Engineering Evaluation Report – MULL2-042423

Prepared by:
A. Lynn Miller, P.E.
1070 Technology Dr.
N. Venice, FL 34275
(941) 480-1600
Registration Number: #29296

Manufacturer:
WinDoor Incorporated
104 Triple Diamond Blvd.
North Venice, FL 34275
(833) 554-5432

Product Description:
Aluminum Tube Mullions & Clips, LMI, Legacy Series, FL-21144

Compliance:
The above-mentioned product has been evaluated for compliance with the requirements of the Florida Department of Business and Professional Regulation for Statewide Acceptance per Rule 61 G20-3.005 method 1(d). The product listed herein complies with requirements of the current Florida Building Code.

This product has been evaluated and is in compliance with the current Florida Building Code, including the "High Velocity Hurricane Zone" (HVHZ).

Supporting Technical Documentation:
1. Approval Document: drawing number TUBEMULL-2, signed and sealed by A. Lynn Miller, P.E.

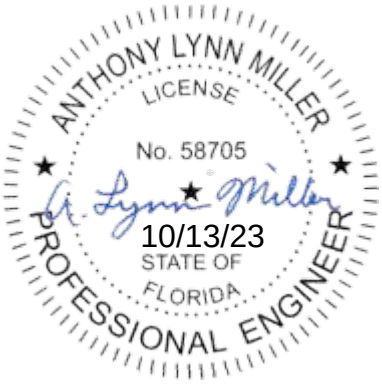
2. Test Reports:
NCTL 210-4041-02, 3774-4, 3774-5, 3774-4, 3774-5, 3884-1, 3884-2, 3884-3, 3995-01 & 3995-02 signed and sealed by Gerard J. Ferrara, P.E.; National Certified Testing Laboratories, Inc.; Orlando, FL
TAS 201-94 Large Missile Impact Test
TAS 202-94 Uniform Static Air Pressure Test
TAS 203-94 Cyclic Pressure Loading Test

NCTL 210-3744-3 signed and sealed by Robert H. Zeiders, P.E.; National Certified Testing Laboratories, Inc.; Orlando, FL
TAS 201-94 Large Missile Impact Test
TAS 202-94 Uniform Static Air Pressure Test
TAS 203-94 Cyclic Pressure Loading Test

FTL 18-8511 signed and sealed by Idalmis Ortega, P.E. Fenestration Testing Labs, Inc.; Venice, FL
TAS 201-94 Large Missile Impact Test
TAS 202-94 Uniform Static Air Pressure Test
TAS 203-94 Cyclic Pressure Loading Test

3. Mullion Analysis, prepared, signed and sealed by A. Lynn Miller, P.E., Dated 4/15/23

Limitations and Conditions of use:
- This product is impact resistant and does not require impact protection in wind borne debris regions.
- This product is rated to be used in the HVHZ.
- Mullion and clip material to be extruded aluminum 6063-T6.
- Units attached to mullion must have their own separate approval.
- Units must be installed in accordance with Approval Document.



IMPACT RESISTANT, CLIPPED, ALUMINUM TUBE MULLIONS "LEGACY" SERIES

FLORIDA PRODUCT APPROVAL #(TBA)

DESIGN PRESSURE RATING	IMPACT RATING
SEE TABLES 1A - 14A	RATED FOR LARGE & SMALL MISSILE IMPACT RESISTANCE

1) MULLIONS AND CLIPS HAVE BEEN DESIGNED & TESTED TO COMPLY WITH THE REQUIREMENTS OF THE FLORIDA BUILDING CODE, AND ARE APPROVED FOR IMPACT AND NON-IMPACT APPLICATIONS IN THE HVHZ. MULLIONS ARE ONLY TO BE USED WITH THE MANUFACTURER'S PENETRATION PRODUCTS.

2) INSTALLATION DETAILS SHOWN ARE FOR THE MULLION ONLY. ANCHORS SHOWN ARE IN ADDITION TO ANY ANCHORS REQUIRED FOR THE PENETRATION PRODUCT INSTALLATION. TYPICAL APPLICATIONS ARE SHOWN. EACH SITUATION IS UNIQUE AND SHOULD BE EVALUATED BY AN EXPERIENCED INSTALLER FOR THE BEST INSTALLATION METHOD. OPTIONAL 1X (OR 2X) WOOD BUCKS IF USED, MUST BE ANCHORED PROPERLY TO TRANSFER LOADS AND ARE TO BE DESIGNED BY OTHERS.

3) THE TYPE AND NUMBER OF ANCHORS IS CRITICAL TO THE STRUCTURAL PERFORMANCE OF THE MULLION UNITS. MULLIONS HAVE BEEN TESTED AS "FREE-FLOATING" AND DO NOT NEED TO BE DIRECTLY ATTACHED TO THE MULLION CLIPS, BUT SHALL NOT HAVE A GAP OF MORE THAN 1/8" FROM THE CLIP. SEE FIG. 1, SHEET 4.

4) THE ANCHORAGE METHODS SHOWN HAVE BEEN DESIGNED TO RESIST THE WIND LOADS CORRESPONDING TO THE REQUIRED DESIGN PRESSURE. MULLIONS ARE CALCULATED TO DEFLECT NO MORE THAN L/175. THE 1/3 STRESS INCREASE WAS NOT USED IN THIS ANCHOR EVALUATION. THE 1.6 LOAD DURATION FACTOR WAS USED FOR THE EVALUATION OF WOOD SCREWS.

5) PROPER SEALING OF ENTIRE ASSEMBLY IS THE RESPONSIBILITY OF OTHERS AND IS BEYOND THE SCOPE OF THESE INSTRUCTIONS.

6) USE THE COMBINED WIDTH OR HEIGHT OF ONLY TWO ADJACENT PENETRATION PRODUCTS TO DETERMINE PRESSURES AND AVERAGE FOR THE COMMON MULLION. FOR MULTIPLE UNITS, CONSIDER ONLY TWO ADJACENT UNITS AT A TIME WHEN USING THE DESIGN PRESSURE AND ANCHORAGE TABLES. THE LOWEST DESIGN PRESSURE OF MULTIPLE MULLIONS OR PENETRATION PRODUCTS SHALL APPLY.

7) ANCHOR EMBEDMENT TO BASE MATERIAL SHALL BE BEYOND WALL DRESSING OR STUCCO. WOOD BUCKS BY OTHERS, MUST BE ANCHORED PROPERLY TO TRANSFER LOADS TO THE STRUCTURE. ANCHORS SHALL BE PLATED OR CORROSION RESISTANT AS APPROPRIATE FOR SUBSTRATE MATERIAL. DISSIMILAR MATERIALS SHALL BE PROTECTED AS REQUIRED TO PREVENT REACTIONS.

8) REFERENCE "DETAIL" or "SECTION" SHOWN TABLES, NOTES AND/OR GATOR & CRITICAL NOTES.

9) QUANTITY OF UNITS WITHIN A MULTIPLE MULLED ASSEMBLY IS UNLIMITED, PROVIDED THAT THE SPAN AND (FRAME) WIDTH/HEIGHT OF EACH INDIVIDUAL MULLION COMPLIES WITH THE REQUIREMENTS OF THIS APPROVAL.

10) SUBSTRATES: CONCRETE SHALL CONFORM TO ACI 301 SPECIFICATIONS. HOLLOW AND GROUT FILLED CONCRETE BLOCK UNIT (CMU) SHALL CONFORM TO ASTM C 90. WOOD SHALL BE SOUTHERN YELLOW PINE WITH AN SG OF 0.55. ALUMINUM SHALL BE 6063-T5 AND BE A MINIMUM OF .125" THICK. STEEL STUDS TO BE A MINIMUM GRADE 33 AND 0.043" THICK (18 GAUGE). STRUCTURAL STEEL TO BE AT LEAST 0.125" THICK AND A36. ALL ANCHORS INTO METAL SHALL EXTEND AT LEAST 3 SCREW THREADS BEYOND THE MATERIAL. #12 & #14 ANCHORS INTO WOOD MAY BE STEEL, IFAB S.S. OR 410 S.S.

FIGURE 1: MULTIPLE MULLIONS

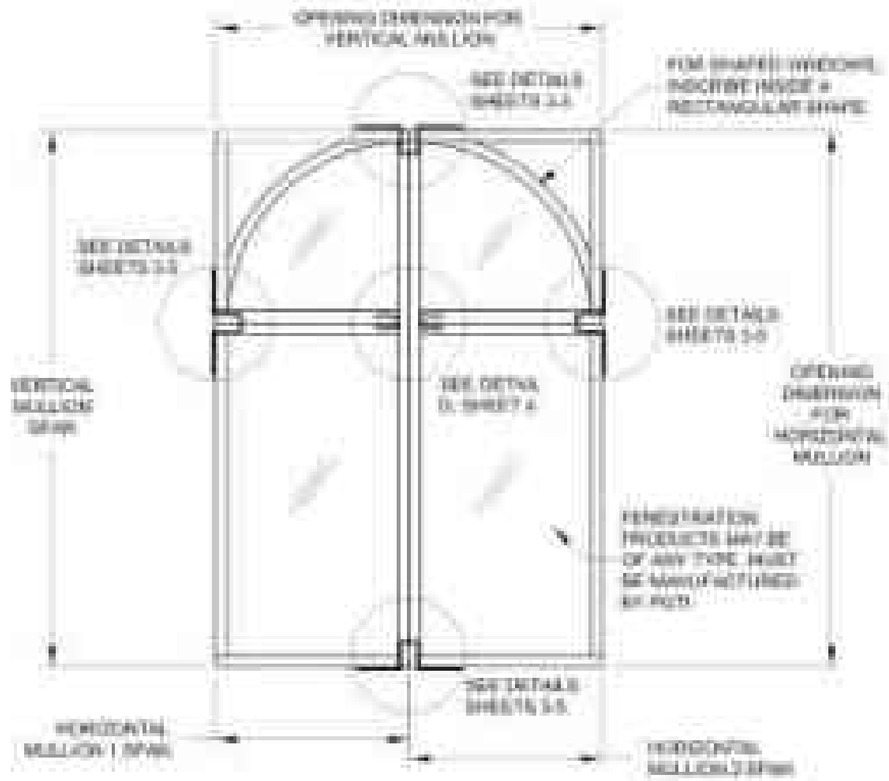
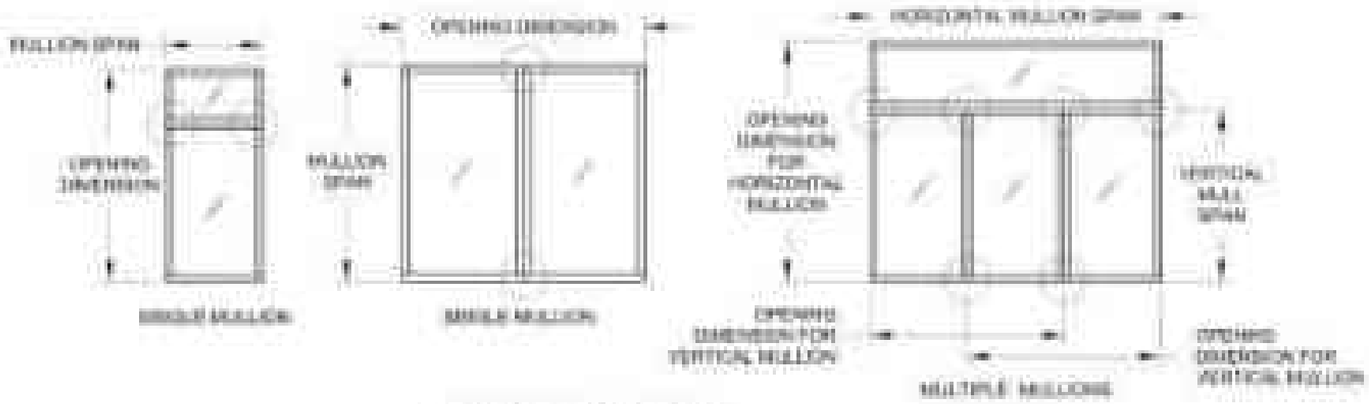


FIGURE 2: ADDITIONAL EXAMPLES OF MULLION CONFIGURATIONS



ANCHOR CAPACITY ADJUSTMENT FORMULA:

$$(DP_{req.}) \times \left(\frac{\text{ANCHOR CAP}_{req.}}{\text{MULLION CAP}_{req.}}\right) = \text{ANCHOR CAP}_{adj.}$$

USE THIS FORMULA TO OBTAIN THE "ANCHOR CAPACITY REQUIRED" CORRESPONDING TO AN ACTUAL PRESSURE REQUIREMENT FOR THE OPENING, WHEN IT IS LOWER THAN THE MULLION CAPACITY (FROM THE TABLE) OF THE SELECTED MULLION. IT WILL YIELD A REDUCED ANCHOR CAPACITY WHICH MAY BE USED TO QUALIFY ADDITIONAL ANCHOR OPTIONS FROM THE CORRESPONDING CAPACITY TABLE.

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ALUMINUM MULLIONS, CLIPPED

GENERAL NOTES & ELEVATIONS

SCALE:	NTS
DRAWN:	JS
CHECKED:	
DATE:	10/27/11
MULL-1	1 OF 21

REVISIONS

NO.	DESCRIPTION	DATE
1	ADDED MULLION SPECS	12/19/11

ARCHIBALD LYNN MILLER
LICENSE
No. 56765
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E., FLORIDA

INSTRUCTIONS:

1) DETERMINE THE ALLOWABLE WIND DESIGN PRESSURE REQUIREMENT (DP/PT) FOR THE OPENING USING THE **ASCE-7 STANDARDS**

2) TO FIND THE DESIGN PRESSURE OF THE MULLION, USE TABLES 1A THROUGH 1AA. THE MULLION DESIGN PRESSURE OBTAINED SHALL MEET OR EXCEED THE DESIGN PRESSURE REQUIREMENT FOR THE OPENING OBTAINED IN STEP 1. NOTE THAT YOU MUST FIRST DETERMINE WHETHER YOU HAVE A POINT LOADED MULLION OR A UNIFORMLY LOADED MULLION FROM FIGURES 1-4, THIS SHEET.

3) AFTER OBTAINING THE MULLION'S DESIGN PRESSURE, FIND THE VALUE IN THE COLUMN TITLED "ANCHOR CAPACITY REQUIRED (LBS)". THIS VALUE REPRESENTS THE CUMULATIVE ANCHOR CAPACITY THAT MUST BE MET TO ATTAIN THE MULLION DESIGN PRESSURE.

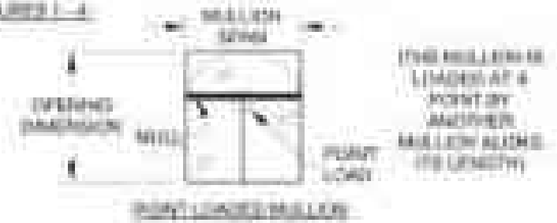
4) FROM THE ANCHOR/CLIP CAPACITY TABLE ON THE LAST SHEET, CHOOSE AN ANCHORING (FASTENER/SUBSTRATE CONDITION) THAT MEETS OR EXCEEDS THE VALUE OBTAINED FROM STEP 3.

5) VERIFY THE DESIGN PRESSURE OF THE PENETRATION PRODUCT TO BE USED AND COMPARE WITH THE FINAL DESIGN PRESSURE FOR THIS MULLION SYSTEM. THE LOWER OF THE TWO SHALL APPLY FOR THE ENTIRE MULLION ASSEMBLY.

6) HIGHLIGHT OPTION USED (ANY TABLE VALUES USED IN A SPECIFIC APPLICATION WHEN USING THIS APPROVAL TO APPLY FOR A PERMIT.

7) OPTIONALLY, IF THE MULLION DESIGN PRESSURE OBTAINED IN THE TABLE IS MUCH HIGHER THAN THE DESIGN PRESSURE REQUIREMENT FOR THE OPENING, YOU MAY USE THE "**ANCHOR CAPACITY ADJUSTMENT FORMULA**" ON SHEET 1 TO OBTAIN A LOWER ANCHOR/CLIP CAPACITY.

FIGURES 1 – 4



POINT LOADED MULLION



UNIFORMLY LOADED MULLIONS

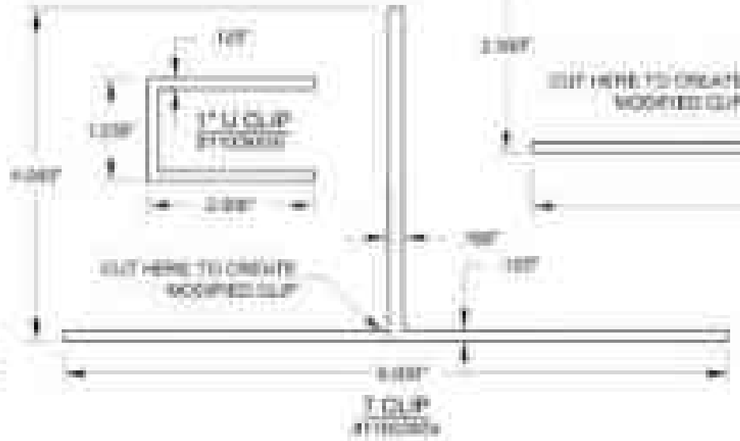
TABLE A

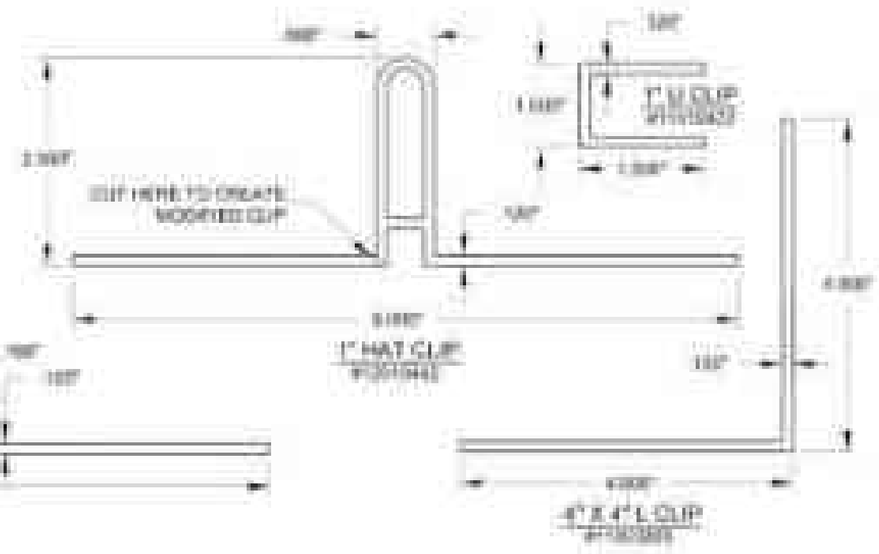
Sheet	Mullion Description	Type Frame Profile	Mullion Part #	Mullion Qty Required/Bay	Anchor Qty Part A - Table A	U Clip Part B - Table B
6	3" x 6" x .156" Tube Mullion	2x1-F	[illegible]	2" Hat Clip	[illegible]	[illegible]
7	3" x 6" x .156" Tube Mullion	4-F10	[illegible]	2" Hat Clip	[illegible]	[illegible]
8	3" x 6" x .078" Tube Mullion	up to 7-F20	[illegible]	2" Hat Clip	[illegible]	[illegible]
9	3" x 6" Tube Mullion	up to 11-F	[illegible]	1 Clip	[illegible]	N/A
10	3" x 6" x .125" Thermally Broken Tube Mullion	5-F20	[illegible] Cpl. Insertion [illegible]	2" Hat Clip	[illegible]	[illegible]
11	1-1/2" x 6-1/2" Thermally Broken Tube Mullion w/Integral Fin	2x1-F	[illegible] Fin Insert & Bar [illegible]	1 Clip	[illegible]	[illegible]
12	3" x 6" Thermally Broken HD Tube Mullion	5-F20	[illegible]	1 Clip	[illegible]	N/A
13	1-1/2" x 3-1/2" Thermally Broken Tube Mullion w/Fin Insert & Bar	3-1-F 4-F20	[illegible] Cpl. Fin Insert & Bar [illegible] Cpl. Fin Bar [illegible]	1 Clip	[illegible]	[illegible]
14	4-1/2" Thermally Broken Tube Mullion	4-F20	[illegible] Fin Insert & Bar [illegible]	1 Clip	[illegible]	N/A
15	4-1/2" Thermally Broken Adjustable Leg Mullion	up to 4-F10	[illegible]	1 Clip	[illegible]	N/A
16	3" x 6-1/4" Thermally Broken Tube Mullion w/Clip Cap	9-F1	[illegible] Cpl. Fin Insert & Bar [illegible]	2" Hat Clip	[illegible]	[illegible]
17	3" x 6-1/4" Thermally Broken Tube Mullion w/Clip Cap	6-F10	[illegible]	1 Clip	[illegible]	N/A
18	1-1/2" x 3" Thermally Broken Tube Mullion	2-F1	[illegible]	1 Hat Clip	[illegible]	[illegible]
19	3" x 6-1/2" Thermally Broken Tube Mullion	4-F10	[illegible]	1 Clip	[illegible]	[illegible]

ALL MULLIONS & CLIPS ARE 6063-T5 ALUMINUM









WINDOOR

ALUMINUM MULLIONS CLIPPED (LM)

INSTRUCTIONS & CLIP INFO

TUBE MULL-2

JENS KOSCHWSKI

10/1/2020

4

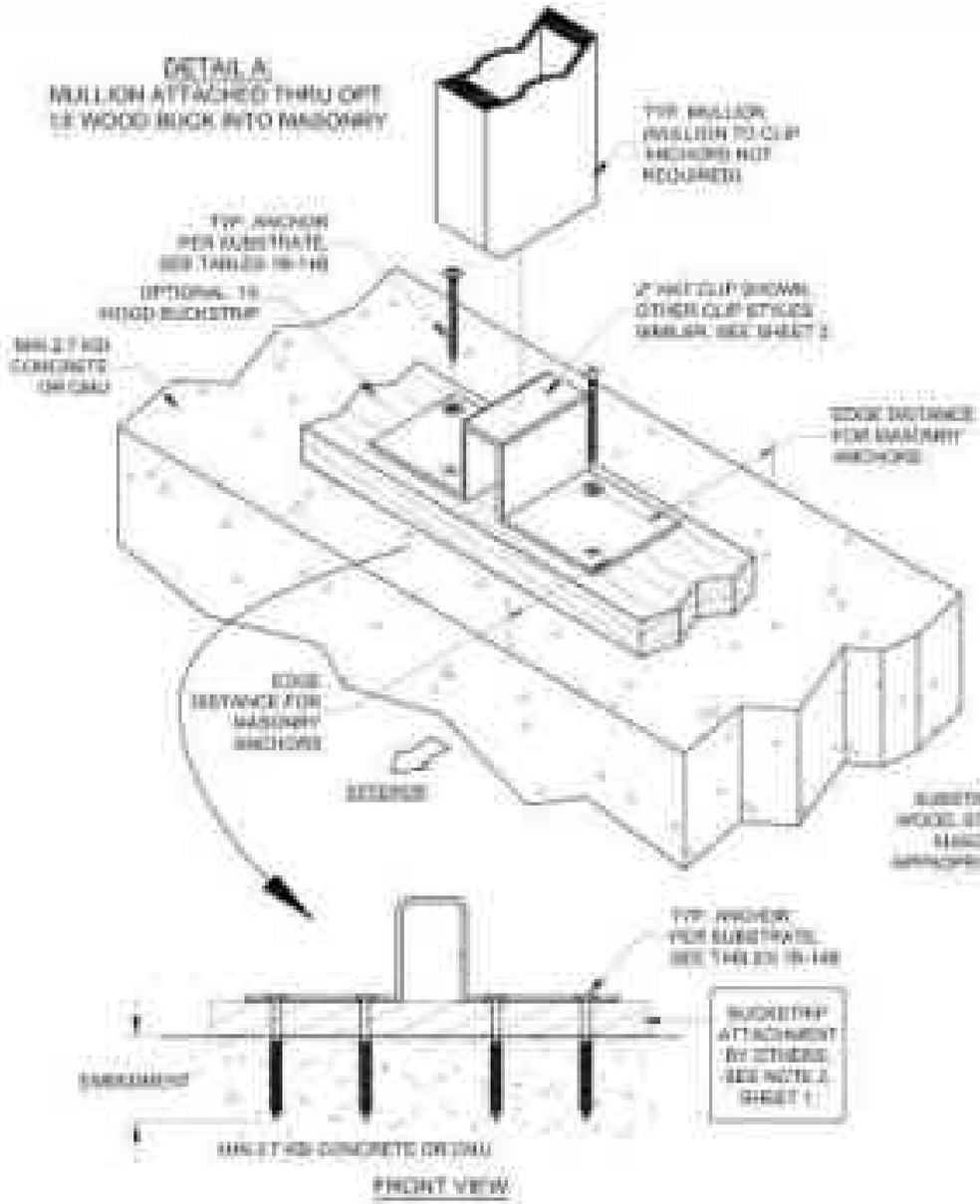
SHEET 1 OF 1

CORRECT TABLE A TITLE

ANTHONY LYNN MILLER
LICENSE
No. 56765
10/1/2020
STATE OF FLORIDA
PROFESSIONAL ENGINEER

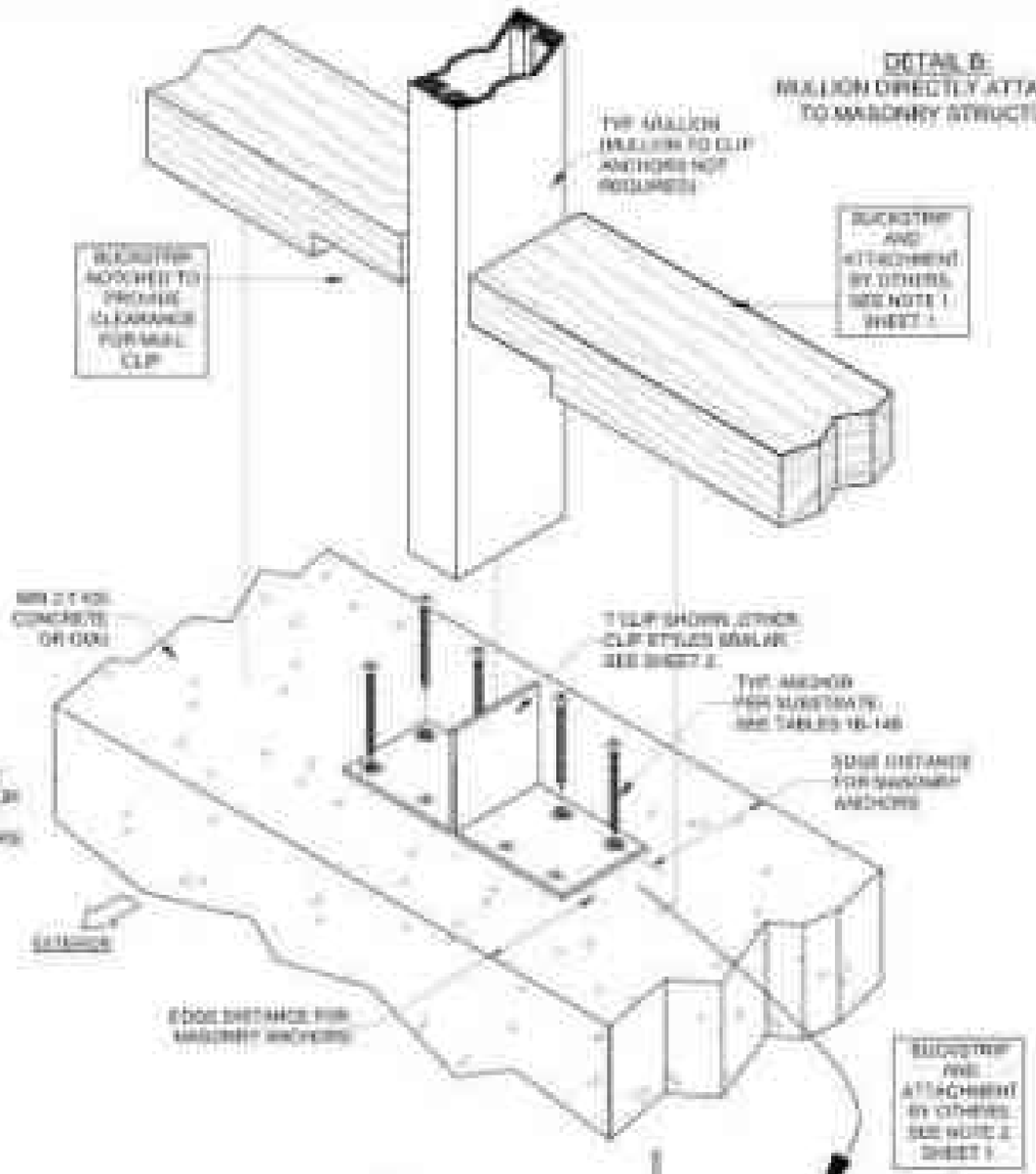
A LYNN MILLER, P.E. #56765

DETAIL A:
MULLION ATTACHED THRU OFF
LY WOOD BUCK INTO MASONRY



FRONT VIEW

DETAIL B:
MULLION DIRECTLY ATTACHED
TO MASONRY STRUCTURE



FRONT VIEW

INSTALLATION NOTES:

1) ANCHOR EMBEDMENT TO SUBSTRATE SHALL BE BEYOND WALL DRESSING OR STUCCO. SUBSTRATE MAY VARY FROM DETAILS. SEE TABLES 1B-14B FOR SUBSTRATE PROPERTIES.

2) QUANTITY OF ANCHORS, MULLION TYPES AND MULLION CLIP TYPES AND STYLES SHOWN ABOVE ARE FOR PICTORIAL REPRESENTATION ONLY. BECAUSE THE ANCHOR CAPACITY IS BASED PARTLY ON THE ANCHOR TO ANCHOR DISTANCE, THE CORRECT QUANTITY AND LOCATION OF ANCHORS MUST BE FOLLOWED. REFER TO THE TABLES ON THE FOLLOWING SHEETS.

3) MULLIONS MAY BE INSTALLED HORIZONTALLY OR VERTICALLY UNLESS OTHERWISE SPECIFIED. 3 CLIPS, 4" USED, MUST BE INSTALLED IN PAIRS AND PULLED AGAINST THE MULLION'S INSIDE WALL FOR A SECURE FIT.

4) FOR MASONRY APPLICATIONS, USE ONLY DEWALT (ETRACON, DEWALT (ETRACON, ELCO 1/4" ALPHABOLT OR ELCO ONETRUE) MASONRY ANCHORS AS LISTED IN TABLES 1B-14B.

REVISIONS	DATE

SHEET	TITLE
1	MULLION THRU SHEET
2	JAMB MULLIONS

DESIGNED BY	A.L.LYNN MILLER
CHECKED BY	
DRAWN BY	(LM)
DATE	
SCALE	
JOB #	
SHEET #	

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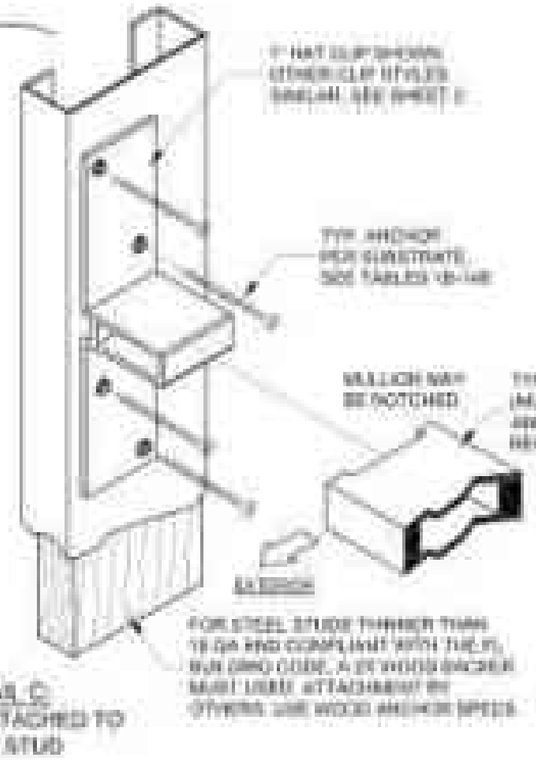
ALUMINUM MULLIONS CLIPPED (LM)

INSTALLATION INSTRUCTIONS

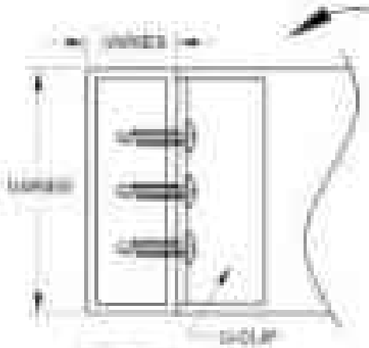
ANTHONY LYNN MILLER
LICENSE
No. 56765
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E., FLORIDA

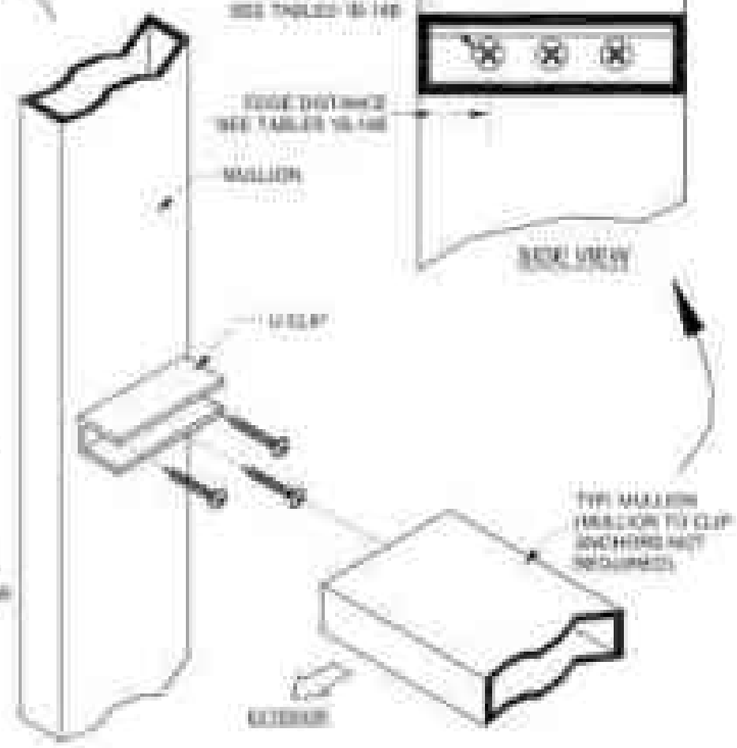




DETAIL C:
MULLION ATTACHED TO STEEL STUD

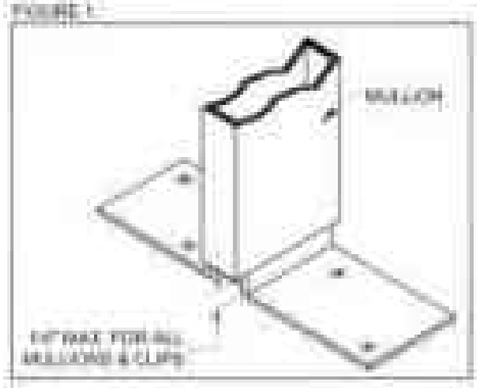






DETAIL D:
MULLION TO MULLION INTERSECTION

FIGURE 1



INSTALLATION NOTES:

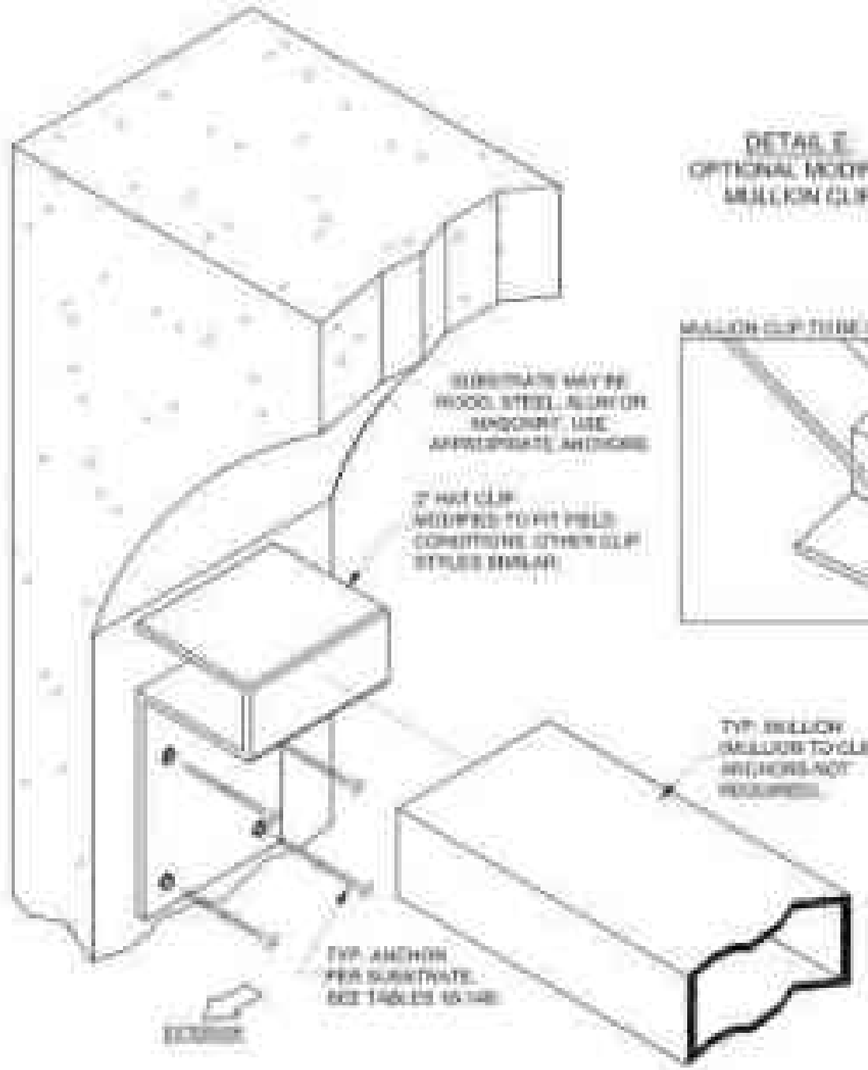
1) ANCHOR EMBEDMENT TO SUBSTRATE SHALL BE BEYOND WALL DRESSING OR STUCCO. SUBSTRATE MAY VARY FROM DETAILS. SEE TABLES 1B-14B FOR SUBSTRATE PROPERTIES.

2) QUANTITY OF ANCHORS, MULLION TYPES AND MULLION CLIP TYPES AND STYLES SHOWN ABOVE ARE FOR PICTURAL REPRESENTATION ONLY. BECAUSE THE ANCHOR CAPACITY IS BASED PARTLY ON THE ANCHOR TO ANCHOR DISTANCE, THE CORRECT QUANTITY AND LOCATION OF ANCHORS MUST BE FOLLOWED. REFER TO THE TABLES ON THE FOLLOWING SHEETS.

3) MULLIONS MAY BE INSTALLED HORIZONTALLY OR VERTICALLY UNLESS OTHERWISE SPECIFIED. U CLIPS, IF USED, MUST BE INSTALLED IN PAIRS AND FILLED AGAINST THE MULLIONS INNER WALL FOR A SECURE FIT.

4) FOR MASONRY APPLICATIONS, USE ONLY DEWALT (ITW RAMSET) DEWALT ULTRACON+ (ELCO 1/4" ASSEMBLY) OR ELCO CRETEFLEX MASONRY ANCHORS AS LISTED IN TABLES 1B-14B.

REVISIONS						
NO.	DESCRIPTION	DATE	BY	CHK'D	APP'D	
1	RECOMMODE THIS SHEET	11/19/13				



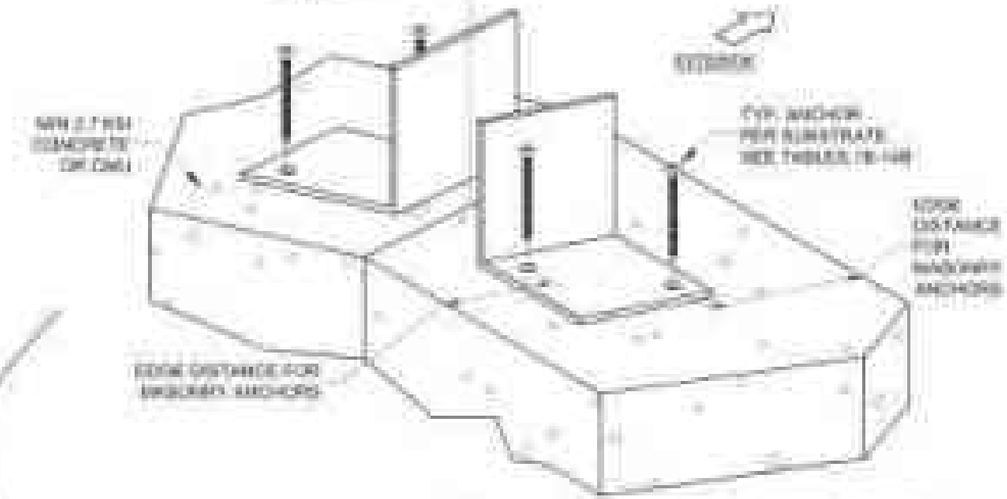
DETAIL E
OPTIONAL MODIFIED
MULLION CLIP

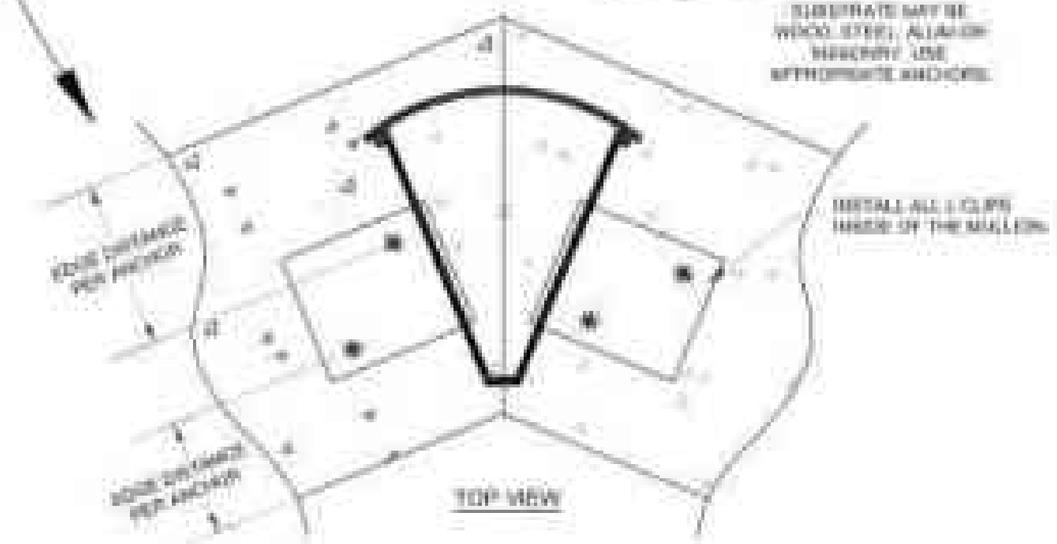




DETAIL F
BAY MULLION
INSTALLATION

TYP. BAY MULLION
(MULLION TO CLIP
ANCHORS NOT
REQUIRED)





INSTALLATION NOTES:

1) ANCHOR EMBEDMENT TO SUBSTRATE SHALL BE BEYOND WALL DRESSING OR STUCCO. SUBSTRATE MAY VARY FROM DETAILS. SEE TABLES 16-14B FOR SUBSTRATE PROPERTIES.

2) QUANTITY OF ANCHORS, MULLION TYPES AND MULLION CLIP TYPES AND STYLES SHOWN ABOVE ARE FOR PICTORIAL REPRESENTATION ONLY. BECAUSE THE ANCHOR CAPACITY IS BASED PARTLY ON THE ANCHOR TO ANCHOR DISTANCE, THE CORRECT QUANTITY AND LOCATION OF ANCHORS MUST BE FOLLOWED. REFER TO THE TABLES ON THE FOLLOWING SHEETS.

3) MULLIONS MAY BE INSTALLED HORIZONTALLY OR VERTICALLY UNLESS OTHERWISE SPECIFIED. 2 CLIPS, IF USED, MUST BE INSTALLED IN PAIRS AND PULLED AGAINST THE MULLIONS WHERE WALL FOR A SECURE FIT.

4) FOR MASONRY APPLICATIONS, USE ONLY (8X1A1) ULTRACON OR (8X1A1) ULTRACON+ (0.120 OR AGGREGATOR OR (0.120 ONE TRIPLEX MASONRY ANCHORS AS LISTED IN TABLES 16-14B.

REVISIONS			
NO.	DESCRIPTION	DATE	APPD.
1	ADDED TUBE SHEET	11/08/11	

RECOMMENDED TUBE SHEET

DRAWN BY:	JENS ROSTWEG	TUBE SHEET:	2
CHECKED BY:			
APPROVED BY:			
DATE:	11/08/11	SCALE:	1:4
SHEET:	1 OF 2		

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MANUFACTURING FACILITIES
555 TRIPLE DIAMOND BLVD.
N. VENICE, FL 34275
941.484.7665

ALUMINUM MULLIONS, CLIP TYPED (LM)

INSTALLATION INSTRUCTIONS



ANTHONY LYNN MILLER, P.E., FLORIDA

TABLE 1A

2" x 4" x .500" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement

Opening Dimension																															
10'-0"				20'-0"				30'-0"				40'-0"				50'-0"				60'-0"				70'-0"				80'-0"			
Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion	
Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)	Design Pressure (psf)	Allowable Load (lbs)
40 in	150.2	697	150.0	384	150.0	408	150.0	408	150.0	377	150.0	408	150.0	408	150.0	408	150.0	408	150.0	408	150.0	408	150.0	408	150.0	408	150.0	408	150.0	408	150.0	408
60 in	150.0	696	149.4	382	150.0	756	150.0	378	150.0	1040	150.0	481	150.0	1080	150.0	501	150.0	1080	150.0	501	150.0	1080	150.0	501	150.0	1080	150.0	501	150.0	1080	150.0	501
80 in (2 @ 40 in)	150.0	694	150.0	436	150.0	751	150.0	447	150.0	1034	150.0	548	150.0	1378	150.0	663	150.0	1482	150.0	667	150.0	1668	150.0	667	150.0	1668	150.0	667	150.0	1668	150.0	667
84 in	150.0	723	150.0	540	150.0	884	150.0	468	150.0	1209	150.0	718	150.0	1468	150.0	702	150.0	1668	150.0	702	150.0	1668	150.0	702	150.0	1668	150.0	702	150.0	1668	150.0	702
90 in	150.0	781	150.0	716	150.0	948	150.0	502	150.0	1302	150.0	833	150.0	1663	150.0	811	152.0	1875	150.0	836	150.0	2186	150.0	836	150.0	2186	150.0	836	150.0	2186	150.0	836
96 in	150.0	865	150.0	898	150.0	998	150.0	756	150.0	1371	150.0	968	150.0	1963	150.0	962	150.0	2369	150.0	1021	150.0	2857	150.0	1029	150.0	2857	150.0	1029	150.0	2857	150.0	1029
98 in	150.0	896	150.0	987	150.0	1031	150.0	791	150.0	1415	150.0	1000	150.0	2030	150.0	1000	150.0	2460	150.0	1114	150.0	3000	150.0	1134	150.0	3000	150.0	1134	150.0	3000	150.0	1134
114 in	150.0	1038	150.0	1178	150.0	1195	150.0	961	150.0	1691	150.0	1248	150.0	2419	150.0	1241	150.0	2959	150.0	1414	150.0	3000	150.0	1466	150.0	3000	150.0	1466	150.0	3000	150.0	1466
120 in	150.0	1094	150.0| 1321	150.0	1312	150.0	1078	150.0	1773	150.0	1374	150.0	2524	150.0	1394	151.9	1774	126.1	1394	97.9	1774	121.0	1394	85.9	1774	112.2	1394	72.9	1774	105.7	1394
144 in	150.0	1295	150.0	1687	150.0	1512	150.0	1318	150.0	1333	150.0	1715	150.0	2525	150.0	1715	124.8	1333	84.7	1535	64.8	1333	77.0	1540	48.2	1333	71.9	1540	44.2	1333	64.7	1540
156 in	113.9	1237	111.5	1636	93.2	1637	79.7	1637	66.1	1637	73.1	1636	60.3	1637	63.4	1637	66.1	1637	61.3	1637	58.3	1637	47.3	1636	54.4	1637	51.4	1636	36.7	1637	41.4	1636
168 in	94.8	1332	90.7	1637	84.5	1636	68.4	1636	53.4	1636	63.3	1637	50.8	1636	51.1	1636	54.3	1636	47.4	1637	46.8	1636	36.5	1636	41.5	1636	40.1	1636	31.5	1636	33.3	1637
174 in	86.7	1383	87.1	1636	80.8	1636	64.3	1637	50.2	1636	60.1	1636	51.2	1636	54.2	1636	52.4	1636	44.4	1636	44.1	1636	34.1	1636	39.4	1636	38.0	1636	34.4	1636	31.5	1636
192 in	84.8	1637	82.7	1636	77.2	1636	57.7	1636	48.2	1636	57.9	1636	48.4	1636	47.3	1636	46.4	1636	41.3	1636	41.2	1636	32.1	1636	36.8	1636	35.5	1636	32.1	1636	29.4	1636
216 in	75.4	1637	73.5	1636	68.6	1636	51.3	1636	42.8	1636	51.5	1636	43.0	1636	42.0	1636	41.2	1636	36.7	1636	36.6	1636	28.5	1636	32.7	1636	31.5	1636	28.5	1636	26.1	1636
240 in	67.8	1637	66.1	1636	61.7	1636	46.1	1636	38.5	1636	46.3	1636	38.7	1636	37.8	1636	37.1	1636	33.0	1636	32.9	1636	25.6	1636	29.4	1636	28.3	1636	25.6	1636	23.5	1636
264 in	61.6	1637	60.1	1636	56.1	1636	41.9	1636	35.0	1636	42.1	1636	35.2	1636	34.3	1636	33.7	1636	30.0	1636	29.9	1636	23.3	1636	26.7	1636	25.7	1636	23.3	1636	21.3	1636
288 in	56.5	1637	55.1	1636	51.4	1636	38.4	1636	32.1	1636	38.6	1636	32.2	1636	31.4	1636	30.9	1636	27.5	1636	27.4	1636	21.3	1636	24.5	1636	23.5	1636	21.3	1636	19.5	1636
312 in	52.1	1637	50.8	1636	47.4	1636	35.4	1636	29.6	1636	35.6	1636	29.7	1636	29.0	1636	28.5	1636	25.4	1636	25.3	1636	19.7	1636	22.6	1636	21.7	1636	19.7	1636	18.0	1636
336 in	48.4	1637	47.2	1636	44.0	1636	32.9	1636	27.5	1636	33.0	1636	27.6	1636	26.9	1636	26.5	1636	23.6	1636	23.5	1636	18.3	1636	21.0	1636	20.2	1636	18.3	1636	16.7	1636
360 in	45.2	1637	44.1	1636	41.1	1636	30.7	1636	25.7	1636	30.8	1636	25.8	1636	25.2	1636	24.7	1636	22.0	1636	22.0	1636	17.1	1636	19.6	1636	18.9	1636	17.1	1636	15.6	1636

TABLE 1B

2" x 4" x .500" Tube Mullion Clip/Anchor Capacity

Summary		"A" Summary				"A" Clip	"B" Clip (Qty)					"C" Clip (Qty)				Wood		Metal
Anchor Type		#10 Self-Drill (Required)		1/4" Self-Drill (Required)		#10 Self-Drill (Required)	#10 Self-Drill (Required)		1/4" Self-Drill (Required)		1/4" Clip Qty/Hole	#10 Self-Drill (Required)		1/4" Self-Drill (Required)	1/4" Clip Qty/Hole	#10 Wood Screw	#14 Wood Screw	#10 Sheet Metal Screw
Edge Clearance (in)		1"	2 1/2"	1"	4 1/2"	2 1/4"	1"	2 1/2"	1"	4 1/2"	2 1/2"	2"	1"	1"	2"	1 3/4"	4 3/4"	1 3/4"
Embedment (in)		1 3/8"	1 3/8"	1 3/4"	1 3/4"	2"	1 1/4"	1 1/4"	1 3/4"	1 3/4"	1 1/2"	1 1/2"	1 3/4"	1 3/4"	2"	1 3/4"	1 3/4"	See Detail 1
2 Anchors @ 5" from C.L. Mullion Cap (Psf)		233.8lbs	1500 lbs	400 lbs	1,500 lbs	1886 lbs	465 lbs	745 lbs	1007 lbs	1,500 lbs	988 lbs	745 lbs	360 lbs	837 lbs	832 lbs	1886 lbs	3115 lbs	1115 lbs
4 Anchors @ 5" from C.L. Mullion Cap (Psf)		117 psf	2250 lbs	317 lbs	4413 lbs	N/A	467 lbs	1496 lbs	1511 lbs	1987 lbs	1749 lbs	N/A	180 lbs	469 lbs	N/A	1715 lbs	2746 lbs	2189 lbs
6 Anchors @ 5" from C.L. Mullion Cap (Psf)		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8 Anchors @ 5" from C.L. Mullion Cap (Psf)		467 lbs	1500 lbs	401 lbs	1737 lbs	N/A	349 lbs	745 lbs	1511 lbs	1987 lbs	972 lbs	N/A	360 lbs	418 lbs	N/A	1886 lbs	1115 lbs	1115 lbs

SEE SUBSTRATE PROPERTIES SHEET 1

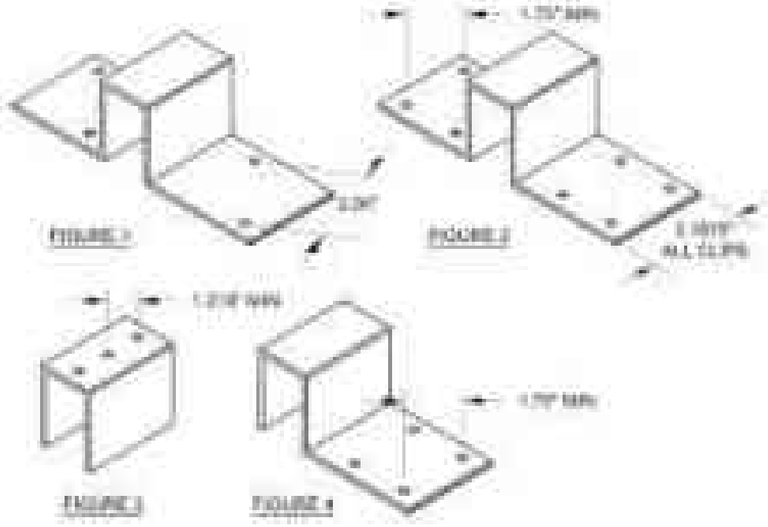


TABLE NOTES:

1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT/UNIFORMLY LOADED CLARIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE MOUNTED OVER SIP C.L. FROM CLIP EDGE.

3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



2" X 4" X 3/8" TUBE MULLION

WINDOOR
WINDOW & DOOR MFG. CORP.
ALUMINUM MULLIONS, CLIPPED (LM)
2" X 4" X 3/8" TUBE MULLION
SHEET 2 OF 2
ANTHONY LYNN MILLER
LICENSE
No. 56765
10/15/25
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., FL# 56765

TABLE 29

2" x 6" x .125" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																													
	72 in				84 in				96 in				108 in				120 in				132 in				144 in				156 in			
	Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion	
Mullion Span	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)	Design Pressure (psf)	Clip/Anchor Capacity (lbs)
48 in	150.2	337	150.0	384	112.6	406	150.0	480	90.1	375	113.0	480	75.1	348	94.0	480	64.4	333	80.5	480	56.4	321	70.5	480	50.1	312	62.8	480	45.1	305	56.4	480
60 in	150.2	404	149.4	480	120.2	792	150.0	576	75.1	1080	120.2	864	64.3	1080	102.6	864	56.3	1080	85.8	864	50.1	1080	75.2	864	45.1	1080	67.1	864	40.6	1080	60.2	864
72 in (2 spans)	150.2	418	150.0	438	128.5	751	150.0	647	75.1	1080	120.2	648	64.3	1080	102.6	648	56.3	1080	85.8	648	50.1	1080	75.2	648	45.1	1080	67.1	648	40.6	1080	60.2	648
84 in	150.2	518	150.0	540	128.5	864	150.0	648	75.1	1080	120.2	756	64.3	1080	102.6	756	56.3	1080	85.8	756	50.1	1080	75.2	756	45.1	1080	67.1	756	40.6	1080	60.2	756
90 in	150.2	781	150.0	810	150.0	918	150.0	972	75.1	1080	120.2	810	64.3	1080	102.6	811	56.3	1080	85.8	811	50.1	1080	75.2	811	45.1	1080	67.1	811	40.6	1080	60.2	811
96 in	150.2	865	149.9	864	150.0	864	150.0	1080	75.1	1080	120.2	864	64.3	1080	102.6	864	56.3	1080	85.8	864	50.1	1080	75.2	864	45.1	1080	67.1	864	40.6	1080	60.2	864
108 in	150.2	1054	150.0	1080	150.0	1080	150.0	1080	75.1	1080	120.2	1080	64.3	1080	102.6	1080	56.3	1080	85.8	1080	50.1	1080	75.2	1080	45.1	1080	67.1	1080	40.6	1080	60.2	1080
120 in	150.2	1255	150.0	1297	150.0	1350	150.0	1296	75.1	1080	120.2	1296	64.3	1080	102.6	1296	56.3	1080	85.8	1296	50.1	1080	75.2	1296	45.1	1080	67.1	1296	40.6	1080	60.2	1296
132 in	150.2	1468	150.0	1512	150.0	1512	150.0	1512	75.1	1080	120.2	1512	64.3	1080	102.6	1512	56.3	1080	85.8	1512	50.1	1080	75.2	1512	45.1	1080	67.1	1512	40.6	1080	60.2	1512
144 in	150.2	1682	150.0	1728	150.0	1728	150.0	1728	75.1	1080	120.2	1728	64.3	1080	102.6	1728	56.3	1080	85.8	1728	50.1	1080	75.2	1728	45.1	1080	67.1	1728	40.6	1080	60.2	1728
156 in	150.2	1896	150.0	1944	150.0	1944	150.0	1944	75.1	1080	120.2	1944	64.3	1080	102.6	1944	56.3	1080	85.8	1944	50.1	1080	75.2	1944	45.1	1080	67.1	1944	40.6	1080	60.2	1944
168 in	150.2	2109	150.0	2160	150.0	2160	150.0	2160	75.1	1080	120.2	2160	64.3	1080	102.6	2160	56.3	1080	85.8	2160	50.1	1080	75.2	2160	45.1	1080	67.1	2160	40.6	1080	60.2	2160
180 in	150.2	2323	150.0	2376	150.0	2376	150.0	2376	75.1	1080	120.2	2376	64.3	1080	102.6	2376	56.3	1080	85.8	2376	50.1	1080	75.2	2376	45.1	1080	67.1	2376	40.6	1080	60.2	2376
192 in	150.2	2537	150.0	2592	150.0	2592	150.0	2592	75.1	1080	120.2	2592	64.3	1080	102.6	2592	56.3	1080	85.8	2592	50.1	1080	75.2	2592	45.1	1080	67.1	2592	40.6	1080	60.2	2592
204 in	150.2	2750	150.0	2808	150.0	2808	150.0	2808	75.1	1080	120.2	2808	64.3	1080	102.6	2808	56.3	1080	85.8	2808	50.1	1080	75.2	2808	45.1	1080	67.1	2808	40.6	1080	60.2	2808
216 in	150.2	2964	150.0	3024	150.0	3024	150.0	3024	75.1	1080	120.2	3024	64.3	1080	102.6	3024	56.3	1080	85.8	3024	50.1	1080	75.2	3024	45.1	1080	67.1	3024	40.6	1080	60.2	3024
228 in	150.2	3178	150.0	3240	150.0	3240	150.0	3240	75.1	1080	120.2	3240	64.3	1080	102.6	3240	56.3	1080	85.8	3240	50.1	1080	75.2	3240	45.1	1080	67.1	3240	40.6	1080	60.2	3240
240 in	150.2	3392	150.0	3456	150.0	3456	150.0	3456	75.1	1080	120.2	3456	64.3	1080	102.6	3456	56.3	1080	85.8	3456	50.1	1080	75.2	3456	45.1	1080	67.1	3456	40.6	1080	60.2	3456

TABLE 30

2" x 6" x .125" Tube Mullion Clip/Anchor Capacity	Anchor(s)	Jb Clip(s)				Sill Clip(s)	Mullion Clip(s)					Head Clip(s)			Shims		Notes
	Anchor Type	2-1/2" Sidefoot (Standard)		1-1/4" Sidefoot (Standard)		6-5/8" Sill or Similar (Standard)	2-1/2" Sidefoot (Standard)		1-1/4" Sidefoot (Standard)		1-1/4" Sill or Similar (Standard)	1-1/4" Sill or Similar (Standard)	2-1/2" Sidefoot (Standard)	1-1/4" Sidefoot (Standard)	1-1/4" Sill or Similar (Standard)	#12 Shield Screw	#14 Shim Screw	#12 Shield Screw
	Edge Distance (in)	1"	2-1/2"	1"	2-1/2"	2-1/2"	1"	2-1/2"	1"	2-1/2"	2-1/2"	2"	1"	2-1/2"	2"	2-1/2"	2-1/2"	2-1/2"
	Embedment (in)	1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/4"	1-3/4"	Per Shim
4 Anchors @ 6" Min. C.C. / Mullion Cap. (lbs)	1077 lbs	1080 lbs	840 lbs	1140 lbs	1080 lbs	807 lbs	1080 lbs	540 lbs	1140 lbs	1080 lbs	1140 lbs	1080 lbs	1080 lbs	1080 lbs	1080 lbs	1080 lbs	1080 lbs	1080 lbs
3 Anchors @ 7.5" Min. C.C. / Mullion Cap. (lbs)	971 lbs	1080 lbs	810 lbs	1071 lbs	N/A	807 lbs	1080 lbs	810 lbs	1067 lbs	1140 lbs	N/A	1080 lbs	1080 lbs	N/A	1072 lbs	1140 lbs	1140 lbs	
2 Anchors @ 12" Min. C.C. / Mullion Cap. (lbs)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2 Anchors @ 10" Min. C.C. / Mullion Cap. (lbs)	867 lbs	1080 lbs	810 lbs	1080 lbs	N/A	807 lbs	1080 lbs	720 lbs	960 lbs	1140 lbs	N/A	1080 lbs	1080 lbs	N/A	1080 lbs	1140 lbs	1140 lbs	

CIRCLED VALUES ARE USED IN THE EXAMPLE ON SHEET 20.

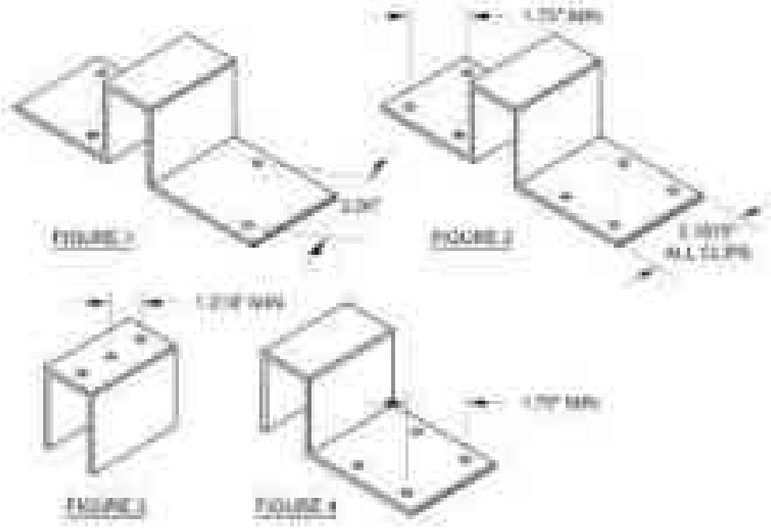
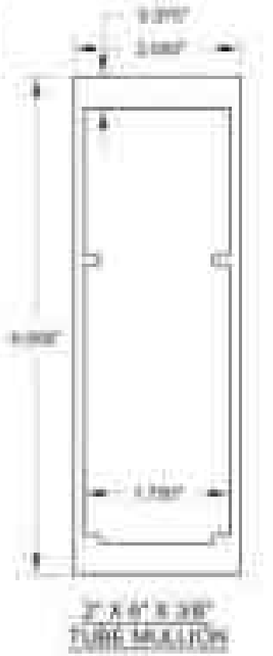


TABLE NOTES:
1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT/UNIFORMLY LOADED CLARIFICATION.

2) MULLION AND WALL/MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE MOUNTED OVER SLOT C.C. FROM CLIP EDGE.

3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



2" X 6" X 3/8" TUBE MULLION

WINDOOR
WINDOW & DOOR MANUFACTURERS ASSOCIATION INTERNATIONAL
3910 PRESTON COMMONS BLVD.
BOYNTON BEACH, FL 33436
(561) 484-3503

ALUMINUM MULLIONS, CLIPPED (LM)
2" X 6" X 3/8" TUBE MULLION

DRAWN	JEFF BOSCHEN
CHECKED	ANTHONY LYNN MILLER
DATE	7/31/13
SCALE	NTS
SHEET	19 OF 21
REVISION	

ANTHONY LYNN MILLER
LICENSE
No. 56765
7/31/13
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., FL# 56765

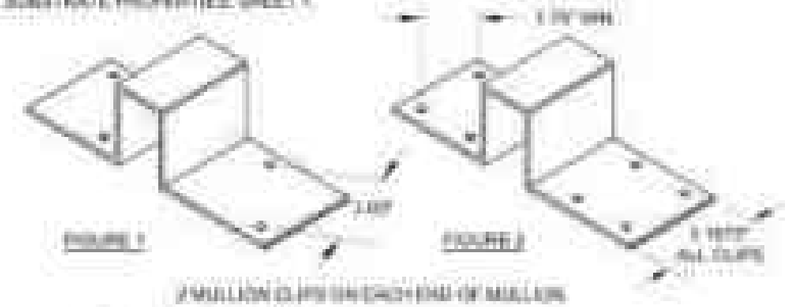
TABLE 2A

2" x 4" x .125" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Mullion Span	Opening Dimension 10'-0"				12'-0"				14'-0"				16'-0"				18'-0"				20'-0"			
		Fixed Leaded Mullion		Deflecting Leaded Mullion		Fixed Leaded Mullion		Deflecting Leaded Mullion		Fixed Leaded Mullion		Deflecting Leaded Mullion		Fixed Leaded Mullion		Deflecting Leaded Mullion		Fixed Leaded Mullion		Deflecting Leaded Mullion		Fixed Leaded Mullion		Deflecting Leaded Mullion	
		Max Design Pressure (psf)	Max Allowable Load (plf)	Max Design Pressure (psf)	Max Allowable Load (plf)	Max Design Pressure (psf)	Max Allowable Load (plf)	Max Design Pressure (psf)	Max Allowable Load (plf)	Max Design Pressure (psf)	Max Allowable Load (plf)	Max Design Pressure (psf)	Max Allowable Load (plf)	Max Design Pressure (psf)	Max Allowable Load (plf)	Max Design Pressure (psf)	Max Allowable Load (plf)	Max Design Pressure (psf)	Max Allowable Load (plf)	Max Design Pressure (psf)	Max Allowable Load (plf)	Max Design Pressure (psf)	Max Allowable Load (plf)	Max Design Pressure (psf)	Max Allowable Load (plf)
	40 in.	150.2	937	150.0	564	150.0	806	150.0	484	150.0	677	150.0	406	150.0	582	150.0	349	150.0	511	150.0	307	150.0	456	150.0	274
	60 in.	150.0	838	149.4	562	150.0	752	150.0	376	150.0	598	150.0	299	150.0	481	150.0	241	150.0	402	150.0	201	150.0	345	150.0	172
	80 in.	150.0	838	150.0	419	150.0	751	150.0	187	150.0	598	150.0	149	150.0	481	150.0	120	150.0	402	150.0	100	150.0	345	150.0	86
	96 in.	150.0	838	150.0	349	150.0	751	150.0	156	150.0	598	150.0	124	150.0	481	150.0	100	150.0	402	150.0	83	150.0	345	150.0	72
	112 in.	150.0	838	150.0	299	150.0	751	150.0	134	150.0	598	150.0	107	150.0	481	150.0	86	150.0	402	150.0	71	150.0	345	150.0	62
	120 in.	150.0	838	150.0	279	150.0	751	150.0	125	150.0	598	150.0	100	150.0	481	150.0	80	150.0	402	150.0	67	150.0	345	150.0	57
	144 in.	150.0	838	150.0	233	150.0	751	150.0	104	150.0	598	150.0	83	150.0	481	150.0	67	150.0	402	150.0	56	150.0	345	150.0	48
	168 in.	150.0	838	150.0	200	150.0	751	150.0	89	150.0	598	150.0	71	150.0	481	150.0	57	150.0	402	150.0	48	150.0	345	150.0	41
	192 in.	150.0	838	150.0	175	150.0	751	150.0	78	150.0	598	150.0	62	150.0	481	150.0	50	150.0	402	150.0	42	150.0	345	150.0	36
	216 in.	150.0	838	150.0	155	150.0	751	150.0	69	150.0	598	150.0	55	150.0	481	150.0	44	150.0	402	150.0	37	150.0	345	150.0	32
	240 in.	150.0	838	150.0	140	150.0	751	150.0	62	150.0	598	150.0	50	150.0	481	150.0	40	150.0	402	150.0	33	150.0	345	150.0	29

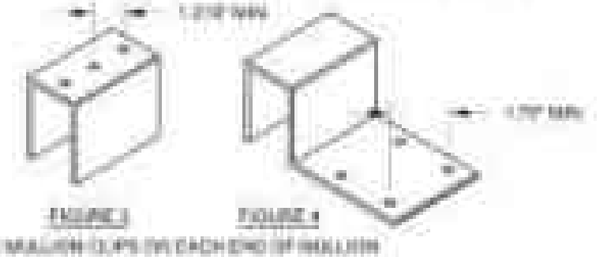
TABLE 2B

2" x 4" x .125" Tube Mullion Clip/Anchor Capacity	Anchor Type	Clip Capacity				Clip Screw	Mullion (MC)						Wall (WC)				Screw		Notes
		2-1/2" Setback (Maximum)		1-1/4" Setback (Minimum)		#12-14 Sheet Metal	2-1/2" Setback (Maximum)		1-1/4" Setback (Minimum)		1.90" Shim Straddle	1.18" Shim Straddle	2-1/2" Setback (Maximum)		1-1/4" Setback (Minimum)		#12 Sheet Metal	#14 Sheet Metal	#12 Sheet Metal
	Edge Distance (in.)	1"	2-1/2"	1"	2-1/2"	1-1/8"	1"	2-1/2"	1"	2-1/2"	2-1/2"	2"	2"		1"		2"	1-3/8"	1-3/8"	2-3/8"
	Embedment (in.)	1-3/8"	1-3/4"	1-3/8"	1-3/8"	3"	1-1/4"	1-1/2"	1-1/8"	1-1/8"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/8"	1-3/8"	3"	1-1/2"	1-1/2"	See Sheet 1
2 Anchors @ 8" Min. c.c. Installed Into Ref. 1		1540 lbs	2620 lbs	1540 lbs	2480 lbs	3080 lbs	1620 lbs	1960 lbs	1540 lbs	2220 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs	1760 lbs	2140 lbs	1540 lbs
3 Anchors @ 7.75" Min. c.c. Installed Into Ref. 1		1540 lbs	3080 lbs	1620 lbs	3080 lbs	N/A	1620 lbs	2960 lbs	1620 lbs	3620 lbs	1540 lbs	N/A	1540 lbs	1760 lbs	N/A	3080 lbs	2640 lbs	3210 lbs	
4 Anchors @ 7.75" Min. c.c. Installed Into Ref. 1		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
6 Anchors @ 7.75" Min. c.c. Installed Into Ref. 1		3080 lbs	3080 lbs	3080 lbs	3080 lbs	N/A	3080 lbs	3080 lbs	3080 lbs	3080 lbs	N/A	N/A	3080 lbs	3080 lbs	3080 lbs	3080 lbs	3520 lbs	4280 lbs	

SEE SUBSTRATE PROPERTIES, SHEET 1



2 MULLION CLIPS ON EACH END OF MULLION



2 MULLION CLIPS ON EACH END OF MULLION

TABLE NOTES:
1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT/UNIFORMLY LOADED CLARIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE MID-SLOTTED, 0.656" O.C. FROM CLIP EDGE.

3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



2" X 6" X .125" TUBE MULLION

WINDOOR
WINDOW & DOOR MANUFACTURERS ASSOCIATION INTERNATIONAL
3910 PRESTIGE PARKWAY EAST
SARASOTA, FL 34240
(941) 484-3454

ALUMINUM MULLIONS, CLIPPED (LM)

2" X 6" X .125" TUBE MULLION

REVISIONS			
NO.	DESCRIPTION	DATE	APP'D
1	ADDED TABLE 2B	10/15/13	

DRAWN BY:	LM
CHECKED BY:	
DATE:	10/15/13
SCALE:	AS NOTED
SHEET NO.	2 OF 2

ANTHONY LYNN MILLER
LICENSE
No. 56765
10/15/13
STATE OF FLORIDA
PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E., FS #56765

TABLE 1A

8", 135° Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement

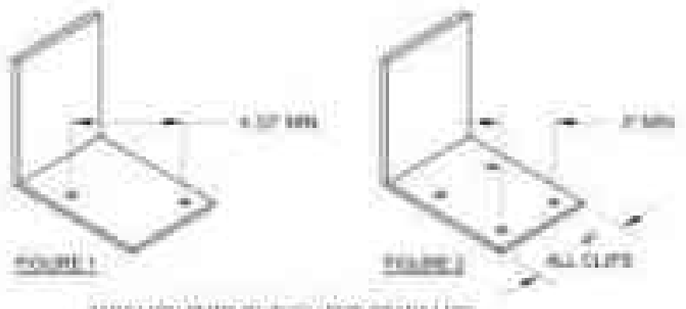
Design Pressure (psf)	Opening Dimension 60 in.								80 in.								100 in.								120 in.							
	Fixed Leaf or Mullion		Operating Leaf or Mullion						Fixed Leaf or Mullion		Operating Leaf or Mullion						Fixed Leaf or Mullion		Operating Leaf or Mullion						Fixed Leaf or Mullion		Operating Leaf or Mullion					
	Clip Capacity (lbs/ft)	Clip Spacing (in)	Anchor Capacity (lbs/ft)	Anchor Spacing (in)	Clip Capacity (lbs/ft)	Clip Spacing (in)	Anchor Capacity (lbs/ft)	Anchor Spacing (in)	Clip Capacity (lbs/ft)	Clip Spacing (in)	Anchor Capacity (lbs/ft)	Anchor Spacing (in)	Clip Capacity (lbs/ft)	Clip Spacing (in)	Anchor Capacity (lbs/ft)	Anchor Spacing (in)	Clip Capacity (lbs/ft)	Clip Spacing (in)	Anchor Capacity (lbs/ft)	Anchor Spacing (in)	Clip Capacity (lbs/ft)	Clip Spacing (in)	Anchor Capacity (lbs/ft)	Anchor Spacing (in)	Clip Capacity (lbs/ft)	Clip Spacing (in)	Anchor Capacity (lbs/ft)	Anchor Spacing (in)	Clip Capacity (lbs/ft)	Clip Spacing (in)	Anchor Capacity (lbs/ft)	Anchor Spacing (in)
15 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
20 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
25 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
30 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
35 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
40 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
45 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
50 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
55 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
60 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
65 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
70 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
75 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
80 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
85 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
90 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
95 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in
100 psf	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in	192.0	72in

TABLE 1B

8", 135° Tube Mullion Clip/Anchor Capacity

Substrate	Wood				Steel				Aluminum				Masonry				Concrete			
Anchor Type	#14 Screw		#14 Screw		#14 Screw		#14 Screw		#14 Screw		#14 Screw		#14 Screw		#14 Screw		1/4" Tapcon		1/4" Tapcon	
Edge Distance (in)	1"	2 1/2"	1"	2 1/2"	1 1/2"	1"	2 1/2"	1"	2 1/2"	1 1/2"	1 1/2"	1"	1"	1"	2"	1 1/2"	1"	2 1/2"	1"	2 1/2"
Embedment (in)	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
1 Row Anchors @ 3.25" O.C. Into Mullion Cavity (Per Fig. 1)	920 lbs	1380 lbs	690 lbs	1380 lbs	690 lbs	920 lbs	1380 lbs	690 lbs	1380 lbs	690 lbs	690 lbs	920 lbs	690 lbs	920 lbs	460 lbs	690 lbs	920 lbs	1380 lbs	920 lbs	1380 lbs
2 Row Anchors @ 3.25" O.C. Into Mullion Cavity (Per Fig. 1)	1840 lbs	2760 lbs	1380 lbs	2760 lbs	1380 lbs	1840 lbs	2760 lbs	1380 lbs	2760 lbs	1380 lbs	1380 lbs	1840 lbs	1380 lbs	1840 lbs	920 lbs	1380 lbs	1840 lbs	2760 lbs	1840 lbs	2760 lbs

SEE SUBSTRATE PACKMARTIES, SHEET 1



2 MULLION CLIPS ON EACH END OF MULLION

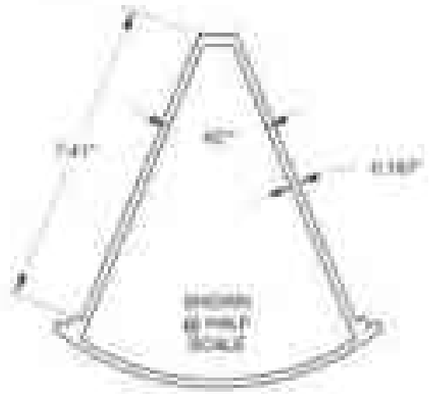
TABLE NOTES:

1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT LOAD/MOMENT LOADED CLIP APPLICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 3/4" O.C. FROM CLIP EDGE.

3) SEE SHEET 1 FOR ADDITIONAL ANCHOR SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



8", 135° TUBE MULLION
VERTICAL APPLICATIONS ONLY

WINDOOR
WINDOOR TECHNOLOGIES
300 PRAIRIE CORPORATE BLVD.
N. VENICE, FL 34275
(941) 484-7665

ALUMINUM MULLIONS, CLIP/ANCHOR (LM)

8", 135° TUBE MULLION

DESIGNED JENS

DRAWN

MULLION

ANTHONY LYNN MILLER
LICENSE
No. 56765
10/13/23
STATE OF FLORIDA
PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E. - FL# 56765

TABLE 2A

2" x 4-1/8" Thermally-Broken Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement		60 in.				80 in.				100 in.				120 in.				140 in.				160 in.				180 in.				200 in.			
		Fixed (center Mullion)		Unbalanced (center Mullion)		Fixed (center Mullion)		Unbalanced (center Mullion)		Fixed (center Mullion)		Unbalanced (center Mullion)		Fixed (center Mullion)		Unbalanced (center Mullion)		Fixed (center Mullion)		Unbalanced (center Mullion)		Fixed (center Mullion)		Unbalanced (center Mullion)		Fixed (center Mullion)		Unbalanced (center Mullion)		Fixed (center Mullion)		Unbalanced (center Mullion)	
		Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)
Mullion Span	60 in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150
	80 in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150
	96 (8ft) in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150
	100 in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150
	110 in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150
	120 in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150
	130 in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150
	140 in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150
	150 in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150
	160 in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150
	170 in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150
	180 in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150
	190 in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150
	200 in.	160.2	160	160.0	160	150.0	150	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	160.0	160.0	160.0	160	150.0	150.0	160.0	160	150.0	150.0	160.0	160	150.0	150

TABLE 2B

2" x 4-1/8" Thermally-Broken Tube Mullion Clip/Anchor Capacity	Submittal	Clip Calculate				Clip Screw	Mullion (MF)					Track (MF)				Shims		Glass
	Assembly Type	#14 Optional (Required)		#12 Optional (Required)		#12 Shim (Required)	#14 Optional (Required)		#12 Optional (Required)		#12 Shim (Optional/Not Required)	#14 Optional (Required)		#12 Optional (Required)	#12 Shim (Suggested)	#10 Sheet Screws	#10 Sheet Screws	#10 Sheet Screws
	Edge Distance (e)	1"	2 1/2"	1"	2 1/2"	2 1/8"	1"	2 1/2"	1"	2 1/2"	2 1/2"	2"	1"	2"	2"	2 3/8"	2 3/8"	2 3/8"
	Spacing (s)	2 1/8"	3 3/4"	2 1/8"	3 3/4"	2"	2 1/8"	3 3/4"	2 1/8"	3 3/4"	3 3/4"	2 1/8"	2 1/8"	2"	2"	3 3/8"	3 3/8"	See Sheet 1
	1 Anchor @ 2 1/8" Min. O.C. (Mullion Clip Fig. 1)	187 lbs	1080 lbs	417 lbs	1777 lbs	150 lbs	150 lbs	1080 lbs	187 lbs	1777 lbs	1800 lbs	N/A	150 lbs	150 lbs	150 lbs	225 lbs	1777 lbs	1777 lbs
	2 Anchors @ 3 3/4" Min. O.C. (Mullion Clip Fig. 1)	187 lbs	3520 lbs	750 lbs	N/A	N/A	N/A	1440 lbs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1777 lbs	2145 lbs	2145 lbs
	2 Anchors @ 2 1/8" Min. O.C. (Track Clip Fig. 2)	N/A	N/A	N/A	1440 lbs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	800 lbs
	2 Anchors @ 3 3/4" Min. O.C. (Track Clip Fig. 2)	263 lbs	1440 lbs	667 lbs	1920 lbs	N/A	N/A	1920 lbs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1920 lbs	1775 lbs	1775 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1.

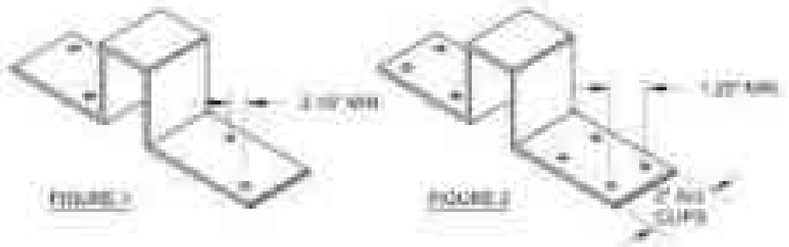


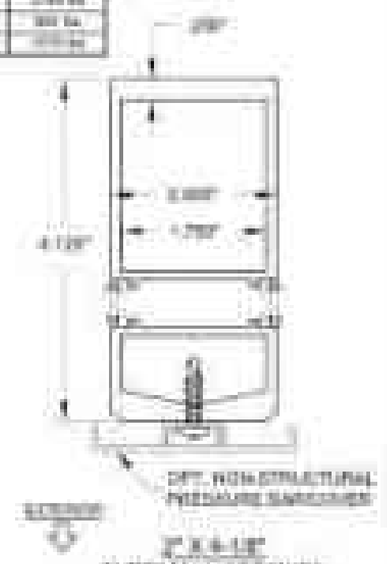
TABLE NOTES:

1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR NON-UNIFORMLY LOADED CLASSIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 3/4" O.C. FROM CLIP EDGE.

3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



WINDOOR
WINDOW SYSTEMS
ALUMINUM MULLIONS, CLIP/ANCHOR
2" X 4-1/8" TB TUBE MULLION
MULLION (MF)
DRAWING SHEET
DRAWING INDEX
DRAWING SHEET
10 OF 11

ANTHONY LYNN MILLER
LICENSE
No. 56755
10/15/25
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., FL# 56755

TABLE 2A

1-1/2" x 4-1/4" Thermally Broken Tube Mullion w/Pressure Bar Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																													
	60 in				80 in				90 in				100 in				120 in				140 in				160 in				180 in			
	Point Load (Inches)		Uniformly Load (Inches)		Point Load (Inches)		Uniformly Load (Inches)		Point Load (Inches)		Uniformly Load (Inches)		Point Load (Inches)		Uniformly Load (Inches)		Point Load (Inches)		Uniformly Load (Inches)		Point Load (Inches)		Uniformly Load (Inches)		Point Load (Inches)		Uniformly Load (Inches)		Point Load (Inches)		Uniformly Load (Inches)	
Design Pressure (psf)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)	Load (lbs)	Deflection (in)
15 psf	1800	.750	1800	.469	1800	.844	1800	.844	1800	1.125	1800	.703	1800	1.406	1800	.781	1800	1.688	1800	1.055	1800	1.406	1800	.844	1800	2.250	1800	1.406	1800	.938
20 psf	1800	.781	1800	.938	1800	.938	1800	.703	1800	1.250	1800	.938	1800	1.563	1800	.977	1800	2.188	1800	1.406	1800	2.000	1800	1.125	1800	2.500	1800	1.875	1800	1.250
25 psf	1800	.469	1800	.937	1800	1.054	1800	.781	1800	1.375	1800	1.172	1800	1.719	1800	1.172	1800	2.063	1800	1.758	1800	2.406	1800	1.406	1800	2.750	1800	2.344	1800	1.563
30 psf	1800	.938	1800	.938	1800	1.266	1800	.938	1800	1.500	1800	1.406	1800	1.875	1800	1.406	1800	2.250	1800	2.109	1800	2.813	1800	1.688	1800	3.000	1800	2.813	1800	1.875
35 psf	1800	1.078	1800	.844	1800	1.219	1800	1.094	1800	1.625	1800	1.641	1800	2.031	1800	1.641	1800	2.438	1800	2.461	1800	2.906	1800	1.969	1800	3.250	1800	3.281	1800	2.188
40 psf	1800	1.250	1800	.938	1800	1.406	1800	1.250	1800	1.750	1800	1.875	1800	2.344	1800	1.875	1800	2.625	1800	2.813	1800	3.375	1800	2.250	1800	3.500	1800	3.750	1800	2.500
45 psf	1800	1.406	1800	1.055	1800	1.594	1800	1.406	1800	1.969	1800	2.109	1800	2.656	1800	2.109	1800	2.813	1800	3.164	1800	3.844	1800	2.531	1800	3.750	1800	4.219	1800	2.813
50 psf	1800	1.563	1800	1.172	1800	1.688	1800	1.563	1800	2.188	1800	2.344	1800	2.813	1800	2.344	1800	3.000	1800	3.516	1800	4.000	1800	2.813	1800	4.000	1800	4.688	1800	3.125
55 psf	1800	1.719	1800	1.289	1800	1.859	1800	1.719	1800	2.406	1800	2.578	1800	3.094	1800	2.578	1800	3.000	1800	3.867	1800	4.000	1800	3.094	1800	4.000	1800	4.000	1800	3.438
60 psf	1800	1.875	1800	1.406	1800	2.000	1800	1.875	1800	2.625	1800	2.813	1800	3.375	1800	2.813	1800	3.000	1800	4.000	1800	4.000	1800	3.375	1800	4.000	1800	4.000	1800	3.750
70 psf	1800	2.188	1800	1.641	1800	2.000	1800	2.188	1800	3.000	1800	3.281	1800	3.938	1800	3.281	1800	3.000	1800	4.000	1800	4.000	1800	3.938	1800	4.000	1800	4.000	1800	4.000
80 psf	1800	2.500	1800	1.875	1800	2.000	1800	2.500	1800	3.000	1800	3.750	1800	4.000	1800	3.750	1800	3.000	1800	4.000	1800	4.000	1800	4.000	1800	4.000	1800	4.000	1800	4.000
90 psf	1800	2.813	1800	2.109	1800	2.000	1800	2.813	1800	3.000	1800	4.000	1800	4.000	1800	4.000	1800	3.000	1800	4.000	1800	4.000	1800	4.000	1800	4.000	1800	4.000	1800	4.000
100 psf	1800	3.125	1800	2.344	1800	2.000	1800	3.125	1800	3.000	1800	4.000	1800	4.000	1800	4.000	1800	3.000	1800	4.000	1800	4.000	1800	4.000	1800	4.000	1800	4.000	1800	4.000

TABLE 2B

1-1/2" x 4-1/4" Thermally Broken Tube Mullion w/Pressure Bar Clip/Anchor Capacity	Substrate	Aluminum				1/16" Screw	Vinyl (PVC)						Fiber (FRP)			Wood		
	Anchor Type	5/16" Outside Diameter		1/4" Outside Diameter		5/16" Screw Diameter	5/16" Outside Diameter		1/4" Outside Diameter		1/4" Screw Outside Diameter	1/4" Screw Hugger/Direct	5/16" Outside Diameter	1/4" Outside Diameter	1/4" Screw Hugger/Direct	#12 Sheet Screw	#14 Sheet Screw	#12 Lag Screw
	Edge Distance (in.)	1"	6 1/2"	1"	6 1/2"	6 1/8"	1"	6 1/2"	1"	6 1/2"	6 1/2"	2"	1"	1"	2"	1 1/4"	2 1/8"	2 3/8"
	Embedment (in.)	1 3/4"	2 3/4"	1 3/4"	1 3/4"	2"	1 1/2"	1 1/2"	2 1/4"	1 1/4"	1 1/2"	1 1/2"	1 3/4"	1 3/4"	2"	1 3/4"	1 3/4"	See Note 1
4 Anchors @ 3 5/8" Min. O.C.	1 Anchor Clip (Fig. 1)	300 lbs	1800 lbs	450 lbs	1125 lbs	1440 lbs	300 lbs	1800 lbs	375 lbs	1125 lbs	994 lbs	540	288 lbs	850 lbs	N/A	688 lbs	1375 lbs	1375 lbs
6 Anchors @ 3 5/8" Min. O.C.	1 Anchor Clip (Fig. 1)	375 lbs	2531 lbs	563 lbs	1407 lbs	N/A	462 lbs	1406 lbs	787 lbs	1837 lbs	1774 lbs	N/A	540 lbs	927 lbs	N/A	1100 lbs	2140 lbs	2140 lbs
2 Anchors @ 5 1/2" Min. O.C.	1 Anchor Clip (Fig. 2)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	825 lbs
4 Anchors @ 3 5/8" Min. O.C.	1 Anchor Clip (Fig. 3)	487 lbs	1080 lbs	407 lbs	1107 lbs	N/A	343 lbs	740 lbs	453 lbs	993 lbs	970 lbs	540	360 lbs	443 lbs	N/A	688 lbs	1375 lbs	1375 lbs

SEE SUBSTRATE PROPERTIES SHEET 1

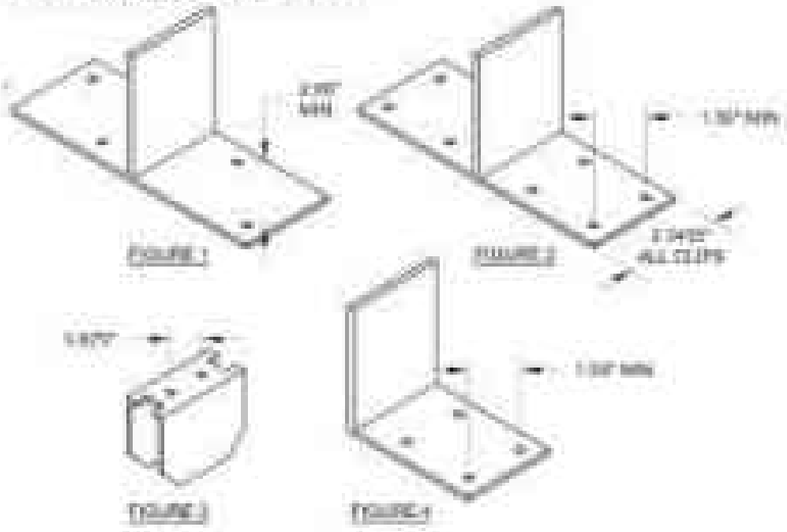


TABLE NOTES:
1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT UNIFORMLY LOADED CLARIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 3/4" O.C. FROM CLIP EDGE.

3) SEE SHEET 1 FOR ADDITIONAL ANCHORING SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.

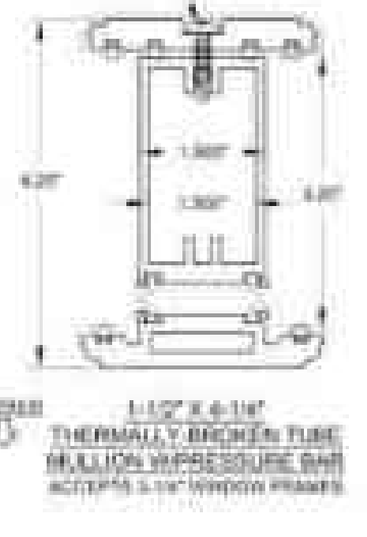


TABLE 2A, 2B

1-1/2" X 4-1/4" THERMALLY BROKEN TUBE MULLION W/PRESSURE BAR

ALUMINUM MULLIONS, CLIPPED (LW)

WINDOOR

ASSEMBLY LYNN MILLER No. 56765 10/15/25 STATE OF FLORIDA PROFESSIONAL ENGINEER

LYNN MILLER, P.E., FLORIDA

TABLE 7A

3-5/8" Thermally Broken, HD, 135° Tube Mullion Design Pressure & Deflection Capacity Requirement		Opening Dimension																													
		60 in				80 in				96 in				112 in				128 in				144 in				160 in				176 in			
		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion	
		Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor	Design Pressure (psf)	Safety Factor
Mullion Span	84 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	90 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	96 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	102 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	108 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	114 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	120 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	126 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	132 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	138 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	144 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	150 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	156 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	162 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	168 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	174 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01
	180 in	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01	153.2	3.01

TABLE 7B

3-5/8" Thermally Broken, HD, 135° Tube Mullion Capacity	Anchor Type	Jamb		Sill Corner		Sill Tube	Mullion (MC)					Head (HC)			Screw		Nail	
		2-1/2" Slotted Wedge-on		1-1/2" Slotted Wedge-on		3-1/8" Slot Shear Block	2-1/2" Slotted Wedge-on		1-1/2" Slotted Wedge-on		3-1/8" Slot Head Plate	1-1/8" Slot Sight Plate	2-1/2" Slotted Wedge-on	1-1/2" Slotted Wedge-on	1-1/2" Slot Sight Plate	#10 Wood Screw	#10 Wood Screw	#10 Wood Screw
	Edge Distance (E)	3"	4-1/2"	3"	4-1/2"	3-1/8"	3"	4-1/2"	3"	4-1/2"	4-1/2"	3"	3"	3"	3"	1-3/8"	2-3/8"	4-3/8"
	Embedment (D)	1-1/2"	1-1/2"	1-1/2"	1-1/2"	3"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1"	1-1/2"	1-1/2"	See Sheet 1
1 Side Anchors @ 7" from Each Side (Fig. 1)		571 lbs	2220 lbs	711 lbs	3011 lbs	N/A	997 lbs	1440 lbs	997 lbs	1997 lbs	1190 lbs	N/A	997 lbs	1997 lbs	N/A	1170 lbs	2140 lbs	2140 lbs

SEE SUBSTRATE PROPERTIES SHEET 1

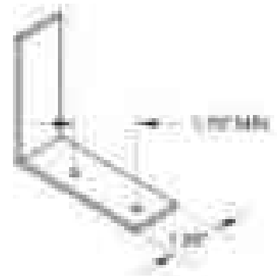


FIGURE 1
4 MULLION CLIPS ON EACH END OF MULLION

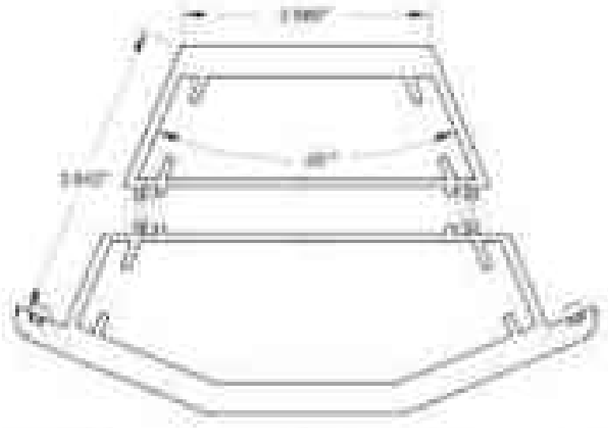
TABLE NOTES:

1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR SPACING (SPACER) IS ALLOWABLE. SEE SHEET 2 FOR POINT/UNIFORMLY LOADED CLARIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 5. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 1/8" (3.2) FROM CLIP EDGE.

3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



3-5/8" THERMALLY BROKEN, HD, 135° TUBE MULLION
VERTICAL APPLICATIONS ONLY

WINDOOR
WINDOW INDUSTRIES
ALUMINUM MULLIONS, CLIPPED (LM)
3-5/8" TB, HD, 135° TUBE MULL
MULL-H-3-5/8-135-TB-HD-LM
SHEET 4 OF 11
REVISIONS
NO. DESCRIPTION DATE
ANTHONY LYNN MILLER
LICENSE
No. 56765
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., FS #56765

TABLE 3A

1-1/2" x 5-1/2" Thermally Broken Tube Mullion w/Pressure Bar Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																											
		70 in				80 in				90 in				96 in				120 in				144 in				156 in				180 in			
		Fixed Leaded Mullion		Unlikely Leaded Mullion		Fixed Leaded Mullion		Unlikely Leaded Mullion		Fixed Leaded Mullion		Unlikely Leaded Mullion		Fixed Leaded Mullion		Unlikely Leaded Mullion		Fixed Leaded Mullion		Unlikely Leaded Mullion		Fixed Leaded Mullion		Unlikely Leaded Mullion		Fixed Leaded Mullion		Unlikely Leaded Mullion		Fixed Leaded Mullion		Unlikely Leaded Mullion	
Mullion Span	50 in	150.0	722	150.0	695	150.0	844	150.0	809	150.0	1116	150.0	1061	150.0	1466	150.0	1391	150.0	1988	150.0	1799	150.0	1987	150.0	1799	150.0	2280	150.0	1999	150.0	2811	150.0	2481
	60 in	150.0	781	150.0	618	150.0	849	150.0	772	150.0	1124	150.0	1012	150.0	1480	150.0	1341	150.0	1979	150.0	1618	150.0	2148	150.0	1618	150.0	2554	150.0	1618	150.0	3015	150.0	2618
	66 in	150.0	806	150.0	660	150.0	1001	150.0	792	150.0	1275	150.0	1009	150.0	1716	150.0	1358	150.0	2484	150.0	1966	150.0	2495	150.0	1966	150.0	2792	150.0	1966	150.0	3388	150.0	2681
	72 in	150.0	848	150.0	776	150.0	1222	150.0	967	150.0	1554	150.0	1230	150.0	1970	150.0	1559	150.0	2990	150.0	2366	150.0	3000	150.0	2366	150.0	3360	150.0	2366	150.0	4075	150.0	3225
	78 in	150.0	914	150.0	872	150.0	1444	150.0	1142	150.0	1839	150.0	1454	150.0	2337	150.0	1848	150.0	3496	150.0	2766	150.0	3505	150.0	2766	150.0	3928	150.0	2766	150.0	4762	150.0	3768
	84 in	150.0	1064	150.0	971	150.0	1679	150.0	1328	150.0	2139	150.0	1692	150.0	2718	150.0	2150	150.0	4065	150.0	3216	150.0	4076	150.0	3216	150.0	4568	150.0	3216	150.0	5538	150.0	4382
	90 in	150.0	1171	150.0	1089	150.0	1848	150.0	1435	150.0	2354	150.0	1829	150.0	2991	150.0	2324	150.0	4473	150.0	3475	150.0	4485	150.0	3475	150.0	5027	150.0	3475	150.0	6094	150.0	4735
	96 in	150.0	1298	150.0	1207	150.0	2048	150.0	1591	150.0	2609	150.0	2027	150.0	3315	150.0	2577	150.0	4958	150.0	3853	150.0	4972	150.0	3853	150.0	5572	150.0	3853	150.0	6755	150.0	5248
	102 in	150.0	1425	150.0	1326	150.0	2248	150.0	1747	150.0	2864	150.0	2225	150.0	3639	150.0	2828	150.0	5442	150.0	4230	150.0	5459	150.0	4230	150.0	6117	150.0	4230	150.0	7416	150.0	5762
	108 in	150.0	1552	150.0	1445	150.0	2448	150.0	1903	150.0	3119	150.0	2424	150.0	3963	150.0	3080	150.0	5927	150.0	4607	150.0	5946	150.0	4607	150.0	6662	150.0	4607	150.0	8077	150.0	6275
	114 in	150.0	1679	150.0	1564	150.0	2647	150.0	2059	150.0	3374	150.0	2622	150.0	4287	150.0	3331	150.0	6411	150.0	4984	150.0	6433	150.0	4984	150.0	7207	150.0	4984	150.0	8738	150.0	6789
	120 in	150.0	1807	150.0	1684	150.0	2847	150.0	2214	150.0	3629	150.0	2820	150.0	4611	150.0	3583	150.0	6896	150.0	5361	150.0	6920	150.0	5361	150.0	7753	150.0	5361	150.0	9400	150.0	7302
	126 in	150.0	1934	150.0	1803	150.0	3047	150.0	2370	150.0	3884	150.0	3018	150.0	4935	150.0	3834	150.0	7380	150.0	5738	150.0	7407	150.0	5738	150.0	8298	150.0	5738	150.0	10062	150.0	7816
	132 in	150.0	2062	150.0	1923	150.0	3247	150.0	2525	150.0	4139	150.0	3216	150.0	5259	150.0	4086	150.0	7865	150.0	6115	150.0	7894	150.0	6115	150.0	8844	150.0	6115	150.0	10724	150.0	8330
	138 in	150.0	2191	150.0	2043	150.0	3447	150.0	2681	150.0	4394	150.0	3414	150.0	5583	150.0	4337	150.0	8349	150.0	6492	150.0	8381	150.0	6492	150.0	9389	150.0	6492	150.0	11386	150.0	8844
	144 in	150.0	2319	150.0	2162	150.0	3647	150.0	2836	150.0	4648	150.0	3612	150.0	5906	150.0	4589	150.0	8834	150.0	6869	150.0	8868	150.0	6869	150.0	9935	150.0	6869	150.0	12048	150.0	9358

TABLE 3B

1-1/2" x 5-1/2" Thermally Broken Tube Mullion w/Pressure Bar Clip/Anchor Capacity	Summary	Jb Concrete				Mullion Data						Keep Data				Screws		Notes
	Anchor Type	2-1/4" Diameter Ultracon		1-1/4" Diameter Ultracon		2-1/2" Dia Ultracon	2-1/4" Diameter Ultracon		1-1/2" Diameter Ultracon		1-1/4" Dia Clip/Plate	1-1/2" Dia Aggregate	2-1/4" Diameter Ultracon	1-1/4" Diameter Ultracon	1-1/4" Dia Aggregate	#10 Sheet Screw	#14 Sheet Screw	#12 Sheet Screw
	Edge Distance (in)	3"	2-1/2"	3"	2-1/2"	3-1/8"	3"	2-1/2"	3"	2-1/2"	2-1/2"	3"	3"	2"	3"	2"	2-1/4"	2-1/2"
	Embedment (in)	2-1/4"	1-3/4"	1-3/4"	1-3/4"	3"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/4"	1-3/4"	See Sheet 1
3 Anchors @ 6.5" Max. O.C. - Mullion Clip (Fig. 1)		1620 lbs	1260 lbs	540 lbs	1782 lbs	1620 lbs	1620 lbs	1215 lbs	810 lbs	1134 lbs	945 lbs	756 lbs	945 lbs	756 lbs	945 lbs	756 lbs	1215 lbs	1215 lbs
3 Anchors @ 7" Max. O.C. - Mullion Clip (Fig. 1)		1215 lbs	2835 lbs	810 lbs	2430 lbs	1215 lbs	729 lbs	1458 lbs	1215 lbs	2835 lbs	1215 lbs	N/A	945 lbs	945 lbs	N/A	1215 lbs	2835 lbs	2835 lbs
3 Anchors @ 7.5" Max. O.C. - Mullion Clip (Fig. 1)		1215 lbs	3150 lbs	1215 lbs	3307 lbs	N/A	1296 lbs	1890 lbs	1458 lbs	3780 lbs	2187 lbs	N/A	1260 lbs	1134 lbs	N/A	1215 lbs	3780 lbs	3307 lbs
3 Anchors @ 6.625" Min. O.C. - Mullion Clip (Fig. 1)		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3 Anchors @ 7" Min. O.C. - Mullion Clip (Fig. 1)		1620 lbs	1260 lbs	810 lbs	2722 lbs	1620 lbs	1620 lbs	1134 lbs	810 lbs	1134 lbs	945 lbs	756 lbs	945 lbs	756 lbs	945 lbs	756 lbs	1215 lbs	1134 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1

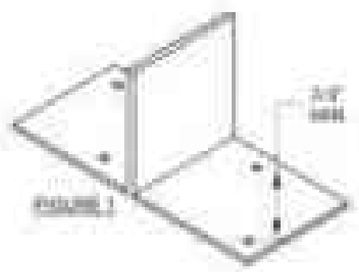


FIGURE 1

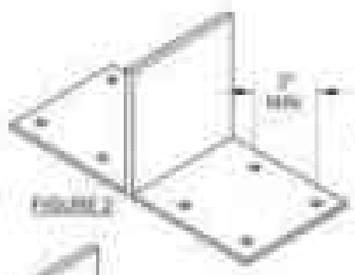


FIGURE 2

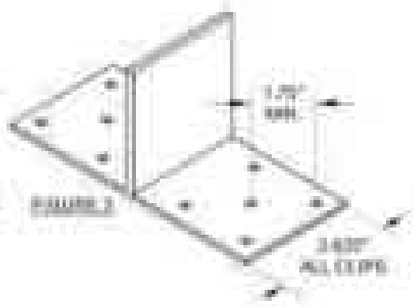


FIGURE 3



FIGURE 4

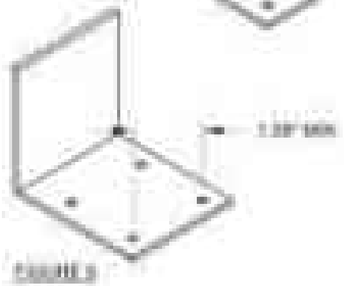


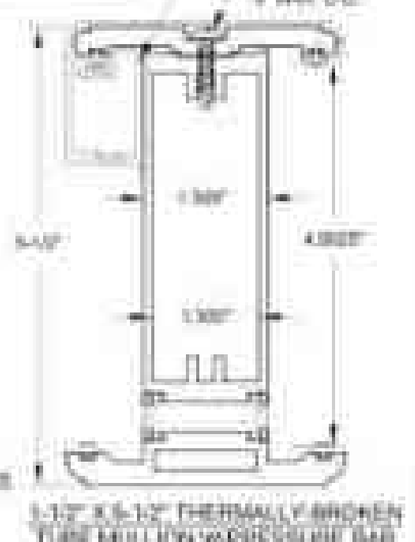
FIGURE 5

TABLE NOTES:
1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POSITIVE/IMPERMEABLY LOADED CLASSIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 3/8" O.C. FROM CUT EDGE.

3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



1-1/2" X 5-1/2" THERMALLY BROKEN TUBE MULLION W/ PRESSURE BAR
ACCEPTS 4-9/16" WINDOW FRAMES

WINDOOR®	CORRECT MULL DESCRIPTION: SS
ALUMINUM MULLIONS, CLIPPED (LM)	JENS KOSTWEIN
5.000" X 1-1/2" TB TUBE MULLION	10/18/23
MULLION	13 OF 41

ANTHONY LYNN MILLER
LICENSE
No. 56765
10/18/23
STATE OF
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., P.E.(RET)

TABLE 3A

5-3/8" Thermally Broken, 135° Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																											
	30 in				40 in				50 in				60 in				70 in				80 in				90 in			
	Front Loaded Mullion		Unbalanced Loaded Mullion		Front Loaded Mullion		Unbalanced Loaded Mullion		Front Loaded Mullion		Unbalanced Loaded Mullion		Front Loaded Mullion		Unbalanced Loaded Mullion		Front Loaded Mullion		Unbalanced Loaded Mullion		Front Loaded Mullion		Unbalanced Loaded Mullion		Front Loaded Mullion		Unbalanced Loaded Mullion	
	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)	Positive Design Pressure (psf)	Negative Design Pressure (psf)
Mullion Span																												
10 in	324.0	324	180.0	180	138.0	138	102.0	102	156.0	156	96.0	96	90.0	90	60.0	60	66.0	66	42.0	42	54.0	54	36.0	36	48.0	48	30.0	30
20 in	156.0	156	90.0	90	72.0	72	48.0	48	78.0	78	48.0	48	48.0	48	30.0	30	36.0	36	24.0	24	30.0	30	18.0	18	24.0	24	18.0	18
30 in	102.0	102	60.0	60	48.0	48	30.0	30	54.0	54	30.0	30	36.0	36	18.0	18	24.0	24	18.0	18	24.0	24	12.0	12	18.0	18	12.0	12
40 in	78.0	78	48.0	48	36.0	36	24.0	24	42.0	42	24.0	24	30.0	30	12.0	12	18.0	18	12.0	12	18.0	18	12.0	12	12.0	12	12.0	12
50 in	66.0	66	36.0	36	30.0	30	18.0	18	36.0	36	18.0	18	24.0	24	12.0	12	18.0	18	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12
60 in	54.0	54	30.0	30	24.0	24	18.0	18	30.0	30	18.0	18	18.0	18	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12
70 in	48.0	48	30.0	30	24.0	24	18.0	18	24.0	24	18.0	18	18.0	18	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12
80 in	42.0	42	24.0	24	18.0	18	12.0	12	24.0	24	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12
90 in	36.0	36	24.0	24	18.0	18	12.0	12	18.0	18	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12
100 in	36.0	36	18.0	18	18.0	18	12.0	12	18.0	18	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12
110 in	30.0	30	18.0	18	12.0	12	12.0	12	18.0	18	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12
120 in	30.0	30	18.0	18	12.0	12	12.0	12	18.0	18	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12
130 in	30.0	30	18.0	18	12.0	12	12.0	12	18.0	18	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12
140 in	30.0	30	18.0	18	12.0	12	12.0	12	18.0	18	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12
150 in	30.0	30	18.0	18	12.0	12	12.0	12	18.0	18	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12
160 in	30.0	30	18.0	18	12.0	12	12.0	12	18.0	18	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12	12.0	12

TABLE 3B

5-3/8" Thermally Broken, 135° Tube Mullion Clip/Anchor Capacity	Material	Al. Extrusion				Clip Screw	Anchor (Typ.)						Wood Screw (Typ.)			Wood		Metal
	Anchor Type	0.125" Slotted Attachment		0.25" Slotted Attachment		0.140" Screw Attachment	0.125" Slotted Attachment		0.25" Slotted Attachment		0.5" Screw Attachment	0.140" Screw Attachment	#14 Screw Attachment	0.5" Slotted Attachment	0.25" Slotted Attachment	#10 Screw Shank	#14 Screw Shank	#12 Screw Shank
	Edge Distance (in.)	1"	1-1/2"	1"	1-1/2"	1-1/8"	1"	1-1/2"	1"	1-1/2"	2-1/2"	2"	1"	1"	1"	1-1/8"	1-1/2"	1-1/8"
	Embedment (in.)	1-1/4"	1-3/4"	1-1/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	2"	1-1/4"	1-1/2"	See Detail
2 Total Anchors @ 3.5" O.C. Max Anch.E.D.Angle Clip Pad (Fig. 1)	600 lbs	1440 lbs	440 lbs	1160 lbs	2800 lbs	600 lbs	760 lbs	600 lbs	1160 lbs	3880 lbs	1540 lbs	280 lbs	760 lbs	1600 lbs	880 lbs	2240 lbs	1520 lbs	
3 Total Anchors @ 3" O.C. Max Anch.E.D.Angle Clip Pad (Fig. 2)	1120 lbs	2280 lbs	820 lbs	1840 lbs	4370 lbs	1120 lbs	1200 lbs	1080 lbs	1840 lbs	5820 lbs	2310 lbs	420 lbs	1200 lbs	2400 lbs	1320 lbs	3360 lbs	2280 lbs	
10 Total Anchors @ 1.75" O.C. Max Anch.E.D.Angle Clip Pad (Fig. 3)	2.2 lbs	5100 lbs	1520 lbs	4080 lbs	N/A	2080 lbs	2680 lbs	2000 lbs	4080 lbs	12920 lbs	5130 lbs	N/A	2680 lbs	5320 lbs	2920 lbs	7440 lbs	5060 lbs	
3 Total Anchors @ 1.75" O.C. Max Anch.E.Angle Clip Pad (Fig. 4)	1120 lbs	2280 lbs	820 lbs	1840 lbs	N/A	1120 lbs	1200 lbs	1080 lbs	1840 lbs	5820 lbs	2310 lbs	N/A	1200 lbs	2400 lbs	1320 lbs	3360 lbs	2280 lbs	

SEE SUBSTRATE PROPERTIES, SHEET 1.

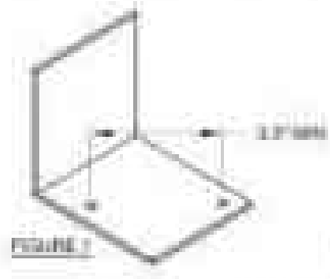


FIGURE 1

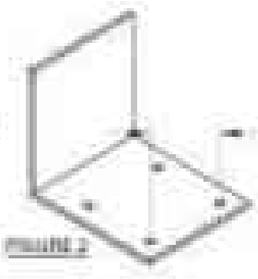


FIGURE 2

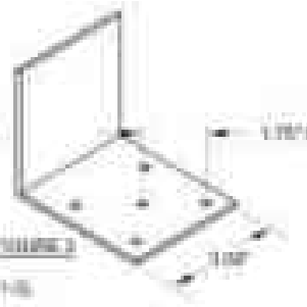


FIGURE 3

2 MULLION CLIPS ON EACH END OF MULLION (FIG. 1-3)



FIGURE 4

4 MULLION CLIPS ON EACH END OF MULLION

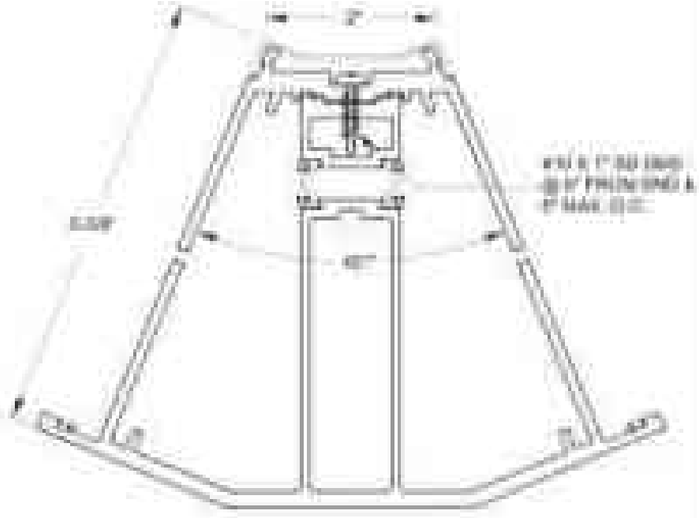
TABLE NOTES:

1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT/UNIFORMLY LOADED CLASSIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 3/8" (9.5) FROM CLIP EDGE.

3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



5-3/8" THERMALLY BROKEN, 135° TUBE MULLION
VERTICAL APPLICATIONS ONLY

WINDOOR
ENGINEERED ENTRIES
ALUMINUM MULLIONS, CLIPPED (LW)
5.375" TB, 135° TUBE MULLION
MULL5-1
TUBE135
ANSI AISI (SI/IMPERIAL)
1 OF 2
11/19/19

ANTHONY LYNN MILLER
LICENSE
No. 56765
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., FES #56765

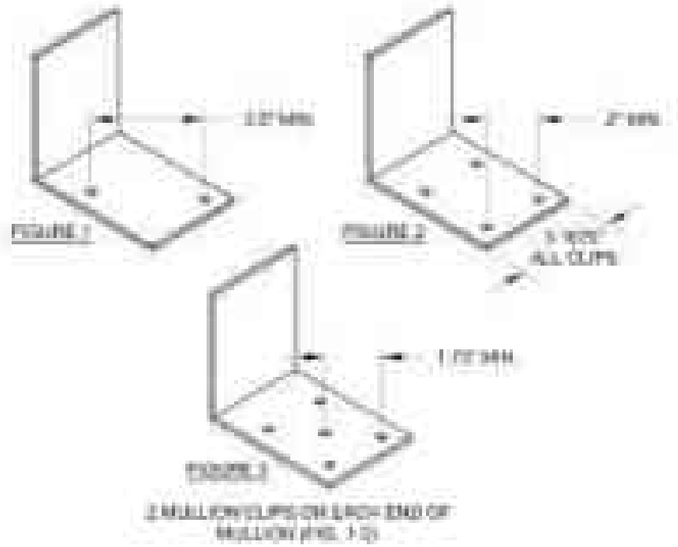
TABLE 1(A)

5-3/8" Thermally Broken Adjustable Bay Mullion Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																											
	30 in				40 in				50 in				60 in				70 in				80 in				90 in			
	Fixed (Upward Mullion)		Unbalanced (Upward Mullion)		Fixed (Upward Mullion)		Unbalanced (Upward Mullion)		Fixed (Upward Mullion)		Unbalanced (Upward Mullion)		Fixed (Upward Mullion)		Unbalanced (Upward Mullion)		Fixed (Upward Mullion)		Unbalanced (Upward Mullion)		Fixed (Upward Mullion)		Unbalanced (Upward Mullion)		Fixed (Upward Mullion)		Unbalanced (Upward Mullion)	
Mullion Span	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Requirement (lbs)
24 in	150.0	703	150.0	562	150.0	937	150.0	808	150.0	1109	150.0	758	150.0	1438	150.0	1115	150.0	1884	150.0	1481	150.0	2345	136.5	1876	114.0	1567	100.0	2841	78.0	1964
30 in	150.0	781	150.0	618	150.0	938	132.0	715	150.0	1258	150.0	849	150.0	1613	150.0	1247	150.0	1875	119.0	918	119.0	2348	100.0	1845	100.0	1386	87.5	2831	68.0	1720
36 in	150.0	859	150.0	687	139.0	1031	109.0	787	150.0	1379	130.0	940	150.0	1788	130.0	1379	150.0	2063	100.0	1018	100.0	2579	85.0	1814	85.0	1536	75.0	2821	58.0	1716
72 in	150.0	938	150.0	775	150.0	1126	150.0	941	150.0	1500	150.0	1040	150.0	1974	150.0	1520	150.0	2251	130.0	1121	130.0	2820	110.0	1784	110.0	1694	97.5	2810	75.0	1964
78 in	150.0	1016	150.0	843	150.0	1219	150.0	894	150.0	1620	150.0	1231	150.0	2161	150.0	1661	150.0	2439	130.0	1224	130.0	3044	110.0	1938	110.0	1834	97.5	3029	75.0	1964
84 in	150.0	1095	150.0	911	150.0	1313	150.0	1075	150.0	1750	150.0	1322	150.0	2346	150.0	1802	150.0	2650	130.0	1448	130.0	3402	110.0	2091	110.0	1974	97.5	3249	75.0	1964
97 in	150.0	1172	150.0	1048	150.0	1406	142.0	1173	150.0	1875	142.0	1416	150.0	2494	150.0	1920	150.0	2874	142.0	1575	142.0	3628	120.0	2278	120.0	2149	106.5	3471	82.0	2146
96 in	150.0	1250	150.0	1087	150.0	1563	150.0	1286	150.0	2083	150.0	1650	150.0	2639	150.0	2031	150.0	3045	150.0	1890	150.0	3837	129.0	2464	129.0	2324	114.0	3693	87.0	2328
108 in	150.0	1408	150.0	1226	150.0	1969	150.0	1498	150.0	2345	150.0	1858	150.0	2972	150.0	2289	150.0	3429	150.0	2126	150.0	4320	145.0	3026	145.0	2616	128.5	4159	98.0	2621
120 in	150.0	1563	150.0	1364	150.0	2188	150.0	1710	150.0	2606	150.0	2066	150.0	3304	150.0	2546	150.0	3813	150.0	2363	150.0	4803	150.0	3365	150.0	2908	142.5	4625	109.0	2914
126 in	150.0	1641	150.0	1425	150.0	2297	150.0	1922	150.0	2736	150.0	2170	150.0	3470	150.0	2675	150.0	4005	150.0	2482	150.0	5045	150.0	3535	150.0	3054	150.0	4857	114.5	3060
132 in	150.0	1719	150.0	1504	150.0	2406	150.0	2014	150.0	2866	150.0	2274	150.0	3635	150.0	2804	150.0	4196	150.0	2600	150.0	5287	150.0	3704	150.0	3200	150.0	5089	120.0	3207
138 in	150.0	1797	150.0	1582	150.0	2516	150.0	2106	150.0	2997	150.0	2378	150.0	3801	150.0	2933	150.0	4388	150.0	2719	150.0	5529	150.0	3874	150.0	3346	150.0	5321	125.5	3353
144 in	150.0	1875	150.0	1660	150.0	2625	150.0	2198	150.0	3127	150.0	2482	150.0	3966	150.0	3061	150.0	4579	150.0	2837	150.0	5771	150.0	4043	150.0	3492	150.0	5553	131.0	3499

TABLE 1(B)

5-3/8" Thermally Broken Adjustable Bay Mullion Clip/Anchor Capacity	Screw(s)		Nut Capacity		T-Bolt Capacity	Anchor (lbs)						Plate (lbs)			Beam	Note
	Anchor Type		5/16" Slotted (Aluminum)		3/8" Slotted (Aluminum)	5/16"-18 x 3 in (Steel)	5/16" Slotted (Aluminum)		1/4" Slotted (Aluminum)		1/4" Slotted Cast Iron	1/4" Slotted (Aluminum)	5/16" Slotted (Aluminum)	1/4" Slotted (Aluminum)	#12 Steel Screw	#12 Steel Screw	#12 Steel Screw
	Edge Distance (in)		1"	0.75"	1"	0.125"	1"	0.75"	1"	0.75"	0.75"	1"	1"	1"	0.188"	0.188"	0.188"
	Embedment (in)		1.00"	1.00"	1.00"	2.5"	1"	1.00"	1"	1.00"	1.00"	1.00"	1.00"	1.00"	1.00"	1.00"	See Note 1
4 Total Anchors @ 3" O.C. Max and Angle Clip Post Qty. 1)	525 lbs	1,050 lbs	700 lbs	1,050 lbs	525 lbs	400 lbs	750 lbs	400 lbs	1,050 lbs	600 lbs	700 lbs	525 lbs	750 lbs	1,050 lbs	525 lbs	1,575 lbs	1,575 lbs
6 Total Anchors @ 3" O.C. Max and Angle Clip Post Qty. 1)	1,137 lbs	1,950 lbs	1,517 lbs	2,437 lbs	1,275 lbs	1,125 lbs	1,687 lbs	1,125 lbs	2,362 lbs	1,350 lbs	1,575 lbs	N/A	1,687 lbs	2,362 lbs	1,181 lbs	3,146 lbs	3,146 lbs
12 Total Anchors @ 3" O.C. Max and Angle Clip Post Qty. 1)	2,917 lbs	3,150 lbs	3,117 lbs	4,837 lbs	N/A	2,500 lbs	3,937 lbs	2,500 lbs	5,250 lbs	3,000 lbs	3,500 lbs	N/A	3,937 lbs	5,250 lbs	N/A	6,615 lbs	6,615 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1



2 MULLION CLIPS ON EACH END OF MULLION (FIG. 1-3)

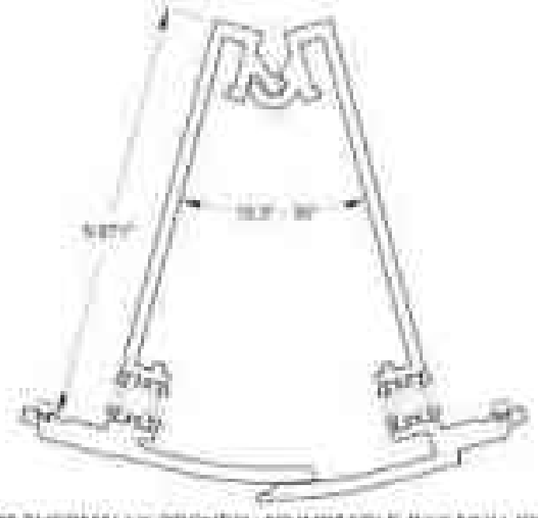
TABLE NOTES:

1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT LOAD ONLY LOADED CLIP APPLICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 3/8" O.C. FROM CLIP EDGE.

3) SEE SHEET 4 FOR ADDITIONAL ANCHOR SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY REQUIREMENT FORMULA ON SHEET 1.



5-3/8" THERMALLY BROKEN ADJUSTABLE BAY MULLION
VERTICAL APPLICATIONS ONLY

CORRECT MULLION ORIENTATION
FIGURE 1A, 1B

WINDOOR
WINDOW SYSTEMS MANUFACTURER
555 PINELAND ROAD
N. VENICE, FL 34275
(941) 484-7665

ALUMINUM MULLIONS, CLIPPED (LM)

5-3/8" TH. ADJUSTABLE BAY MULLION

JENS KOSCHWSKI

TUBEMULL-2

SHEET 2 OF 4

MULL-2

HTM

ARTHUR LYNN MILLER
LICENSE
No. 56765
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., FE 56765

TABLE 1A:

2" x 4-1/4" Thermally Broken Tube Mullion w/Snp Cap Design Pressure & Clip/Anchor Capacity Requirement

Mullion Span	60 in.				80 in.				90 in.				100 in.				120 in.				140 in.				160 in.				180 in.				200 in.			
	Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion		Fixed Leaded Mullion		Operating Leaded Mullion	
	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)	Design Pressure (+)	Design Pressure (-)
60 in.	150.0	150.0	150.0	150.0	150.0	94.6	150.0	94.6	150.0	72.9	150.0	72.9	150.0	58.6	150.0	58.6	150.0	40.7	150.0	40.7	150.0	29.9	150.0	29.9	150.0	22.9	150.0	22.9	134.9	18.1	150.0	18.1	116.2	14.4	150.0	14.4
80 in.	150.0	150.0	150.0	150.0	150.0	94.6	150.0	94.6	150.0	72.9	150.0	72.9	150.0	58.6	150.0	58.6	150.0	40.7	150.0	40.7	150.0	29.9	150.0	29.9	150.0	22.9	150.0	22.9	134.9	18.1	150.0	18.1	116.2	14.4	150.0	14.4
90 in.	150.0	150.0	150.0	150.0	150.0	94.6	150.0	94.6	150.0	72.9	150.0	72.9	150.0	58.6	150.0	58.6	150.0	40.7	150.0	40.7	150.0	29.9	150.0	29.9	150.0	22.9	150.0	22.9	134.9	18.1	150.0	18.1	116.2	14.4	150.0	14.4
100 in.	150.0	150.0	150.0	150.0	150.0	94.6	150.0	94.6	150.0	72.9	150.0	72.9	150.0	58.6	150.0	58.6	150.0	40.7	150.0	40.7	150.0	29.9	150.0	29.9	150.0	22.9	150.0	22.9	134.9	18.1	150.0	18.1	116.2	14.4	150.0	14.4
120 in.	150.0	150.0	150.0	150.0	150.0	94.6	150.0	94.6	150.0	72.9	150.0	72.9	150.0	58.6	150.0	58.6	150.0	40.7	150.0	40.7	150.0	29.9	150.0	29.9	150.0	22.9	150.0	22.9	134.9	18.1	150.0	18.1	116.2	14.4	150.0	14.4
140 in.	150.0	150.0	150.0	150.0	150.0	94.6	150.0	94.6	150.0	72.9	150.0	72.9	150.0	58.6	150.0	58.6	150.0	40.7	150.0	40.7	150.0	29.9	150.0	29.9	150.0	22.9	150.0	22.9	134.9	18.1	150.0	18.1	116.2	14.4	150.0	14.4
160 in.	150.0	150.0	150.0	150.0	150.0	94.6	150.0	94.6	150.0	72.9	150.0	72.9	150.0	58.6	150.0	58.6	150.0	40.7	150.0	40.7	150.0	29.9	150.0	29.9	150.0	22.9	150.0	22.9	134.9	18.1	150.0	18.1	116.2	14.4	150.0	14.4
180 in.	150.0	150.0	150.0	150.0	150.0	94.6	150.0	94.6	150.0	72.9	150.0	72.9	150.0	58.6	150.0	58.6	150.0	40.7	150.0	40.7	150.0	29.9	150.0	29.9	150.0	22.9	150.0	22.9	134.9	18.1	150.0	18.1	116.2	14.4	150.0	14.4
200 in.	150.0	150.0	150.0	150.0	150.0	94.6	150.0	94.6	150.0	72.9	150.0	72.9	150.0	58.6	150.0	58.6	150.0	40.7	150.0	40.7	150.0	29.9	150.0	29.9	150.0	22.9	150.0	22.9	134.9	18.1	150.0	18.1	116.2	14.4	150.0	14.4

TABLE 1B:

2" x 4-1/4" Thermally Broken Tube Mullion w/Snp Cap Clip/Anchor Capacity

Anchor Type	Air Operable				Fixed	Interior (IM)						Exterior (EM)						Fixed (FIX)				Mullion		Notes
	0.187" Gasket (Required)*		125" Gasket (Required)*		0.187" Glass	0.187" Gasket (Required)*		1/4" Gasket (Required)*		1/4" Glass (Required)*	1/4" Glass (Applicable)	0.187" Gasket (Required)*		1/4" Gasket (Required)*		1/4" Glass (Applicable)	0.187" Gasket (Required)*	1/4" Gasket (Required)*	1/4" Glass (Applicable)	#12 Sheet Screw	#14 Sheet Screw	#12 Sheet Screw	
Total Distance (+)	1"	0.125"	1"	0.125"	0.188"	1"	0.125"	1"	0.125"	0.125"	1"	1"	0.125"	1"	0.125"	1"	1"	0.125"	0.188"	0.125"	0.125"			
Embedment (-)	1.125"	1.125"	1.125"	1.125"	1"	1.125"	1.125"	1.125"	1.125"	1.125"	1.125"	1.125"	1.125"	1.125"	1.125"	1.125"	1.125"	1.125"	1"	1.125"	1.125"	See Note 7		
2 Anchors @ 1" Min. C.C. - Mullion Ops. Reg. (1)	150.0 lbs.	150.0 lbs.	137.5 lbs.	137.5 lbs.	150.0 lbs.	150.0 lbs.	150.0 lbs.	106.3 lbs.	150.0 lbs.	106.3 lbs.	106.3 lbs.	150.0 lbs.	150.0 lbs.	150.0 lbs.	150.0 lbs.	106.3 lbs.	150.0 lbs.	150.0 lbs.	106.3 lbs.	150.0 lbs.	150.0 lbs.	150.0 lbs.	150.0 lbs.	150.0 lbs.
3 Anchors @ 1" Min. C.C. - Mullion Ops. Reg. (2)	150.0 lbs.	150.0 lbs.	150.0 lbs.	N/A	N/A	N/A	150.0 lbs.	N/A	N/A	N/A	N/A	N/A	150.0 lbs.	N/A	N/A	N/A	N/A	150.0 lbs.	N/A	N/A	150.0 lbs.	150.0 lbs.	150.0 lbs.	150.0 lbs.
4 Anchors @ 1" Min. C.C. - Mullion Ops. Reg. (3)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2 Anchors @ 1.25" Min. C.C. - Mullion Ops. Reg. (4)	150.0 lbs.	150.0 lbs.	150.0 lbs.	N/A	N/A	N/A	150.0 lbs.	N/A	N/A	N/A	N/A	N/A	150.0 lbs.	N/A	N/A	N/A	N/A	150.0 lbs.	N/A	N/A	150.0 lbs.	150.0 lbs.	150.0 lbs.	150.0 lbs.

SEE SUBSTRATE PROPERTIES, SHEET 1

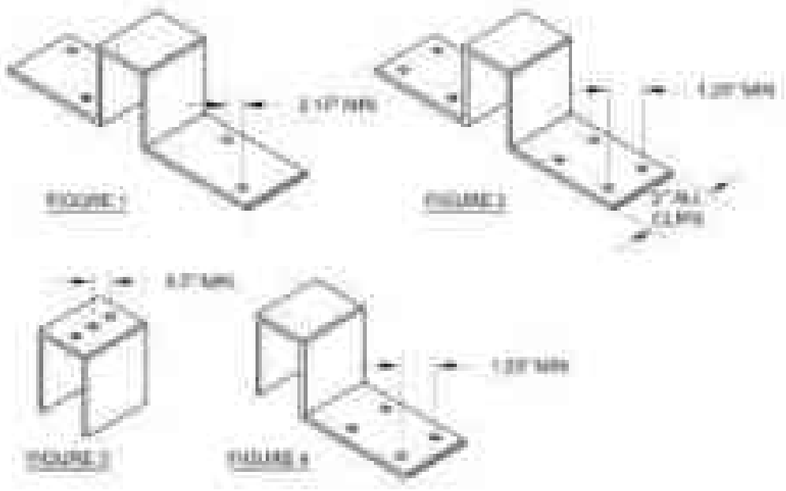


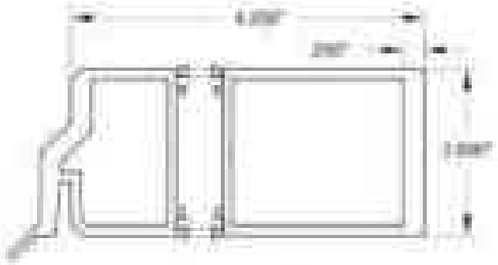
TABLE NOTES:

1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 3 FOR FONTSUNIVERSALY LOADED CLIP/ANCHOR.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 5/8" O.C. FROM CLIP EDGE

3) SEE SHEET 1 FOR ADDITIONAL ANCHOR SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



2" X 4-1/4"
THERMALLY-BROKEN TUBE
MULLION W/SNP CAP
HORIZONTAL APPLICATIONS ONLY
ACCEPTS 2-1/4" GLASS

REVISIONS	
DESIGNED BY	ANTHONY LYNN MILLER
DRAWN BY	JENS ROSENBERG
CHECKED BY	
APPROVED BY	
DATE	10/13/23
SCALE	AS NOTED
SHEET SIZE	ANSI B (11" X 17")
DRAWING NO.	2" X 4-1/4" TB TUBE MULLION
REVISION	ALUMINUM MULLIONS, CLIP/ED (LM)
	SHEET 2 OF 3

WINDOOR
WINDOW INDUSTRIES
300 PRIVATE DRIVE
VENICE, FL 34275
(941) 484-7665

ANTHONY LYNN MILLER
LICENSE
No. 56765
10/13/23
STATE OF FLORIDA
PROFESSIONAL ENGINEER
ANTHONY LYNN MILLER, P.E. FL# 56765

TABLE 1(A)

2" x 5-3/4" Thermally-Broken Tube Mullion w/Snp Cap Design Pressure & Cip/Anchor Capacity Requirement	Opening Dimension																													
	60 in				72 in				84 in				96 in				108 in				120 in				132 in				144 in			
	Pass		Uniformly		Pass		Uniformly		Pass		Uniformly		Pass		Uniformly		Pass		Uniformly		Pass		Uniformly		Pass		Uniformly		Pass		Uniformly	
	Lowest Mullion		Lowest Mullion		Lowest Mullion		Lowest Mullion		Lowest Mullion		Lowest Mullion		Lowest Mullion		Lowest Mullion		Lowest Mullion		Lowest Mullion		Lowest Mullion		Lowest Mullion		Lowest Mullion		Lowest Mullion		Lowest Mullion	
	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)	Design Pressure (psf)	Allowable Cip/Anchor Capacity (lbs)
Mullion Span: 60 in	150.0	721	150.0	540	150.0	844	150.0	608	150.0	1101	150.0	736	150.0	1406	150.0	882	150.0	1998	150.0	1032	150.0	1880	150.0	1180	150.0	2265	150.0	1328	150.0	2650	150.0	1476
72 in	150.0	581	150.0	436	150.0	648	150.0	702	150.0	1060	150.0	852	150.0	1364	150.0	977	150.0	1979	150.0	1104	150.0	2499	150.0	1230	150.0	2997	150.0	1356	150.0	3495	150.0	1482
84 in	150.0	489	150.0	367	150.0	631	150.0	597	150.0	1075	150.0	696	150.0	1779	150.0	1048	150.0	2383	150.0	1125	150.0	3089	150.0	1203	150.0	3795	150.0	1280	150.0	4501	150.0	1358
96 in	150.0	438	150.0	329	150.0	418	150.0	494	150.0	1064	150.0	659	150.0	1670	150.0	824	150.0	2299	150.0	1111	150.0	3000	150.0	1199	150.0	3701	150.0	1287	150.0	4402	150.0	1375
108 in	150.0	378	150.0	284	150.0	518	150.0	384	150.0	1025	150.0	568	150.0	1532	150.0	752	150.0	2148	150.0	1036	150.0	2765	150.0	1120	150.0	3382	150.0	1204	150.0	3999	150.0	1288
120 in	150.0	338	150.0	253	150.0	429	150.0	384	150.0	1000	150.0	506	150.0	1400	150.0	684	150.0	2000	150.0	964	150.0	2600	150.0	1044	150.0	3200	150.0	1124	150.0	3800	150.0	1204
132 in	150.0	308	150.0	231	150.0	360	150.0	346	150.0	1000	150.0	460	150.0	1300	150.0	624	150.0	1900	150.0	888	150.0	2500	150.0	968	150.0	3100	150.0	1048	150.0	3700	150.0	1128
144 in	150.0	284	150.0	213	150.0	324	150.0	319	150.0	1000	150.0	424	150.0	1200	150.0	576	150.0	1800	150.0	828	150.0	2400	150.0	908	150.0	3000	150.0	988	150.0	3600	150.0	1068

TABLE 1(B)

2" x 5-3/4" Thermally-Broken Tube Mullion w/Snp Cap Cip/Anchor Capacity	Anchor		Clip Capacity			Clip Cross	Mullion (MC)						Wind (WC)				Shear		Notes
	Member Type		2-1/2" Setback (Maximum)		3-1/4" Setback (Maximum)		2-1/2" Setback (Minimum)	2-1/2" Setback (Maximum)		3-1/4" Setback (Minimum)		3-1/4" Setback (Maximum)	3-1/4" Slot Depth/Pass	3-1/4" Slot in Application	2-1/2" Setback (Maximum)	3-1/4" Setback (Maximum)	Cip/ Slot in Application	#12 Sheet to Jaw	#14 Sheet to Jaw	#12 Sheet to Sheet
	Edge Distance (c1)		2"	2-1/2"	2"	2-1/2"	2-1/2"	2"	2-1/2"	2"	2-1/2"	2-1/2"	2-1/2"	2"	2"	2"	2"	2-1/2"	2-1/2"	2-1/2"
	Embedment (c2)		1-1/2"	1-1/2"	1-1/2"	1-1/2"	2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	2"	1-1/2"	1-1/2"	Max Power (")
4 Anchors @ 1-1/8" Min. (c1) - Mullion Clip (Fig. 1)			625 lbs	1240 lbs	625 lbs	1780 lbs	1625 lbs	625 lbs	1625 lbs	1170 lbs	1710 lbs	1960 lbs	1625	625 lbs	1625 lbs	1840 lbs	1625	880 lbs	1570 lbs	1570 lbs
4 Anchors @ 1-1/8" Min. (c1) - Mullion Clip (Fig. 2)			1810 lbs	2800 lbs	1810 lbs	3410 lbs	N/A	1647 lbs	2480 lbs	1647 lbs	2480 lbs	2480 lbs	1625	1647 lbs	2480 lbs	2480 lbs	1625	1770 lbs	2140 lbs	2140 lbs
4 Anchors @ 1-1/8" Min. (c1) - Mullion Clip (Fig. 3)			1647 lbs	2480 lbs	1647 lbs	3410 lbs	N/A	1647 lbs	2480 lbs	1647 lbs	2480 lbs	2480 lbs	1625	1647 lbs	2480 lbs	2480 lbs	1625	2650 lbs	3170 lbs	3170 lbs

SEE SUBSTRATE PROPERTIES SHEET 1

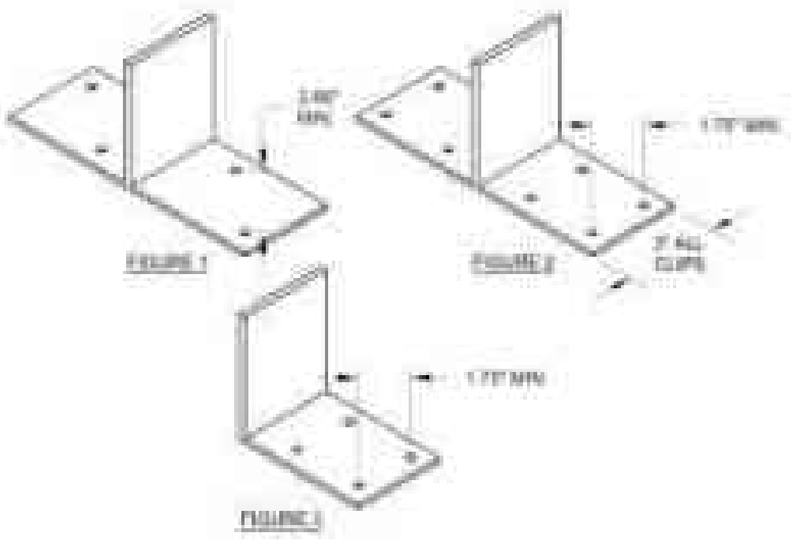


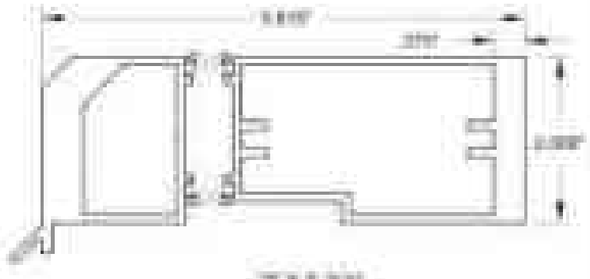
TABLE NOTES

1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 3 FOR FORTIFIED UNIVERSALLY LOADED CLIP VERIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 3/8" O.C. FROM CLIP EDGE.

3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



2" X 5-3/4"
THERMALLY-BROKEN TUBE
MULLION W/SNAP CAP
HORIZONTAL APPLICATIONS ONLY
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WINDOOR
WINDOOR TECHNOLOGIES
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(800) 461-7482

ALUMINUM MULLIONS, CLIPPED (LM)

2" X 5-3/4" TB TUBE MULLION

MULLION

SHEET 2 OF 11

ANTHONY LYNN MILLER
LICENSE
No. 56765
10/15/25
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E., FL# 56765

REVISIONS

NO.	DESCRIPTION	DATE
1	ADDED TABLE 1(B)	10/15/25

TABLE 1(A)

1-1/4" x 4" Thermally Broken Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Wall Span	Opening Dimension 30 in.				35 in.				40 in.				45 in.				50 in.				55 in.				60 in.				65 in.				70 in.			
		Front (Jamb Mullion)		Leftwing (Jamb Mullion)		Front (Jamb Mullion)		Leftwing (Jamb Mullion)		Front (Jamb Mullion)		Leftwing (Jamb Mullion)		Front (Jamb Mullion)		Leftwing (Jamb Mullion)		Front (Jamb Mullion)		Leftwing (Jamb Mullion)		Front (Jamb Mullion)		Leftwing (Jamb Mullion)		Front (Jamb Mullion)		Leftwing (Jamb Mullion)		Front (Jamb Mullion)		Leftwing (Jamb Mullion)		Front (Jamb Mullion)		Leftwing (Jamb Mullion)	
		Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)	Min. Edge Distance (in.)	Min. Embedment Depth (in.)
	84 in.	4.61	1.75	5.63	3.63	4.63	2.88	5.63	3.88	4.64	3.38	5.63	4.38	4.64	3.88	5.63	4.88	4.64	4.38	5.63	5.38	4.64	4.88	5.63	5.88	4.64	5.38	5.63	6.38	4.64	5.88	5.63	6.88	4.64	6.38	5.63	7.38
	90 in.	4.62	1.81	5.63	3.75	4.63	2.94	5.63	3.94	4.64	3.44	5.63	4.44	4.64	3.94	5.63	4.94	4.64	4.44	5.63	5.44	4.64	4.94	5.63	5.94	4.64	5.44	5.63	6.44	4.64	5.94	5.63	6.94	4.64	6.44	5.63	7.44
	96 in.	4.62	1.88	5.63	3.88	4.63	3.00	5.63	4.00	4.64	3.50	5.63	4.50	4.64	4.00	5.63	5.00	4.64	4.50	5.63	5.50	4.64	5.00	5.63	6.00	4.64	5.50	5.63	6.50	4.64	6.00	5.63	7.00	4.64	6.50	5.63	7.50
	102 in.	4.62	1.94	5.63	4.00	4.63	3.06	5.63	4.06	4.64	3.56	5.63	4.56	4.64	4.06	5.63	5.06	4.64	4.56	5.63	5.56	4.64	5.06	5.63	6.06	4.64	5.56	5.63	6.56	4.64	6.06	5.63	7.06	4.64	6.56	5.63	7.56
	108 in.	4.62	2.00	5.63	4.13	4.63	3.13	5.63	4.13	4.64	3.63	5.63	4.63	4.64	4.13	5.63	5.13	4.64	4.63	5.63	5.63	4.64	5.13	5.63	6.13	4.64	5.63	5.63	6.63	4.64	6.13	5.63	7.13	4.64	6.63	5.63	7.63
	114 in.	4.62	2.06	5.63	4.25	4.63	3.19	5.63	4.19	4.64	3.69	5.63	4.69	4.64	4.19	5.63	5.19	4.64	4.69	5.63	5.69	4.64	5.19	5.63	6.19	4.64	5.69	5.63	6.69	4.64	6.19	5.63	7.19	4.64	6.69	5.63	7.69
	120 in.	4.62	2.13	5.63	4.38	4.63	3.25	5.63	4.25	4.64	3.75	5.63	4.75	4.64	4.25	5.63	5.25	4.64	4.75	5.63	5.75	4.64	5.25	5.63	6.25	4.64	5.75	5.63	6.75	4.64	6.25	5.63	7.25	4.64	6.75	5.63	7.75
	126 in.	4.62	2.19	5.63	4.50	4.63	3.31	5.63	4.31	4.64	3.81	5.63	4.81	4.64	4.31	5.63	5.31	4.64	4.81	5.63	5.81	4.64	5.31	5.63	6.31	4.64	5.81	5.63	6.81	4.64	6.31	5.63	7.31	4.64	6.81	5.63	7.81
	132 in.	4.62	2.25	5.63	4.63	4.63	3.38	5.63	4.38	4.64	3.88	5.63	4.88	4.64	4.38	5.63	5.38	4.64	4.88	5.63	5.88	4.64	5.38	5.63	6.38	4.64	5.88	5.63	6.88	4.64	6.38	5.63	7.38	4.64	6.88	5.63	7.88
	138 in.	4.62	2.31	5.63	4.75	4.63	3.44	5.63	4.44	4.64	3.94	5.63	4.94	4.64	4.44	5.63	5.44	4.64	4.94	5.63	5.94	4.64	5.44	5.63	6.44	4.64	5.94	5.63	6.94	4.64	6.44	5.63	7.44	4.64	6.94	5.63	7.94
	144 in.	4.62	2.38	5.63	4.88	4.63	3.50	5.63	4.50	4.64	4.00	5.63	5.00	4.64	4.50	5.63	5.50	4.64	5.00	5.63	6.00	4.64	5.50	5.63	6.50	4.64	6.00	5.63	7.00	4.64	6.50	5.63	7.50	4.64	7.00	5.63	8.00
	150 in.	4.62	2.44	5.63	5.00	4.63	3.56	5.63	4.56	4.64	4.06	5.63	5.06	4.64	4.56	5.63	5.56	4.64	5.06	5.63	6.06	4.64	5.56	5.63	6.56	4.64	6.06	5.63	7.06	4.64	6.56	5.63	7.56	4.64	7.06	5.63	8.06
	156 in.	4.62	2.50	5.63	5.13	4.63	3.63	5.63	4.63	4.64	4.13	5.63	5.13	4.64	4.63	5.63	5.63	4.64	5.13	5.63	6.13	4.64	5.63	5.63	6.63	4.64	6.13	5.63	7.13	4.64	6.63	5.63	7.63	4.64	7.13	5.63	8.13
	162 in.	4.62	2.56	5.63	5.25	4.63	3.69	5.63	4.69	4.64	4.19	5.63	5.19	4.64	4.69	5.63	5.69	4.64	5.19	5.63	6.19	4.64	5.69	5.63	6.69	4.64	6.19	5.63	7.19	4.64	6.69	5.63	7.69	4.64	7.19	5.63	8.19
	168 in.	4.62	2.63	5.63	5.38	4.63	3.75	5.63	4.75	4.64	4.25	5.63	5.25	4.64	4.75	5.63	5.75	4.64	5.25	5.63	6.25	4.64	5.75	5.63	6.75	4.64	6.25	5.63	7.25	4.64	6.75	5.63	7.75	4.64	7.25	5.63	8.25
	174 in.	4.62	2.69	5.63	5.50	4.63	3.81	5.63	4.81	4.64	4.31	5.63	5.31	4.64	4.81	5.63	5.81	4.64	5.31	5.63	6.31	4.64	5.81	5.63	6.81	4.64	6.31	5.63	7.31	4.64	6.81	5.63	7.81	4.64	7.31	5.63	8.31
	180 in.	4.62	2.75	5.63	5.63	4.63	3.88	5.63	4.88	4.64	4.38	5.63	5.38	4.64	4.88	5.63	5.88	4.64	5.38	5.63	6.38	4.64	5.88	5.63	6.88	4.64	6.38	5.63	7.38	4.64	6.88	5.63	7.88	4.64	7.38	5.63	8.38

TABLE 1(B)

1-1/4" x 4" Thermally Broken Tube Mullion Clip/Anchor Capacity	Substrate	Mullion Clip				2 in. Sq. Tube	Fastener (Jamb)						Fastener (Sill)						Head (Sill)			Screw		Washer
	Anchor Type	0.141" Slotted (Mullion)		0.25" Slotted (Mullion)		0.141" Slotted (Mullion)	0.141" Slotted (Mullion)		0.141" Slotted (Mullion)		0.25" Slotted (Mullion)	0.25" Slotted (Jamb/Sill)	0.25" Slotted (Mullion)		0.141" Slotted (Mullion)		0.25" Slotted (Mullion)	0.25" Slotted (Jamb/Sill)	0.141" Slotted (Mullion)		0.25" Slotted (Mullion)	#12 Head To Web	#12 Shaft Screw	#12 Shaft Washer
	Edge Distance (in.)	1"	2-1/2"	1"	2-1/2"	2-1/8"	1"	2-1/2"	1"	2-1/2"	2-1/8"	2-1/8"	1"	2-1/2"	1"	2-1/2"	2-1/8"	2-1/8"	1"	2-1/2"	2-1/8"	4.25"	2.25"	2.25"
	Embedment (in.)	1.63"	1.63"	1.63"	1.25"	2"	1.13"	1.13"	1.13"	1.13"	1.13"	1.13"	1.63"	1.63"	1.63"	1.63"	2"	1.63"	1.63"	1.63"	2"	1.63"	1.63"	See Sheet 1
2 Screws @ 2.5" Min. C.C. - Mullion Clip Only (lb)		313 lbs	1338 lbs	418 lbs	1313 lbs	716 lbs	313 lbs	782 lbs	418 lbs	1338 lbs	1600 lbs	1600 lbs	N/A	N/A	N/A	N/A	N/A	N/A	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs
3 Screws @ 2.5/10" Min. C.C. - Mullion Clip Only (lb)		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4 Screws @ 2.5" Min. C.C. - Mullion Clip Only (lb)		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5 Screws @ 2.5/10" Min. C.C. - Mullion Clip Only (lb)		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

SEE SUBSTRATE PROPERTIES, SHEET 1

OPPOSED VALUES ARE USED IN THE EXAMPLE ON SHEET 21

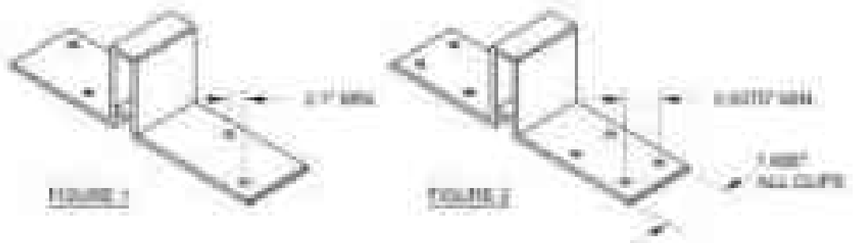


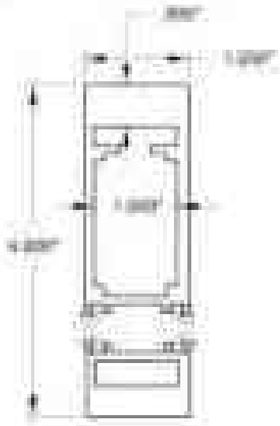
TABLE NOTES:

1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT UNIFORMLY LOADED CLASSIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE TO CLOSER THAN 3/4" C.C. FROM CLIP EDGE.

3) SEE SHEET 1 FOR ADDITIONAL ANCHORS/SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



1-1/4" X 4" THERMALLY BROKEN TUBE MULLION

WINDOOR

ALUMINUM MULLIONS, CLIPPED (LM)

1-1/4" X 4" TB TUBE MULL

ANTHONY LYNN MILLER
LICENSE
No. 56765
10/31/23
STATE OF FLORIDA
PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E., FL# 56765

REVISIONS

NO.	DESCRIPTION	DATE
1	ADDED TABLE 1(B)	10/31/23

DRAWN	CHECKED	SCALE	SHEET
MTL	MTL	NTS	18 OF 21

TABLE 1A5

2" x 5-5/8" Thermally Broken Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																											
	30 in				36 in				48 in				60 in				72 in				84 in				96 in			
	Fixed Leaf or Mullion		Operating Leaf or Mullion		Fixed Leaf or Mullion		Operating Leaf or Mullion		Fixed Leaf or Mullion		Operating Leaf or Mullion		Fixed Leaf or Mullion		Operating Leaf or Mullion		Fixed Leaf or Mullion		Operating Leaf or Mullion		Fixed Leaf or Mullion		Operating Leaf or Mullion		Fixed Leaf or Mullion		Operating Leaf or Mullion	
Wall or Span																												
84 in	150.0	109	150.0	160	150.0	144	150.0	208	150.0	219	150.0	336	150.0	348	150.0	516	150.0	588	150.0	756	150.0	1008	150.0	1296	150.0	1584	150.0	1920
90 in	150.0	121	150.0	178	150.0	160	150.0	232	150.0	243	150.0	374	150.0	387	150.0	574	150.0	654	150.0	840	150.0	1120	150.0	1440	150.0	1760	150.0	2134
96 in	150.0	133	150.0	196	150.0	176	150.0	256	150.0	268	150.0	412	150.0	426	150.0	632	150.0	720	150.0	924	150.0	1232	150.0	1584	150.0	1936	150.0	2347
72 in	150.0	109	150.0	178	150.0	144	150.0	232	150.0	219	150.0	374	150.0	348	150.0	574	150.0	588	150.0	840	150.0	1008	150.0	1296	150.0	1584	150.0	1920
78 in	150.0	115	150.0	189	150.0	152	150.0	246	150.0	231	150.0	396	150.0	369	150.0	608	150.0	624	150.0	894	150.0	1068	150.0	1372	150.0	1676	150.0	2032
84 in	150.0	1484	150.0	193	150.0	1915	150.0	1478	150.0	1782	150.0	1155	150.0	2186	150.0	1549	150.0	2624	150.0	1549	150.0	3287	150.0	1549	150.0	3950	150.0	1549
90 in	150.0	1172	150.0	1384	150.0	1459	150.0	1172	150.0	1675	150.0	1458	150.0	2344	150.0	1675	150.0	2813	150.0	1675	150.0	3751	150.0	1675	150.0	4688	150.0	1675
96 in	150.0	1250	150.0	1367	150.0	1555	150.0	1244	150.0	2000	150.0	1555	150.0	2500	150.0	1555	150.0	3000	150.0	2063	150.0	4000	150.0	2063	150.0	5000	150.0	2063
72 in	150.0	1328	150.0	1776	150.0	1556	150.0	1328	150.0	2125	150.0	1556	150.0	2656	150.0	1556	150.0	3188	150.0	2344	150.0	4250	150.0	2344	150.0	5313	150.0	2344
78 in	150.0	1406	150.0	1535	150.0	1648	150.0	1412	150.0	2250	150.0	1648	150.0	2813	150.0	1648	150.0	3375	150.0	2625	150.0	4500	150.0	2625	150.0	5625	150.0	2625
84 in	150.0	1484	150.0	1295	150.0	1741	150.0	1497	150.0	2375	150.0	1741	150.0	2969	150.0	1741	150.0	3563	150.0	2906	150.0	4750	150.0	2906	150.0	5938	150.0	2906
90 in	150.0	1563	150.0	1055	150.0	1835	150.0	1577	150.0	2500	150.0	1835	150.0	3125	150.0	1835	150.0	3750	150.0	3188	150.0	5000	150.0	3188	150.0	6250	150.0	3188
96 in	150.0	1641	150.0	1476	150.0	1928	150.0	1734	150.0	2625	150.0	1931	150.0	3281	150.0	1931	150.0	3938	150.0	3469	150.0	5250	150.0	3469	150.0	6563	150.0	3469
72 in	150.0	1719	150.0	1196	150.0	1807	150.0	1898	150.0	2750	150.0	1807	150.0	3438	150.0	1807	150.0	4125	150.0	3750	150.0	5500	150.0	3750	150.0	6875	150.0	3750
78 in	150.0	1797	150.0	1424	150.0	1927	150.0	1446	150.0	2875	150.0	1927	150.0	3594	150.0	1927	150.0	4313	150.0	4031	150.0	5750	150.0	4031	150.0	7188	150.0	4031
84 in	150.0	1875	150.0	1440	150.0	1979	150.0	1868	150.0	3000	150.0	1979	150.0	3750	150.0	1979	150.0	4500	150.0	4313	150.0	6000	150.0	4313	150.0	7500	150.0	4313

TABLE 3A5

2" x 5-5/8" Thermally-Broken Tube Mullion Clip/Anchor Capacity	Aluminum	Al. Concrete			Al. Conc.	Stainless (SS)						Steel (Stl)				Screw		Nails
	Anchor Type	3/16" Diameter Wedge-Lok		1/4" Diameter Wedge-Lok		5/16" Screw Wedge-Lok	3/16" Diameter Wedge-Lok		1/4" Diameter Wedge-Lok		3/8" Screw Clip/Plate	1/4" Screw Hyperbolt	3/16" Diameter Wedge-Lok	1/4" Diameter Wedge-Lok	3/8" Screw Hyperbolt	#12 Head Screw	#14 Screw Screw	#10 Steel Screw
	Edge Distance (in)	1"	2 1/2"	1"	2 1/2"	2 1/2"	1"	2 1/2"	1"	2 1/2"	2 1/2"	2"	1"	1"	2"	2 1/4"	2 1/4"	2 1/4"
	Embedment (in)	1 1/4"	1 1/4"	1 1/4"	1 1/4"	3"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	2"	1 3/4"	1 1/2"	See Sheet 1
4 Anchors @ 24" Max. O.C. - Positive Design Pressure (Psf) - 1	225.00	1350 lbs	450.00	1795 lbs	1500 lbs	225 lbs	540 lbs	795 lbs	1710 lbs	360 lbs	N/A	2475 lbs	360 lbs	N/A	885 lbs	1575 lbs	1575 lbs
4 Anchors @ 12" Max. O.C. - Positive Design Pressure (Psf) - 2	375.00	2250 lbs	810 lbs	3015 lbs	N/A	367 lbs	1485 lbs	1347 lbs	4987 lbs	1799 lbs	N/A	4500 lbs	984 lbs	N/A	1771 lbs	2799 lbs	2799 lbs
4 Anchors @ 6.000" Max. O.C. - Positive Design Pressure (Psf) - 3	N/A	3150	1620	5625	N/A	510	2430	2430	9450	3240	N/A	8100	1620	N/A	3240	5625	5625 lbs
4 Anchors @ 4.125" Max. O.C. - Positive Design Pressure (Psf) - 4	667 lbs	4500 lbs	972 lbs	7781 lbs	N/A	675 lbs	3240 lbs	2430 lbs	9450 lbs	3240 lbs	N/A	8100 lbs	1620 lbs	N/A	3240 lbs	5625 lbs	5625 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1

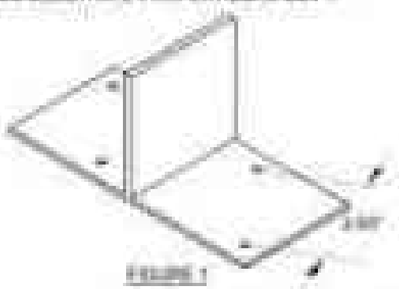


FIGURE 1

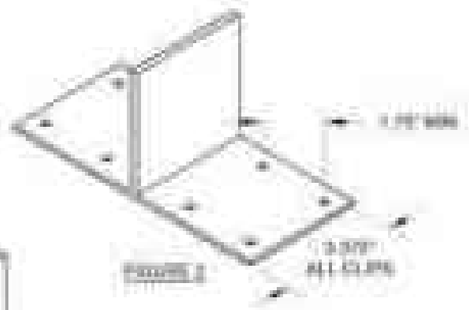


FIGURE 2

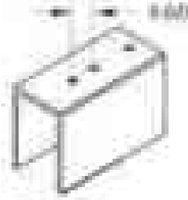


FIGURE 3

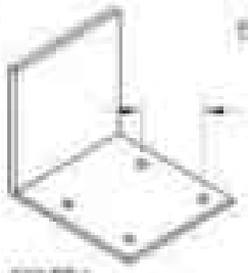


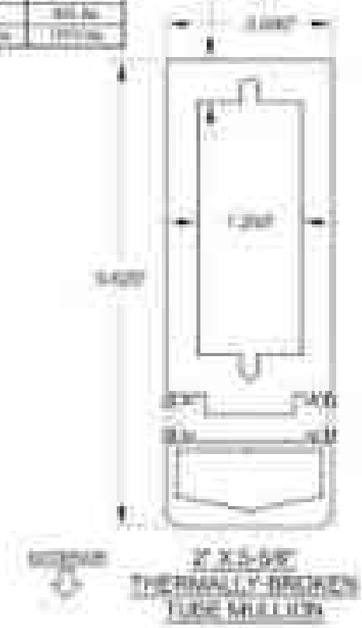
FIGURE 4

TABLE NOTES:
1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT LOAD/UNIFORMLY LOADED CLASSIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 3/4" O.C. FROM CLIP EDGE.

3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



2" X 5-5/8" THERMALLY BROKEN TUBE MULLION

WINDOOR
WINDOOR INTERNATIONAL
100 PHILLIPS PARKWAY
MONTVALE, NJ 07645
(201) 391-1300

ALUMINUM MULLIONS, CLIPPED (LM)

2" X 5-5/8" TB TUBE MULLION

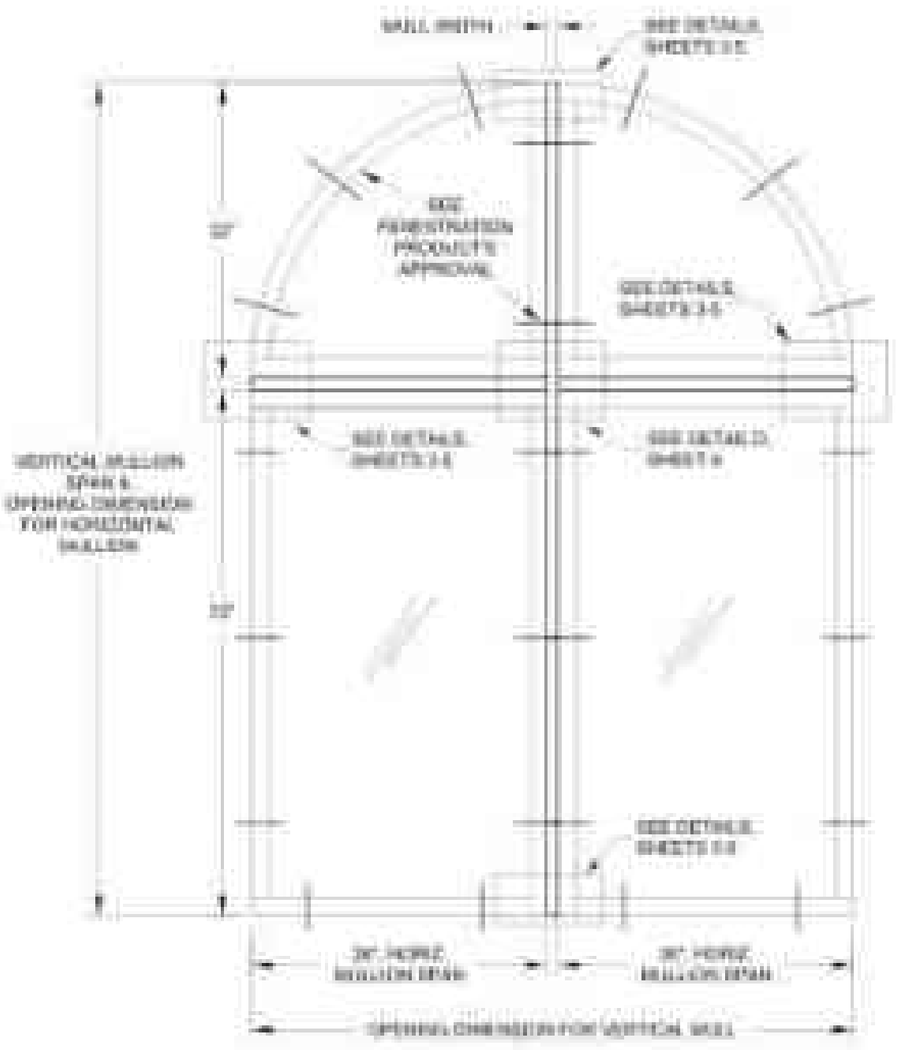
MULL-LM

SHEET 2 OF 2

ISSUED FOR PERMIT

ARTHUR LYNN MILLER
LICENSE
No. 56765
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E., FLORIDA



EXAMPLE 1: MULTIPLE MULLIONS

THE BUILDING SUBSTRATE IS KNOWN TO BE HOLLOW CMU ON THE JAMBS AND USES A CONCRETE HEADER AND SILL. THE WINDOW FRAME DEPTH IS 4 9/16". THE OPENING REQUIRES A DESIGN PRESSURE OF +/-[illegible] 130.0 PSF.

FOR THE VERTICAL MULLION

1) INITIALLY ASSUMING THAT A 7" WIDE MULLION IS SUITABLE, THE MULLION SPAN IS 42"+12"+7"+1/8" AND THE OPENING DIMENSION IS 96"+36"+/- 7/8". REFERENCING SHEET 2, THE MULLION IS POINT LOADED. SCAN THE MULLION TABLES FOR A MULLION THAT IS AT LEAST THE WINDOW FRAME DEPTH OF 4-9/16" AND WILL MEET OR EXCEED THE REQUIRED DESIGN PRESSURE OF [illegible] 130.0 PSF. IF THE TABLE DOES NOT SHOW THE EXACT SIZE, USE THE NEXT LARGER SIZE AVAILABLE.

FROM TABLE 2A, SHEET 7, THE 2" X 6" X 0.075" MULLION (SPAN = 89", OPENING DIMENSION = 96") HAS A DESIGN PRESSURE OF +/- [illegible] PSF WHICH EXCEEDS THE REQUIREMENTS FOR THE OPENING AND MAY BE USED IN THIS APPLICATION. NOTE THE CORRESPONDING ANCHOR CAPACITY REQUIRED OF [illegible].

BECAUSE IT IS NOW KNOWN THAT THE WALL ON WILL ADD 2" TO THE WIDTH OF THE MULLION (ART INSTEAD OF 1", THE ADJUSTED OPENING DIMENSION IS 96"+96"+2"=194", NOT 72" AS PREVIOUSLY ASSUMED). VERIFY THAT THE DESIGN PRESSURE IS STILL APPLICABLE FOR THE ADJUSTED OPENING. ALTERNATIVELY, THE WINDOW WIDTHS MAY BE REDUCED TO MAINTAIN THE 72" DIMENSION (32-1/2"+29-1/2"+1"+1").

2) USE TABLE 3B TO FIND THE ANCHOR TYPE, ANCHOR QUANTITY AND CLIP TYPE REQUIRED FOR THE CONCRETE SUBSTRATE. IN THIS EXAMPLE, ASSUME THE POURED CONCRETE HEADER AND SILL ARE 8" WIDE. IF THE MULLION CLIP WERE TO BE CENTERED WITHIN THE 8", CARE MUST BE TAKEN TO MAINTAIN THE FASTENER'S EDGE DISTANCE. USING THE STANDARD CLIP WITH (6) 5/16" ULTRACON+ ANCHORS AT AN EDGE DISTANCE OF 2-1/2" GIVES AN ANCHOR CAPACITY OF 2520 LBS WHICH IS GREATER, AND THEREFORE SUITABLE, FOR THE REQUIRED ANCHOR CAPACITY OF 2200 LBS.

FOR THE HORIZONTAL MULLIONS

BECAUSE THE VERTICAL MULL WILL BE A 2" X 6" X 0.075" MULLION, IN THIS EXAMPLE WE WILL MATCH THE HORIZONTAL AND VERTICAL MULLIONS. ALTERNATIVELY, ANOTHER MULLION TYPE COULD BE CHOSEN.

1) THE MULLION SPAN IS 36" AND THE OPENING DIMENSION IS 32"+12"+0" (-1/8)". REFERENCING SHEET 2, THE MULLION IS UNIFORMLY LOADED. FROM TABLE 2A, SHEET 7, THE 2" X 6" X 0.075" MULLION (@ SPAN = 42", OPENING DIMENSION = 120") HAS A DESIGN PRESSURE OF +/- [illegible] PSF WHICH EXCEEDS THE REQUIREMENTS FOR THE OPENING AND MAY BE USED IN THIS APPLICATION. NOTE THE CORRESPONDING ANCHOR CAPACITY REQUIRED OF 494 LBS.

2) USE TABLE 3B TO FIND THE ANCHOR TYPE, ANCHOR QUANTITY AND CLIP TYPE REQUIRED FOR THE CMU SUBSTRATE. IN THIS EXAMPLE, ASSUME THE CMU JAMBS ARE 8" WIDE. IF THE MULLION CLIP WERE TO BE CENTERED WITHIN THE 8", CARE MUST BE TAKEN TO MAINTAIN THE FASTENER'S EDGE DISTANCE. USING THE STANDARD WALL CLIPS WITH (4) 5/16" ULTRACON+ ANCHORS AT AN EDGE DISTANCE OF 2-1/2" GIVES AN ANCHOR CAPACITY OF 1400 LBS WHICH IS GREATER, AND THEREFORE SUITABLE, FOR THE REQUIRED ANCHOR CAPACITY OF 494 LBS. THE SAME ANCHOR TYPES WERE CHOSEN AS BEFORE FOR SIMPLICITY. HOWEVER ANY ANCHOR MEETING THE REQUIREMENTS COULD HAVE BEEN USED.

3) FOR THE U-CLIP IN THE HORIZONTAL MULLION TO VERTICAL MULLION, USE THE SAME ANCHOR CAPACITY OF 7011 LBS. TABLE 3B FOR THE U-CLIP SHOWS THE ANCHOR CAPACITY IS 800 LBS WHEN USING 3 ANCHORS, WHICH IS GREATER, AND THEREFORE SUITABLE, FOR THE REQUIRED ANCHOR CAPACITY REQUIREMENT OF 494 LBS. THE ANCHOR TYPE IS A #12 STEEL SCREW.

FROM THE ABOVE STEPS, OUR MULLION DESIGN PRESSURE IS:
+/- 130.0 PSF FROM THE VERTICAL MULLION
+/- 130.0 PSF FROM THE 36" HORIZONTAL MULLION ATTACHING TO CMU
+/- 130.0 PSF FROM THE 36" HORIZONTAL MULLION ATTACHING TO THE VERTICAL MULLION (INTERSECTION)
THE LOWEST DESIGN PRESSURE IS +/- 130.0 PSF AND WOULD APPLY TO ALL OF THE MULLIONS.

VERIFY THE DESIGN PRESSURE OF THE FENESTRATION PRODUCTS USED WITH THIS MULLION SYSTEM. THE LOWER DESIGN PRESSURE OF MULLIONS OR FENESTRATION PRODUCTS WILL APPLY TO THE OVERALL ASSEMBLY. FINAL DESIGN PRESSURE REQUIRES THAT BOTH THE MULLION MEET THE FENESTRATION PRODUCT BE INSTALLED IN ACCORDANCE WITH THE INSTALLATION SPECIFICATIONS INTO RESPECTIVE SUBSTRATES AND FENESTRATION PRODUCTS TO MULLION.

1	10/19/23	JENS KOSCHMIEDER	TUBEWALL
NO.	DATE	DRAWN BY	

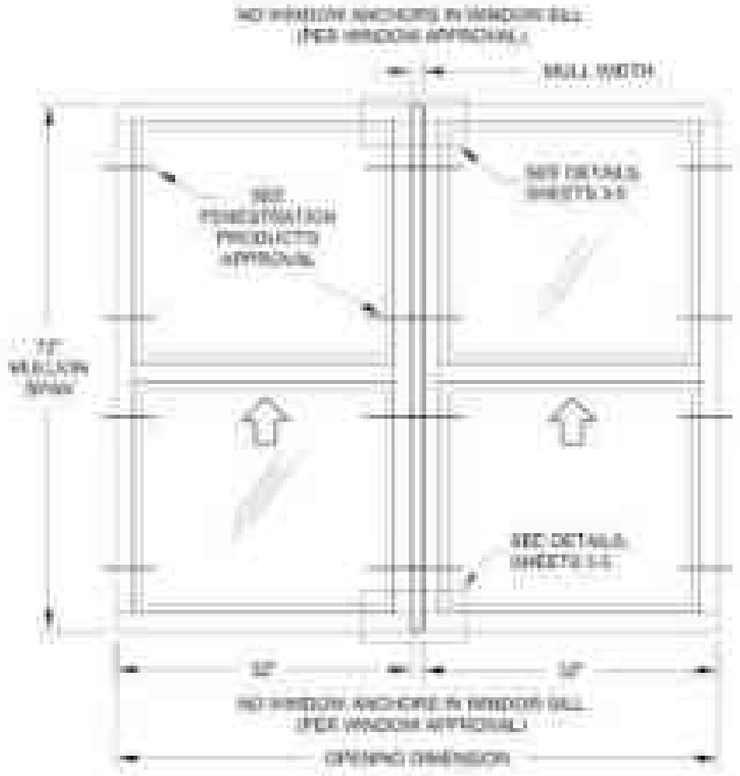
WINDOOR
[illegible]
[illegible]
[illegible]

ALUMINUM MULLIONS, CLIPPED (LW)

EXAMPLE 1

SCALE:			
MULL-1	MM	20 OF 41	

ANTHONY LYNN MILLER
LICENSE
No. 56765
10/19/23
STATE OF
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., FLORIDA



EXAMPLE 2: SINGLE VERTICAL MULLION

THE BUILDING SUBSTRATE IS KNOWN TO BE WOOD ON ALL FOUR SIDES. THE WINDOW FRAME DEPTH IS 2-3/4". THE OPENING REQUIRES A DESIGN PRESSURE OF +60.0/-60.0 PSF.

1) INITIALLY ASSUMING THAT A 1" WIDE MULLION IS SUITABLE, THE MULLION SPAN IS 72" AND THE OPENING DIMENSION IS 72"+(2)•1" = 93". REFERENCING SHEET 2, THE MULLION IS UNIFORMLY LOADED. SCAN THE MULLION TABLES FOR A MULLION THAT IS AT LEAST THE WINDOW FRAME DEPTH OF 2-3/4" AND WILL MEET OR EXCEED THE REQUIRED DESIGN PRESSURE OF +60.0/-60.0 PSF. IF THE TABLE DOES NOT SHOW THE EXACT SIZE, USE THE NEXT LARGER SIZE AVAILABLE.

FROM TABLE 1-3A, SHEET 18 THE ½"-3.4" MULLION (SPAN = 72", OPENING DIMENSION = 93") HAS A DESIGN PRESSURE OF +/- 150.0 PSF WHICH EXCEEDS THE PDI REQUIREMENTS FOR THE OPENING AND MAY BE USED IN THIS APPLICATION. NOTE THE ANCHOR CAPACITY REQUIRED OF 150 LBS.

2) USE TABLE 1-3B TO FIND THE ANCHOR TYPE, ANCHOR QUANTITY AND CLIP TYPE REQUIRED FOR THE WOOD SUBSTRATE. THE STANDARD CLIP WITH (2) #12 ANCHORS HAS A CAPACITY OF 175 LBS WHICH IS GREATER, AND THEREFORE SUITABLE, FOR THE REQUIRED ANCHOR CAPACITY OF 150 LBS.

3) VERIFY THE DESIGN PRESSURE OF THE PENETRATION PRODUCTS USED WITH THIS MULLION SYSTEM. THE LOWER DESIGN PRESSURE OF MULLIONS OR PENETRATION PRODUCTS WILL APPLY TO THE OVERALL ASSEMBLY. FINAL DESIGN PRESSURE REQUIRES THAT THE BOTH THE MULLION AND THE PENETRATION PRODUCT BE INSTALLED IN ACCORDANCE WITH THE INSTALLATION SPECIFICATIONS INTO RESPECTIVE SUBSTRATES AND PENETRATION PRODUCTS TO MULLION.

IN THIS EXAMPLE, THE DESIGN PRESSURE REQUIRED WAS +/-60.0 PSF. THE OVERALL MULLION SYSTEM WAS DETERMINED TO BE +/- 150.0 PSF WITH AN ANCHOR CAPACITY OF 175 LBS. ALTERNATIVELY, THE ANCHOR CAPACITY ADJUSTMENT FORMULA COULD HAVE BEEN USED TO CALCULATE THE ANCHOR CAPACITY REQUIRED FOR THE EXACT DESIGN PRESSURE OF 60.0 PSF.

$$(60.0\ \text{PSF}) \times \left(\frac{175\ \text{LBS}}{150.0\ \text{PSF}}\right) = 70.0\ \text{LBS}$$ (I.E. YOU COULD USE A LOWER CAPACITY ANCHORAGE OPTION OF 70.0 LBS. SINCE YOU ONLY REQUIRE A DESIGN PRESSURE OF 60 PSF.)

NO.	REVISION	DATE	BY
1	INITIAL SUBMISSION	11/18/2015	JL

WINDOOR
ENGINEERING
ALUMINUM MULLIONS CLIPPED
EXAMPLE
SCALE: NTS
DRAWN BY: JL
CHECKED BY: MH
DATE: 11/18/15
SHEET: 2

BRADLEY LYNN MILLER
LICENSE
No. 56755
STATE OF FLORIDA
PROFESSIONAL ENGINEER