0.75
		108"	66	78	13056	0.34	0.94
		120"	56	66	11807	0.38	1.13
		132"	50	59	11065	0.57	1.39
		144"	41	49	9735	0.73	1.54
168"	72"	96"	72	82	13848	0.35	0.70
		108"	63	72	12889	0.39	0.91
		120"	54	62	11725	0.44	1.14
		132"	46	53	10645	0.60	1.35
		144"	41	47	9929	0.78	1.58
168"	96"	96"	57	63	12228	0.53	0.58
		108"	49	54	11165	0.61	0.75
		120"	43	48	10316	0.75	0.94
		132"	39	43	9684	0.87	1.20
		144"	36	40	9361	0.96	1.41



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

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AND WHEN STORM-BARS ARE USED TO REDUCE SHUTTER DEFLECTIONS.

#	DATE	REVISIONS



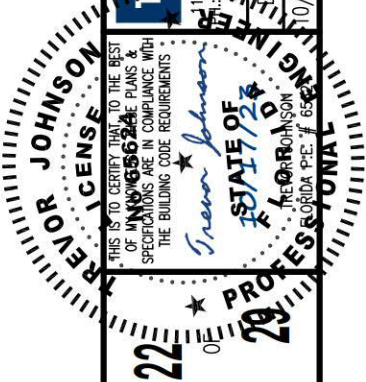
"Knowledge is Your Best Protection"
AMERICAN SHUTTER SYSTEM ASSOCIATION, INC.
4268 WESTROADS DRIVE, WEST PALM BEACH, FL 33407
PHONE: 800.432.2204; FAX: 561.841.0852
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ROLL-UP SHUTTER MULLIONS



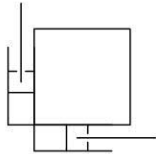
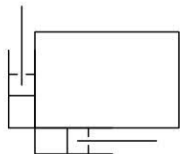
TKJ Engineering, LLC.
1125 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
PH: 215.404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 10/17/23
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 23-0402



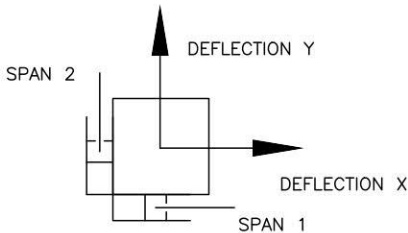
THIS IS TO CERTIFY THAT TO THE BEST
OF MY KNOWLEDGE THE PLANS &
SPECIFICATIONS ARE IN COMPLIANCE WITH
THE BUILDING CODE REQUIREMENTS

Trevor Johnson
10/17/23
FLORIDA
PROFESSIONAL ENGINEER
LICENSE NO. 65624



MAXIMUM DESIGN PRESSURE OF A CORNER 4"X6"X1/2" MULLION (6005-T5)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
168"	120"	96"	48	52	11449	0.61	0.52
		108"	41	44	10407	0.77	0.66
		120"	36	39	9582	0.97	0.84
		132"	32	34	8829	1.10	1.03
		144"	29	31	8351	1.24	1.21
192"	48"	96"	66	79	14669	0.24	0.76
		108"	55	66	13200	0.29	0.94
		120"	48	57	12190	0.41	1.20
		132"	39	47	10726	0.55	1.34
		144"	34	41	9800	0.64	1.61
192"	72"	96"	62	72	14213	0.30	0.73
		108"	54	63	13247	0.34	0.96
		120"	45	52	11895	0.48	1.14
		132"	39	45	10890	0.59	1.37
		144"	35	41	10268	0.68	1.64
192"	96"	96"	50	56	12581	0.47	0.62
		108"	43	49	11583	0.59	0.79
		120"	38	43	10766	0.65	1.03
		132"	34	38	10029	0.73	1.27
		144"	31	35	9566	0.86	1.51
192"	120"	96"	42	46	11591	0.56	0.55
		108"	36	39	10562	0.72	0.71
		120"	31	34	9669	0.84	0.86
		132"	28	31	9097	1.06	1.10
		144"	25	27	8444	1.14	1.28
216"	48"	84"	71	85	16894	0.18	0.59
		96"	57	68	14933	0.23	0.76
		108"	48	58	13535	0.29	0.99
		120"	39	47	11965	0.45	1.15
		132"	33	40	10780	0.48	1.35
216"	72"	84"	65	76	16095	0.23	0.56
		96"	55	64	14756	0.24	0.75
		108"	45	53	13127	0.34	0.94
		120"	38	45	11821	0.40	1.17
		132"	34	40	11150	0.53	1.45

MAXIMUM DESIGN PRESSURE OF A CORNER 4"X4"X1/8" MULLION (6061-T6)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
60"	48"	96"	114	120	2310	0.51	0.63
		108"	87	91	2019	0.81	0.56
		120"	60	63	1741	0.63	0.63
		132"	49	52	1715	1.07	0.72
		144"	43	45	1544	1.30	0.83
72"	48"	96"	87	94	2531	0.64	0.68
		108"	74	80	2153	0.83	0.75
		120"	60	65	1727	0.76	1.02
		132"	46	50	1806	1.23	0.99
		144"	37	40	1536	1.53	0.85
72"	72"	96"	77	77	2531	0.63	0.63
		108"	56	56	2240	0.73	0.73
		120"	47	47	1890	0.84	0.84
		132"	38	38	1516	0.74	0.74
		144"	27	27	1689	1.13	1.13
96"	48"	84"	55	62	2844	0.22	0.71
		96"	49	55	2480	0.46	0.90
		108"	42	47	2299	0.60	0.91
		120"	39	44	2115	0.95	1.03
		132"	34	38	1883	0.97	1.06
96"	72"	84"	51	54	2805	0.31	0.71
		96"	46	49	2572	0.46	0.89
		108"	41	44	2275	0.63	0.99
		120"	36	38	1907	0.62	1.12
		132"	26	28	1717	1.01	0.67
96"	96"	72"	43	43	2858	0.35	0.35
		84"	39	39	2592	0.49	0.49
		96"	36	36	2337	0.62	0.62
		108"	35	35	2223	0.84	0.84
		120"	31	31	1946	0.90	0.90
120"	48"	72"	43	50	3311	0.15	0.57
		78"	39	45	3071	0.18	0.66
		84"	36	42	2907	0.21	0.76
		90"	34	39	2740	0.28	0.90
		96"	31	36	2540	0.32	0.95



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

THE DEFLECTION IN THE X DIRECTION CAN BE NEGLECTED ON NON-RETENSION SHUTTERS
AND WHEN STORM-BARS ARE USED TO REDUCE SHUTTER DEFLECTIONS.

REVISIONS

DATE

#



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

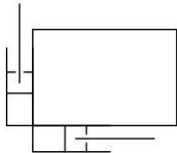
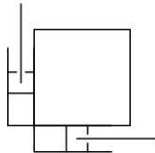
ROLL-UP SHUTTER MULLIONS

TKJ Engineering, LLC.

11235 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 503.404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

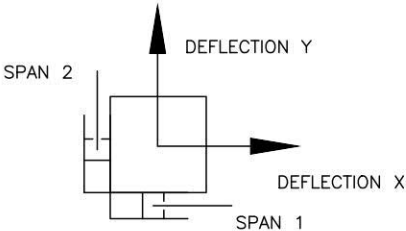
THIS IS TO CERTIFY THAT TO THE BEST
OF MY KNOWLEDGE, THE PLANS &
SPECIFICATIONS ARE IN COMPLIANCE WITH
THE BUILDING CODE REQUIREMENTS

23 OF 29



MAXIMUM DESIGN PRESSURE OF A CORNER 4"X4"X1/4" MULLION (6061-T6)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	48"	96"	76	86	4839	0.37	0.99
		108"	67	76	4326	0.48	1.25
		120"	58	65	3885	0.54	1.39
		132"	52	59	3644	0.84	1.72
		144"	46	52	3310	1.06	1.84
96"	72"	96"	70	74	4770	0.42	0.94
		108"	61	65	4186	0.48	1.17
		120"	55	59	3977	0.71	1.38
		132"	49	52	3528	0.94	1.54
		144"	45	48	3421	1.29	1.82
96"	96"	96"	51	51	4277	0.71	0.71
		108"	47	47	4040	0.83	0.83
		120"	43	43	3641	0.97	0.97
		132"	42	42	3492	1.30	1.30
		144"	38	38	3202	1.32	1.32
120"	48"	84"	63	73	5595	0.20	0.84
		96"	53	61	4921	0.27	1.07
		108"	43	50	4256	0.41	1.24
		120"	36	42	3972	0.58	1.49
		132"	31	36	3588	0.69	1.84
120"	72"	84"	59	65	5462	0.25	0.83
		96"	49	54	4847	0.33	1.03
		108"	42	46	4296	0.42	1.23
		120"	34	38	3934	0.57	1.60
		132"	29	32	3489	0.54	1.75
120"	96"	72"	52	55	5455	0.32	0.46
		84"	44	46	4793	0.41	0.65
		96"	39	41	4356	0.54	0.87
		108"	36	38	4101	0.71	1.11
		120"	33	35	3791	0.79	1.39
120"	120"	72"	44	44	5441	0.39	0.39
		84"	36	36	4642	0.54	0.54
		96"	31	31	4169	0.65	0.65
		108"	28	28	3799	0.86	0.86
		120"	25	25	3432	0.97	0.97

MAXIMUM DESIGN PRESSURE OF A CORNER 4"X6"X1/8" MULLION (6061-T6)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	48"	96"	64	72	4156	0.39	0.62
		108"	55	62	3581	0.44	0.75
		120"	50	56	3252	0.81	0.87
		132"	43	49	2915	1.09	0.93
		144"	40	45	2693	1.33	1.03
96"	72"	96"	59	63	4009	0.38	0.62
		108"	51	54	3593	0.62	0.72
		120"	46	49	3237	0.81	0.85
		132"	41	44	2886	0.95	0.90
		144"	36	38	2433	0.83	0.93
96"	96"	96"	43	43	3465	0.67	0.41
		108"	41	41	3286	0.88	0.58
		120"	39	39	3117	1.07	0.71
		132"	36	36	2817	1.13	0.84
		144"	34	34	2702	1.54	0.85
120"	48"	84"	53	61	4924	0.21	0.55
		96"	42	48	4175	0.32	0.65
		108"	36	42	3658	0.45	0.81
		120"	33	38	3442	0.62	0.98
		132"	29	34	3036	0.83	1.11
120"	72"	84"	49	54	4819	0.25	0.52
		96"	41	45	4162	0.34	0.67
		108"	35	39	3672	0.43	0.80
		120"	31	34	3292	0.45	0.95
		132"	28	31	2940	0.91	1.16
120"	96"	72"	44	46	4604	0.32	0.29
		84"	37	39	4026	0.40	0.41
		96"	33	35	3689	0.52	0.54
		108"	31	33	3526	0.65	0.72
		120"	28	29	3191	0.63	0.88
120"	120"	72"	36	36	4384	0.41	0.25
		81"	31	31	3885	0.51	0.31
		90"	28	28	3598	0.61	0.39
		99"	26	26	3393	0.78	0.46
		108"	24	24	3188	0.83	0.55



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

THE DEFLECTION IN THE X DIRECTION CAN BE NEGLECTED ON NON-RETENSION SHUTTERS
AND WHEN STORM-BARS ARE USED TO REDUCE SHUTTER DEFLECTIONS.

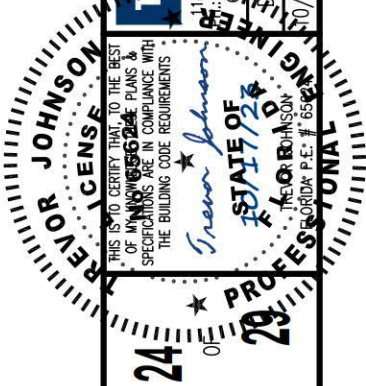
#	DATE	REVISIONS



"Knowledge is Your Best Protection"
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4268 WESTROADS DRIVE, WEST PALM BEACH, FL 33407
PHONE: 800.432.2204; FAX: 561.841.0852
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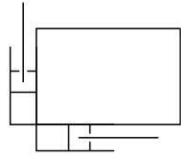
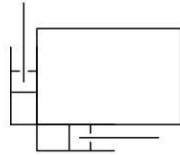
ROLL-UP SHUTTER MULLIONS

TKJ Engineering, LLC.		11235 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569	PROJ. #:	23-0402
P.O. BOX 6662, N. MIAMI, FL 33151		TEL: 313.404.7649; EM: TKJENGINEERING@VERIZON.NET	SCALE:	N.T.S.
CERTIFICATE OF AUTHORIZATION NUMBER: 28582		DATE:	DRAWN BY:	TKJ
STATE OF FLORIDA		10/17/23	DATE:	10/17/23



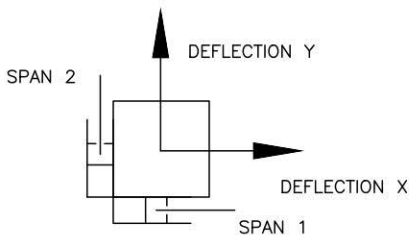
THIS IS TO CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE PLANS & SPECIFICATIONS ARE IN COMPLIANCE WITH THE BUILDING CODE REQUIREMENTS

Trevor Johnson
TREVOR JOHNSON
P.E.
65624
10/17/23



MAXIMUM DESIGN PRESSURE OF A CORNER 4"x6"x1/4" MULLION (6061-T6)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	96"	96"	66	66	6632	0.72	0.44
		108"	59	59	6027	0.90	0.58
		120"	53	53	5465	1.07	0.67
		132"	50	50	5166	1.26	0.86
		144"	48	48	4963	1.56	1.05
120"	48"	96"	77	89	8310	0.34	0.71
		108"	65	75	7386	0.44	0.87
		120"	56	65	6595	0.48	1.08
		132"	51	59	6151	0.71	1.32
		144"	42	48	5324	0.89	1.41
120"	72"	96"	69	76	7869	0.40	0.67
		108"	60	66	7127	0.40	0.86
		120"	51	56	6418	0.60	0.99
		132"	46	51	5902	0.81	1.24
		144"	42	46	5508	0.97	1.47
120"	96"	96"	52	55	6885	0.61	0.52
		108"	46	48	6220	0.74	0.69
		120"	42	44	5809	0.93	0.88
		132"	38	40	5355	0.94	1.06
		144"	37	39	5347	1.24	1.27
120"	120"	96"	42	42	6417	0.72	0.44
		108"	37	37	5872	0.91	0.55
		120"	33	33	5347	1.07	0.70
		132"	31	31	5128	1.38	0.85
		144"	28	28	4654	1.64	0.94
144"	48"	96"	58	68	8294	0.24	0.73
		108"	50	59	7556	0.33	0.94
		120"	41	48	6605	0.52	1.09
		132"	36	42	6034	0.65	1.31
		144"	32	38	5560	0.74	1.53
144"	72"	96"	56	63	8304	0.28	0.72
		108"	46	52	7305	0.41	0.88
		120"	40	45	6648	0.50	1.08
		132"	35	40	6045	0.64	1.28
		144"	32	36	5701	0.70	1.53

MAXIMUM DESIGN PRESSURE OF A CORNER 4"x6"x1/4" MULLION (6061-T6)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
144"	96"	96"	43	47	7165	0.53	0.58
		108"	38	41	6582	0.63	0.76
		120"	34	37	6049	0.76	0.98
		132"	32	35	5904	0.87	1.21
		144"	29	32	5493	0.91	1.49
144"	120"	84"	41	43	7290	0.50	0.37
		96"	35	37	6664	0.61	0.49
		108"	31	32	6052	0.80	0.66
		120"	27	28	5448	0.91	0.81
		132"	25	26	5175	1.10	1.01
144"	144"	72"	45	45	8224	0.42	0.25
		84"	36	36	7192	0.56	0.33
		96"	30	30	6337	0.72	0.44
		108"	26	26	5738	0.95	0.57
		120"	23	23	5290	1.12	0.68
168"	48"	72"	75	89	11288	0.14	0.43
		84"	58	69	9658	0.18	0.59
		96"	47	56	8487	0.28	0.74
		108"	39	46	7580	0.38	0.92
		120"	33	39	6785	0.47	1.11
168"	72"	72"	67	77	10562	0.19	0.40
		84"	55	63	9452	0.22	0.56
		96"	45	52	8413	0.28	0.73
		108"	38	44	7553	0.35	0.94
		120"	31	36	6564	0.33	1.07
168"	96"	72"	53	59	9276	0.29	0.33
		81"	45	50	8428	0.35	0.43
		90"	40	44	7849	0.40	0.56
		99"	35	39	7194	0.49	0.66
		108"	32	36	6793	0.56	0.83
168"	120"	72"	45	48	8703	0.35	0.29
		81"	38	41	7881	0.43	0.38
		90"	33	35	7207	0.51	0.47
		99"	29	31	6617	0.61	0.57
		108"	26	28	6141	0.71	0.71



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

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#	DATE	REVISIONS



"Knowledge is Your Best Protection"
AMERICAN SHUTTER SYSTEM ASSOCIATION, INC.
4268 WESTROADS DRIVE, WEST PALM BEACH, FL 33407
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ROLL-UP SHUTTER MULLIONS



TKJ Engineering, LLC.
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CERTIFICATE OF AUTHORIZATION NUMBER: 28582

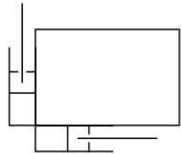
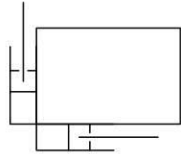
DATE: 10/17/23
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 23-0402

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

Trevor Johnson
Trevor Johnson
STATE OF FLORIDA
P.E. # 65424

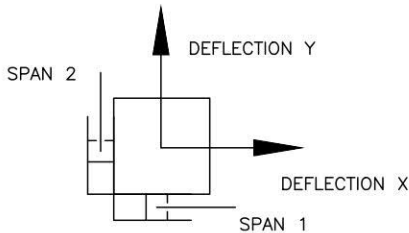
25 OCT 2023

PROFESSIONAL ENGINEER



MAXIMUM DESIGN PRESSURE OF A CORNER 4\"X8\"X1/4\" MULLION (6061-T6)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	96"	96"	81	81	9004	0.75	0.31
		108"	71	71	8141	0.93	0.40
		120"	65	65	7656	1.13	0.50
		132"	59	59	7005	1.32	0.62
		144"	56	56	6710	1.70	0.74
120"	48"	96"	106	122	12297	0.31	0.54
		108"	86	99	10740	0.47	0.66
		120"	74	85	9713	0.59	0.81
		132"	64	74	8763	0.71	0.94
		144"	57	66	8039	0.80	1.12
120"	72"	96"	86	95	10861	0.48	0.46
		108"	77	85	10177	0.58	0.62
		120"	68	75	9388	0.61	0.75
		132"	60	66	8611	0.69	0.91
		144"	54	60	8019	1.02	1.06
120"	96"	96"	66	69	9563	0.65	0.37
		108"	57	60	8676	0.81	0.47
		120"	51	54	8031	0.95	0.60
		132"	47	49	7535	1.14	0.74
		144"	44	46	7219	1.38	0.89
120"	120"	96"	53	53	8799	0.75	0.31
		108"	46	46	7970	0.94	0.40
		120"	41	41	7383	1.13	0.50
		132"	37	37	6820	1.40	0.61
		144"	34	34	6405	1.65	0.72
144"	48"	96"	81	95	12411	0.33	0.55
		108"	67	78	11006	0.40	0.69
		120"	57	67	9921	0.46	0.84
		132"	50	59	9088	0.57	1.01
		144"	42	49	8119	0.86	1.11
144"	72"	96"	72	81	11629	0.41	0.50
		108"	64	72	10922	0.45	0.67
		120"	55	62	9907	0.53	0.82
		132"	46	52	8803	0.71	0.95
		144"	41	46	8138	0.83	1.12

MAXIMUM DESIGN PRESSURE OF A CORNER 4\"X8\"X1/4\" MULLION (6061-T6)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
144"	96"	96"	55	60	9963	0.58	0.41
		108"	48	52	9159	0.71	0.53
		120"	43	47	8591	0.85	0.67
		132"	39	42	8047	1.00	0.81
		144"	36	39	7609	1.06	1.05
144"	120"	96"	45	47	9120	0.68	0.35
		108"	39	41	8397	0.86	0.45
		120"	34	35	7603	1.01	0.54
		132"	31	32	7134	1.27	0.69
		144"	28	29	6644	1.36	0.82
144"	144"	84"	47	47	9841	0.59	0.24
		96"	39	39	8782	0.77	0.31
		108"	33	33	7927	0.91	0.39
		120"	29	29	7255	1.16	0.48
		132"	26	26	6775	1.40	0.57
168"	48"	96"	66	78	12674	0.28	0.57
		108"	53	63	11011	0.29	0.68
		120"	47	56	10319	0.53	0.86
		132"	39	46	9133	0.67	0.99
		144"	34	40	8306	0.79	1.19
168"	72"	96"	62	71	12305	0.35	0.55
		108"	52	60	11050	0.38	0.70
		120"	44	50	9986	0.54	0.85
		132"	38	44	9099	0.63	1.02
		144"	32	37	8044	0.57	1.16
168"	96"	84"	57	63	11618	0.42	0.33
		96"	47	52	10328	0.51	0.43
		108"	41	46	9584	0.65	0.57
		120"	37	41	9024	0.74	0.73
		132"	33	37	8409	0.84	0.90
168"	120"	84"	48	52	10770	0.49	0.29
		96"	39	42	9453	0.64	0.37
		108"	34	37	8736	0.82	0.50
		120"	29	31	7824	0.88	0.60
		132"	27	29	7575	1.13	0.76



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

THE DEFLECTION IN THE X DIRECTION CAN BE NEGLECTED ON NON–RETENSION SHUTTERS
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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.AMSHUTTER.ORG

ROLL-UP SHUTTER
MULLIONS

TKJ Engineering, LLC.

11235 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 503.3404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

DATE: 10/17/23
DRAWN BY: TKJ
SCALE: N.T.S.
PROJ. #: 23-0402

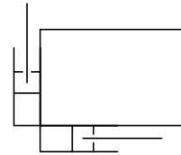
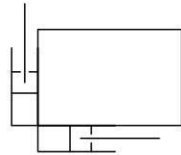
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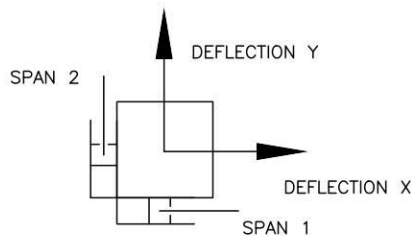
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STATE OF
FLORIDA
PROFESSIONAL
ENGINEER
TREVOR JOHNSON
P.E. # 65622



MAXIMUM DESIGN PRESSURE OF A CORNER 4"x6"x3/8" MULLION (6061-T6)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	48"	96"	147	150	11601	0.38	0.70
		108"	126	142	10388	0.49	0.89
		120"	108	122	9257	0.58	1.05
		132"	97	109	8500	0.71	1.27
		144"	83	94	7700	1.03	1.37
96"	72"	96"	111	118	10017	0.59	0.56
		108"	100	106	9294	0.69	0.73
		120"	92	98	8744	0.84	0.93
		132"	85	90	8241	0.94	1.13
		144"	76	81	7474	1.14	1.34
96"	96"	96"	85	85	9265	0.74	0.45
		108"	75	75	8420	0.95	0.58
		120"	68	68	7794	1.19	0.71
		132"	62	62	7262	1.34	0.84
		144"	59	59	6933	1.70	1.07
120"	48"	96"	107	123	11811	0.28	0.73
		108"	88	101	10458	0.44	0.90
		120"	76	88	9474	0.54	1.11
		132"	68	78	8805	0.75	1.31
		144"	59	68	7932	0.73	1.49
120"	72"	96"	89	98	10769	0.47	0.64
		108"	78	86	9871	0.53	0.82
		120"	71	78	9297	0.61	1.05
		132"	63	69	8575	0.74	1.26
		144"	57	63	8008	0.94	1.50
120"	96"	96"	68	71	9550	0.64	0.52
		108"	59	62	8662	0.80	0.65
		120"	53	56	8048	0.93	0.85
		132"	49	52	7624	1.20	1.04
		144"	45	47	7114	1.24	1.24
120"	120"	96"	56	56	9077	0.75	0.45
		108"	49	49	8313	0.97	0.57
		120"	43	43	7575	1.13	0.69
		132"	39	39	7021	1.40	0.87
		144"	36	36	6592	1.73	1.05

MAXIMUM DESIGN PRESSURE OF A CORNER 4"x6"x3/8" MULLION (6061-T6)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
144"	72"	96"	74	83	11373	0.38	0.70
		108"	65	73	10500	0.46	0.92
		120"	56	63	9569	0.49	1.12
		132"	47	53	8532	0.65	1.29
		144"	42	47	7886	0.78	1.56
144"	96"	96"	57	62	9941	0.57	0.58
		108"	50	54	9143	0.69	0.75
		120"	44	48	8422	0.81	0.93
		132"	40	43	7851	0.99	1.15
		144"	37	40	7498	1.14	1.36
144"	120"	96"	48	50	9464	0.69	0.50
		108"	41	43	8521	0.86	0.65
		120"	36	38	7838	1.05	0.79
		132"	33	34	7331	1.25	1.01
		144"	30	31	6849	1.52	1.17
144"	144"	96"	41	41	9042	0.77	0.44
		108"	35	35	8150	0.97	0.56
		120"	31	31	7517	1.21	0.72
		132"	28	28	7049	1.43	0.88
		144"	25	25	6497	1.67	1.00
168"	48"	96"	68	80	12326	0.29	0.78
		108"	57	67	11112	0.35	0.97
		120"	49	58	10100	0.47	1.22
		132"	40	47	8896	0.61	1.33
		144"	35	41	8123	0.74	1.59
168"	72"	96"	63	72	11890	0.34	0.74
		108"	53	61	10702	0.35	0.94
		120"	45	52	9718	0.50	1.14
		132"	40	46	9019	0.65	1.42
		144"	35	40	8251	0.71	1.67
168"	96"	96"	49	54	10293	0.51	0.61
		108"	43	48	9570	0.63	0.80
		120"	38	42	8803	0.73	1.03
		132"	34	38	8273	0.83	1.21
		144"	32	36	8076	0.94	1.50



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

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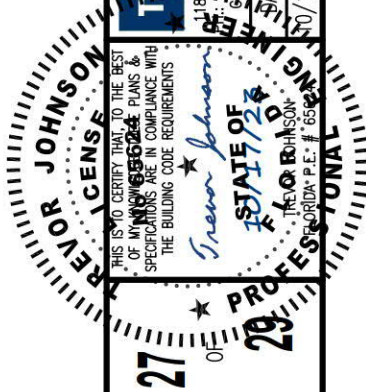
ROLL-UP SHUTTER MULLIONS



TKJ Engineering, LLC.

11235 AUTUMN CREEK DRIVE, RIVERVIEW, FL 33569
TEL: 503.404.7649; EM: TKJENGINEERING@VERIZON.NET
CERTIFICATE OF AUTHORIZATION NUMBER: 28582

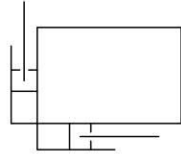
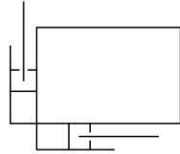
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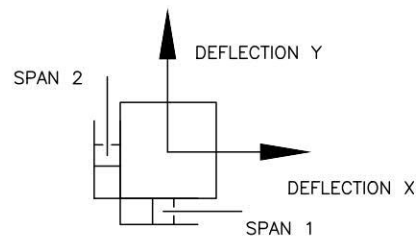
Trevor Johnson
TREVOR JOHNSON
FLORIDA P.E. # 65624

27 OF 29



MAXIMUM DESIGN PRESSURE OF A CORNER 4\"X6\"X1/2\" MULLION (6061-T6)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
96"	48"	96"	150	150	14903	0.36	0.74
		108"	150	150	13272	0.44	0.92
		120"	132	149	11775	0.64	1.09
		132"	116	131	10720	0.79	1.27
		144"	103	116	9760	0.84	1.49
96"	72"	96"	133	141	12534	0.63	0.56
		108"	118	125	11528	0.76	0.73
		120"	107	114	10765	0.92	0.93
		132"	99	105	10155	1.08	1.14
		144"	92	98	9618	1.23	1.41
96"	96"	96"	103	103	11663	0.78	0.46
		108"	90	90	10611	1.00	0.58
		120"	80	80	9720	1.21	0.73
		132"	73	73	9060	1.46	0.87
		144"	66	66	8567	1.78	1.05
120"	48"	96"	134	150	14986	0.33	0.75
		108"	114	131	13549	0.44	0.96
		120"	97	112	12155	0.49	1.16
		132"	83	96	11100	0.75	1.35
		144"	73	84	10087	0.92	1.59
120"	72"	96"	106	117	13232	0.52	0.63
		108"	93	102	12162	0.60	0.82
		120"	84	93	11434	0.74	1.05
		132"	77	85	10855	0.82	1.29
		144"	68	75	9894	0.98	1.55
120"	96"	96"	83	87	12029	0.67	0.53
		108"	72	76	10986	0.84	0.67
		120"	64	67	10078	1.05	0.85
		132"	58	61	9464	1.24	1.03
		144"	53	56	8873	1.47	1.22
120"	120"	96"	69	69	11474	0.79	0.45
		108"	59	59	10382	0.96	0.57
		120"	52	52	9524	1.20	0.71
		132"	47	47	8853	1.49	0.88
		144"	42	42	8357	1.79	1.01

MAXIMUM DESIGN PRESSURE OF A CORNER 4\"X6\"X1/2\" MULLION (6061-T6)							
SPAN WIDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
144"	72"	96"	89	100	14006	0.44	0.69
		108"	78	88	12980	0.52	0.90
		120"	70	79	12204	0.57	1.15
		132"	59	67	10876	0.59	1.33
		144"	54	61	10264	0.81	1.65
144"	96"	96"	70	76	12505	0.60	0.57
		108"	60	65	11324	0.75	0.73
		120"	53	58	10483	0.93	0.92
		132"	48	52	9812	1.09	1.14
		144"	44	48	9324	1.20	1.39
144"	120"	96"	59	62	11878	0.71	0.51
		108"	50	52	10624	0.90	0.65
		120"	43	45	9673	1.04	0.76
		132"	39	41	9108	1.27	0.97
		144"	35	37	8414	1.49	1.18
144"	144"	96"	51	51	11416	0.79	0.46
		108"	43	43	10276	0.97	0.56
		120"	38	38	9494	1.25	0.73
		132"	33	33	8638	1.48	0.82
		144"	29	29	8104	1.72	1.01
168"	48"	96"	85	100	15481	0.30	0.78
		108"	70	83	13731	0.38	0.98
		120"	60	71	12550	0.48	1.20
		132"	52	61	11474	0.57	1.43
		144"	46	54	10670	0.71	1.67
168"	72"	96"	76	87	14554	0.39	0.74
		108"	66	76	13456	0.44	0.96
		120"	58	66	12537	0.51	1.17
		132"	49	56	11288	0.67	1.40
		144"	43	49	10387	0.78	1.64
168"	96"	96"	60	67	12840	0.56	0.62
		108"	51	57	11642	0.66	0.78
		120"	46	51	10959	0.81	1.02
		132"	41	46	10213	0.92	1.25
		144"	38	42	9799	1.08	1.51



NOTE: USE DEFLECTIONS PROVIDED WHEN DETERMINING MINIMUM SEPARATION TO GLASS

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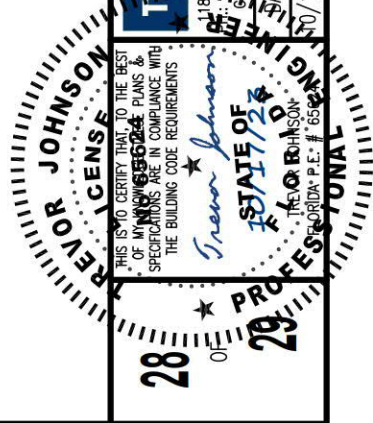
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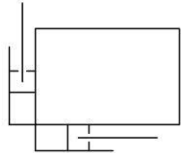
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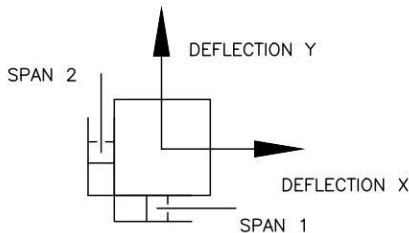


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Trevor Johnson
STATE OF FLORIDA
PROFESSIONAL ENGINEER
LICENSE NO. 65624



MAXIMUM DESIGN PRESSURE OF A CORNER 4"X6"X1/2" MULLION (6061-T6)							
SPAN WDTH 1 UP TO	SPAN WIDTH 2 UP TO	MULLION LENGTH UP TO	DESIGN PRESSURE 1 (PSF)	DESIGN PRESSURE 2 (PSF)	MULLION END LOAD (LB)	MULLION DEFLECTION Y (IN)	MULLION DEFLECTION X (IN)
168"	120"	96"	51	55	12130	0.67	0.54
		108"	43	46	10850	0.82	0.68
		120"	38	41	10081	1.02	0.88
		132"	34	37	9424	1.24	1.09
		144"	31	33	8895	1.39	1.29
192"	48"	96"	71	85	15633	0.27	0.79
		108"	59	70	14016	0.35	0.99
		120"	50	60	12651	0.41	1.24
		132"	43	51	11649	0.64	1.45
		144"	37	44	10590	0.77	1.69
192"	72"	96"	66	76	15018	0.33	0.77
		108"	56	65	13680	0.34	0.99
		120"	47	55	12385	0.48	1.18
		132"	41	48	11409	0.59	1.42
		144"	36	42	10501	0.68	1.72
192"	96"	96"	53	60	13327	0.50	0.65
		108"	45	51	12080	0.62	0.83
		120"	40	45	11257	0.72	1.07
		132"	36	41	10625	0.84	1.33
		144"	33	37	10130	0.98	1.59
192"	120"	96"	45	49	12358	0.61	0.57
		108"	38	42	11167	0.77	0.74
		120"	33	36	10238	0.92	0.91
		132"	29	32	9460	1.06	1.10
		144"	27	30	9159	1.28	1.37
216"	48"	84"	76	91	17904	0.20	0.63
		96"	61	73	15815	0.26	0.81
		108"	50	60	14023	0.29	1.02
		120"	42	50	12679	0.45	1.24
		132"	36	43	11564	0.59	1.49
216"	72"	84"	69	81	16945	0.25	0.58
		96"	58	68	15433	0.30	0.80
		108"	49	57	14104	0.38	1.00
		120"	41	48	12666	0.45	1.21
		132"	35	41	11484	0.53	1.45



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PROFESSIONAL ENGINEER

STATE OF FLORIDA

REVOR JOHNSON
P.E. # 65584