Engineering Evaluation Report – MULL1-042423

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, Estate 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 MULL-WD-1, signed and sealed by A. Lynn Miller, P.E.

2. Test Reports:
HTL-0080-0105-08, HTL-0080-0304-11 signed and sealed by Vinu J. Abraham, P.E.; Hurricane Testing Laboratory, Inc.
TAS 201-94 Large Missile Impact Test
TAS 202-94 Uniform Static Air Pressure Test
TAS 203-94 Cyclic Pressure Loading Test

HTL-0080-0303-96, HTL-0080-912-97 signed and sealed by Timothy S. Marshall, P.E.; Hurricane Testing Laboratory, Inc.
TAS 201-94 Large Missile Impact Test
TAS 202-94 Uniform Static Air Pressure Test
TAS 203-94 Cyclic Pressure Loading Test

HETI-96-525 signed and sealed by Hector M. Medina, P.E.; Hurricane Engineering and Testing, Inc.
TAS 201-94 Large Missile Impact Test
TAS 202-94 Uniform Static Air Pressure Test
TAS 203-94 Cyclic Pressure Loading Test

FTL 6443 signed and sealed by Marlin D. Brinson, 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

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 per FBC 1709.8 & R609.8, 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 "ESTATE" SERIES

FLORIDA PRODUCT APPROVAL #[illegible]

DESIGN PRESSURE RATING	IMPACT RATING
SEE TABLES 1A - 19A	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 THIS HVHZ. MULLIONS ARE ONLY TO BE USED WITH THE MANUFACTURER'S FENESTRATION PRODUCTS.

2) INSTALLATION DETAILS SHOWN ARE FOR THE MULLION ONLY. ANCHORS SHOWN ARE IN ADDITION TO ANY ANCHORS REQUIRED FOR THE FENESTRATION PRODUCT INSTALLATION. TYPICAL APPLICATIONS ARE SHOWN. EACH SITUATION IS UNIQUE AND SHOULD BE EVALUATED BY AN EXPERIENCED INSTALLER FOR THE MOST INSTALLATION METHOD. OPTIONAL (3) OR (5) WOOD SHORS 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 MULLED UNITS. MULLIONS HAVE BEEN TESTED AS "FIXED, FLOATING" AND DO NOT NEED TO BE DIRECTLY ATTACHED TO THE MULLION CLIPS, BUT SHALL NOT HAVE A GAP OF MORE THAN 1/16" 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 HAS NOT BEEN 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 FENESTRATION PRODUCTS TO DETERMINE PRESSURES AND ANCHORAGE 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 FENESTRATION PRODUCTS SHALL APPLY.

7) ANCHOR EMBEDMENT TO BASE MATERIAL SHALL BE MINIMUM WALL THICKNESS OR STUD CEDAR WOOD BY OTHERS. MUST BE ANCHORED PROPERLY TO TRANSFER LOADS TO THE STRUCTURE. ANCHORS SHALL BE COATED OR CORROSION RESISTANT AS APPROPRIATE FOR SUBSTRATE MATERIAL. DISSIMILAR MATERIALS SHALL BE PROTECTED AS REQUIRED TO PREVENT REACTIONS.

8) [illegible]

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

10) SUBSTRATES: CONCRETE SHALL CONFORM TO ACI 318 SPECIFICATIONS. MASONRY AND GROUT-FILLED CONCRETE BLOCK UNIT CORE 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 .125" THICK AND #36. ALL ANCHORS INTO METAL SHALL ENTEND AT LEAST 3 SCREW THREADS BEYOND THE MATERIAL. #12 & #14 ANCHORS INTO WOOD MAY BE STEEL 316 S.S. OR 410 S.S.

FIGURE 1: MULTIPLE MULLIONS

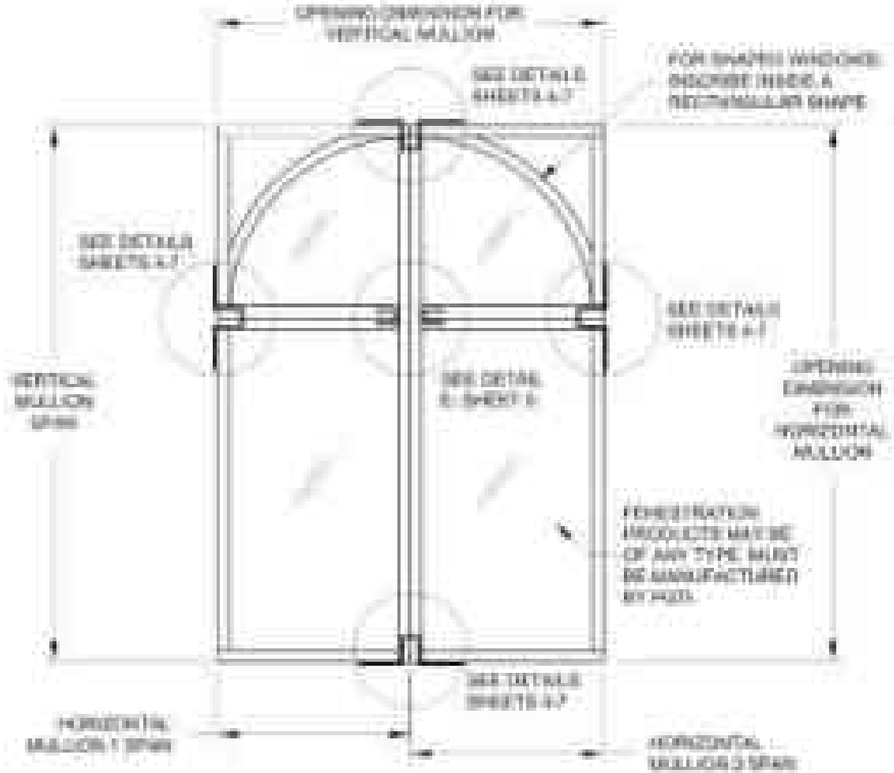
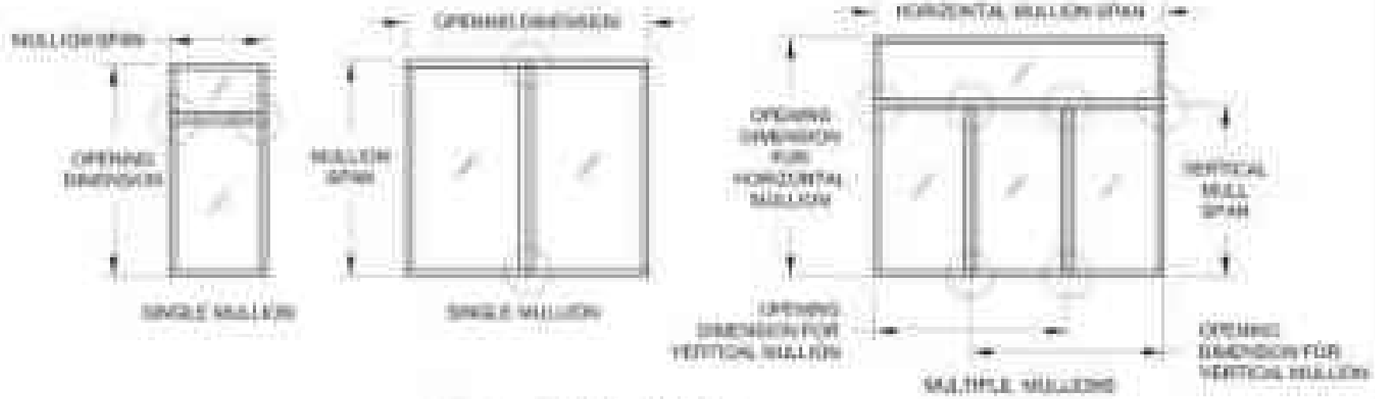


FIGURE 2: ADDITIONAL EXAMPLES OF MULLION CONFIGURATIONS



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REVISIONS	
1	10/13/23
2	
3	
4	

WINDOOR®
[illegible]

ALUMINUM TUBE MULLIONS CLIPPED (LM) (MADE)

GENERAL NOTES & ELEVATIONS

MULLIONS	sht	1 OF 28

ANTHONY LYNN MILLER
LICENSE
No. 58707
10/13/23
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., P.E.# 58707

TABLE A: MULLION INDEX

Sheet	Mullion
8	1" X 2" X 1/8"
9	1" X 2" X 1/8" w/ .218 sleeve attached frame
10	1" X 2" X 3/32"
11	1" X 2-1/2" X 1/8"
12	1" X 3" X 1/8"
13	1" X 3" X 1/8" w/ .228 sleeve attached frame
14	1" X 4" X 1/8"
15	1" X 4" X 1/8" w/ .228 sleeve attached frame
16	1" X 4" X 3/16"
17	1" X 2-1/8" X 1/8" Pin
18	2" x 4" X 1/8"
19	2" x 4" X 1/4"
20	2" x 6" X 1/8"
21	2" X 6" X 1/8" w/ .456 sleeve attached frame
22	2" x 6" X 1/4"
23	2" x 8" X 1/8"
24	2" X 8" X 1/8" w/ .456 sleeve attached frame
25	30" X 3-1/4"
26	40" X 3-1/4"

INSTRUCTIONS:

1) DETERMINE THE ALLOWABLE STRESS DESIGN PRESSURE REQUIREMENT (DSP/T) FOR THE OPENING (PER) THE **ASCE 7 STANDARD**

2) TO FIND THE DESIGN PRESSURE OF THE MULLION, USE TABLES 1A THROUGH 26A. 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 OR UNIFORMLY LOADED MULLION, FROM THE IMAGES BELOW)

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

4) FROM THE ANCHOR/CLIP CAPACITY TABLE, ON THE SAME SHEET, CHOOSE AN ANCHOR/CLIP/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 MULLED ASSEMBLY.

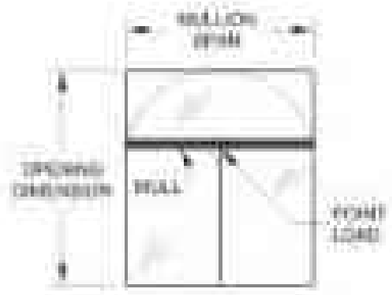
6) HIGHLIGHT OPTION (S) AND TABLE VALUES USED IN A SPECIFIC APPLICATION WHEN USING THIS APPROVAL TO APPLY FOR A PERMIT.

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

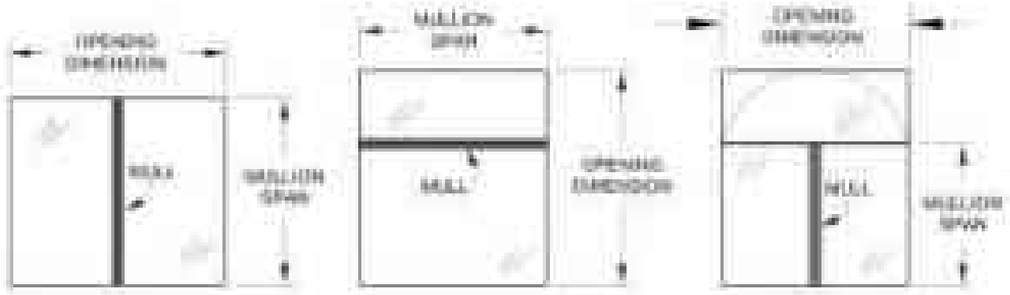
ANCHOR CAPACITY ADJUSTMENT FORMULA:

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

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 MINIMUM ANCHOR CAPACITY WHICH MAY BE USED TO QUALIFY ADDITIONAL ANCHOR OPTIONS FROM THE CLIP/ANCHOR CAPACITY TABLE.



POINT LOADED MULLION
(THE MULLION IS LOADED AT A POINT BY ANOTHER MULLION ALONG ITS LENGTH)

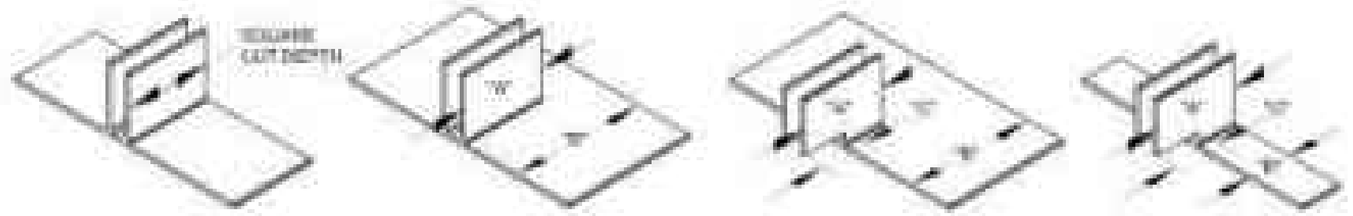


UNIFORMLY LOADED MULLIONS

WINDOOR
ENGINEERED FOR PERFECTION
ALUMINUM TUBE MULLIONS CONFIGURATIONS
INSTRUCTIONS AND INDEX
MULLIONS
SHT
2 OF 26
APPROVED (LM)
DRAWN (MD)
CHECKED (AM)
JENS ROESTWSKI
ANTHONY LYNN MILLER
LICENSE
No. 58707
10/31/23
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E. - FLA # 58707

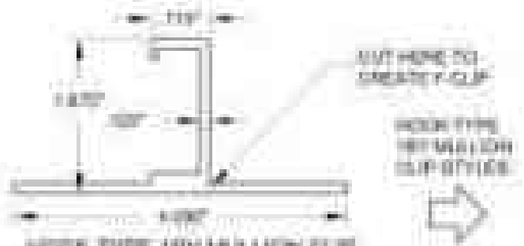


STANDARD 1BY MULLION CLIP



SQUARE CUT 1BY CLIP | 1BY FULL LOAD CLIP | 1BY CLEARANCE CLIP | 1BY OFFSET CLIP

THE ABOVE MULLION CLIP STYLE OPTIONS MAY BE USED INTERCHANGEABLY PROVIDED THAT THE ANCHOR HOLE QUANTITY AND HOLE SPACING FROM SHEETS F.XX IS MAINTAINED



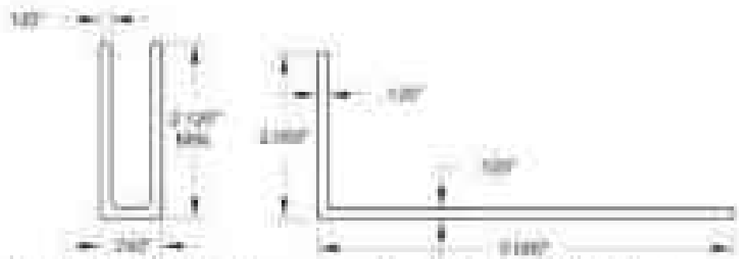
HOOK-TYPE 1BY MULLION CLIP



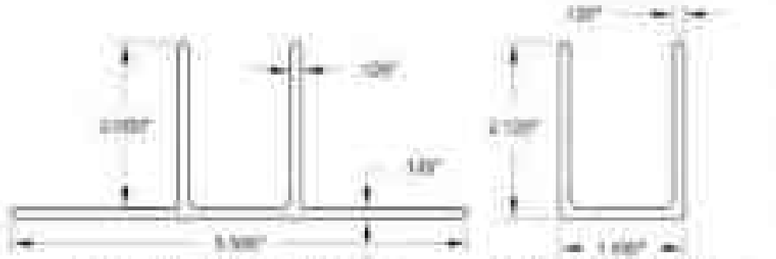
SQUARE CUT 1BY CLIP | 1BY FULL LOAD CLIP | 1BY CLEARANCE CLIP | 1BY OFFSET CLIP

THE ABOVE MULLION CLIP STYLE OPTIONS MAY BE USED INTERCHANGEABLY PROVIDED THAT THE ANCHOR HOLE QUANTITY AND HOLE SPACING FROM SHEETS F.XX IS MAINTAINED

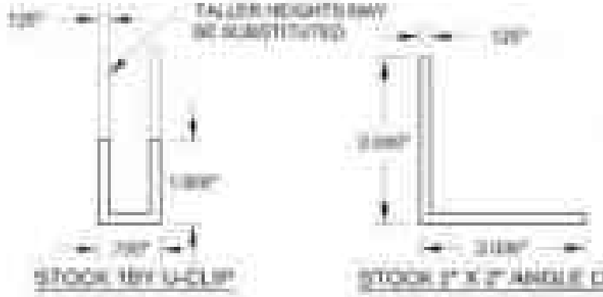
THE MULLION CLIPS BELOW ARE AVAILABLE ONLY IN A SQUARE CUT STYLE, SIMILAR TO SQUARE-CUT CLIP DETAILS ABOVE



STANDARD 1BY U-CLIP | STOCK 2" X 5" ANGLE CLIP



STANDARD 2BY MULLION CLIP | STANDARD 2BY U-CLIP
FOR MULLIONS WITH 1/4" SIDE WALLS



STOCK 1BY U-CLIP | STOCK 2" X 2" ANGLE CLIP | HOOK-TYPE 2BY MULLION CLIP | STOCK 2BY U-CLIP
FOR MULLIONS WITH 1/4" SIDE WALLS

Mullion	Dim.	Standard 1By Clip	Hook-Type 1By Clip	Angle-s, U-clips & 2By Clips, Square Cut Depth
7" X 2" X 1/8"	"A"	1.423"	1.485"	1.423" (Standard) 1.485" (Hook-Type)
	"B"	2.923"	2.985"	
	"C"	3.485"	3"	
7" X 2" X 3/8"	"A"	1.123		1.123"
	"B"	2.623"		
	"C"	3.185"		
7" X 2.1/2" X 1/8"	"A"		2.198"	2.160"
	"B"		3.698"	
	"C"		4.5"	
7" X 3" X 1/8"	"A"		3.698"	3.460"
	"B"		4.698"	
	"C"		5.5"	
7" X 3" X 1/8"	"A"		3.698"	3.460"
	"B"		4.698"	
	"C"		5.5"	
7" X 4" X 3/8"	"A"	3.135"		3.197"
	"B"	4"		
	"C"	4.760"		
7" X 2.1/2" X 1/8" Fin				1.810"
2" x 4" X 1/8"				3.698"
2" x 4" X 1/4"				3.435"
2" x 4" X 1/8"				3.698"
2" x 4" X 1/4"				3.435"
2" x 3" X 1/8"				2.698"
20" X 2.1/2"				2.810"
20" X 3"				2.810"

NOTE: 1) ALL CLIPS SHOWN ON THIS SHEET TO BE ALUMINUM EXTR.

4	07/21/23	JENS ROSENVINGE	MULLION CLIPS
3	04/20/23	JENS ROSENVINGE	MULLION CLIPS
2	03/16/23	JENS ROSENVINGE	MULLION CLIPS
1	02/16/23	JENS ROSENVINGE	MULLION CLIPS
REV	DATE	DRAWN BY	SHEET TITLE

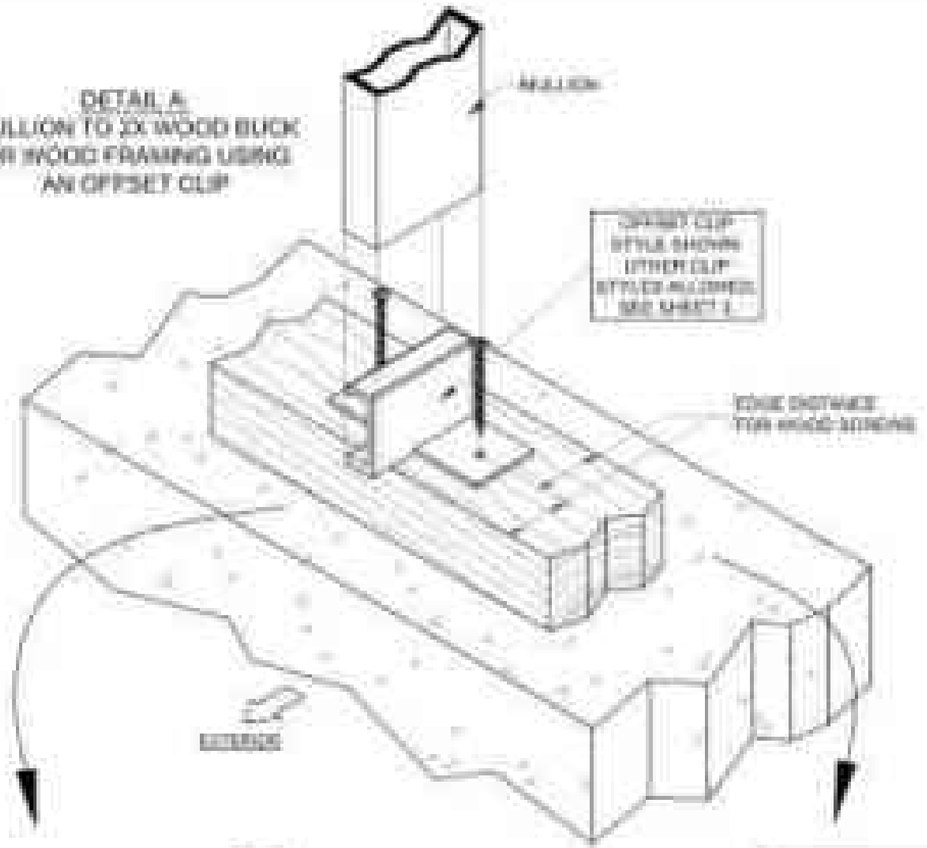
WINDOOR®
CONSTRUCTION SYSTEMS
ALUMINUM TUBE MULLIONS, CLOSED (UNSLOTTED)
CLIP STYLES & DIMENSIONS
SHEET NO. F.XX

PREPARED BY A LYNN MILLER
SYSTEMS ENGINEERING
PO BOX 1000
ANYWHERE, FL 34000
(941) 555-1212

LICENSED PROFESSIONAL ENGINEER
ANTHONY LYNN MILLER
LICENSE
No. 54707
10/13/23
STATE OF FLORIDA
PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E., P.O. # 54707

DETAIL A:
MULLION TO 2X WOOD BUCK
OR WOOD FRAMING USING
AN OFFSET CLIP

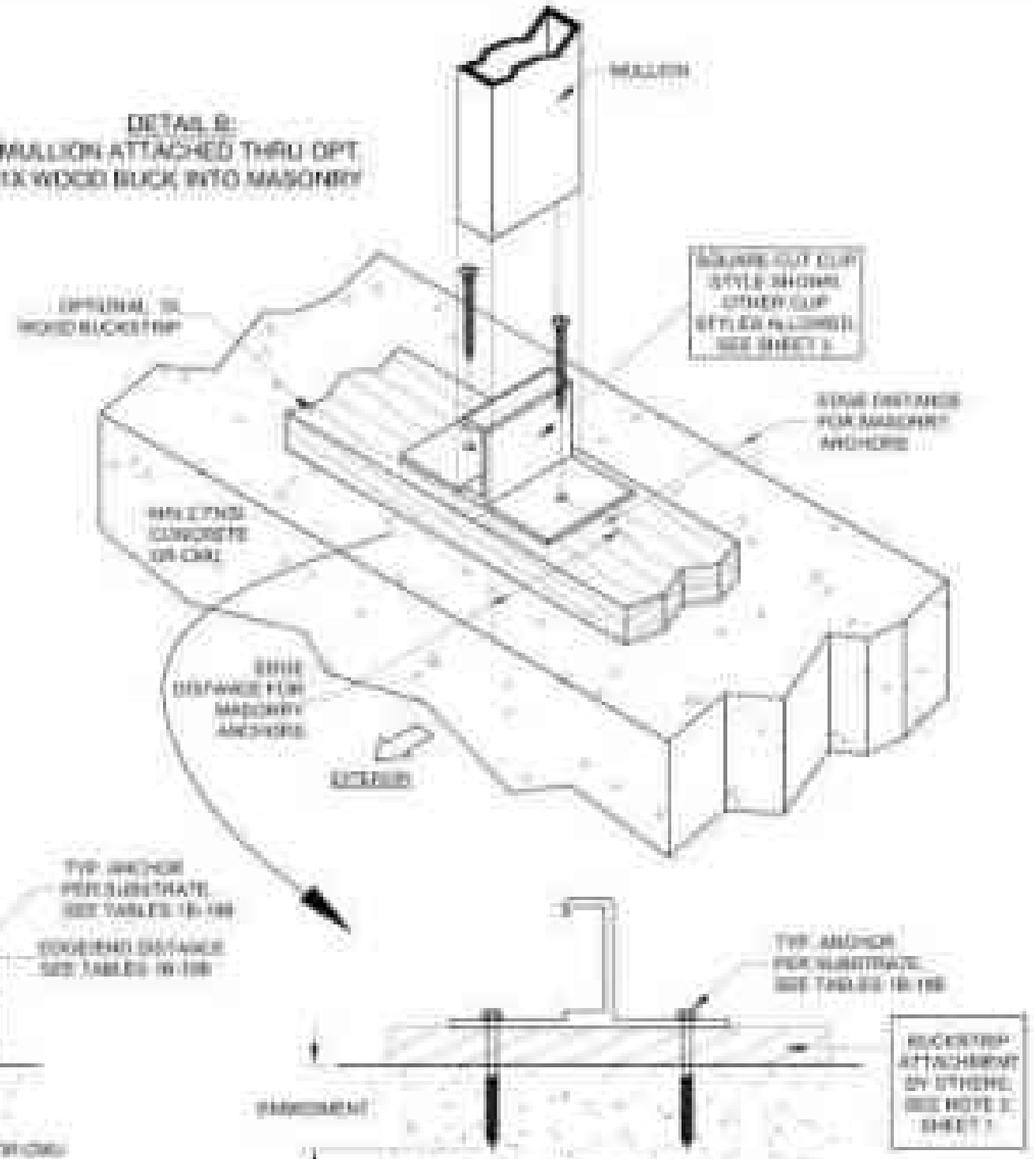


FRONT VIEW



SIDE VIEW

DETAIL B:
MULLION ATTACHED THRU OPT.
1X WOOD BUCK INTO MASONRY



FRONT VIEW

INSTALLATION NOTES:

1) ANCHOR EMBEDMENT TO SUBSTRATE SHALL BE BEYOND WALL DRESSING OR STUCCO. SUBSTRATE MAY VARY FROM DETAILS. SEE TABLES 1B-1M FOR SUBSTRATE PROPERTIES. ANCHOR HEAD TYPE MAY BE PANHEAD, HEXHEAD OR FLATHEAD.

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. 2X2 OR 2X3 ANGLE CLIPS, IF USED, MUST BE INSTALLED IN PAIRS AND PULLED AGAINST THE MULLIONS INSIDE WALL FOR A SECURE FIT.

4) FOR MASONRY APPLICATIONS IN MIAMI-DADE COUNTY, USE ONLY MIAMI-DADE COUNTY APPROVED DEWALT (ETRATION, DEWALT (ETRACON, ITW TAPCON OR ELCO CRETEFIX MASONRY ANCHORS AS LISTED IN TABLES 1B-1M.

REVISIONS			
REV	DESCRIPTION	DATE	APPD
A	ADDED NOTE 4	10/11/23	

WINDOOR®
WINDOW & DOOR MANUFACTURERS ASSOCIATION
INC.
6675 CORPORATE CENTER PKWY
JACKSONVILLE, FL 32216
(904) 448-1400

ALUMINUM TUBE MULLIONS CLIPPED (LM) (04/2023)

INSTALLATION INSTRUCTIONS

JENS ROSEWSKI

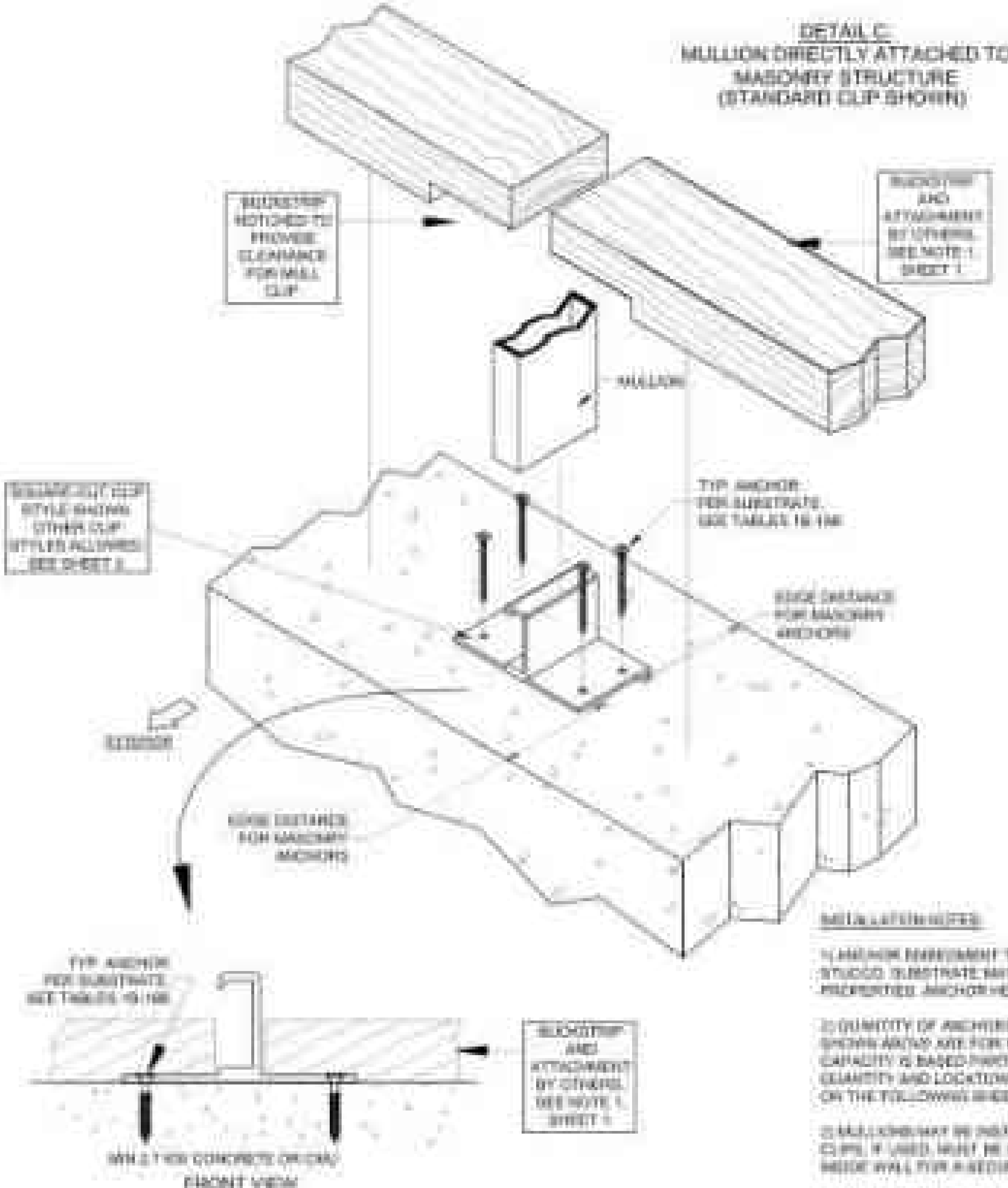
WNLI-MP-1

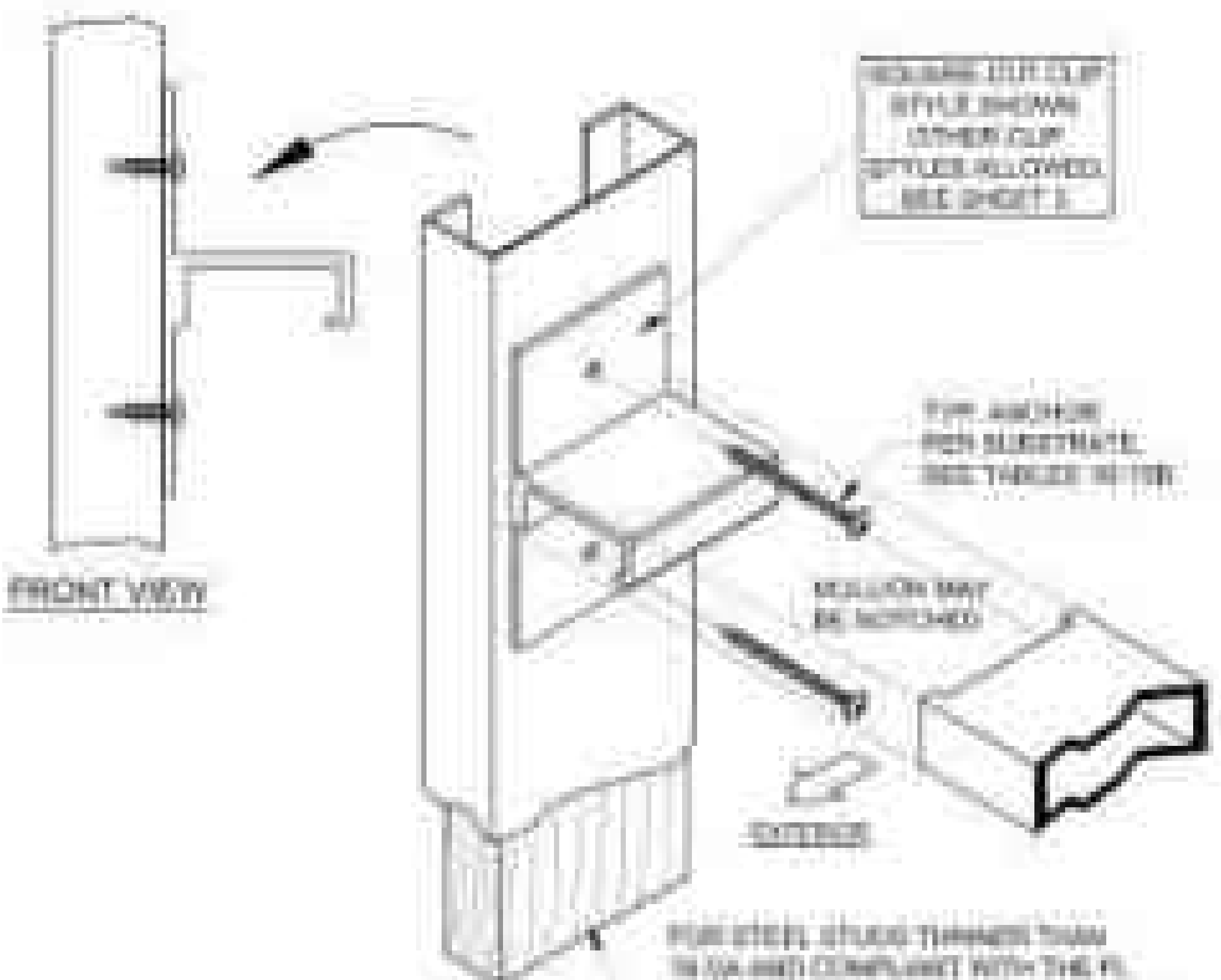
SCALE	NTS
DRAWN	MLH
APPROVED	ANTHONY LYNN MILLER
DATE	10/11/23
SHEET	4 OF 4

ANTHONY LYNN MILLER
LICENSE
No. 58707
STATE OF FLORIDA
PROFESSIONAL ENGINEER
10/11/23

A. LYNN MILLER, P.E., FSE # 58707

DETAIL C:
MULLION DIRECTLY ATTACHED TO
MASONRY STRUCTURE
(STANDARD CLIP SHOWN)





DETAIL D:
MULLION ATTACHED
TO STEEL STUD

INSTALLATION NOTES:

1) ANCHOR EMBEDMENT TO SUBSTRATE SHALL BE BEYOND WALL DRESSING OR STUCCO. SUBSTRATE MAY VARY FROM DETAILS. SEE TABLES 16-19B FOR SUBSTRATE PROPERTIES. ANCHOR HEAD TYPE MAY BE PANHEAD, HEXHEAD OR FLATHEAD.

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. 2X2 OR 2X3 ANGLE CLIPS, IF USED, MUST BE INSTALLED IN PAIRS AND PULLED AGAINST THE MULLION'S INSIDE WALL FOR A SECURE FIT.

4) FOR MASONRY APPLICATIONS IN MIAMI-DADE COUNTY, USE ONLY MIAMI-DADE COUNTY APPROVED DEWALT ULTRACON, DEWALT 1/4" TAPCON+, ELCO 1/4" AGGREGATOR OR ELCO CRETEFLEX MASONRY ANCHORS AS LISTED IN TABLES 16-19B.

FIGURE 1



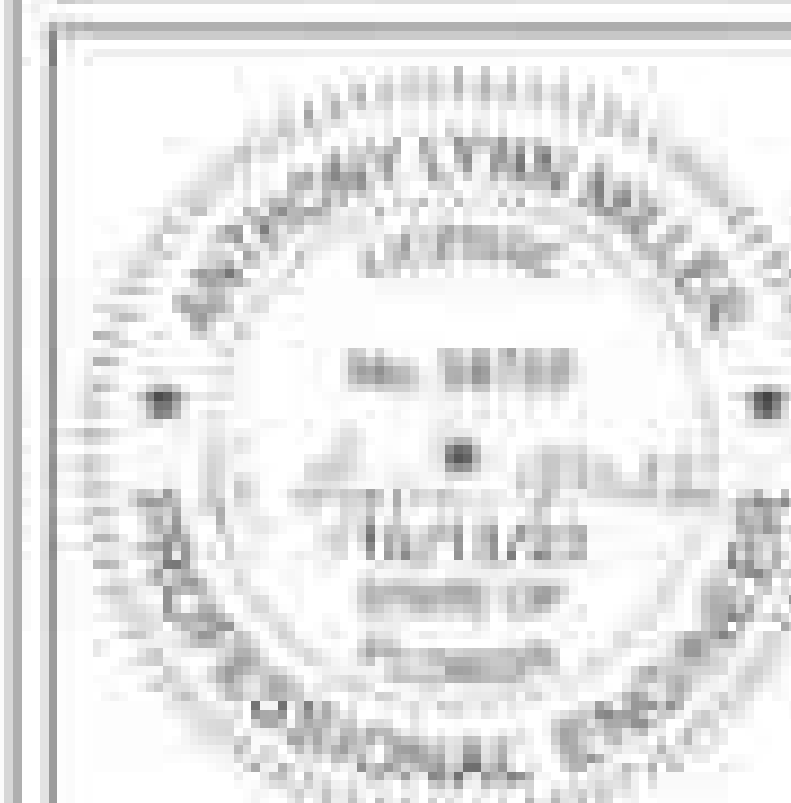
A | 10/13/23 | NO CHANGES THIS SHEET

WINDOOR®

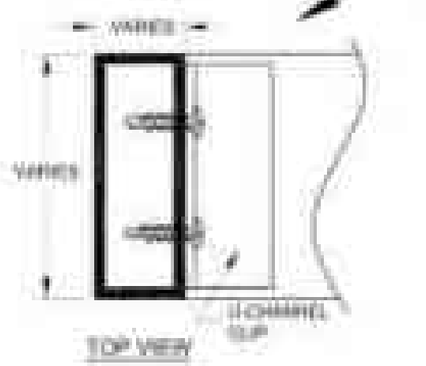
ALUMINUM TUBE MULLIONS, CLIPPED (LM)

INSTALLATION INSTRUCTIONS

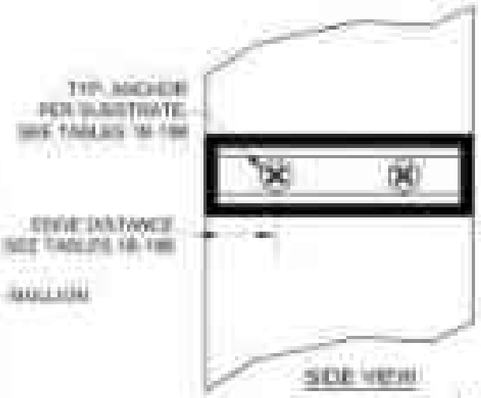
MULLIONS | NTS | 5 OF 28 | MULL-WD-1



A. LYNN MILLER, P.E., P.E.# 58705

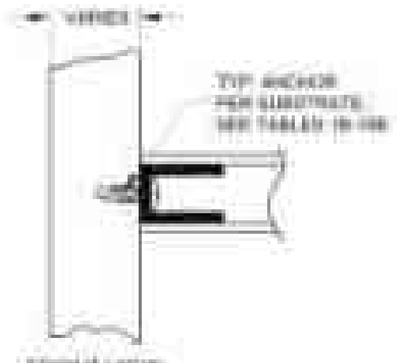


TOP VIEW



SIDE VIEW

DETAIL E
MULLION TO MULLION INTERSECTION



FRONT VIEW

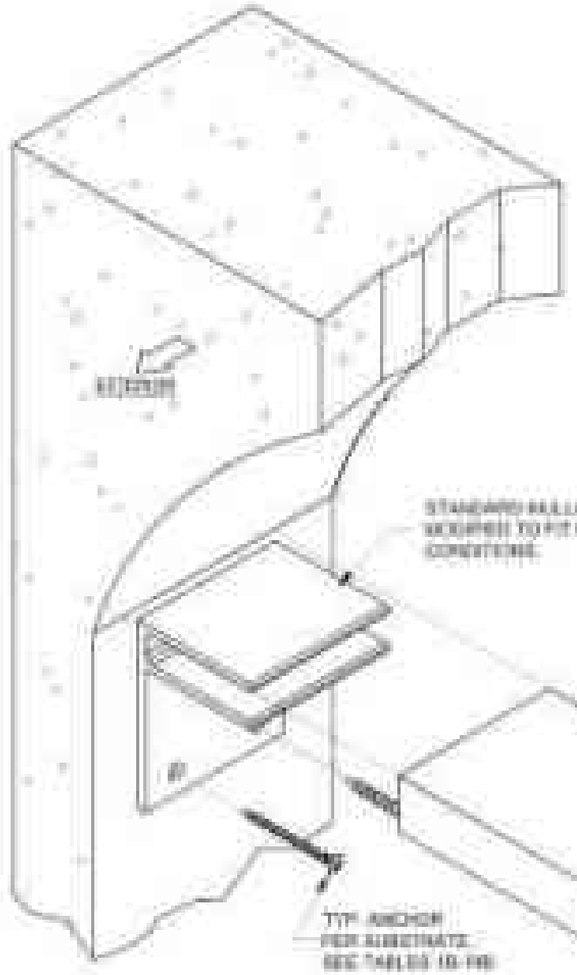
INSTALLATION NOTES:

1) ANCHOR EMBEDMENT TO SUBSTRATE SHALL BE BEYOND WALL DRESSING OR STUCCO. SUBSTRATE MAY VARY FROM DETAILS. SEE TABLES 18-19B FOR SUBSTRATE PROPERTIES. ANCHOR HEAD TYPE MAY BE PANHEAD, HEXHEAD OR FLATHEAD.

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, VERTICALLY, OR AT ANY ANGLE IN-BETWEEN. IF USED, MUST BE INSTALLED IN PAIRS AND PULLED AGAINST THE MULLIONS INSIDE WALL FOR A SECURE FIT.

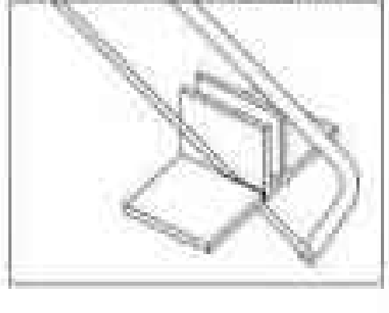
4) FOR MASONRY APPLICATIONS IN MIAMI-DADE COUNTY, USE ONLY MIAMI-DADE COUNTY APPROVED DEWALT ULTRACON, DEWALT ULTRACON+, ELCO 1/4" AGGREGATOR OR ELCO CHEMTOPLEX MASONRY ANCHORS AS LISTED IN TABLES 18-19B.



DETAIL F
OPTIONAL FIELD-MODIFIED MULLION F-CLIP



THE HOOK TYPE CLIP MAY ALSO BE MODIFIED AND USED AS AN F-CLIP.



ADD CHANGES THIS SHEET

4	11/15/23	
3		
2		
1		

WINDOOR®
TECHNOLOGIES, LLC
100 PEPPER STREET
W. MELBOURNE, FL 32904
(321) 953-7400

ALUMINUM TUBE MULLIONS CLIP-ON

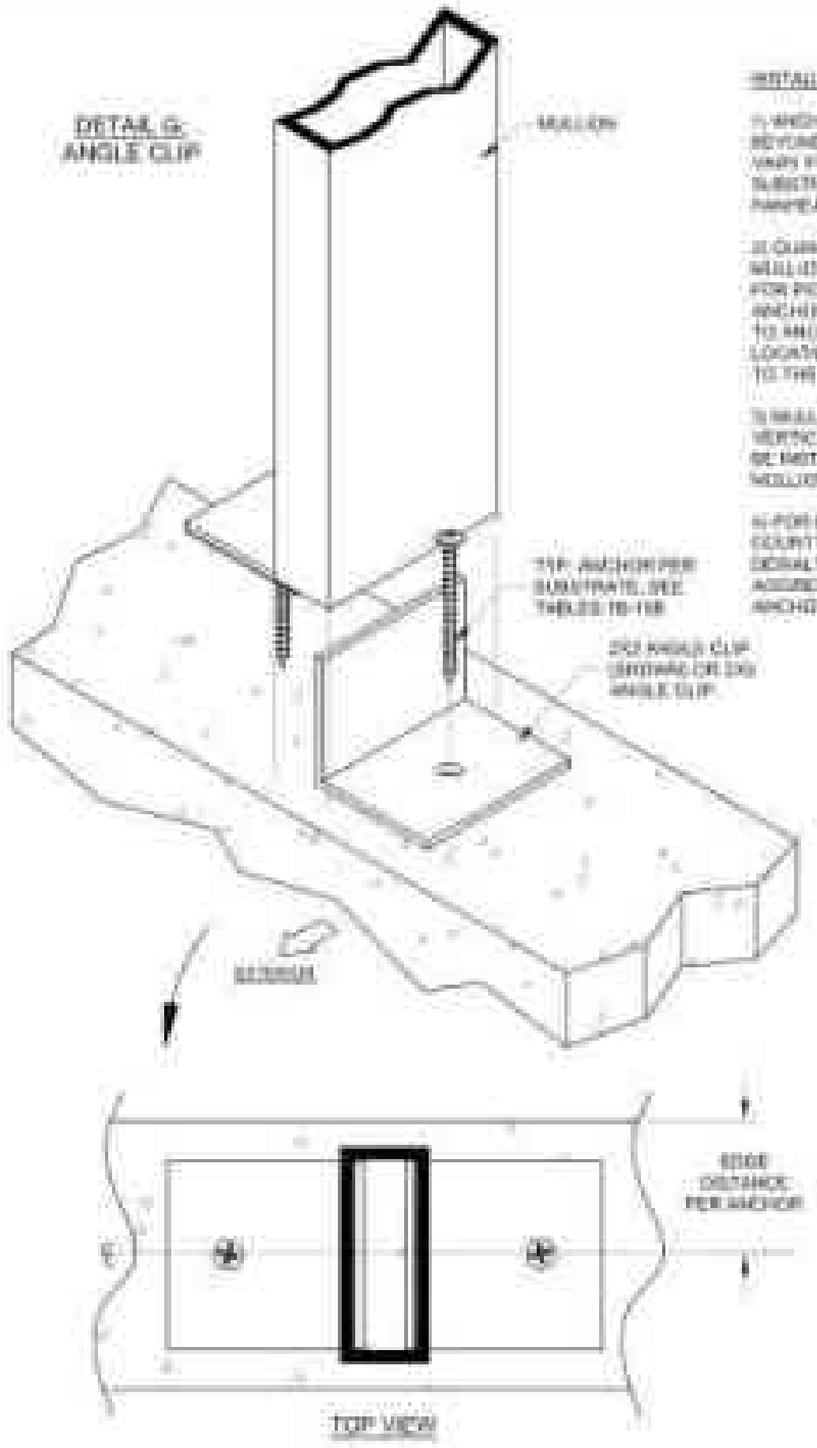
INSTALLATION INSTRUCTIONS

MULLION-1		
JENS ROSE(WSI)	04/20/23	
CLIPPED (LM)		

ANTHONY LYNN MILLER
LICENSE
No. 58707
11/13/23
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E., PE # 58707

DETAIL G:
ANGLE CLIP



INSTALLATION NOTES:

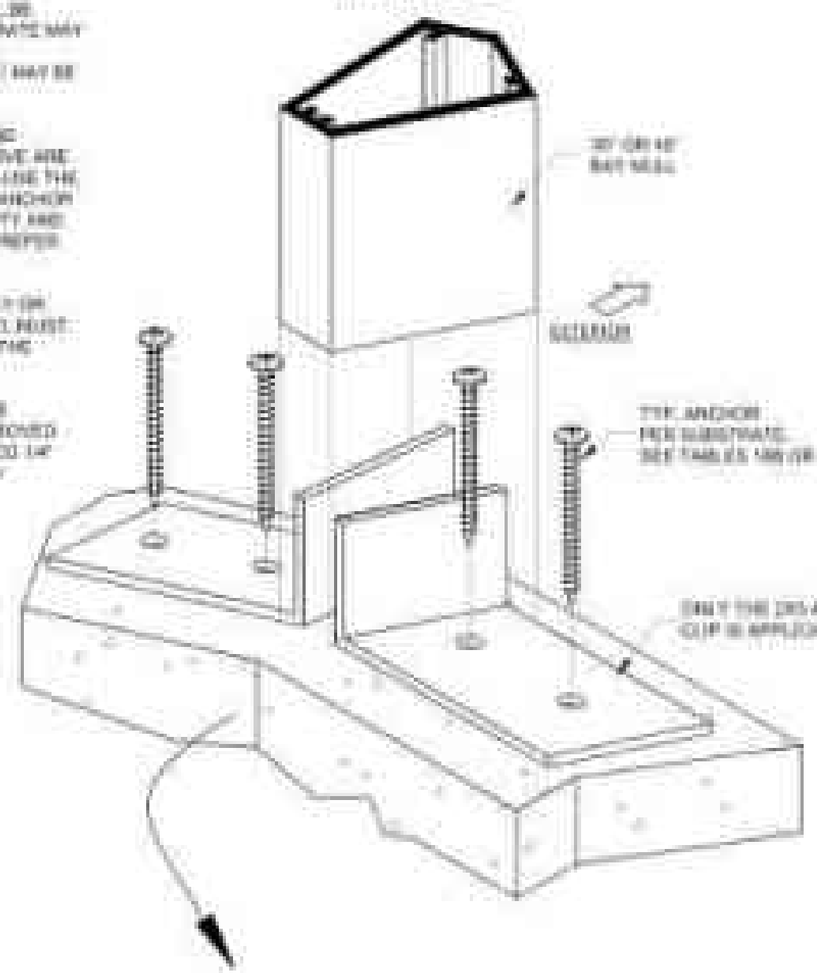
1) ANCHOR EMBEDMENT TO SUBSTRATE SHALL BE BEYOND WALL DRESSING OR STUCCO. SUBSTRATE MAY VARY FROM DETAILS. SEE TABLES 7B-10B FOR SUBSTRATE PROPERTIES. ANCHOR HEAD TYPE MAY BE PANHEAD, HEXHEAD OR FLATHEAD.

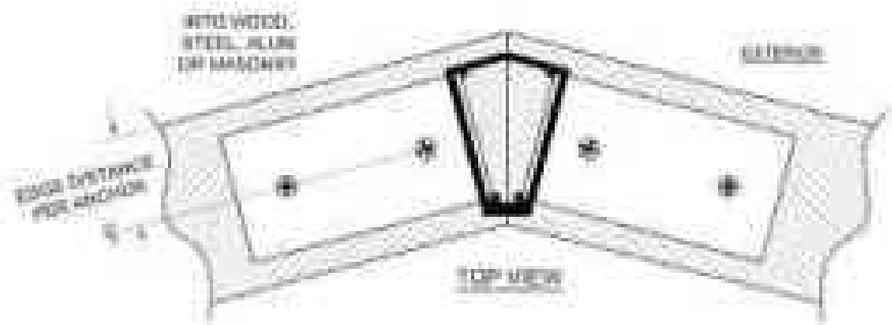
2) QUANTITY OF ANCHORS, MULLION TYPES AND MULLION CLIP TYPES AND STYLES SHOWN ABOVE ARE FOR PICTORIAL REPRESENTATION ONLY. BECAUSE THE ANCHOR CAPACITY IS BASED PARTLY ON THE ANCHOR TO ANCHOR DISTANCE, THE CORRECT QUANTITY AND LOCATION OF ANCHORS MUST BE FOLLOWED. REFER TO THE TABLES ON THE FOLLOWING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

3) MULLIONS MAY BE INSTALLED HORIZONTALLY OR VERTICALLY. 202 OR 205 ANGLE CLIPS, IF USED, MUST BE INSTALLED IN PAIRS AND PULLED AGAINST THE MULLION'S INSIDE WALL FOR A SECURE FIT.

4) FOR MASONRY APPLICATIONS IN MIAMI-DADE COUNTY, USE ONLY MIAMI-DADE COUNTY APPROVED DEWALT ULTRACON, DEWALT ULTRACON+, ELCO 14" AGGREGATE OR ELCO CRETEFLEX MASONRY ANCHORS AS LISTED IN TABLES 4E-4M.

DETAIL H
BAY MULLION
INSTALLATION





WINDOOR
ALUMINUM TUBE MULLIONS, CLIPS
INSTALLATION INSTRUCTIONS
JENS ROSENVINGE
CLIPPED (LM)
04/2023
WILLIAM F.
ANTHONY LYNN MILLER
LICENSE
No. 94797
STATE OF FLORIDA
PROFESSIONAL ENGINEER

TABLE 1A

1" x 2" x 1/8" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																																			
	[illegible]				[illegible]				[illegible]				[illegible]				[illegible]				[illegible]				[illegible]				[illegible]				[illegible]			
	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		Point Loaded Mullion		Uniformly Loaded Mullion	
Mullion Span	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]																								
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]																												
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]																																

TABLE 1B

Anchor/Clip Capacity (lbs) when using a 1" x 2" x 1/8" Tube Mullion	[illegible]				[illegible]	[illegible]							[illegible]			Wood			Metal
Substrate:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Anchor Type:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Edge Distance (in):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Embedment (in):	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



FIGURE 1 FIGURE 2 FIGURE 3 FIGURE 4 FIGURE 5 FIGURE 6 FIGURE 7 FIGURE 8

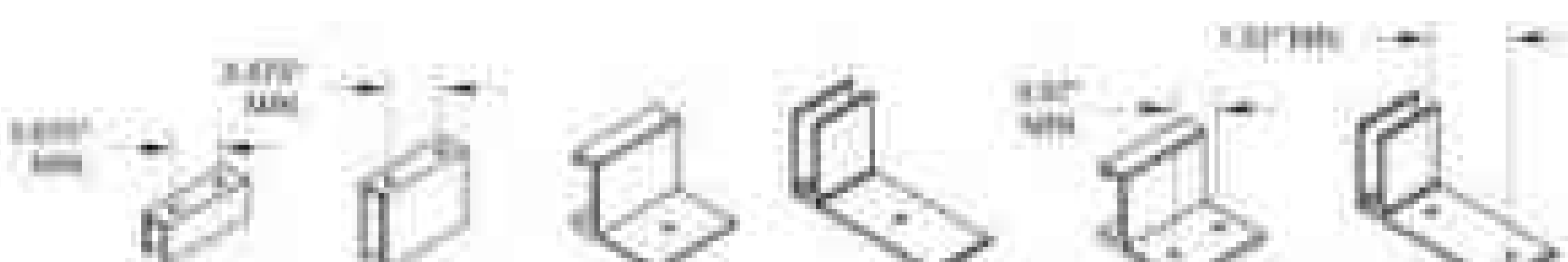


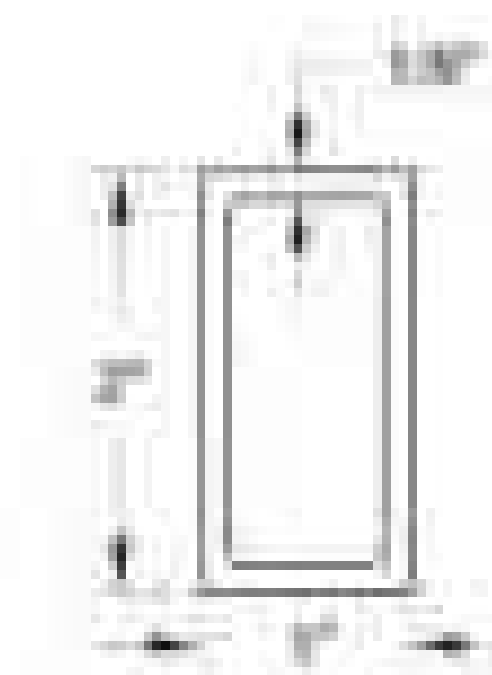
FIGURE 9 FIGURE 10 FIGURE 11 FIGURE 12 FIGURE 13 FIGURE 14

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 3. 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 2.



1" X 2" X 1/8" MULLION

NO CHANGES THIS SHEET

WINDOOR

ALUMINUM TUBE MULLIONS CLIPPED (LM)

1 X 2 X 1/8 CAPACITIES

MULLIONS

NTS

9 OF 29

PREPARED BY: A. LYNN MILLER

ANTHONY LYNN MILLER LICENSE No. 58705 10/13/23 STATE OF FLORIDA PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E.

TABLE 2A

1" x 2" x 1/8" with 238 Series Frames Design Pressure & Clip/Anchor Capacity Requirement

Mullion Span	Opening Dimension 60 in.				80 in.				96 in.				120 in.				144 in.				168 in.				192 in.				216 in.				240 in.			
	Fixed Leaded Mullion		Outswing Leaded Mullion		Fixed Leaded Mullion		Outswing Leaded Mullion		Fixed Leaded Mullion		Outswing Leaded Mullion		Fixed Leaded Mullion		Outswing Leaded Mullion		Fixed Leaded Mullion		Outswing Leaded Mullion		Fixed Leaded Mullion		Outswing Leaded Mullion		Fixed Leaded Mullion		Outswing Leaded Mullion		Fixed Leaded Mullion		Outswing Leaded Mullion		Fixed Leaded Mullion		Outswing 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)	Design Pressure (psf)	Allowable Load (lbs)
60 in.	176.3	797	173.8	777	140.8	636	138.7	620	117.3	530	115.6	516	93.7	423	92.4	413	78.4	354	77.3	345	67.2	303	66.3	296	58.8	265	58.0	259	52.2	236	51.5	230	47.0	212	46.4	207
72 in.	146.9	664	144.8	647	117.3	530	115.6	516	97.7	441	96.3	430	78.1	352	77.0	344	65.3	295	64.4	287	56.0	253	55.2	247	49.0	221	48.3	216	43.5	196	42.9	192	39.2	177	38.6	173
84 in.	125.9	569	124.1	555	100.5	454	99.1	443	83.7	378	82.6	369	66.9	302	66.0	295	56.0	253	55.2	247	48.0	217	47.3	212	42.0	190	41.4	185	37.3	168	36.8	165	33.6	152	33.1	148
96 in.	110.2	498	108.6	486	88.0	397	86.7	388	73.3	331	72.3	323	58.6	264	57.7	258	49.0	221	48.3	216	42.0	190	41.4	185	36.7	166	36.2	162	32.6	147	32.2	144	29.4	133	29.0	130
108 in.	97.9	442	96.5	432	78.2	353	77.1	345	65.1	294	64.2	287	52.1	235	51.3	230	43.6	196	43.0	192	37.3	169	36.8	165	32.6	148	32.2	144	29.0	131	28.6	128	26.1	118	25.8	115
120 in.	88.1	398	86.8	389	70.4	318	69.4	310	58.6	265	57.8	258	46.9	211	46.2	207	39.2	177	38.6	173	33.6	152	33.1	148	29.4	133	29.0	130	26.1	118	25.8	115	23.5	106	23.2	104
132 in.	80.1	362	78.9	353	64.0	289	63.1	282	53.3	241	52.5	235	42.6	192	42.0	188	35.6	161	35.1	157	30.5	138	30.1	135	26.7	121	26.4	118	23.8	107	23.5	105	21.4	96	21.1	94
144 in.	73.4	332	72.3	324	58.7	265	57.8	259	48.9	221	48.1	215	39.1	176	38.5	173	32.6	148	32.2	144	28.0	127	27.6	124	24.5	111	24.2	108	21.8	98	21.5	96	19.6	88	19.3	87
156 in.	67.8	307	66.8	299	54.2	245	53.4	239	45.1	204	44.4	199	36.1	163	35.5	160	30.1	136	29.6	133	25.8	117	25.5	114	22.6	102	22.3	100	20.1	91	19.8	89	18.1	81	17.8	80
168 in.	62.9	285	62.0	278	50.3	228	49.6	222	41.9	190	41.2	185	33.5	152	33.0	148	27.9	126	27.5	124	24.0	108	23.7	106	21.0	95	20.7	93	18.7	84	18.4	83	16.8	75	16.5	74
180 in.	58.7	266	57.9	260	46.9	213	46.3	207	39.1	177	38.5	173	31.3	142	30.8	138	26.1	118	25.7	116	22.4	101	22.1	99	19.6	89	19.3	87	17.4	79	17.2	77	15.7	71	15.4	69
192 in.	55.0	249	54.3	244	44.0	199	43.4	195	36.7	166	36.1	162	29.3	133	28.9	130	24.5	111	24.1	108	21.0	95	20.7	93	18.4	83	18.1	81	16.3	74	16.1	72	14.7	67	14.5	65

TABLE 2B

Anchor/Clip Capacity (lbs) when using a 1" x 2" x 1/8" Tube Mullion with 238 Series Frames

Substrate	Steel				Alu. Extrusion				Alu. Extrusion				Alu. Extrusion				Concrete/CMU				Wood		Metal
Anchor Type	2-7/8" Slotted Extrusion		1/4" Slotted Extrusion		5/16" Dia x Varies	5/16" Slotted Extrusion		1/4" Slotted Extrusion		1/4" Dia x Varies Closed Slot	1/4" Dia x Varies Rigged Screw	5/16" Slotted Extrusion		1/4" Slotted Extrusion	1/4" Dia x Varies Rigged Screw	#10 Sheet Screw	#14 Sheet Screw	#10 Sheet Screw
Clip Distance (in)	1"	2-1/2"	1"	2-1/2"	5-1/8"	1"	2-1/2"	1"	2-1/2"	2-1/2"	2"	1"	1"	1"	2"	1-3/4"	1-3/4"	1-1/4"
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"	1-3/4"	4-3/4"	1-3/4"	2"	2-3/4"	1-3/4"	2-3/4"	See Detail 1
1 Anchor @ 1.38" Min. O.C. / Mullion Clip (Fig. 1)	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs
2 Anchors @ 1.38" Min. O.C. / Mullion Clip (Fig. 1)	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs
3 Anchors @ 3.00" 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	1,000 lbs	1,000 lbs
4 Anchors @ 1.38" Min. O.C. / Mullion Clip (Fig. 1)	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	N/A	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	N/A	N/A	1,000 lbs	1,000 lbs	1,000 lbs	N/A	1,000 lbs	1,000 lbs	1,000 lbs
2 Total Anchors @ 1.38" O.C. min. 2x2 Angle Clip Pair (Fig. 2)	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs
3 Total Anchors @ 1.38" O.C. min. 2x2 Angle Clip Pair (Fig. 2)	1,000 lbs	N/A	N/A	N/A	N/A	1,000 lbs	N/A	N/A	N/A	N/A	N/A	1,000 lbs	N/A	N/A	N/A	1,000 lbs	1,000 lbs	1,000 lbs
4 Total Anchors @ 1.38" O.C. min. 2x2 Angle Clip Pair (Fig. 2)	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs
2 Anchors @ 3.000" Min. O.C. / Single Clip (Fig. 3 & 4)	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	1,000 lbs	1,000 lbs
1 Anchor / Single Clip (Fig. 3 & 4)	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs
2 Anchors @ 1.38" Min. O.C. / Single Clip (Fig. 5)	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	1,000 lbs	1,000 lbs
3 Anchors @ 1.38" Min. O.C. / Single Clip (Fig. 5)	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	N/A	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs	1,000 lbs

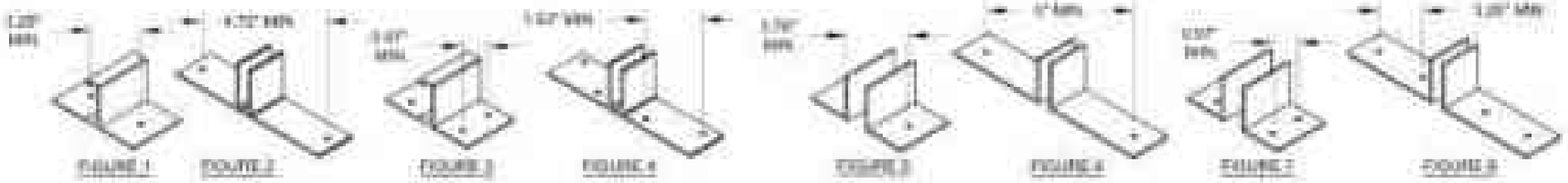


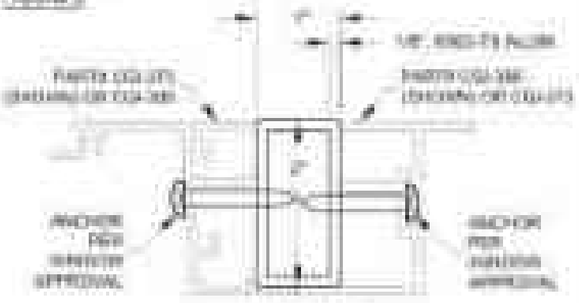
TABLE NOTES:

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

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 3. 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 (M) NOMENCLATURE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY REQUIREMENT FORMULA ON SHEET 3.



1" X 2" X 1/8" MULLION WITH ATTACHED 238 SERIES WINDOW FRAMES

WINDOOR
TORONTO ONTARIO
ALUMINUM TUBE MULLIONS, CLOSED SLOT
1 X 2 X 1/8 CAPACITIES
WALL WP-1
REQUIRED THIS SHEET
6

ANTHONY LYNN MILLER
LICENCE
No. 90707
10/13/23
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., P.S.E. (ONTARIO)

TABLE 2A:

1" x 2" x .098" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																													
	30 in				40 in				50 in				60 in				70 in				80 in				90 in				100 in			
	Fixed (Jackbay Mullion)		Jackbay (Jackbay Mullion)		Fixed (Jackbay Mullion)		Jackbay (Jackbay Mullion)		Fixed (Jackbay Mullion)		Jackbay (Jackbay Mullion)		Fixed (Jackbay Mullion)		Jackbay (Jackbay Mullion)		Fixed (Jackbay Mullion)		Jackbay (Jackbay Mullion)		Fixed (Jackbay Mullion)		Jackbay (Jackbay Mullion)		Fixed (Jackbay Mullion)		Jackbay (Jackbay Mullion)		Fixed (Jackbay Mullion)		Jackbay (Jackbay Mullion)	
Mullion Clips																														
42 in																														
48 in																														
54 in																														
60 in																														
66 in																														
72 in																														
78 in																														
84 in																														
90 in																														
96 in																														

TABLE 2B:

Anchor/Clip Capacity (lbs) when using a 1" x 2" x .098" Tube Mullion	Reference	Jackbay				Clip Type	Mullion (MC)						Floor (MC)				Screw		Mullion
	Anchor Type	2-7/8" Jackbay Mullion*		1-1/4" Jackbay Mullion		2-7/8" Extra Clip Reinforced	2-7/8" Jackbay Mullion		1-1/4" Jackbay Mullion		2-7/8" Extra Clip Reinforced	1-1/4" Extra Clip Reinforced	2-7/8" Jackbay Mullion		1-1/4" Jackbay Mullion	1-1/4" Extra Clip Reinforced	#12 Sheet Screw	#10 Sheet Screw	#12 Sheet Screw
	Edge Clearance (c1)	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"	3/4"	3/4"	3/4"
	End Distance (c2)	1-1/2"	1-1/2"	1-1/2"	1-1/2"	2"	1-1/4"	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"	1-1/2"	1-1/2"	See Detail 1
2 Anchors @ 6-7/8" Min. O.C. - Mullion Clip (Fig. 1)	775 lbs	930 lbs	620 lbs	930+ lbs	1544 lbs	1030 lbs	977 lbs	920 lbs	930 lbs	1116 lbs	774 lbs	774 lbs	919 lbs	1860 lbs	620 lbs	930 lbs	1116 lbs	1116 lbs	
4 Anchors @ 6-7/8" Min. O.C. - Mullion Clip (Fig. 1)	1550 lbs	1860 lbs	1240 lbs	1616	1616	1616	1616	1616	1616	1616	1616	1616	1616	1616	1616	1616	2232 lbs	2232 lbs	2232 lbs
2 Tube Anchors @ 1-3/8" O.C. Min/1-5/8" Height Clip Rail (Fig. 2)	1232 lbs	1540 lbs	1026 lbs	1232 lbs	1231 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs	1540 lbs
2 Anchors @ 6-7/8" Min. O.C. - 2-1/2 Clip (Fig. 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
3 Anchors @ 6-7/8" Min. O.C. - 2-1/2 Clip (Fig. 3)	1550 lbs	1860 lbs	1240 lbs	1616 lbs	1616 lbs	1616 lbs	1616 lbs	1616 lbs	1616 lbs	1616 lbs	1616 lbs	1616 lbs	1616 lbs	1616 lbs	1616 lbs	1616 lbs	2232 lbs	2232 lbs	2232 lbs
4 Anchors @ 6-7/8" Min. O.C. - 2-1/2 Clip (Fig. 3)	1727 lbs	2308 lbs	1540 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

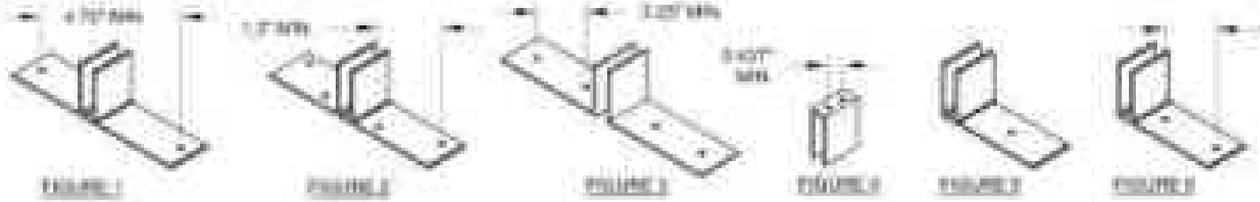


FIGURE 1 FIGURE 2 FIGURE 3 FIGURE 4 FIGURE 5 FIGURE 6

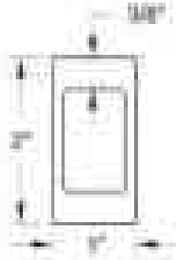
TABLE NOTES:

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 3. 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 2.



WINDOOR®
TECHNOLOGIES, LLC
ALUMINUM TUBE MULLIONS, CLIPS/ANCHORS
1 IN 2 X 98 CAPACITIES
CLIPPED (JM) (MC0023)
JBNS ROSEWSH)
WM1.WP1
REVISED THIS SHEET
4
10/13/23
SHEET
10 OF 16

ANTHONY LYNN MILLER
LICENSE
No. 56707
10/13/23
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E. - FL# 56707

TABLE 4A

1" x 2-1/2" x 1/8" Tube Mullion Design Pressure & Opposite Capacity Requirement	Opening Dimension																													
	30 in				40 in				50 in				60 in				70 in				80 in				90 in				100 in			
	Fixed (Active Mullion)		Uniformly (Active Mullion)		Fixed (Active Mullion)		Uniformly (Active Mullion)		Fixed (Active Mullion)		Uniformly (Active Mullion)		Fixed (Active Mullion)		Uniformly (Active Mullion)		Fixed (Active Mullion)		Uniformly (Active Mullion)		Fixed (Active Mullion)		Uniformly (Active Mullion)		Fixed (Active Mullion)		Uniformly (Active Mullion)		Fixed (Active Mullion)		Uniformly (Active Mullion)	
	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)	Design Pressure (psf)	Opposite Capacity (lbs)
Mullion Span: 30 in	150.0	900	113.0	680	90.0	710	113.0	670	128.0	770	113.0	590	112.0	510	113.0	430	108.0	710	113.0	530	97.0	710	113.0	520	87.0	710	113.0	520	80.0	710	113.0	520
40 in	131.0	1000	114.0	860	105.0	830	113.0	850	96.0	840	113.0	670	113.0	590	113.0	510	108.0	840	113.0	670	99.0	840	113.0	660	90.0	840	113.0	660	83.0	840	113.0	660
50 in	117.0	1100	113.0	1050	93.0	950	113.0	1050	85.0	950	113.0	850	113.0	670	113.0	590	95.0	950	113.0	760	88.0	950	113.0	760	81.0	950	113.0	760	75.0	950	113.0	760
60 in	107.0	1200	113.0	1050	84.0	1050	113.0	1050	76.0	1050	113.0	1050	113.0	850	113.0	670	84.0	1050	113.0	850	78.0	1050	113.0	850	72.0	1050	113.0	850	67.0	1050	113.0	850
70 in	97.0	1300	113.0	1050	77.0	1150	113.0	1050	70.0	1150	113.0	1050	113.0	1050	113.0	850	77.0	1150	113.0	1050	71.0	1150	113.0	1050	66.0	1150	113.0	1050	61.0	1150	113.0	1050
80 in	90.0	1400	113.0	1050	72.0	1250	113.0	1050	65.0	1250	113.0	1050	113.0	1050	113.0	1050	72.0	1250	113.0	1050	66.0	1250	113.0	1050	61.0	1250	113.0	1050	57.0	1250	113.0	1050
90 in	84.0	1500	113.0	1050	67.0	1350	113.0	1050	61.0	1350	113.0	1050	113.0	1050	113.0	1050	67.0	1350	113.0	1050	62.0	1350	113.0	1050	57.0	1350	113.0	1050	53.0	1350	113.0	1050
100 in	79.0	1600	113.0	1050	63.0	1450	113.0	1050	57.0	1450	113.0	1050	113.0	1050	113.0	1050	63.0	1450	113.0	1050	58.0	1450	113.0	1050	54.0	1450	113.0	1050	50.0	1450	113.0	1050
110 in	74.0	1700	113.0	1050	59.0	1550	113.0	1050	54.0	1550	113.0	1050	113.0	1050	113.0	1050	59.0	1550	113.0	1050	55.0	1550	113.0	1050	51.0	1550	113.0	1050	47.0	1550	113.0	1050
120 in	70.0	1800	113.0	1050	56.0	1650	113.0	1050	51.0	1650	113.0	1050	113.0	1050	113.0	1050	56.0	1650	113.0	1050	52.0	1650	113.0	1050	48.0	1650	113.0	1050	45.0	1650	113.0	1050

TABLE 4B

Anchor/Clip Capacity (lbs) when using a 1" x 2-1/2" x 1/8" Tube Mullion	Fastener		Mullion				Clip (min)	Fixed (SS)						Fixed (TS)				Screw		Wood
	Anchor Type		3/16" Dia Self-Drill (Masonry)		1/4" Dia Self-Drill (Masonry)		3/16" Dia Screw (Optional)	3/16" Dia Self-Drill (Masonry)		1/4" Dia Self-Drill (Masonry)		1/4" Dia Screw Cored/Tap	1/4" Dia Screw Rigid Drill-In	3/16" Dia Self-Drill (Masonry)	1/4" Dia Self-Drill (Masonry)	1/4" Dia Screw Rigid Drill-In	#10 Sheet Screw	#12 Sheet Screw	#14 Sheet 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"	1-1/4"	0.30"	0.30"	0.30"
	Embedment (in)		1-1/4"	1-1/4"	1-1/4"	1-1/4"	2"	1-1/4"	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"	1-1/2"	1-1/2"	See Sheet 3
2 Anchors @ 4.00" Max. O.C. - Maximum Clip Rtg. 1			210 lbs	526 lbs	420 lbs	809 lbs	1126 lbs	220 lbs	570 lbs	220 lbs	880 lbs	987 lbs	214 lbs	172 lbs	247 lbs	346 lbs	442 lbs	337 lbs	337 lbs	
2 Anchors @ 3.00" Max. O.C. - Maximum Clip Rtg. 2			630 lbs	1260 lbs	989 lbs	1214	1126	1126	1126	1126	1126	1126	1126	516	742	1126	886 lbs	1012 lbs	1012 lbs	
3 Anchors @ 4.00" Max. O.C. - Maximum Clip Rtg. 3			315 lbs	789 lbs	629 lbs	1214 lbs	1126 lbs	330 lbs	855 lbs	330 lbs	1320 lbs	1481 lbs	321 lbs	258 lbs	371 lbs	519 lbs	663 lbs	506 lbs	506 lbs	
4 Anchors @ 4.00" Max. O.C. - Maximum Clip Rtg. 4			420 lbs	1052 lbs	839 lbs	1214	1126	1126	1126	1126	1126	1126	1126	344	495	1126	884 lbs	675 lbs	675 lbs	
2 Anchors @ 3.00" Max. O.C. - Maximum Clip Rtg. 5			420 lbs	1052 lbs	839 lbs	1214	1126	1126	1126	1126	1126	1126	1126	344	495	1126	884 lbs	675 lbs	675 lbs	
2 Anchors @ 4.00" Max. O.C. - Maximum Clip Rtg. 6			630 lbs	1260 lbs	989 lbs	1214	1126	1126	1126	1126	1126	1126	1126	516	742	1126	886 lbs	1012 lbs	1012 lbs	
1 Anchor @ 4.00" Max. O.C. - Maximum Clip Rtg. 7			630 lbs	1260 lbs	989 lbs	1214	1126	1126	1126	1126	1126	1126	1126	516	742	1126	886 lbs	1012 lbs	1012 lbs	
1 Anchor @ 3.00" Max. O.C. - Maximum Clip Rtg. 8			420 lbs	1052 lbs	839 lbs	1214	1126	1126	1126	1126	1126	1126	1126	344	495	1126	884 lbs	675 lbs	675 lbs	
1 Anchor @ 4.00" Max. O.C. - Maximum Clip Rtg. 9			315 lbs	789 lbs	629 lbs	1214 lbs	1126 lbs	330 lbs	855 lbs	330 lbs	1320 lbs	1481 lbs	321 lbs	258 lbs	371 lbs	519 lbs	663 lbs	506 lbs	506 lbs	
2 Anchors @ 4.00" Max. O.C. - Clip Rtg. 10			630 lbs	1260 lbs	989 lbs	1214	1126	1126	1126	1126	1126	1126	1126	516	742	1126	886 lbs	1012 lbs	1012 lbs	



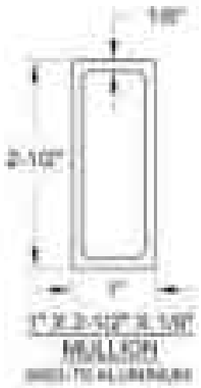
TABLE NOTES

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 3. 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 2.



WINDOOR
ALUMINUM TUBE MULLIONS CLIPPED TO
1 X 2-1/2 X 1/8 EXTRUDED
WALL NO. 1

TABLE 2A:

1" x 2" x 1/8" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Mullion Data	Opening Dimension: 30 in.				40 in.				50 in.				60 in.				70 in.				80 in.				90 in.				100 in.				110 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		Point Loaded Mullion		Uniformly Loaded Mullion	
		Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)
	42 in.																																		
	48 in.																																		
	54 in.																																		
	60 in.																																		
	66 in.																																		
	72 in.																																		
	78 in.																																		
	84 in.																																		
	90 in.																																		
	96 in.																																		
	102 in.																																		
	114 in.																																		

TABLE 2B:

Anchor/Clip Capacity (lbs) when using a 1" x 2" x 1/8" Tube Mullion	Substrate	Wood				Steel		Hollow CMU					Filled CMU				Poured Concrete		Epoxy
	Anchor Type	5/16" Lag Screw (Minimum)		1/4" Lag Screw (Minimum)		3/16" Sheet Metal Screw	3/16" Self-Drilling Screw (Minimum)		1/4" Self-Drilling Screw (Minimum)		1/4" Sleeve Anchor	3/8" Sleeve Anchor	3/16" Self-Drilling Screw (Minimum)		1/4" Self-Drilling Screw (Minimum)	1/4" Sleeve Anchor	#10 Sheet Metal Screw	#12 Sheet Metal Screw	#12 Rebar Anchor
	Edge Distance (c1)	1"	1 1/2"	1"	1 1/2"	1"	1"	1 1/2"	1"	1 1/2"	1 1/2"	1 1/2"	1"	1 1/2"	1"	1 1/2"	1"	1 1/2"	1 1/2"
	Embedment (c2)	1 3/4"	1 3/4"	1 3/4"	1 3/4"	1"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	See Sheet 1
2 Anchors @ 3.38" Min. O.C. - Mullion Clip (Fig. 1)		510 lbs	638 lbs	329 lbs	515 lbs	118 lbs	156 lbs	276 lbs	201 lbs	364 lbs	467 lbs	574 lbs	170 lbs	287 lbs	248 lbs	468 lbs	482 lbs	637 lbs	526 lbs
3 Anchors @ 1.97" Min. O.C. - Mullion Clip (Fig. 2)		521 lbs	1,096 lbs	441 lbs	1,113 lbs	185 lbs	261 lbs	745 lbs	406 lbs	1,174 lbs	862 lbs	N/A	440 lbs	1,451 lbs	N/A	N/A	963 lbs	1,513 lbs	1,513 lbs
3 Anchors @ 2.953" Min. O.C. - Mullion Clip (Fig. 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	1,527 lbs	1,513 lbs
2 Side Anchors @ 3.38" Min. O.C. Plus (2) Angle Clip Post (Fig. 4)		537 lbs	638 lbs	329 lbs	515 lbs	118 lbs	156 lbs	276 lbs	201 lbs	364 lbs	467 lbs	574 lbs	170 lbs	287 lbs	248 lbs	468 lbs	482 lbs	637 lbs	526 lbs
3 Side Anchors @ 1.97" Min. O.C. Plus (2) Angle Clip Post (Fig. 5)		537 lbs	1,096 lbs	441 lbs	1,113 lbs	185 lbs	261 lbs	745 lbs	406 lbs	1,174 lbs	862 lbs	N/A	440 lbs	1,451 lbs	N/A	N/A	963 lbs	1,513 lbs	1,513 lbs
3 Side Anchors @ 2.953" Min. O.C. Plus (2) Angle Clip Post (Fig. 6)		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	1,527 lbs	1,513 lbs
2 Anchors @ 3.38" Min. O.C. - U Clip (Fig. 7)		248 lbs	638 lbs	329 lbs	515 lbs	118 lbs	156 lbs	276 lbs	201 lbs	364 lbs	467 lbs	574 lbs	170 lbs	287 lbs	248 lbs	468 lbs	482 lbs	637 lbs	526 lbs
2 Anchors @ 2.953" Min. O.C. - U Clip (Fig. 8)		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	1,527 lbs	1,513 lbs
1 Anchor - U Clip (Fig. 9)		192 lbs	319 lbs	113 lbs	338 lbs	59 lbs	78 lbs	183 lbs	101 lbs	364 lbs	388 lbs	287 lbs	85 lbs	287 lbs	124 lbs	468 lbs	241 lbs	399 lbs	399 lbs
2 Anchors @ 1.97" Min. O.C. - U Clip (Fig. 10)		248 lbs	638 lbs	329 lbs	515 lbs	118 lbs	156 lbs	276 lbs	201 lbs	364 lbs	467 lbs	574 lbs	170 lbs	287 lbs	248 lbs	468 lbs	482 lbs	637 lbs	526 lbs
3 Anchors @ 2.953" Min. O.C. - U Clip (Fig. 11)		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	1,527 lbs	1,513 lbs

CIRCLED VALUES ARE USED IN THE EXAMPLE ON SHEET 2B

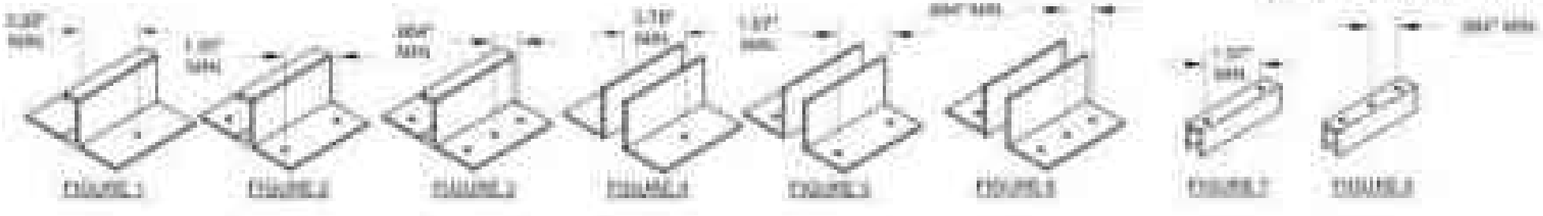


TABLE NOTES:

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 3. 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 2.



2" X 1" X 1/8" MULLION
6063-T6 ALUMINUM

REVISIONS

NO.	DESCRIPTION	DATE
1	ADDED 10 PSF CAPACITIES	11/15/23

ALUMINUM TUBE MULLIONS CLOSED SECTIONS

WINDOOR®
ENGINEERED INTEGRITY
2211 FIFTH AVENUE (98121)
P.O. BOX 21384, SEATTLE, WA
(206) 441-1444

PREPARED BY A LICENSED DESIGN PROFESSIONAL IN THE STATE OF WASHINGTON

ANTHONY LYNN MILLER
LICENSE
No. 56707
10/13/23
STATE OF WASHINGTON
PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E., P.S.E. & INTR.

DRAWN BY: MW
CHECKED BY: AM
DATE: 10/13/23
SCALE: AS NOTED (IN.)
SHEET NO. 2A OF 3B

TABLE 2A:

1" x 3" x 1/8" with 250 Series Frames Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																													
	60 in				66 in				72 in				78 in				84 in				90 in				96 in				102 in			
	Fixed		Operating		Fixed		Operating		Fixed		Operating		Fixed		Operating		Fixed		Operating		Fixed		Operating		Fixed		Operating		Fixed		Operating	
	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	
Mullion Span																														
54 in	180.0	180	180.0	180	180.0	180	180.0	170	177.8	180	180.0	167	167.1	169	180.0	157	171.1	160	180.0	150	160.1	142	180.0	140	151.3	135	180.0	132	144.4	129	180.0	123
60 in	180.0	180	180.0	180	177.8	180	180.0	164	175.6	180	180.0	158	164.8	160	180.0	147	168.8	150	180.0	140	157.9	133	180.0	131	149.1	126	180.0	123	142.3	120	180.0	114
66 in	174.7	180	180.0	180	173.3	180	180.0	161	171.1	180	180.0	154	161.4	157	180.0	144	165.4	147	180.0	137	154.7	130	180.0	128	146.1	123	180.0	120	139.5	117	180.0	112
72 in	170.0	180	174.9	180	168.7	180	176.1	157	166.5	180	176.1	150	157.1	153	176.1	140	161.0	143	176.1	134	150.5	127	176.1	125	142.2	120	176.1	117	135.8	114	176.1	109
78 in	165.3	180	170.0	180	164.1	180	171.2	153	161.9	180	171.2	146	152.7	149	171.2	136	156.5	139	171.2	130	146.3	123	171.2	121	138.2	116	171.2	114	132.0	111	171.2	106
84 in	160.8	180	165.3	180	159.5	180	166.4	149	157.4	180	166.4	142	148.4	145	166.4	132	152.1	135	166.4	126	142.2	119	166.4	118	134.3	113	166.4	110	128.3	107	166.4	103
90 in	156.4	180	160.8	180	155.1	180	161.8	145	153.0	180	161.8	138	144.3	141	161.8	128	147.9	131	161.8	122	138.3	115	161.8	114	130.6	110	161.8	107	124.8	104	161.8	100
96 in	152.3	175	156.4	180	150.9	175	157.4	141	148.7	175	157.4	134	140.3	137	157.4	125	143.8	127	157.4	119	134.5	112	157.4	111	127.0	107	157.4	104	121.3	101	157.4	97
102 in	148.5	170	152.3	175	146.9	170	153.2	137	144.7	170	153.2	130	136.5	133	153.2	121	139.9	123	153.2	116	130.8	109	153.2	108	123.5	104	153.2	101	118.0	98	153.2	94
108 in	144.9	165	148.5	170	143.2	165	149.3	133	141.0	165	149.3	126	133.0	129	149.3	118	136.3	120	149.3	113	127.4	106	149.3	105	120.3	101	149.3	98	114.9	95	149.3	91
114 in	141.6	160	144.9	165	139.8	160	145.7	129	137.6	160	145.7	122	129.8	125	145.7	114	133.0	116	145.7	110	124.3	103	145.7	102	117.4	98	145.7	95	112.1	92	145.7	88
120 in	138.4	155	141.6	160	136.6	155	142.3	125	134.4	155	142.3	118	126.8	121	142.3	111	129.9	113	142.3	107	121.4	100	142.3	99	114.7	95	142.3	92	109.5	89	142.3	85
126 in	135.3	150	138.4	155	133.5	150	139.0	121	131.3	150	139.0	114	123.9	117	139.0	107	126.9	109	139.0	103	118.6	97	139.0	96	112.0	92	139.0	89	107.0	86	139.0	82
132 in	132.4	145	135.3	150	130.6	145	135.9	117	128.4	145	135.9	110	121.1	113	135.9	103	124.0	105	135.9	100	115.9	94	135.9	93	109.5	89	135.9	86	104.6	83	135.9	79
138 in	129.7	140	132.4	145	127.9	140	133.1	113	125.8	140	133.1	106	118.7	109	133.1	100	121.5	102	133.1	97	113.5	91	133.1	90	107.2	86	133.1	83	102.4	80	133.1	76
144 in	127.2	135	129.7	140	125.4	135	130.4	109	123.3	135	130.4	102	116.4	105	130.4	97	119.1	99	130.4	93	111.3	88	130.4	87	105.1	83	130.4	80	100.4	77	130.4	73

TABLE 2B:

Anchor/Clip Capacity (lbs) when using a 1" x 3" x 1/8" Tube Mullion with 250 Series Frames	Supplier	S. Ennis				T.B. Cox	Hohn (US)					Pfaul (US)			Rose		Sohn
	Anchor Type	2-1/8" Self-Pull (Western)		1-1/4" Self-Pull (Western)		2-1/4" Screw (Western)	2-1/8" Self-Pull (Western)		1-1/4" Self-Pull (Western)		1-1/4" Screw (Eastern)	2-1/8" Self-Pull (Western)	1-1/4" Self-Pull (Western)	1-1/4" Screw (Eastern)	#12 Screw (Eastern)	#14 Screw (Eastern)	#12 Screw (Eastern)
	Edge Distance (in)	1"	1-1/2"	1"	1-1/2"	2"	1-1/2"	2"	1-1/2"	2"	2"	1-1/2"	2"	2"	1-3/8"	1-3/8"	1-3/8"
	Embedment (in)	1-3/8"	1-3/8"	1-3/8"	1-3/8"	2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-3/8"	1-3/8"	2"	1-3/8"	1-3/8"	See Detail 3
2 Anchors @ 3.38" Min. O.C. / Mullion Clip (Fig. 1)	330 lbs	330 lbs	330 lbs	330 lbs	1130 lbs	330 lbs	330 lbs	330 lbs	330 lbs	1064 lbs	1067 lbs	354 lbs	170 lbs	337 lbs	348 lbs	442 lbs	337 lbs	338 lbs
3 Anchors @ 1.97" Min. O.C. / Mullion Clip (Fig. 2)	521 lbs	599 lbs	521 lbs	1130 lbs	1130 lbs	521 lbs	521 lbs	521 lbs	1119 lbs	1067 lbs	1067 lbs	521 lbs	521 lbs	521 lbs	521 lbs	663 lbs	1073 lbs	1073 lbs
3 Anchors @ 2.953" Min. O.C. / Mullion Clip (Fig. 3)	495	495	495	495	N/A	N/A	N/A	N/A	N/A	N/A	N/A	495	495	495	495	1107 lbs	1615 lbs	1615 lbs
2 Clips Tension @ 1.38" O.C. thru (2) Angle Clip Pair (Fig. 4)	330 lbs	330 lbs	330 lbs	330 lbs	1130 lbs	330 lbs	330 lbs	330 lbs	330 lbs	330 lbs	330 lbs	354 lbs	170 lbs	337 lbs	348 lbs	442 lbs	337 lbs	338 lbs
2 Clips Tension @ 1.97" O.C. thru (2) Angle Clip Pair (Fig. 5)	521 lbs	599 lbs	521 lbs	1130 lbs	1130 lbs	521 lbs	521 lbs	521 lbs	521 lbs	521 lbs	521 lbs	521 lbs	521 lbs	521 lbs	521 lbs	663 lbs	1073 lbs	1073 lbs
3 Clips Tension @ 2.953" O.C. thru (2) Angle Clip Pair (Fig. 6)	495	495	495	495	N/A	N/A	N/A	N/A	N/A	N/A	N/A	495	495	495	495	1107 lbs	1615 lbs	1615 lbs
1 Anchor @ 1.97" Min. O.C. / Clip (Fig. 7)	248 lbs	330 lbs	248 lbs	330 lbs	270 lbs	330 lbs	330 lbs	330 lbs	330 lbs	330 lbs	330 lbs	354 lbs	170 lbs	337 lbs	348 lbs	442 lbs	337 lbs	338 lbs
2 Anchors @ 2.953" Min. O.C. / Clip (Fig. 8)	495	495	495	495	N/A	N/A	N/A	N/A	N/A	N/A	N/A	495	495	495	495	1107 lbs	1615 lbs	1615 lbs
1 Anchor / 1 Clip (Fig. 9)	150 lbs	210 lbs	115 lbs	330 lbs	150 lbs	170 lbs	150 lbs	150 lbs	330 lbs	330 lbs	167 lbs	95 lbs	337 lbs	170 lbs	348 lbs	221 lbs	337 lbs	338 lbs
2 Anchors @ 1.97" Min. O.C. / Clip (Fig. 10)	248 lbs	330 lbs	248 lbs	330 lbs	270 lbs	330 lbs	330 lbs	330 lbs	330 lbs	330 lbs	330 lbs	354 lbs	170 lbs	337 lbs	348 lbs	442 lbs	337 lbs	338 lbs
3 Anchors @ 2.953" Min. O.C. / Clip (Fig. 11)	495	495	495	495	N/A	N/A	N/A	N/A	N/A	N/A	N/A	495	495	495	495	1107 lbs	1615 lbs	1615 lbs

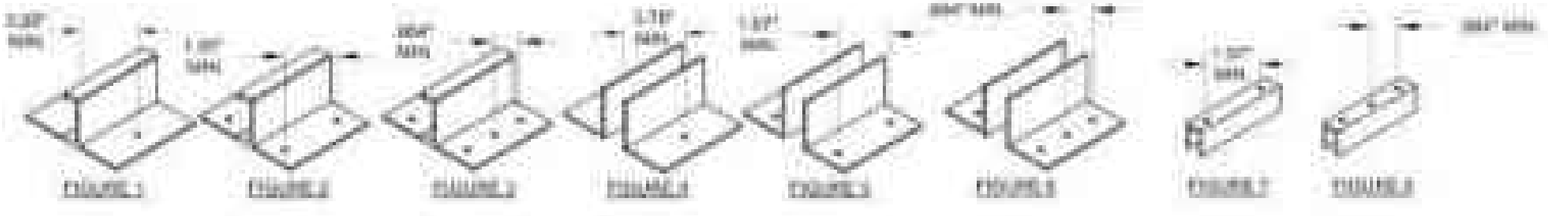


FIGURE 1 FIGURE 2 FIGURE 3 FIGURE 4 FIGURE 5 FIGURE 6 FIGURE 7 FIGURE 8

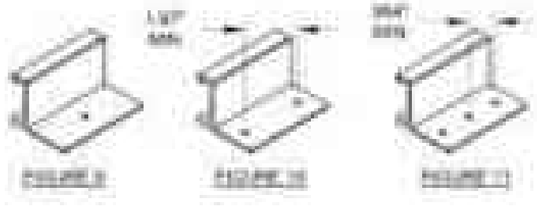


FIGURE 9 FIGURE 10 FIGURE 11

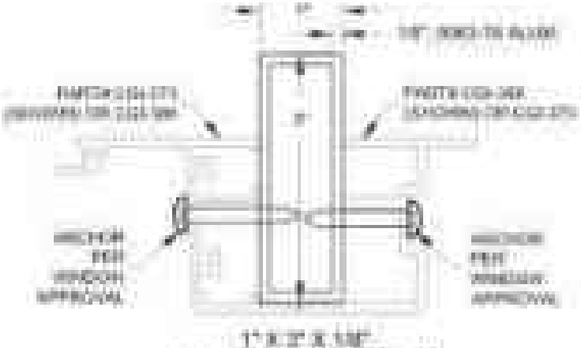
TABLE NOTES:

1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND ANCHOR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT LOAD (PSF) & LOADED CLASSIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE FOR EXACT DIMENSIONS. SEE SHEET 3. 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 2.



1" x 3" x 1/8"
MULLION WITH ATTACHED
2 OR MORE WINDOW FRAMES

WINDOOR®
ENGINEERED BY A LICENSED PROFESSIONAL ENGINEER
ANTHONY LYNN MILLER
LICENSE No. 58707
10/13/23
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., P.E.# 58707

ALUMINUM TUBE MULLIONS CLOSED SECTIONS
1" x 3" x 1/8" CAPACITIES

DRAWN BY:	MILLWP-1
CHECKED BY:	
DATE:	10/13/23
SCALE:	AS NOTED
SHEET:	1 OF 3
REVISIONS:	

REQUIRED THIS SHEET

TABLE 7A

1" x 4" x .125" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																													
	30 in				60 in				70 in				80 in				90 in				100 in				120 in				150 in			
	Fixed Leaded Mullion		Latching Leaded Mullion		Fixed Leaded Mullion		Latching Leaded Mullion		Fixed Leaded Mullion		Latching Leaded Mullion		Fixed Leaded Mullion		Latching Leaded Mullion		Fixed Leaded Mullion		Latching Leaded Mullion		Fixed Leaded Mullion		Latching Leaded Mullion		Fixed Leaded Mullion		Latching Leaded Mullion		Fixed Leaded Mullion		Latching Leaded Mullion	
Mullion Span																														
42 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
48 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
54 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
60 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
66 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
72 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
78 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
84 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
90 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
96 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
102 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
108 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
114 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
120 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
126 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
132 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
138 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3
144 in	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3

TABLE 7B

Anchor/Clip Capacity (lbs) when using a 1" x 4" x .125" Tube Mullion	Fastener	Air Transom				Clip Type	Mullion (Sill)						Floor (Sill)			Wood		Metal
	Anchor Type	0"-90" Vertical Ultimate**		1-45° Vertical Ultimate**		0-90° Shim Allowance	0-90° Vertical Ultimate**		1-45° Vertical Ultimate**		1-45° Shim Installed	0-90° Shim Approximation	0-90° Vertical Ultimate**	1-45° Vertical Ultimate**	0-90° Shim Approximation	#12 Wood Anchor	#14 Wood Anchor	#12 Metal Anchor
	Edge Distance (E)	1"	4-1/2"	1"	4-1/2"	5-1/8"	1"	4-1/2"	1"	4-1/2"	5-1/8"	0"	1"	1"	0"	5-3/4"	5-3/4"	4" (Min)
	Centerline (C)	1-1/8"	1-1/8"	1-1/8"	1-1/8"	0"	1-1/8"	1-1/8"	1-1/8"	1-1/8"	1-1/8"	1-1/8"	1-1/8"	1-1/8"	1-1/8"	1-1/8"	1-1/8"	Does Not Apply
2 Anchors @ 2.25" Min. C.C. - Mullion Clip (Fig. 1)		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1-1/8" Max	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs
4 Anchors @ 2.25" Min. C.C. - Mullion Clip (Fig. 2)		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1-1/8" Max	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs
2 Anchors @ 1.48" Min. C.C. - Mullion Clip (Fig. 3)		1000 lbs	1000 lbs	1000 lbs	N/A	N/A	N/A	1000 lbs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1000 lbs
2 Tube Anchors @ 1.78" C.C. thru 2x2 Angle Clip Part (Fig. 4)		1000 lbs	1000 lbs	1000 lbs	1000 lbs	N/A	N/A	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs
4 Tube Anchors @ 1.78" C.C. thru 2x2 Angle Clip Part (Fig. 4)		1000 lbs	1000 lbs	1000 lbs	1000 lbs	N/A	N/A	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs
2 Tube Anchors @ 1.48" Min. C.C. - Mullion Clip (Fig. 5)		1000 lbs	1000 lbs	1000 lbs	N/A	N/A	N/A	1000 lbs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1000 lbs
2 Anchors @ 1.48" Min. C.C. - Mullion Clip (Fig. 6)		1000 lbs	1000 lbs	1000 lbs	N/A	N/A	N/A	1000 lbs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1000 lbs
2 Anchors @ 2.25" Min. C.C. - Mullion Clip (Fig. 7)		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1-1/8" Max	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs
4 Anchors @ 2.25" Min. C.C. - Mullion Clip (Fig. 8)		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1-1/8" Max	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs
2 Anchors @ 1.48" Min. C.C. - Mullion Clip (Fig. 9)		1000 lbs	1000 lbs	1000 lbs	N/A	N/A	N/A	1000 lbs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1000 lbs

CIRCLED VALUES ARE USED IN THE EXAMPLE ON SHEET 3B.

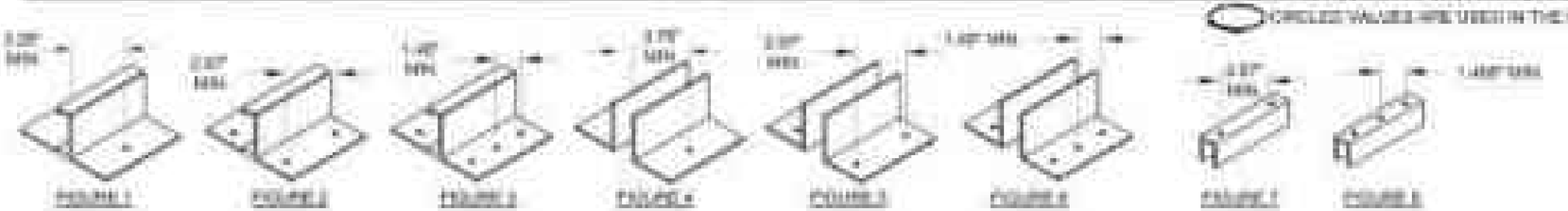


TABLE NOTES:
1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR PERFORMANCE CLASS CLASSIFICATION.

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 CLIP EDGE.

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

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 3.



1" X 4" X .125" MULLION
(SEE TS-XL1 EXTRUSION)

WINDOOR
MANUFACTURING & TECHNOLOGY CENTER
2211 PRINCE LEONARD ROAD
N. TONAWANDA, NY 14120
(800) 724-9663

ALUMINUM TUBE MULLIONS CLASSED (JAMB) (MODEL)
TABLE 7A/7B CAPACITIES
BUILDING WALL TYPE
SHEET 3A OF 3B

ANTHONY LYNN MILLER
LICENSE
No. 56707
10/31/23
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., P.E.# 56707

TABLE 3A

1" x 4" x .125" with 2SB Series Frames Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																													
	30 in				36 in				42 in				48 in				54 in				60 in				66 in				72 in			
	Fixed		Operating		Fixed		Operating		Fixed		Operating		Fixed		Operating		Fixed		Operating		Fixed		Operating		Fixed		Operating		Fixed		Operating	
Positive Design Pressure																														
15.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
20.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
25.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
30.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
35.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
40.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
45.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
50.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
55.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
60.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
65.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
70.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
75.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
80.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
Negative Design Pressure																														
15.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
20.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
25.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
30.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
35.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
40.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
45.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
50.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
55.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
60.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
65.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
70.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
75.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"
80.0 psf	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"	5'-0"	10'-0"

TABLE 3B

Anchor/Clip Capacity (lbs) when using a 1" x 4" x .125" Tube Mullion with 2SB Series Frames	Example	Air Pressure				Life Load	Wind Load								Dead Load				Shear		Moment
	Anchor Type	0.125" Clip/Sub (Aluminum)		1/4" Clip/Sub (Aluminum)		0.125" Clip (Aluminum)	0.125" Clip/Sub (Aluminum)		1/4" Clip/Sub (Aluminum)		1/4" Anchor (Steel/Wood)	1/4" Sub to Aluminum	0.125" Clip/Sub (Aluminum)	1/4" Clip/Sub (Aluminum)	1/4" Anchor (Steel/Wood)	1/4" Sub to Aluminum	#12 Sheet Screw	#14 Sheet Screw	#12 Sheet Screw
	Edge Distance (E)	1"	2-1/2"	1"	2-1/2"	0.250"	1"	2-1/2"	1"	2-1/2"	0.125"	1"	1"	2-1/2"	1"	2-1/2"	1"	2-1/2"	0.250"	0.250"	0.250"
	Embedment (D)	1-3/8"	1-3/8"	1-3/8"	1-3/8"	1"	1-3/8"	1-3/8"	1-3/8"	1-3/8"	1-3/8"	1-3/8"	1-3/8"	1-3/8"	1-3/8"	1-3/8"	1-3/8"	1-3/8"	1-3/8"	1-3/8"	Less Than 1
6 Anchors @ 4.00" Min. C.C. / Mullion Clip Wing		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	442 lbs	442 lbs	1000 lbs
5 Anchors @ 4.00" Min. C.C. / Mullion Clip Wing		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	885 lbs	1000 lbs	1000 lbs
5 Anchors @ 4.00" Min. C.C. / Mullion Clip Wing		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs
3 Pole Anchors @ 4.00" Min. C.C. / Mullion Clip Wing		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs
4 Pole Anchors @ 4.00" Min. C.C. / Mullion Clip Wing		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs
3 Tube Anchors @ 4.00" Min. C.C. / Mullion Clip Wing		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs
4 Anchors @ 2.00" Min. C.C. / Mullion Clip Wing		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs
3 Anchors @ 3.00" Min. C.C. / Mullion Clip Wing		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs
2 Anchors @ 4.00" Min. C.C. / Mullion Clip Wing		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs	1000 lbs

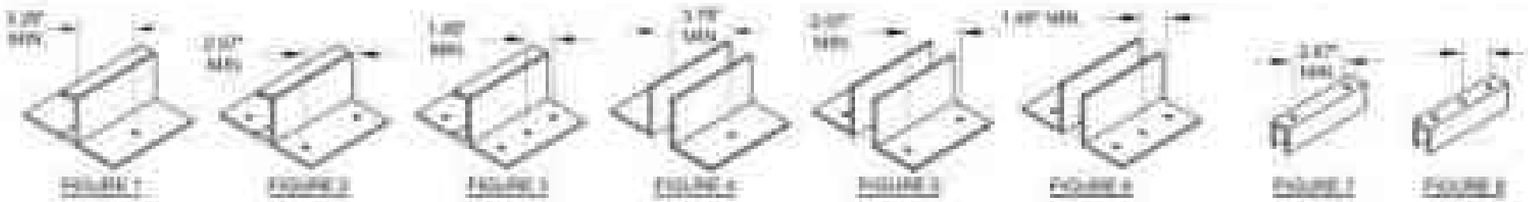


FIGURE 1 FIGURE 2 FIGURE 3 FIGURE 4 FIGURE 5 FIGURE 6 FIGURE 7 FIGURE 8



FIGURE 9 FIGURE 10 FIGURE 11

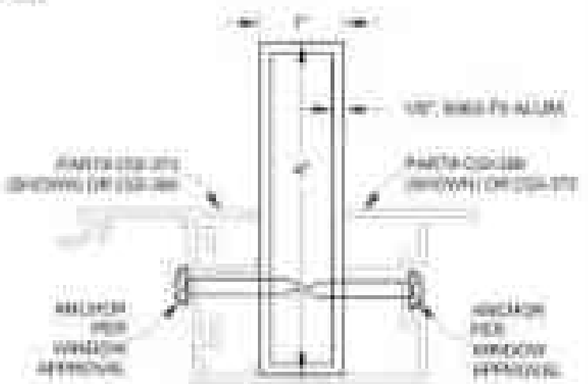
TABLE NOTES:

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

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 3. 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.

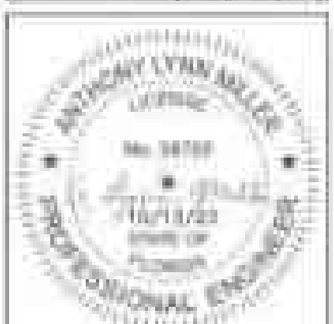
3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.

4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 2.



1" X 4" X .125"
MULLION WITH ATTACHED
2SB SERIES WINDOW FRAMES

WINDOOR®
CONSTRUCTION SYSTEMS
ALUMINUM TUBE MULLIONS, CLIPS AND ANCHORS
1" X 4" X .125" CAPACITIES



A. LYNN MILLER, P.E., FLA #58707

4	03/31/23	ADDED TABLE 3B					
3	10/31/22	ADDED (W) DESIGN PRESSURES	MJ				
2	10/31/22	ADDED 1" X 4" X .125" CAPACITIES	MJ				
1	10/31/22	ADDED 1" X 4" X .125" CAPACITIES	MJ				
NO.	DATE	DESCRIPTION	BY	CHK'D	APP'D		

MOTORIZED TINTED GLASS

4	03/31/23	ADDED TABLE 3B					
3	10/31/22	ADDED (W) DESIGN PRESSURES	MJ				
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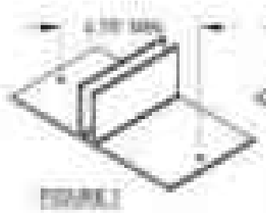
MOTORIZED TINTED GLASS

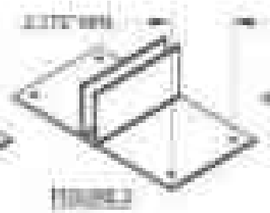
TABLE 3A

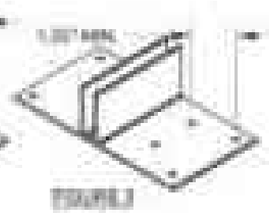
1" x 4" x 0.08" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																									
		30 in		40 in		50 in		60 in		70 in		80 in		90 in		100 in		110 in		120 in		130 in		140 in		150 in	
		Fixed Location Mullions		Deflecting Location Mullions		Fixed Location Mullions		Deflecting Location Mullions		Fixed Location Mullions		Deflecting Location Mullions		Fixed Location Mullions		Deflecting Location Mullions		Fixed Location Mullions		Deflecting Location Mullions		Fixed Location Mullions		Deflecting Location Mullions		Fixed Location Mullions	
Mullion Span		Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)
30 in		170.0	127	170.0	127	170.0	127	170.0	127	170.0	127	170.0	127	170.0	127	170.0	127	170.0	127	170.0	127	170.0	127	170.0	127	170.0	127
40 in		170.0	170	170.0	170	170.0	170	170.0	170	170.0	170	170.0	170	170.0	170	170.0	170	170.0	170	170.0	170	170.0	170	170.0	170	170.0	170
50 in		170.0	212	170.0	212	170.0	212	170.0	212	170.0	212	170.0	212	170.0	212	170.0	212	170.0	212	170.0	212	170.0	212	170.0	212	170.0	212
60 in		170.0	255	170.0	255	170.0	255	170.0	255	170.0	255	170.0	255	170.0	255	170.0	255	170.0	255	170.0	255	170.0	255	170.0	255	170.0	255
70 in		170.0	297	170.0	297	170.0	297	170.0	297	170.0	297	170.0	297	170.0	297	170.0	297	170.0	297	170.0	297	170.0	297	170.0	297	170.0	297
80 in		170.0	340	170.0	340	170.0	340	170.0	340	170.0	340	170.0	340	170.0	340	170.0	340	170.0	340	170.0	340	170.0	340	170.0	340	170.0	340
90 in		170.0	382	170.0	382	170.0	382	170.0	382	170.0	382	170.0	382	170.0	382	170.0	382	170.0	382	170.0	382	170.0	382	170.0	382	170.0	382
100 in		170.0	425	170.0	425	170.0	425	170.0	425	170.0	425	170.0	425	170.0	425	170.0	425	170.0	425	170.0	425	170.0	425	170.0	425	170.0	425
110 in		170.0	467	170.0	467	170.0	467	170.0	467	170.0	467	170.0	467	170.0	467	170.0	467	170.0	467	170.0	467	170.0	467	170.0	467	170.0	467
120 in		170.0	510	170.0	510	170.0	510	170.0	510	170.0	510	170.0	510	170.0	510	170.0	510	170.0	510	170.0	510	170.0	510	170.0	510	170.0	510
130 in		170.0	552	170.0	552	170.0	552	170.0	552	170.0	552	170.0	552	170.0	552	170.0	552	170.0	552	170.0	552	170.0	552	170.0	552	170.0	552
140 in		170.0	595	170.0	595	170.0	595	170.0	595	170.0	595	170.0	595	170.0	595	170.0	595	170.0	595	170.0	595	170.0	595	170.0	595	170.0	595
150 in		170.0	637	170.0	637	170.0	637	170.0	637	170.0	637	170.0	637	170.0	637	170.0	637	170.0	637	170.0	637	170.0	637	170.0	637	170.0	637
160 in		170.0	680	170.0	680	170.0	680	170.0	680	170.0	680	170.0	680	170.0	680	170.0	680	170.0	680	170.0	680	170.0	680	170.0	680	170.0	680

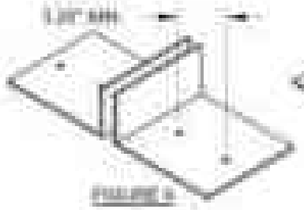
TABLE 3B

Anchor/Clip Capacity (lbs) when using a 1" x 4" x 0.08" Tube Mullion	Substrate	Al Concrete			C.M. Deck	Wood (SPF)					Plastic (UPC)			Metal		Metal
	Anchor Type	2-3/4" Sidefast (Masonry)		1-3/4" Sidefast (Masonry)	5/16" Sidefast (Masonry)	5/16" Sidefast (Masonry)		1/4" Sidefast (Masonry)	1/4" Sidefast (Masonry)	1/4" Sidefast (Concrete)	1/4" Sidefast (Applications)	1/4" Sidefast (Masonry)	1/4" Sidefast (Masonry)	1/4" Sidefast (Applications)	#10 Sheet Screws	#10 Sheet Screws	#10 Sheet Screws
	Edge Distance (c)	3"	1-1/2"	3"	2-1/2"	2-1/2"		3"	2-1/2"	2-1/2"	2"	3"	3"	2"	2-1/2"	2-1/2"	2-1/2"
	Embedment (e)	2-1/2"	2-1/2"	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"	2"	2"	See Detail 1
1 Anchor @ 6.00" Min. c.c. - Medium Clip (Fig. 1)		113 lbs	226 lbs	226 lbs	226 lbs	164 lbs		226 lbs	226 lbs	226 lbs	226 lbs	170 lbs	170 lbs	170 lbs	113 lbs	164 lbs	226 lbs
2 Anchors @ 6.00" Min. c.c. - Medium Clip (Fig. 2)		226 lbs	452 lbs	452 lbs	452 lbs	328 lbs		452 lbs	452 lbs	452 lbs	452 lbs	340 lbs	340 lbs	340 lbs	226 lbs	328 lbs	452 lbs
3 Anchors @ 6.00" Min. c.c. - Medium Clip (Fig. 3)		340 lbs	680 lbs	680 lbs	680 lbs	492 lbs		680 lbs	680 lbs	680 lbs	680 lbs	510 lbs	510 lbs	510 lbs	340 lbs	492 lbs	680 lbs
4 Anchors @ 6.00" Min. c.c. - Medium Clip (Fig. 4)		453 lbs	906 lbs	906 lbs	906 lbs	656 lbs		906 lbs	906 lbs	906 lbs	906 lbs	680 lbs	680 lbs	680 lbs	453 lbs	656 lbs	906 lbs
5 Anchors @ 6.00" Min. c.c. - Medium Clip (Fig. 5)		566 lbs	1132 lbs	1132 lbs	1132 lbs	820 lbs		1132 lbs	1132 lbs	1132 lbs	1132 lbs	850 lbs	850 lbs	850 lbs	566 lbs	820 lbs	1132 lbs
6 Anchors @ 6.00" Min. c.c. - Medium Clip (Fig. 6)		680 lbs	1359 lbs	1359 lbs	1359 lbs	984 lbs		1359 lbs	1359 lbs	1359 lbs	1359 lbs	1020 lbs	1020 lbs	1020 lbs	680 lbs	984 lbs	1359 lbs
7 Anchors @ 6.00" Min. c.c. - Medium Clip (Fig. 7)		793 lbs	1585 lbs	1585 lbs	1585 lbs	1148 lbs		1585 lbs	1585 lbs	1585 lbs	1585 lbs	1190 lbs	1190 lbs	1190 lbs	793 lbs	1148 lbs	1585 lbs
8 Anchors @ 6.00" Min. c.c. - Medium Clip (Fig. 8)		906 lbs	1812 lbs	1812 lbs	1812 lbs	1312 lbs		1812 lbs	1812 lbs	1812 lbs	1812 lbs	1360 lbs	1360 lbs	1360 lbs	906 lbs	1312 lbs	1812 lbs
9 Anchors @ 6.00" Min. c.c. - Medium Clip (Fig. 9)		1019 lbs	2038 lbs	2038 lbs	2038 lbs	1476 lbs		2038 lbs	2038 lbs	2038 lbs	2038 lbs	1530 lbs	1530 lbs	1530 lbs	1019 lbs	1476 lbs	2038 lbs
10 Anchors @ 6.00" Min. c.c. - Medium Clip (Fig. 10)		1132 lbs	2265 lbs	2265 lbs	2265 lbs	1640 lbs		2265 lbs	2265 lbs	2265 lbs	2265 lbs	1700 lbs	1700 lbs	1700 lbs	1132 lbs	1640 lbs	2265 lbs
11 Anchors @ 6.00" Min. c.c. - Medium Clip (Fig. 11)		1245 lbs	2491 lbs	2491 lbs	2491 lbs	1804 lbs		2491 lbs	2491 lbs	2491 lbs	2491 lbs	1870 lbs	1870 lbs	1870 lbs	1245 lbs	1804 lbs	2491 lbs
12 Anchors @ 6.00" Min. c.c. - Medium Clip (Fig. 12)		1359 lbs	2718 lbs	2718 lbs	2718 lbs	1968 lbs		2718 lbs	2718 lbs	2718 lbs	2718 lbs	2040 lbs	2040 lbs	2040 lbs	1359 lbs	1968 lbs	2718 lbs


FIGURE 1


FIGURE 2


FIGURE 3


FIGURE 4

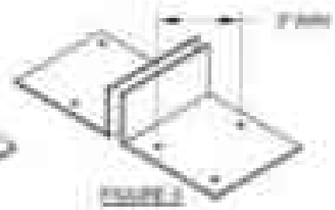

FIGURE 5


FIGURE 6


FIGURE 7

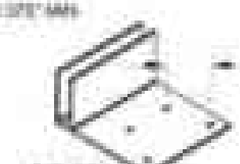
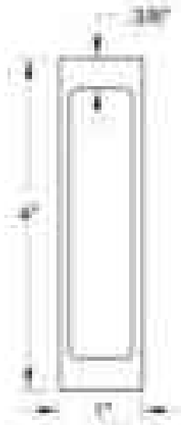

FIGURE 8

TABLE NOTES:
1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT LOAD ONLY LOADING 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 3/8" 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 2.



1" X 4" X .08" MULLION
SIDES TO ALUMINUM

WINDOOR
ENGINEERED BY A LYNN MILLER, P.E. LICENSE NO. 56707 STATE OF FLORIDA
ALUMINUM TUBE MULLIONS CLIPPED TO ANCHORS
1 X 4 X .08 CAPACITIES
ADJUSTMENT THIS SHEET
WM1 WP-1
10/11/23
A LYNN MILLER, P.E. LICENSE NO. 56707 STATE OF FLORIDA PROFESSIONAL ENGINEER

TABLE 18A

1" x 2-1/8" x 1/8" Fin Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																																			
	[illegible] in				[illegible] in				[illegible] in				[illegible] in				[illegible] in				[illegible] in				[illegible] in				[illegible] in				[illegible] 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		Point Loaded Mullion		Uniformly Loaded Mullion	
Mullion Span	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]																				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]																								

TABLE 18B

Anchor/Clip Capacity (lbs) when using a 1" x 2-1/8" x 1/8" Fin/Tube Mullion	Substrate:	3k Concrete				3.5k Conc.	Hollow CMU						Filled CMU			Wood		Metal
	Anchor Type:	3/16" Dewalt Ultracon		1/4" Dewalt Ultracon		5/16" Elco Ultracon	3/16" Dewalt Ultracon		1/4" Dewalt Ultracon		1/4" Elco [illegible]	1/4" Elco AggreGator	3/16" Dewalt Ultracon	1/4" Dewalt Ultracon	1/4" Elco AggreGator	#12 Steel Screw	#14 Steel Screw	#12 Steel Screw
	Edge Distance (in):	1"	2-1/2"	1"	2-1/2"	3-1/8"	1"	2-1/2"	1"	2-1/2"	2-1/2"	2"	1"	1"	2"	[illegible]	[illegible]	[illegible]
	Embedment (in):	[illegible]	1.25"	[illegible]	1.25"	2"	1.25"	1.25"	1.25"	1.25"	1.25"	1.25"	1.25"	1.25"	2"	[illegible]	[illegible]	See Note [illegible]
2 Total Anchors @ [illegible]" O.C. thru 2x5 Angle Clip Pair (Fig. 1)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4 Total Anchors @ [illegible]" O.C. thru 2x5 Angle Clip Pair (Fig. 2)		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

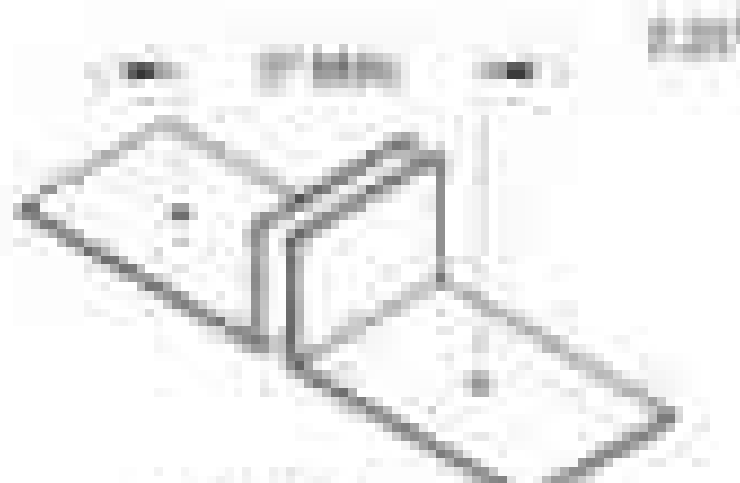


FIGURE 1

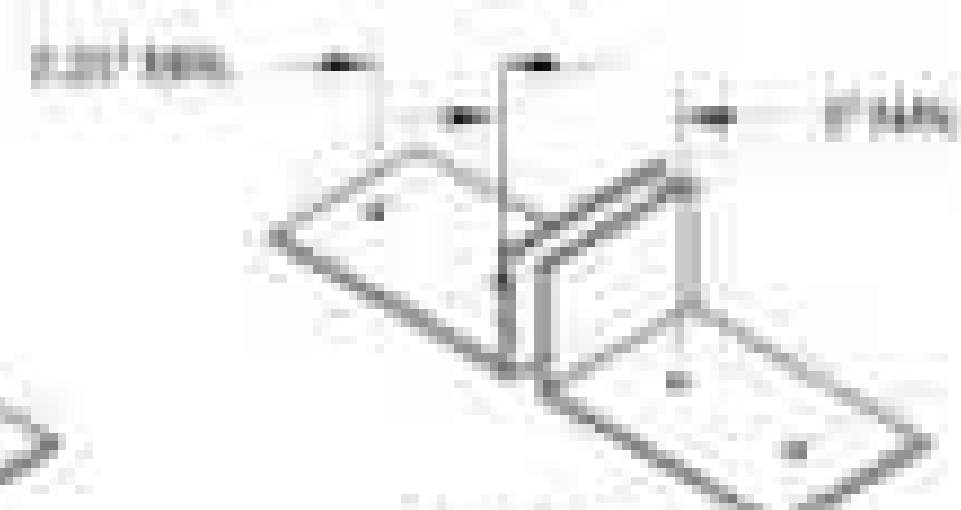


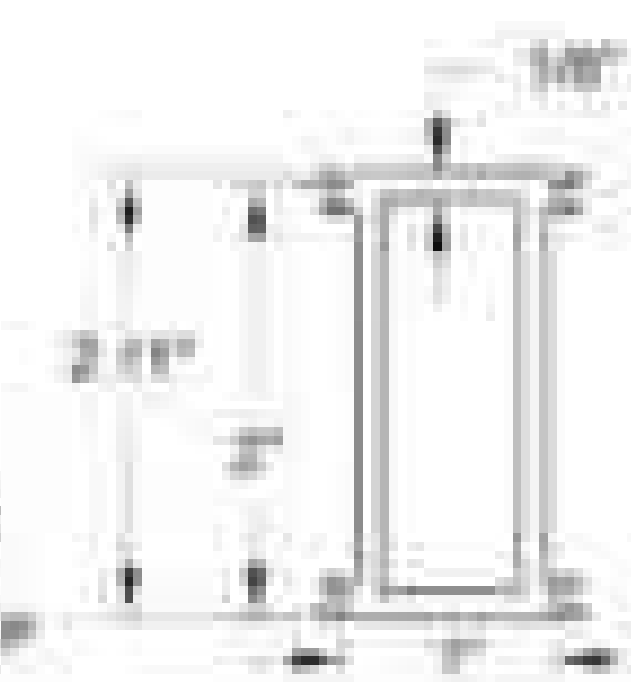
FIGURE 2

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 1. 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 2.



1" X 2-1/8" X 1/8" FIN MULLION
6063-T5 ALUMINUM

CORRECT MULL SIZE TABLE

WinDoor®

ALUMINUM TUBE MULLIONS, CLIPPED (LM)

1 X 2-1/8 X 1/8 FIN CAPACITIES

MULLIONS | NTS | 17 OF 28 | MULL-WD-1

ANTHONY LYNN MILLER
LICENSE
No. 58705
STATE OF FLORIDA
PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E. P.E.# 58705

TABLE 1 (A)

2" x 4" x 1/8" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement

Mullion Span	Opening Dimension																											
	30 in				40 in				50 in				60 in				70 in				80 in				90 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	
	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)
10 in																												
20 in																												
30 in (1 in c.c.)																												
40 in																												
50 in																												
60 in																												
70 in																												
80 in																												
90 in																												
100 in																												
110 in																												
120 in																												
130 in																												
140 in																												

TABLE 1 (B)

Anchor/Clip Capacity (lbs) when using a 2" x 4" x 1/8" Tube Mullion

Fastener		In Concrete				T-Bar (Slot)	Hollow Core				Face Fixed				Wood		Metal
	Anchor Type	3/16" Tapcon (Alternate)		1/4" Tapcon (Alternate)		3/16" Screw (Alternate)	3/16" Tapcon (Alternate)		1/4" Tapcon (Alternate)		1/4" Screw Caulk/Tube	1/4" Screw Expan/Sleeve	3/16" Tapcon (Alternate)		1/4" Tapcon (Alternate)		#12 Sheet Screw	#12 Sheet Screw	#12 Sheet Screw
	Clips Clearance (c)	1"	2 1/2"	1"	2 1/2"	3 1/16"	1"	2 1/2"	1"	2 1/2"	2 1/2"	2"	1"		1"		2"		1 3/4"	1 3/4"	1 3/4"
	Embedment (e)	1 3/4"	1 3/4"	1 3/4"	1 3/4"	2"	1 3/4"	1 3/4"	1 3/4"	1 3/4"	1 3/4"	1 3/4"	1 3/4"		1 3/4"		2"		1 3/4"	1 3/4"	See Detail 1
3 Anchors @ 3.00" Min. C.C.		1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs		1600 lbs		1600 lbs		1600 lbs	1600 lbs	1600 lbs
4 Anchors @ 3.00" Min. C.C.		1600 lbs	1600 lbs	1600 lbs	1600 lbs	N/A	N/A	N/A	1600 lbs	1600 lbs	N/A	N/A	N/A		N/A		N/A		1600 lbs	1600 lbs	1600 lbs
3 Total Anchors @ 3.00" C.C. min./3.00" Angle Clip Pairs (Fig. 1)		1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs		1600 lbs		1600 lbs		1600 lbs	1600 lbs	1600 lbs
4 Total Anchors @ 3.00" C.C. min./3.00" Angle Clip Pairs (Fig. 1)		1600 lbs	1600 lbs	1600 lbs	N/A	N/A	N/A	1600 lbs	1600 lbs	N/A	N/A	N/A	N/A		N/A		N/A		1600 lbs	1600 lbs	1600 lbs
2 Anchors @ 3.00" Min. C.C. / 1 Clip (Fig. 2)		1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs		1600 lbs		1600 lbs		1600 lbs	1600 lbs	1600 lbs
3 Anchors @ 3.00" Min. C.C. / 1 Clip (Fig. 2)		1600 lbs	1600 lbs	1600 lbs	1600 lbs	N/A	N/A	N/A	1600 lbs	1600 lbs	N/A	N/A	N/A		N/A		N/A		1600 lbs	1600 lbs	1600 lbs
4 Anchors @ 3.00" Min. C.C. / 1 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		1600 lbs	1600 lbs	1600 lbs
2 Anchors @ 3.00" Min. C.C. / 2 Clips (Fig. 3)		1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs		1600 lbs		1600 lbs		1600 lbs	1600 lbs	1600 lbs
3 Anchors @ 3.00" Min. C.C. / 2 Clips (Fig. 3)		1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs		1600 lbs		1600 lbs		1600 lbs	1600 lbs	1600 lbs
4 Anchors @ 3.00" Min. C.C. / 2 Clips (Fig. 3)		1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs	1600 lbs		1600 lbs		1600 lbs		1600 lbs	1600 lbs	1600 lbs

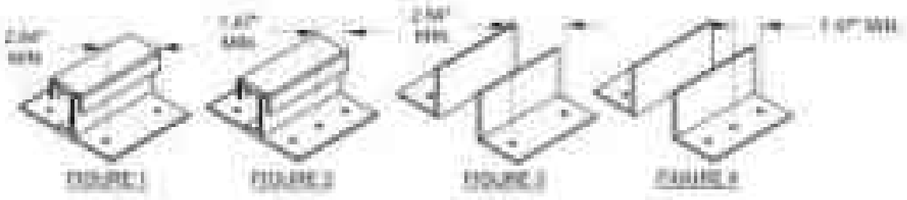


TABLE NOTES:

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

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 3. 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 3.



2" X 4" X 1/8" MULLION
WITH ALUMINUM

REVISIONS

NO.	DESCRIPTION	DATE
4	ADDED TABLE 1(B)	11/10/23

WINDOOR®
WINDOW SYSTEMS
2501 PRAIRIE DIAMOND DR. NW
ALBUQUERQUE, NEW MEXICO 87107
505-881-1648

ALUMINUM TUBE MULLIONS CLOSED (UP)
2" X 4" X 1/8" CAPACITIES

SCALE	DRAWN	CHECKED	DATE
NOT TO SCALE	MTL	MTL	11/10/23

SHEET NO. 4 OF 26

ANTHONY LYNN MILLER
LICENSE
No. 36707
10/10/23
STATE OF
NEW MEXICO
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., P.S.# 36707

TABLE 12a

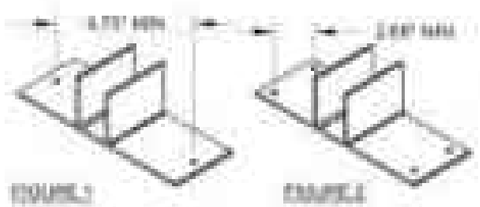
3" x 4" x 1/8" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																													
	72 in				60 in				72 in				84 in				96 in				108 in				120 in				144 in			
	Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion		Point 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 Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)	Design Pressure (psf)	Clip/Anchor Capacity Required (lbs)
12 in	170.1	306	113.4	136	170.1	306	113.4	136	170.1	306	113.4	136	170.1	306	113.4	136	170.1	306	113.4	136	170.1	306	113.4	136	170.1	306	113.4	136	170.1	306	113.4	136
18 in	170.1	306	113.4	204	170.1	306	113.4	204	170.1	306	113.4	204	170.1	306	113.4	204	170.1	306	113.4	204	170.1	306	113.4	204	170.1	306	113.4	204	170.1	306	113.4	204
20.448 in	170.1	341	113.4	227	170.1	341	113.4	227	170.1	341	113.4	227	170.1	341	113.4	227	170.1	341	113.4	227	170.1	341	113.4	227	170.1	341	113.4	227	170.1	341	113.4	227
24 in	170.1	409	113.4	272	170.1	409	113.4	272	170.1	409	113.4	272	170.1	409	113.4	272	170.1	409	113.4	272	170.1	409	113.4	272	170.1	409	113.4	272	170.1	409	113.4	272
30 in	170.1	511	113.4	340	170.1	511	113.4	340	170.1	511	113.4	340	170.1	511	113.4	340	170.1	511	113.4	340	170.1	511	113.4	340	170.1	511	113.4	340	170.1	511	113.4	340
36 in	170.1	613	113.4	408	170.1	613	113.4	408	170.1	613	113.4	408	170.1	613	113.4	408	170.1	613	113.4	408	170.1	613	113.4	408	170.1	613	113.4	408	170.1	613	113.4	408
42 in	170.1	716	113.4	476	170.1	716	113.4	476	170.1	716	113.4	476	170.1	716	113.4	476	170.1	716	113.4	476	170.1	716	113.4	476	170.1	716	113.4	476	170.1	716	113.4	476
48 in	170.1	818	113.4	544	170.1	818	113.4	544	170.1	818	113.4	544	170.1	818	113.4	544	170.1	818	113.4	544	170.1	818	113.4	544	170.1	818	113.4	544	170.1	818	113.4	544
54 in	170.1	920	113.4	612	170.1	920	113.4	612	170.1	920	113.4	612	170.1	920	113.4	612	170.1	920	113.4	612	170.1	920	113.4	612	170.1	920	113.4	612	170.1	920	113.4	612
60 in	170.1	1022	113.4	680	170.1	1022	113.4	680	170.1	1022	113.4	680	170.1	1022	113.4	680	170.1	1022	113.4	680	170.1	1022	113.4	680	170.1	1022	113.4	680	170.1	1022	113.4	680
66 in	170.1	1124	113.4	748	170.1	1124	113.4	748	170.1	1124	113.4	748	170.1	1124	113.4	748	170.1	1124	113.4	748	170.1	1124	113.4	748	170.1	1124	113.4	748	170.1	1124	113.4	748
72 in	170.1	1226	113.4	816	170.1	1226	113.4	816	170.1	1226	113.4	816	170.1	1226	113.4	816	170.1	1226	113.4	816	170.1	1226	113.4	816	170.1	1226	113.4	816	170.1	1226	113.4	816
78 in	170.1	1328	113.4	884	170.1	1328	113.4	884	170.1	1328	113.4	884	170.1	1328	113.4	884	170.1	1328	113.4	884	170.1	1328	113.4	884	170.1	1328	113.4	884	170.1	1328	113.4	884
84 in	170.1	1430	113.4	952	170.1	1430	113.4	952	170.1	1430	113.4	952	170.1	1430	113.4	952	170.1	1430	113.4	952	170.1	1430	113.4	952	170.1	1430	113.4	952	170.1	1430	113.4	952
90 in	170.1	1532	113.4	1020	170.1	1532	113.4	1020	170.1	1532	113.4	1020	170.1	1532	113.4	1020	170.1	1532	113.4	1020	170.1	1532	113.4	1020	170.1	1532	113.4	1020	170.1	1532	113.4	1020
96 in	170.1	1634	113.4	1088	170.1	1634	113.4	1088	170.1	1634	113.4	1088	170.1	1634	113.4	1088	170.1	1634	113.4	1088	170.1	1634	113.4	1088	170.1	1634	113.4	1088	170.1	1634	113.4	1088
102 in	170.1	1736	113.4	1156	170.1	1736	113.4	1156	170.1	1736	113.4	1156	170.1	1736	113.4	1156	170.1	1736	113.4	1156	170.1	1736	113.4	1156	170.1	1736	113.4	1156	170.1	1736	113.4	1156
108 in	170.1	1838	113.4	1224	170.1	1838	113.4	1224	170.1	1838	113.4	1224	170.1	1838	113.4	1224	170.1	1838	113.4	1224	170.1	1838	113.4	1224	170.1	1838	113.4	1224	170.1	1838	113.4	1224
114 in	170.1	1940	113.4	1292	170.1	1940	113.4	1292	170.1	1940	113.4	1292	170.1	1940	113.4	1292	170.1	1940	113.4	1292	170.1	1940	113.4	1292	170.1	1940	113.4	1292	170.1	1940	113.4	1292
120 in	170.1	2042	113.4	1360	170.1	2042	113.4	1360	170.1	2042	113.4	1360	170.1	2042	113.4	1360	170.1	2042	113.4	1360	170.1	2042	113.4	1360	170.1	2042	113.4	1360	170.1	2042	113.4	1360
144 in	170.1	2451	113.4	1632	170.1	2451	113.4	1632	170.1	2451	113.4	1632	170.1	2451	113.4	1632	170.1	2451	113.4	1632	170.1	2451	113.4	1632	170.1	2451	113.4	1632	170.1	2451	113.4	1632

TABLE 12b

Anchor/Clip Capacity (lbs) when using a 3" x 4" x 1/8" Tube Mullion	Extrusion	Al. Curtainwall				Al. Curtainwall						Al. Curtainwall				Wood		Steel
	Anchor Type	2-1/4" Slotfoot (Aluminum)		1-3/4" Slotfoot (Aluminum)		2-1/2" Slotfoot (Aluminum)		1-3/4" Slotfoot (Aluminum)		1-3/4" Block Curtainwall	2-1/2" Block Curtainwall	2-1/2" Slotfoot (Aluminum)		1-3/4" Slotfoot (Aluminum)	2-1/2" Block Curtainwall	#12 Screw to wood	#12 Screw to Steel	#12 Screw to Steel
	Clips Centered at (-)	3"	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"	2-1/2"	2-1/2"	3"	3"		3"		3"		3"
	Embedment (-)	1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-3/4"	1-3/4"	1-3/4"	1-3/4"	2-1/2"	1-3/4"		2"		1-3/4"	1-3/4"	See Detail 1
2 Anchors @ 2.00" Min. (-) = Mullion Clip (Fig. 1)	2 Anchors @ 2.00" Min. (-) = Mullion Clip (Fig. 1)	2910 lbs	2910 lbs	2910 lbs	2910 lbs	1940 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	970 lbs	970 lbs	970 lbs
3 Anchors @ 2.00" Min. (-) = Mullion Clip (Fig. 1)	3 Anchors @ 2.00" Min. (-) = Mullion Clip (Fig. 1)	4365 lbs	4365 lbs	4365 lbs	4365 lbs	2910 lbs	4365 lbs	4365 lbs	4365 lbs	4365 lbs	4365 lbs	4365 lbs	4365 lbs	4365 lbs	4365 lbs	1455 lbs	1455 lbs	1455 lbs
4 Anchors @ 2.00" Min. (-) = Mullion Clip (Fig. 1)	4 Anchors @ 2.00" Min. (-) = Mullion Clip (Fig. 1)	5820 lbs	5820 lbs	5820 lbs	5820 lbs	3880 lbs	5820 lbs	5820 lbs	5820 lbs	5820 lbs	5820 lbs	5820 lbs	5820 lbs	5820 lbs	5820 lbs	1940 lbs	1940 lbs	1940 lbs
2 Anchors @ 2.00" Min. (-) = Angle Clip (Fig. 2)	2 Anchors @ 2.00" Min. (-) = Angle Clip (Fig. 2)	2910 lbs	2910 lbs	2910 lbs	2910 lbs	1940 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	970 lbs	970 lbs	970 lbs
3 Anchors @ 2.00" Min. (-) = Angle Clip (Fig. 2)	3 Anchors @ 2.00" Min. (-) = Angle Clip (Fig. 2)	4365 lbs	4365 lbs	4365 lbs	4365 lbs	2910 lbs	4365 lbs	4365 lbs	4365 lbs	4365 lbs	4365 lbs	4365 lbs	4365 lbs	4365 lbs	4365 lbs	1455 lbs	1455 lbs	1455 lbs
4 Anchors @ 2.00" Min. (-) = Angle Clip (Fig. 2)	4 Anchors @ 2.00" Min. (-) = Angle Clip (Fig. 2)	5820 lbs	5820 lbs	5820 lbs	5820 lbs	3880 lbs	5820 lbs	5820 lbs	5820 lbs	5820 lbs	5820 lbs	5820 lbs	5820 lbs	5820 lbs	5820 lbs	1940 lbs	1940 lbs	1940 lbs
2 Anchors @ 2.00" Min. (-) = Clip (Fig. 3)	2 Anchors @ 2.00" Min. (-) = Clip (Fig. 3)	1455 lbs	1455 lbs	1455 lbs	1455 lbs	970 lbs	1455 lbs	1455 lbs	1455 lbs	1455 lbs	1455 lbs	1455 lbs	1455 lbs	1455 lbs	1455 lbs	485 lbs	485 lbs	485 lbs
3 Anchors @ 2.00" Min. (-) = Clip (Fig. 3)	3 Anchors @ 2.00" Min. (-) = Clip (Fig. 3)	2183 lbs	2183 lbs	2183 lbs	2183 lbs	1455 lbs	2183 lbs	2183 lbs	2183 lbs	2183 lbs	2183 lbs	2183 lbs	2183 lbs	2183 lbs	2183 lbs	728 lbs	728 lbs	728 lbs
4 Anchors @ 2.00" Min. (-) = Clip (Fig. 3)	4 Anchors @ 2.00" Min. (-) = Clip (Fig. 3)	2910 lbs	2910 lbs	2910 lbs	2910 lbs	1940 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	2910 lbs	970 lbs	970 lbs	970 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1

CIRCLED VALUES ARE USED IN THE EXAMPLE ON SHEET 2?



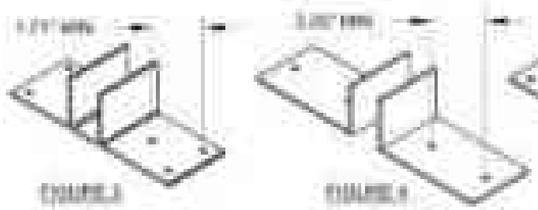




TABLE NOTES:

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 3. 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" (I.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 3.



3" X 4" X 1/8" MULLION
6063-T6 ALUMINUM

WINDOOR®
ENGINEERED BY ANTHONY LYNN MILLER, P.E.
ALUMINUM TUBE MULLIONS CLOSED
3 X 4 X 1/8 CAPACITIES
ANTHONY LYNN MILLER LICENSE No. 58707 10/13/23 STATE OF FLORIDA PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., FLA # 58707
AS CHANGED THIS SHEET
11/11/22
4
MULLIONS
(MODIFIED)
(LM)
JENS ROSENVINGE
11/11/22
5 OF 16

TABLE 1A:

2" x 6" x 1/8" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																													
	30 in				60 in				75 in				90 in				105 in				120 in				135 in				150 in			
	Fixed (Locked Mullion)		Uniformly (Locked Mullion)		Fixed (Locked Mullion)		Uniformly (Locked Mullion)		Fixed (Locked Mullion)		Uniformly (Locked Mullion)		Fixed (Locked Mullion)		Uniformly (Locked Mullion)		Fixed (Locked Mullion)		Uniformly (Locked Mullion)		Fixed (Locked Mullion)		Uniformly (Locked Mullion)		Fixed (Locked Mullion)		Uniformly (Locked Mullion)		Fixed (Locked Mullion)		Uniformly (Locked Mullion)	
Mullion Span																														
10 in	175.0	0.24	175.0	0.24	175.0	0.44	175.0	0.44	175.0	0.60	175.0	0.60	175.0	0.81	175.0	0.81	175.0	1.04	175.0	1.04	175.0	1.29	175.0	1.29	175.0	1.58	175.0	1.58	175.0	1.91
20 in	175.0	0.48	175.0	0.48	175.0	0.88	175.0	0.88	175.0	1.20	175.0	1.20	175.0	1.62	175.0	1.62	175.0	2.08	175.0	2.08	175.0	2.58	175.0	2.58	175.0	3.16	175.0	3.16	175.0	3.81
30 in	175.0	0.72	175.0	0.72	175.0	1.32	175.0	1.32	175.0	1.80	175.0	1.80	175.0	2.43	175.0	2.43	175.0	3.12	175.0	3.12	175.0	3.87	175.0	3.87	175.0	4.74	175.0	4.74	175.0	5.72
40 in	175.0	0.96	175.0	0.96	175.0	1.76	175.0	1.76	175.0	2.40	175.0	2.40	175.0	3.24	175.0	3.24	175.0	4.16	175.0	4.16	175.0	5.16	175.0	5.16	175.0	6.32	175.0	6.32	175.0	7.62
50 in	175.0	1.20	175.0	1.20	175.0	2.20	175.0	2.20	175.0	3.00	175.0	3.00	175.0	4.05	175.0	4.05	175.0	5.20	175.0	5.20	175.0	6.45	175.0	6.45	175.0	7.90	175.0	7.90	175.0	9.53
60 in	175.0	1.44	175.0	1.44	175.0	2.64	175.0	2.64	175.0	3.60	175.0	3.60	175.0	4.86	175.0	4.86	175.0	6.24	175.0	6.24	175.0	7.74	175.0	7.74	175.0	9.48	175.0	9.48	175.0	11.43
70 in	175.0	1.68	175.0	1.68	175.0	3.08	175.0	3.08	175.0	4.20	175.0	4.20	175.0	5.67	175.0	5.67	175.0	7.28	175.0	7.28	175.0	9.03	175.0	9.03	175.0	11.06	175.0	11.06	175.0	13.34
80 in	175.0	1.92	175.0	1.92	175.0	3.52	175.0	3.52	175.0	4.80	175.0	4.80	175.0	6.48	175.0	6.48	175.0	8.32	175.0	8.32	175.0	10.32	175.0	10.32	175.0	12.64	175.0	12.64	175.0	15.24
90 in	175.0	2.16	175.0	2.16	175.0	3.96	175.0	3.96	175.0	5.40	175.0	5.40	175.0	7.29	175.0	7.29	175.0	9.36	175.0	9.36	175.0	11.61	175.0	11.61	175.0	14.22	175.0	14.22	175.0	17.15
100 in	175.0	2.40	175.0	2.40	175.0	4.40	175.0	4.40	175.0	6.00	175.0	6.00	175.0	8.10	175.0	8.10	175.0	10.40	175.0	10.40	175.0	12.90	175.0	12.90	175.0	15.80	175.0	15.80	175.0	19.05
110 in	175.0	2.64	175.0	2.64	175.0	4.84	175.0	4.84	175.0	6.60	175.0	6.60	175.0	8.91	175.0	8.91	175.0	11.44	175.0	11.44	175.0	14.19	175.0	14.19	175.0	17.38	175.0	17.38	175.0	20.96
120 in	175.0	2.88	175.0	2.88	175.0	5.28	175.0	5.28	175.0	7.20	175.0	7.20	175.0	9.72	175.0	9.72	175.0	12.48	175.0	12.48	175.0	15.48	175.0	15.48	175.0	18.96	175.0	18.96	175.0	22.86
130 in	175.0	3.12	175.0	3.12	175.0	5.72	175.0	5.72	175.0	7.80	175.0	7.80	175.0	10.53	175.0	10.53	175.0	13.52	175.0	13.52	175.0	16.77	175.0	16.77	175.0	20.54	175.0	20.54	175.0	24.77
140 in	175.0	3.36	175.0	3.36	175.0	6.16	175.0	6.16	175.0	8.40	175.0	8.40	175.0	11.34	175.0	11.34	175.0	14.56	175.0	14.56	175.0	18.06	175.0	18.06	175.0	22.12	175.0	22.12	175.0	26.67
150 in	175.0	3.60	175.0	3.60	175.0	6.60	175.0	6.60	175.0	9.00	175.0	9.00	175.0	12.15	175.0	12.15	175.0	15.60	175.0	15.60	175.0	19.35	175.0	19.35	175.0	23.70	175.0	23.70	175.0	28.58

TABLE 1B:

Anchor/Clip Capacity (lbs) when using a 2" x 6" x 1/8" Tube Mullion	Substrate	Wall Connection				2 Ply Conn.	Fixture Side(s)						Flipper Side(s)				Screws		Rivets
	Anchor Type	0.197" Diameter Wedge Anchor		1/4" Diameter Wedge Anchor		0.157" Dia. Machine Screw	0.197" Diameter Wedge Anchor		1/4" Diameter Wedge Anchor		1/4" Dia. Carriage Bolt	5/16" Dia. Hex Bolt	0.197" Diameter Wedge Anchor	1/4" Diameter Wedge Anchor	1/4" Dia. Hex Bolt	#12 Sheet Metal Screw	#14 Sheet Metal Screw	0.157" Dia. Steel Rivet
	Edge Distance (in)	1"	1 1/2"	1"	1 1/2"	1"	1"	1 1/2"	1"	1 1/2"	1"	1"	1"	1 1/2"	1"	1"	1"	1"	1"
	Embedment (in)	1 3/4"	1 3/4"	2"	2"	1"	1"	1"	1 1/4"	1 1/4"	1"	1"	1"	1"	1 1/4"	1"	1"	1"	See Chart 1
4 Anchors @ 3.25" Min. O.C. / Mullion Clip (Fig. 1)	4000 lbs	5000 lbs	4000 lbs	5000 lbs	2274 lbs	960 lbs	1200 lbs	1600 lbs	2000 lbs	1600 lbs	1600 lbs	1600 lbs	2000 lbs	2000 lbs	2000 lbs	1600 lbs	2000 lbs	1600 lbs	2274 lbs
3 Anchors @ 3.25" Min. O.C. / Mullion Clip (Fig. 2)	3000 lbs	3750 lbs	3000 lbs	3750 lbs	1705 lbs	720 lbs	900 lbs	1200 lbs	1500 lbs	1200 lbs	1200 lbs	1200 lbs	1500 lbs	1500 lbs	1500 lbs	1200 lbs	1500 lbs	1200 lbs	1705 lbs
2 Anchors @ 3.25" Min. O.C. / Mullion Clip (Fig. 3)	2000 lbs	2500 lbs	2000 lbs	2500 lbs	1137 lbs	480 lbs	600 lbs	800 lbs	1000 lbs	800 lbs	800 lbs	800 lbs	1000 lbs	1000 lbs	1000 lbs	800 lbs	1000 lbs	800 lbs	1137 lbs
4 Total Anchors @ 3" Min. O.C. Angle Clip (Fig. 4)	4000 lbs	5000 lbs	4000 lbs	5000 lbs	2000 lbs	960 lbs	1200 lbs	1600 lbs	2000 lbs	1600 lbs	1600 lbs	1600 lbs	2000 lbs	2000 lbs	2000 lbs	1600 lbs	2000 lbs	1600 lbs	2000 lbs
6 Total Anchors @ 3" Min. O.C. Angle Clip (Fig. 5)	6000 lbs	7500 lbs	6000 lbs	7500 lbs	2700 lbs	1440 lbs	1800 lbs	2400 lbs	3000 lbs	2400 lbs	2400 lbs	2400 lbs	3000 lbs	3000 lbs	3000 lbs	2400 lbs	3000 lbs	2400 lbs	2700 lbs
4 Total Anchors @ 3" Min. O.C. Angle Clip (Fig. 6)	4000 lbs	5000 lbs	4000 lbs	5000 lbs	2000 lbs	960 lbs	1200 lbs	1600 lbs	2000 lbs	1600 lbs	1600 lbs	1600 lbs	2000 lbs	2000 lbs	2000 lbs	1600 lbs	2000 lbs	1600 lbs	2000 lbs
2 Anchors @ 3" Min. O.C. / Clip (Fig. 7)	2000 lbs	2500 lbs	2000 lbs	2500 lbs	1137 lbs	480 lbs	600 lbs	800 lbs	1000 lbs	800 lbs	800 lbs	800 lbs	1000 lbs	1000 lbs	1000 lbs	800 lbs	1000 lbs	800 lbs	1137 lbs
3 Anchors @ 3" Min. O.C. / Clip (Fig. 8)	3000 lbs	3750 lbs	3000 lbs	3750 lbs	1705 lbs	720 lbs	900 lbs	1200 lbs	1500 lbs	1200 lbs	1200 lbs	1200 lbs	1500 lbs	1500 lbs	1500 lbs	1200 lbs	1500 lbs	1200 lbs	1705 lbs
4 Anchors @ 3" Min. O.C. / Clip (Fig. 9)	4000 lbs	5000 lbs	4000 lbs	5000 lbs	2274 lbs	960 lbs	1200 lbs	1600 lbs	2000 lbs	1600 lbs	1600 lbs	1600 lbs	2000 lbs	2000 lbs	2000 lbs	1600 lbs	2000 lbs	1600 lbs	2274 lbs
2 Anchors @ 3" Min. O.C. / Clip (Fig. 10)	2000 lbs	2500 lbs	2000 lbs	2500 lbs	1137 lbs	480 lbs	600 lbs	800 lbs	1000 lbs	800 lbs	800 lbs	800 lbs	1000 lbs	1000 lbs	1000 lbs	800 lbs	1000 lbs	800 lbs	1137 lbs
3 Anchors @ 3" Min. O.C. / Clip (Fig. 11)	3000 lbs	3750 lbs	3000 lbs	3750 lbs	1705 lbs	720 lbs	900 lbs	1200 lbs	1500 lbs	1200 lbs	1200 lbs	1200 lbs	1500 lbs	1500 lbs	1500 lbs	1200 lbs	1500 lbs	1200 lbs	1705 lbs
4 Anchors @ 3" Min. O.C. / Clip (Fig. 12)	4000 lbs	5000 lbs	4000 lbs	5000 lbs	2274 lbs	960 lbs	1200 lbs	1600 lbs	2000 lbs	1600 lbs	1600 lbs	1600 lbs	2000 lbs	2000 lbs	2000 lbs	1600 lbs	2000 lbs	1600 lbs	2274 lbs

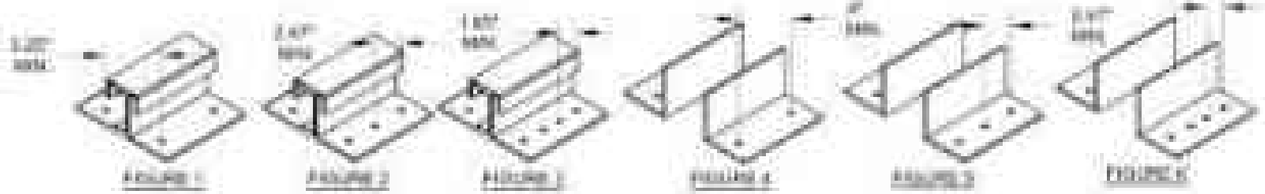


TABLE NOTES:
1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR FOOTUNIFORMLY LOADED CLARIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 1. 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 2.



2" X 6" X 1/8" MULLION
6063-T5 ALUMINUM

WINDOOR®
WINDOOR TECHNOLOGIES INC.
ALUMINUM TUBE MULLIONS CLIPPED (UM)
2 X 6 X 1/8 CAPACITIES

DRAWN	MAD/23
CHECKED	JBS 8/23/23
SCALE	NTS
DRAWING NO.	WM-UM-1
REVISION	4
DATE	11/17/23



TABLE 1AA

2" x 6" x 1/8" with 400 Series Frames Design Pressure & Operation Capacity Requirement	Opening Dimension																													
	80 in				85 in				90 in				100 in				125 in				140 in				160 in				180 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	
	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure	Positive Design Pressure	Negative Design Pressure
Bolted Span																														

TABLE 1AB

Maximum Clear Opening Area when using a 2" x 6" x 1/8" Tube Mullion with 400 Series Frames	Mullion Type	Mullion Dimensions				Mullion Properties					Frame Dimensions		Frame Properties			Mullion Reinforcement		Weight
		Width	Depth	Wall Thickness	Corner Radius	Weight per Foot	Area	Ixx	Sxx	Iyy	Syy	J	Width	Depth	Wall Thickness	Ixx	Sxx	Weight per Foot
	Single Chamber	2"	6"	1/8"	1/8"	2.5 lbs/ft	0.74 in²	8.74 in⁴	2.91 in³	0.67 in⁴	0.67 in³	1.34 in⁴	2"	6"	1/8"	8.74 in⁴	2.91 in³	2.5 lbs/ft
	Thermal Barrier	2"	6"	1/8"	1/8"	2.5 lbs/ft	0.74 in²	8.74 in⁴	2.91 in³	0.67 in⁴	0.67 in³	1.34 in⁴	2"	6"	1/8"	8.74 in⁴	2.91 in³	2.5 lbs/ft

FIGURE 1 — 2.25" MIN.

FIGURE 2 — 2.47" MIN.

FIGURE 3 — 2.47" MIN.

FIGURE 4 — 6" MIN.

FIGURE 5 — 2.47" MIN.

FIGURE 7 — 6" MIN.

FIGURE 8 — 2.47" MIN.

FIGURE 9 — 1.65" MIN.

FIGURE 10 — 6" MIN.

FIGURE 11 — 2.47" MIN.

FIGURE 12 — 1.65" MIN.

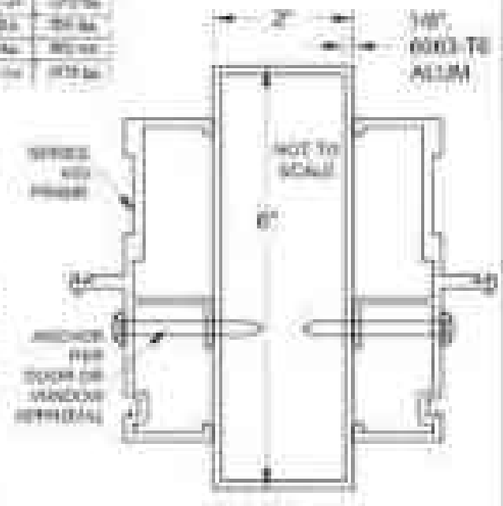
1.65" MIN

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

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 3. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THE 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 3.



WINDOOR®
TECHNOLOGIES LTD.
ALUMINUM TUBE MULLIONS CLIPPED (MI) TO SERIES 400 FRAMES
2 X 6 X 1/8 CAPACITIES
CLIPPED (MI) TO SERIES 400 FRAMES
DRAWN: MW
CHECKED: JENS ROSENKRANZ
DATE: 10/17/2023
SCALE: NTS
SHEET: 2 OF 3
REVISIONS: 1 10/17/2023

ANTHONY LYNN MILLER
LICENSE
No. 58707
10/13/23
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E. - PE# 58707

TABLE 1(A):

2" x 6" x 1/8" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																											
	72 in				80 in				72 in				80 in				96 in				108 in				120 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	
Mullion Span	[illegible]																											
72 in	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5
80 in	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5
90 in	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5
96 in	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5
102 in	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5
108 in	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5
114 in	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5
120 in	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5
126 in	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5
132 in	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5
144 in	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5	170.3	170.3	113.5	113.5

TABLE 1(B):

Anchor/Clip Capacity (lbs) when using a 2" x 6" x 1/8" Tube Mullion	Substrate	Si Concrete				C.M.U. Core	Hollow CMU					Wood			Metal	
	Anchor Type	2-1/2" Embed. Ultracon®		1-1/2" Embed. Ultracon®		5/16" Dia. Wedge	2-1/2" Embed. Ultracon®		1-1/2" Embed. Ultracon®		1-1/2" Dia. Cored Hole	1-1/2" Dia. Expansion	5/16" Embed. Ultracon®	1-1/2" Embed. Ultracon®	1-1/2" Dia. Expansion	#12 Sheet Screw	#14 Sheet Screw	#12 Sheet Screw
	Edge Distance (in)	2"	2-1/2"	2"	2-1/2"	5-1/8"	2"	2-1/2"	2"	2-1/2"	2-1/2"	2"	2"	2"	2"	3-1/8"	3-1/2"	3" x 3/4" Sheet Screw
	Embedment (in)	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"	1-1/2"	1-1/2"	
2 Anchors @ 4.75" Min. C.C. - Mullion Clip (Fig. 1)		310 lbs	335 lbs	265 lbs	305 lbs	1644 lbs	224 lbs	310 lbs	225 lbs	280 lbs	610 lbs	314 lbs	170 lbs	310 lbs	396 lbs	462 lbs	537 lbs	636 lbs
4 Anchors @ 4.75" Min. C.C. - Mullion Clip (Fig. 2)		620 lbs	1290 lbs	441 lbs	1160 lbs	3288 lbs	448 lbs	620 lbs	450 lbs	1160 lbs	1220 lbs	628 lbs	340 lbs	620 lbs	1980 lbs	881 lbs	2074 lbs	3172 lbs
6 Anchors @ 4.75" Min. C.C. - Mullion Clip (Fig. 3)		930 lbs	1290 lbs	910 lbs	2400 lbs	4932 lbs	672 lbs	1860 lbs	675 lbs	1740 lbs	1830 lbs	942 lbs	510 lbs	930 lbs	3177 lbs	2196 lbs	3611 lbs	4758 lbs
4 Total Anchors @ 3.25" C.C. Max Solid Angle Clip Pair (Fig. 4)		620 lbs	1290 lbs	441 lbs	1160 lbs	2211 lbs	448 lbs	620 lbs	450 lbs	1160 lbs	864 lbs	628 lbs	340 lbs	620 lbs	1980 lbs	881 lbs	2074 lbs	3172 lbs
6 Total Anchors @ 3.25" C.C. Max Solid Angle Clip Pair (Fig. 5)		1240 lbs	2580 lbs	882 lbs	2320 lbs	3780 lbs	1024 lbs	1447 lbs	1260 lbs	2320 lbs	1579 lbs	1456 lbs	680 lbs	1240 lbs	3784 lbs	1762 lbs	3240 lbs	5349 lbs
4 Total Anchors @ 3.25" C.C. Max Solid Angle Clip Pair (Fig. 6)		880 lbs	1290 lbs	588 lbs	1160 lbs	3680 lbs	746 lbs	1033 lbs	763 lbs	2320 lbs	2317 lbs	628	1020 lbs	1510 lbs	1980 lbs	2934 lbs	3236 lbs	4518 lbs
4 Anchors @ 4.75" Min. C.C. - Cross Clip (Fig. 7)		620	1290	441	1160	1644	448	620	450	1160	610	628	340	620	1980	881	2074	3172 lbs
6 Anchors @ 4.75" Min. C.C. - Cross Clip (Fig. 8)		930	1290	910	2400	4932	672	1860	675	1740	1830	942	510	930	3177	2196	3611	4758 lbs
2 Anchors @ 4.49" Min. C.C. - Cross Clip (Fig. 9)		310 lbs	335 lbs	265 lbs	305 lbs	1644 lbs	224 lbs	310 lbs	225 lbs	280 lbs	610 lbs	314 lbs	170 lbs	310 lbs	396 lbs	462 lbs	537 lbs	636 lbs
4 Anchors @ 7.77" Min. C.C. - Cross Clip (Fig. 10)		620 lbs	1290 lbs	455 lbs	1160 lbs	n/a	336 lbs	745 lbs	413 lbs	980 lbs	809 lbs	628	340 lbs	620 lbs	1980 lbs	881 lbs	2074 lbs	3172 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1

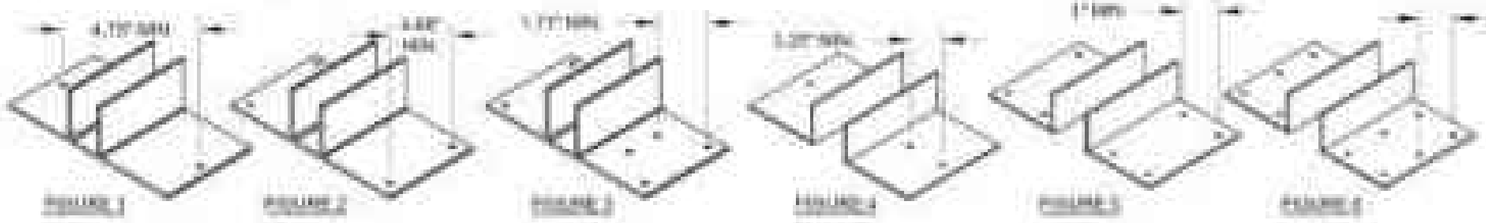


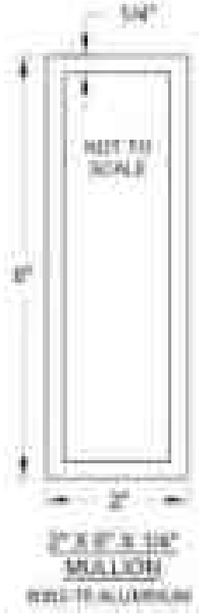
TABLE NOTES:

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

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 3. 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 2.



WINDOOR®
TECHNOLOGIES
ALUMINUM TUBE MULLIONS, CLOSED SHAPES
2 X 6 X 1/8 CAPACITIES
WALL WP-1
06/01/23
REVISED (MM/DD/YY)
AS CHANGED THIS SHEET
4
3
2
1

ANTHONY LYNN MILLER
LICENSE
No. 94707
10/13/23
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., P.E.# 94707

TABLE 1(A)

3" x 8" x 1/8" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension 30 in				40 in				50 in				60 in				70 in				80 in				90 in				100 in				110 in				120 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		Point Loaded Mullion		Uniformly Loaded Mullion		Point Loaded Mullion		Uniformly Loaded Mullion	
Mullion Span																																						
12 in	102.3	102.3	116.3	116.3	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4
18 in	115.3	115.3	116.3	116.3	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4
24 in	115.3	115.3	116.3	116.3	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4
30 in	115.3	115.3	116.3	116.3	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4
36 in	115.3	115.3	116.3	116.3	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4
42 in	115.3	115.3	116.3	116.3	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4
48 in	115.3	115.3	116.3	116.3	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4
54 in	115.3	115.3	116.3	116.3	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4
60 in	115.3	115.3	116.3	116.3	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4
66 in	115.3	115.3	116.3	116.3	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4
72 in	115.3	115.3	116.3	116.3	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4	115.3	115.3	130.4	130.4

TABLE 1(B)

Anchor/Clip Capacity (lbs) when using a 3" x 8" x 1/8" Tube Mullion	Substrate	Air Concrete				Cold-formed Steel	Hollow CMU					Wood				Steel	
	Anchor Type	5/16" Dia Wedge Anchors		1/4" Dia Wedge Anchors		3/16" Dia Wedge Anchors	5/16" Dia Wedge Anchors		1/4" Dia Wedge Anchors		1/4" Dia Tapcon Screws	5/16" Dia Wedge Anchors	1/4" Dia Wedge Anchors		1/4" Dia Tapcon Screws	#12 Steel Screws	#12 Steel Screws	#12 Steel Screws
	Edge Distance (in.)	3"	4-1/2"	3"	4-1/2"	3"	3"	4-1/2"	3"	4-1/2"	3"	3"	3"	4-1/2"	3"	3"	4-1/2"	3"
	Embedment (in.)	1-3/4"	1-3/4"	1-1/4"	1-3/4"	1"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1"	1-1/4"	1-1/4"	Refer Detail 7
1 Anchor @ 3.25" Min. O.C. - Mullion Cap Fig. 1	1616 lbs	1760 lbs	487 lbs	1163 lbs	1077 lbs	960 lbs	1161 lbs	648 lbs	1156 lbs	1161 lbs	1161 lbs	540 lbs	960 lbs	1440 lbs	1920 lbs	960 lbs	1275 lbs	1275 lbs
2 Anchors @ 3.25" Min. O.C. - Mullion Cap Fig. 2	1616 lbs	1760 lbs	960 lbs	1313 lbs	1616 lbs	1440 lbs	1742 lbs	960 lbs	1734 lbs	1742 lbs	1742 lbs	1080 lbs	1440 lbs	2160 lbs	2880 lbs	1440 lbs	1913 lbs	1913 lbs
3 Anchors @ 3.25" Min. O.C. - Mullion Cap Fig. 3	1616 lbs	1760 lbs	960 lbs	1313 lbs	1616 lbs	1440 lbs	1742 lbs	960 lbs	1734 lbs	1742 lbs	1742 lbs	1080 lbs	1440 lbs	2160 lbs	2880 lbs	1440 lbs	1913 lbs	1913 lbs
1 Clip Anchor @ 3.25" Min. O.C. Angle Clip Fig. 4	1616 lbs	1760 lbs	487 lbs	1163 lbs	1077 lbs	960 lbs	1161 lbs	648 lbs	1156 lbs	1161 lbs	1161 lbs	540 lbs	960 lbs	1440 lbs	1920 lbs	960 lbs	1275 lbs	1275 lbs
2 Clip Anchors @ 3.25" O.C. Min Angle Clip Fig. 5	1616 lbs	1760 lbs	960 lbs	1313 lbs	1616 lbs	1440 lbs	1742 lbs	960 lbs	1734 lbs	1742 lbs	1742 lbs	1080 lbs	1440 lbs	2160 lbs	2880 lbs	1440 lbs	1913 lbs	1913 lbs
3 Clip Anchors @ 3.25" O.C. Min Angle Clip Fig. 6	1616 lbs	1760 lbs	960 lbs	1313 lbs	1616 lbs	1440 lbs	1742 lbs	960 lbs	1734 lbs	1742 lbs	1742 lbs	1080 lbs	1440 lbs	2160 lbs	2880 lbs	1440 lbs	1913 lbs	1913 lbs
1 Anchor @ 3" Min. O.C. - U-Clip Fig. 7	1616 lbs	1760 lbs	487 lbs	1163 lbs	1077 lbs	960 lbs	1161 lbs	648 lbs	1156 lbs	1161 lbs	1161 lbs	540 lbs	960 lbs	1440 lbs	1920 lbs	960 lbs	1275 lbs	1275 lbs
2 Anchors @ 3" Min. O.C. - U-Clip Fig. 8	1616 lbs	1760 lbs	960 lbs	1313 lbs	1616 lbs	1440 lbs	1742 lbs	960 lbs	1734 lbs	1742 lbs	1742 lbs	1080 lbs	1440 lbs	2160 lbs	2880 lbs	1440 lbs	1913 lbs	1913 lbs
3 Anchors @ 3" Min. O.C. - U-Clip Fig. 9	1616 lbs	1760 lbs	960 lbs	1313 lbs	1616 lbs	1440 lbs	1742 lbs	960 lbs	1734 lbs	1742 lbs	1742 lbs	1080 lbs	1440 lbs	2160 lbs	2880 lbs	1440 lbs	1913 lbs	1913 lbs
1 Anchor @ 3" Min. O.C. - T-Clip Fig. 10	1616 lbs	1760 lbs	487 lbs	1163 lbs	1077 lbs	960 lbs	1161 lbs	648 lbs	1156 lbs	1161 lbs	1161 lbs	540 lbs	960 lbs	1440 lbs	1920 lbs	960 lbs	1275 lbs	1275 lbs
2 Anchors @ 3" Min. O.C. - T-Clip Fig. 11	1616 lbs	1760 lbs	960 lbs	1313 lbs	1616 lbs	1440 lbs	1742 lbs	960 lbs	1734 lbs	1742 lbs	1742 lbs	1080 lbs	1440 lbs	2160 lbs	2880 lbs	1440 lbs	1913 lbs	1913 lbs
3 Anchors @ 3" Min. O.C. - T-Clip Fig. 12	1616 lbs	1760 lbs	960 lbs	1313 lbs	1616 lbs	1440 lbs	1742 lbs	960 lbs	1734 lbs	1742 lbs	1742 lbs	1080 lbs	1440 lbs	2160 lbs	2880 lbs	1440 lbs	1913 lbs	1913 lbs



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 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 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 3.



REQUIRED THIS SHEET: 6

DATE	11/15/23
SCALE	AS NOTED
DRAWN BY	MJ
CHECKED BY	WM
APP'D BY	WM
REVISIONS	
SHEET	4 OF 12

WINDOOR®
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2.5 & 3" DEEP CAPACITIES

ANTHONY LYNN MILLER
LICENSE
No. 58707
11/15/23
STATE OF
ILLINOIS
PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E., PE.# 58707

TABLE 17A

2" x 8" x 1/8" with 450 Series Frames Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																																			
	[illegible] in				[illegible] in				[illegible] in				[illegible] in				[illegible] in				[illegible] in				[illegible] in				[illegible] in				[illegible] in			
	[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion		[illegible] Loaded Mullion	
Mullion Span	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] in	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] in	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] in	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] in	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] in	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible] in	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible] in	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] in	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] in	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible] in	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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TABLE 17B

Anchor/Clip Capacity (lbs) when using a 2" x 8" x 1/8" Tube Mullion with 450 Series Frames	[illegible]	[illegible]				[illegible]	[illegible]						[illegible]			[illegible]		[illegible]
	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

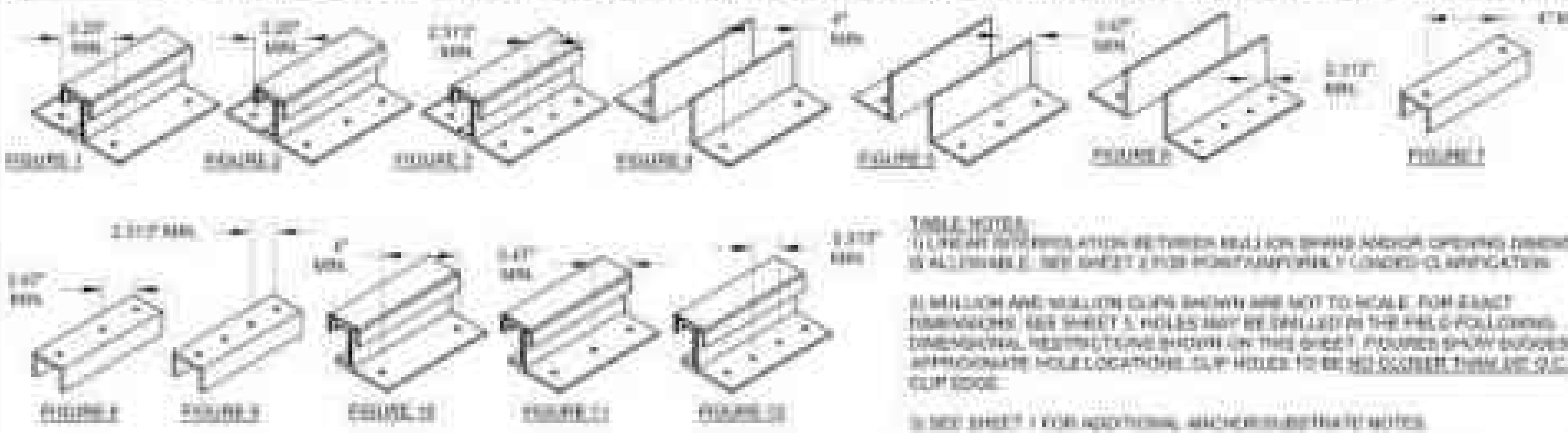
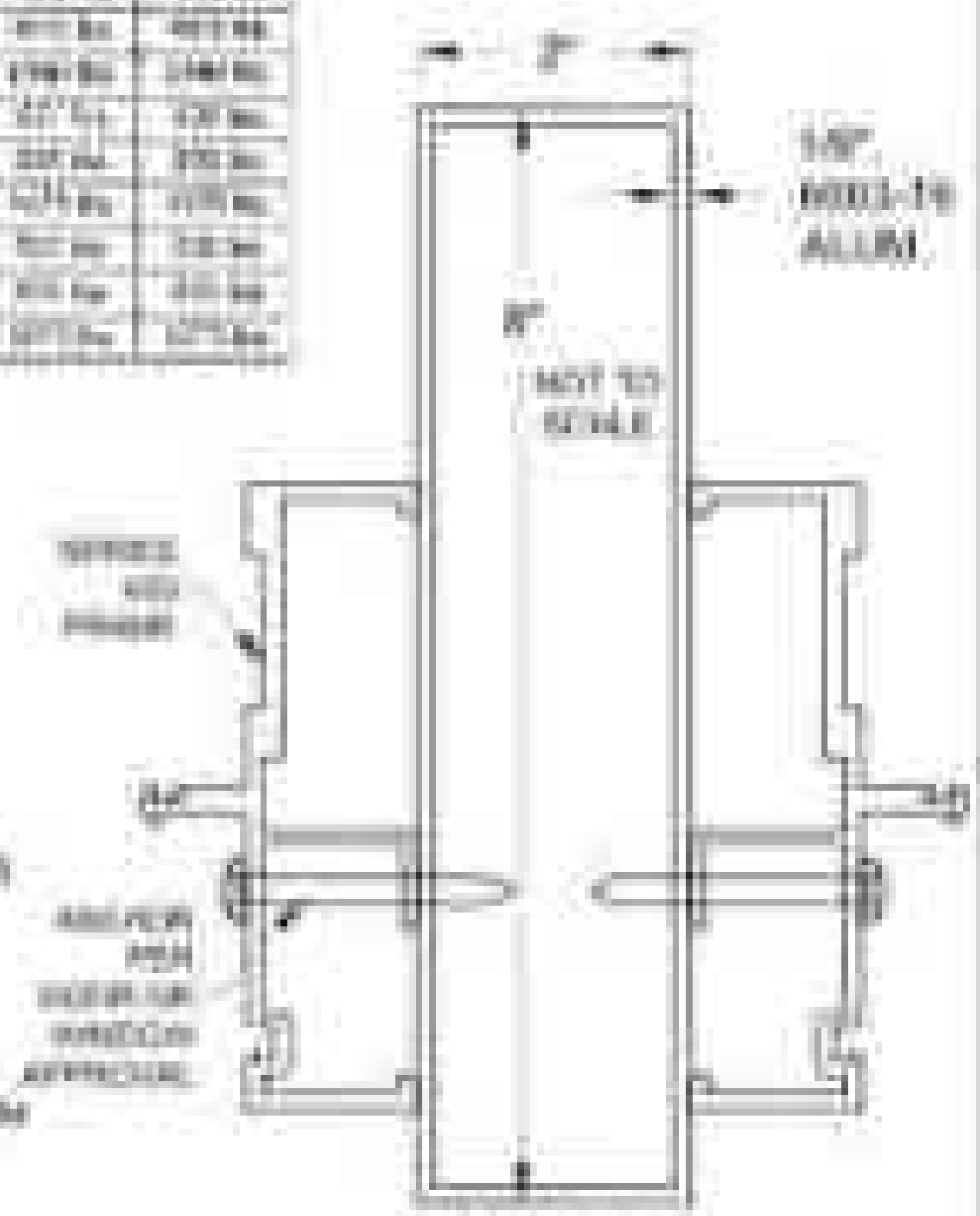


TABLE NOTES:
1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT/UNIFORMLY LOADED CLARIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 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 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 3.



2" X 8" X 1/8" MULLION WITH ATTACHED 450 SERIES FRAMES

WINDOOR

ALUMINUM TUBE MULLIONS, CLIPPED (UM)

2 X 8 X 1/8 CAPACITIES

MULLIONS

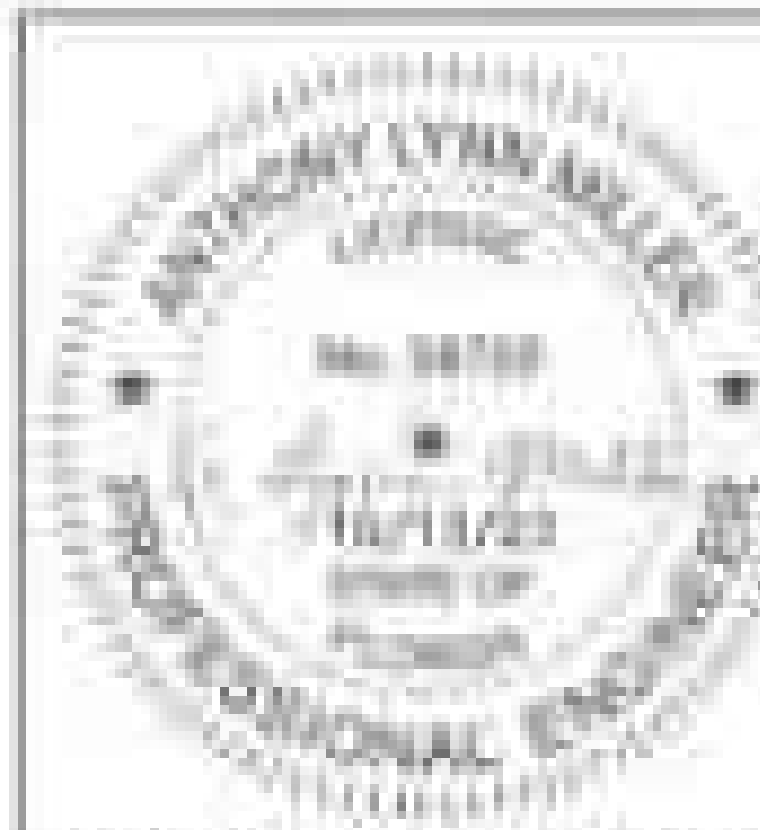
NTS

MULL WD-1

CORRECT SERIES ON TABLE 17B, 9.8

10/10/23

04/03/23



A. LYNN MILLER, P.E., P.E.# 58705

TABLE 1(a)

30 Degree Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																											
		30 in.				36 in.				72 in.				96 in.				96 in.				120 in.				144 in.				168 in.			
		Front (Loaded Mullion)		Uniformly (Loaded Mullion)		Front (Loaded Mullion)		Uniformly (Loaded Mullion)		Front (Loaded Mullion)		Uniformly (Loaded Mullion)		Front (Loaded Mullion)		Uniformly (Loaded Mullion)		Front (Loaded Mullion)		Uniformly (Loaded Mullion)		Front (Loaded Mullion)		Uniformly (Loaded Mullion)		Front (Loaded Mullion)		Uniformly (Loaded Mullion)		Front (Loaded Mullion)		Uniformly (Loaded Mullion)	
		Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)	Design Pressure (psf)	Anchor Capacity Required (lbs)
Mullion Span	42 in.	170.0	440	170.0	440	170.0	528	170.0	476	170.0	880	170.0	598	170.0	880	170.0	679	170.0	1056	170.0	821	170.0	1232	170.0	957	170.0	1408	170.0	1097	170.0	1584	170.0	1232
	48 in.	170.0	506	170.0	506	170.0	604	170.0	544	170.0	1007	170.0	683	170.0	1007	170.0	777	170.0	1208	170.0	938	170.0	1408	170.0	1094	170.0	1610	170.0	1254	170.0	1811	170.0	1408
	60 in.	170.0	633	170.0	633	170.0	755	170.0	680	170.0	1259	170.0	854	170.0	1259	170.0	971	170.0	1510	170.0	1173	170.0	1760	170.0	1367	170.0	2012	170.0	1568	170.0	2264	170.0	1760
	72 in.	170.0	760	170.0	760	170.0	906	170.0	816	170.0	1511	170.0	1025	170.0	1511	170.0	1165	170.0	1812	170.0	1407	170.0	2112	170.0	1641	170.0	2414	170.0	1881	170.0	2717	170.0	2112
	84 in.	170.0	887	170.0	887	170.0	1057	170.0	952	170.0	1763	170.0	1196	170.0	1763	170.0	1360	170.0	2114	170.0	1642	170.0	2464	170.0	1914	170.0	2816	170.0	2195	170.0	3169	170.0	2464
	96 in.	170.0	1013	170.0	1013	170.0	1208	170.0	1088	170.0	2015	170.0	1367	170.0	2015	170.0	1554	170.0	2416	170.0	1876	170.0	2816	170.0	2187	170.0	3218	170.0	2508	170.0	3621	170.0	2816
	108 in.	170.0	1140	170.0	1140	170.0	1359	170.0	1224	170.0	2267	170.0	1538	170.0	2267	170.0	1748	170.0	2718	170.0	2110	170.0	3168	170.0	2460	170.0	3620	170.0	2821	170.0	4073	170.0	3168
	120 in.	170.0	1267	170.0	1267	170.0	1510	170.0	1360	170.0	2519	170.0	1709	170.0	2519	170.0	1942	170.0	3020	170.0	2345	170.0	3520	170.0	2734	170.0	4022	170.0	3135	170.0	4525	170.0	3520
	132 in.	170.0	1394	170.0	1394	170.0	1661	170.0	1496	170.0	2771	170.0	1880	170.0	2771	170.0	2136	170.0	3322	170.0	2579	170.0	3872	170.0	3007	170.0	4424	170.0	3448	170.0	4977	170.0	3872
	144 in.	170.0	1520	170.0	1520	170.0	1812	170.0	1632	170.0	3023	170.0	2051	170.0	3023	170.0	2330	170.0	3624	170.0	2814	170.0	4224	170.0	3281	170.0	4826	170.0	3762	170.0	5429	170.0	4224
	156 in.	170.0	1647	170.0	1647	170.0	1963	170.0	1768	170.0	3275	170.0	2222	170.0	3275	170.0	2524	170.0	3926	170.0	3048	170.0	4576	170.0	3554	170.0	5228	170.0	4075	170.0	5880	170.0	4576
	168 in.	170.0	1774	170.0	1774	170.0	2114	170.0	1904	170.0	3527	170.0	2393	170.0	3527	170.0	2718	170.0	4228	170.0	3283	170.0	4928	170.0	3828	170.0	5630	170.0	4389	170.0	6331	170.0	4928
	180 in.	170.0	1901	170.0	1901	170.0	2265	170.0	2040	170.0	3779	170.0	2564	170.0	3779	170.0	2912	170.0	4530	170.0	3517	170.0	5280	170.0	4101	170.0	6032	170.0	4702	170.0	6783	170.0	5280
	192 in.	170.0	2027	170.0	2027	170.0	2416	170.0	2176	170.0	4031	170.0	2735	170.0	4031	170.0	3106	170.0	4832	170.0	3752	170.0	5632	170.0	4375	170.0	6434	170.0	5016	170.0	7235	170.0	5632
	204 in.	170.0	2154	170.0	2154	170.0	2567	170.0	2312	170.0	4283	170.0	2906	170.0	4283	170.0	3300	170.0	5134	170.0	3986	170.0	5984	170.0	4648	170.0	6836	170.0	5329	170.0	7687	170.0	5984
	216 in.	170.0	2281	170.0	2281	170.0	2718	170.0	2448	170.0	4535	170.0	3077	170.0	4535	170.0	3494	170.0	5436	170.0	4221	170.0	6336	170.0	4922	170.0	7238	170.0	5643	170.0	8139	170.0	6336
	228 in.	170.0	2408	170.0	2408	170.0	2869	170.0	2584	170.0	4787	170.0	3248	170.0	4787	170.0	3688	170.0	5738	170.0	4455	170.0	6688	170.0	5195	170.0	7640	170.0	5957	170.0	8591	170.0	6688
	240 in.	170.0	2535	170.0	2535	170.0	3020	170.0	2720	170.0	5039	170.0	3419	170.0	5039	170.0	3882	170.0	6040	170.0	4690	170.0	7040	170.0	5469	170.0	8042	170.0	6271	170.0	9043	170.0	7040

TABLE 1(b)

Anchor/Clip Capacity (lbs) when using a 30 Degree Tube Mullion	Substrate	30 Degrees				0.05" Gap	Studs		Steel
	Anchor Type	0.187" Diameter (Fastener)		1/4" Diameter (Fastener)		0.05" Gap (Mullion)	#12 Stud (Outer)	#12 Stud (Inner)	#12 Steel (Outer)
	Edge Distance (in.)	1"	2 1/2"	1"	2 1/2"	0.125"	0.125"	0.125"	0.125"
	Embedment (in.)	1 1/2"	1 1/2"	1 1/2"	1 1/2"	0"	1 1/2"	1 1/2"	See Table 2
2 Total Anchors @ 0.75" O.C. Max (Edge Clip Part #Fig. 1)		1000 lbs	1000 lbs	1000 lbs	1000 lbs	1125 lbs	1000 lbs	1000 lbs	1125 lbs
3 Total Anchors @ 1.00" O.C. Max (Intermediate Clip Part #Fig. 2)		1000 lbs	1000 lbs	1000 lbs	1000 lbs	2250 lbs	1000 lbs	1000 lbs	2250 lbs
4 Total Anchors @ 1.75" O.C. Max (Edge Clip Part #Fig. 3)		1000 lbs	1000 lbs	1000 lbs	1000 lbs	3375 lbs	1000 lbs	1000 lbs	3375 lbs

SEE SUBSTRATE PROPERTIES SHEET

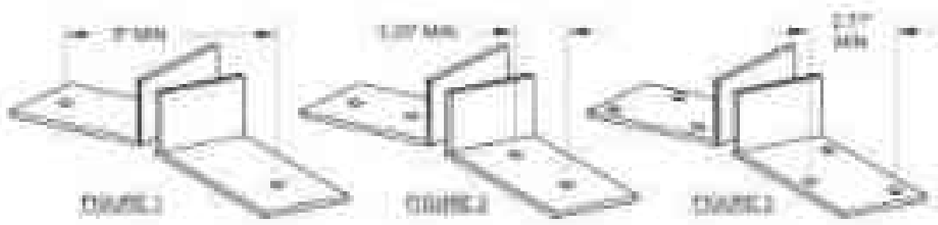
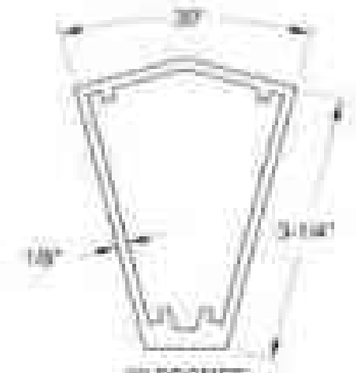


TABLE NOTES:
1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT/UNIFORMLY LOADED CLARIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE FOR EXACT DIMENSIONS, SEE SHEET 3. 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" 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 2.



30 DEGREE
BAY MULLION
SIZES IN ALUMINUM

WINDOOR
WINDOW & DOOR SYSTEMS
2311 FIRPLE COMMERCE BLVD
N. MIAMI, FL 33054
(305) 591-4555

ALUMINUM TUBE MULLIONS, CLIPS & ANCHORS

30 DEGREE BAY CAPACITIES

DRAWN	MW
CHECKED (M)	(MD/DT)
APPROVED (RS)	(RS/DT/EW)
SCALE	NTS
MULLIONS	
SHEET #	3 OF 4
REVISED	10/11/22
	4

ANTHONY LYNN MILLER
LICENSE
No. 58797
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E. #58797

TABLE 1(a)

45 Degree Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement	Opening Dimension																													
	30 in				60 in				75 in				90 in				105 in				120 in				135 in				150 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 Type	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)	Design Pressure (psf)	Anchor Capacity (lbs)
42 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281
48 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281
54 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281
60 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281
66 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281
72 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281
78 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281
84 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281
90 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281
96 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281
102 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281
108 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281
114 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281
120 in	175.0	3,281	175.0	3,281	116.5	3,281	175.0	3,281	100.0	3,281	175.0	3,281	75.0	3,281	175.0	3,281	60.0	3,281	175.0	3,281	50.0	3,281	175.0	3,281	43.0	3,281	175.0	3,281	38.0	3,281	175.0	3,281

TABLE 1(b)

Anchor/Clip Capacity (lbs) when using a 45 Degree Tube Mullion	Substrate	At Concrete				At Hollow Core	Steel		Wood
	Anchor Type	3/16" Dia Self-Drill Titen HD®		1/4" Dia Self-Drill Titen HD®		3/16" Dia Titen HD® Sleeve Anchor	W12 Direct Screw	W16 Direct Screw	W12 Direct Screw
	Edge Distance (in.)	3	2 1/2"	3	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"
	Embedment (in.)	1 3/4"	1 1/2"	1 3/4"	1 1/2"	2"	1 3/4"	1 3/4"	Max Thread
4 Clips Anchored @ 8" o.c. max. (Edge Clip 4" to 8" o.c.)		2,010 lbs	1,840 lbs	2,680 lbs	2,010 lbs	2,680 lbs	1,840 lbs	2,680 lbs	2,680 lbs
3 Clips Anchored @ 12" o.c. max. (Edge Clip 4" to 8" o.c.)		1,500 lbs	1,380 lbs	1,980 lbs	1,500 lbs	1,980 lbs	1,380 lbs	1,980 lbs	1,980 lbs
2 Clips Anchored @ 24" o.c. max. (Edge Clip 4" to 8" o.c.)		990 lbs	990 lbs	990 lbs	990 lbs	990 lbs	990 lbs	990 lbs	990 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1

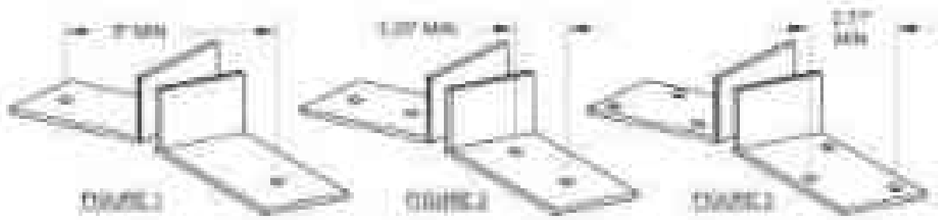
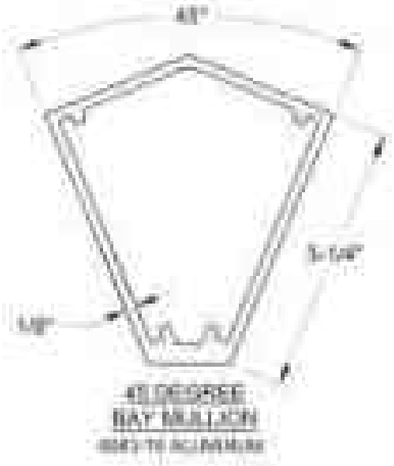


Table Notes:
1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT/UNIFORMLY LOADED CLARIFICATION.

2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE FOR EXACT DIMENSIONS. SEE SHEET 3. 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" (U.N.O.) FROM CLIP EDGE.

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

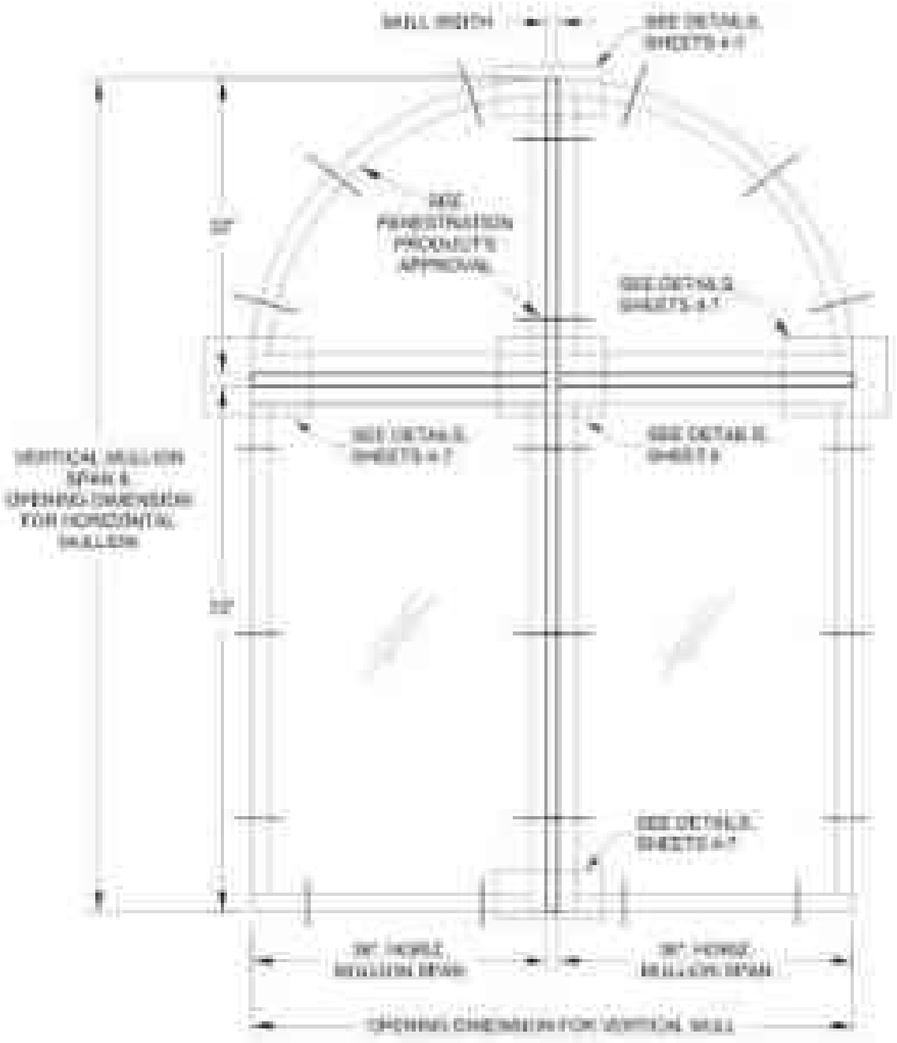
4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 2.



45 DEGREE BAY MULLION
(SEE TO SCALE)

REQUIRED THICKNESS	0.125
ALUMINUM TUBE MULLIONS CLIPPED (JAMB) (RIS ROSETTES)	WALL WP-1
45 DEGREE BAY CAPACITIES	SHEET NO. 3 OF 4
WINDOOR®	MULLION TYPE

ANTHONY LYNN MILLER
LICENSE
No. 58707
10/13/23
STATE OF FLORIDA
PROFESSIONAL ENGINEER
A. LYNN MILLER, P.E., FSE # 58707



EXAMPLE 1: MULTIPLE MULLIONS

THE BUILDING SUBSTRATE IS KNOWN TO BE CMU ON THE JAMBS AND USES A CONCRETE HEADER AND SILL. THE WINDOW FRAME DEPTH IS 2-3/8". THE OPENING REQUIRES A DESIGN PRESSURE OF +50.0/-50.0 PSF.

FOR THE VERTICAL MULLION

1) INITIALLY ASSUMING THAT A 7" WIDE MULLION IS SUITABLE, THE MULLION SPAN IS 52"+72"+1"+1.187" AND THE OPENING DIMENSION IS 36"+36"+7"=79". REFERENCING SHEET 2, THE PORT LOADED MULLION (COLUMN) SHALL BE USED. SCAN THE MULLION TABLES FOR A MULLION THAT IS AT LEAST THE WINDOW FRAME DEPTH OF 2-3/8" AND WILL MEET OR EXCEED THE REQUIRED DESIGN PRESSURE OF +50.0/-50.0 PSF. IF THE TABLE DOES NOT KNOW THE EXACT SIZE, USE THE NEXT LARGER SIZE AVAILABLE.

FROM TABLE 7A, SHEET 14, THE 7" X 4" X .118" MULLION (SPAN = 108", OPENING DIMENSION = 80") MEETS THE DEPTH REQUIRED, HOWEVER THE DESIGN PRESSURE IS ONLY +/-40.3 PSF AND WOULD NOT BE SUITABLE FOR THIS APPLICATION.

FROM TABLE 7DA, SHEET 15, THE 8" X 4" X .250" MULLION (SPAN = 108" /OPENING DIMENSION = 80") HAS A DESIGN PRESSURE OF +/-50.7 PSF WHICH EXCEEDS THE REQUIREMENTS FOR THE OPENING AND MAY BE USED IN THIS APPLICATION. NOTE THE ANCHOR CAPACITY REQUIRED OF 971 LBS.

BECAUSE IT IS NOW KNOWN THAT THE MULLION WILL ADD 8" TO THE WIDTH OF THE MULLED UNIT INSTEAD OF 7", THE ADJUSTED OPENING DIMENSION IS 36"+36"+8"=80". NOT FIT 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 79" DIMENSION (36.625"+36.625"+7"=79").

2) USE TABLE 12B TO FIND THE ANCHOR TYPE, ANCHOR QUANTITY AND CLIP TYPE REQUIRED FOR THE CONCRETE SUBSTRATE. IN THIS EXAMPLE, ASSUME THE FIGURED 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 (4) 3/16" ULTRACON® ANCHORS AT AN EDGE DISTANCE OF 3-1/2" GIVES AN ANCHOR CAPACITY OF 1368 LBS WHICH IS GREATER AND THEREFORE SUITABLE FOR THE REQUIRED ANCHOR CAPACITY OF 971 LBS.

FOR THE HORIZONTAL MULLIONS

BECAUSE THE VERTICAL MULL WILL BE A 2" X 4" X .250" MULLION, IN THIS EXAMPLE WE WILL MATCH THE HORIZONTAL AND VERTICAL MULLIONS. ALTERNATIVELY, ANOTHER MULLION TYPE COULD BE CHOSEN.

1) THE MULLION SPAN IS 28" AND THE OPENING DIMENSION IS 52"+72"+1" = 108". REFERENCING SHEET 3, THE UNIFORMLY LOADED MULLION (COLUMN) MAY BE USED. FROM TABLE 12A, SHEET 18, THE 2" X 4" X .250" MULLION (@ SPAN = 40", OPENING DIMENSION = 120") HAS A DESIGN PRESSURE OF +/-70.0 PSF WHICH EXCEEDS THE REQUIREMENTS FOR THE OPENING AND MAY BE USED IN THIS APPLICATION. BOTH THE ANCHOR CAPACITY REQUIRED OF 971 LBS

2) USE TABLE 12B 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 SILL CLIPS WITH (4) 3/16" ULTRACON® ANCHORS AT AN EDGE DISTANCE OF 3-1/2" GIVES AN ANCHOR CAPACITY OF 760 LBS WHICH IS GREATER AND THEREFORE SUITABLE FOR THE REQUIRED ANCHOR CAPACITY OF 631 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 631 LBS. TABLE 12B FOR THE U-CLIP SHOWS THE ANCHOR CAPACITY IS 800 LBS WHEN USING 2 ANCHORS, WHICH IS GREATER AND THEREFORE SUITABLE. FOR THE REQUIRED ANCHOR CAPACITY REQUIREMENT OF 631 LBS, THE ANCHOR TYPE IS A #12 STEEL SCREW.

FROM THE ABOVE STEPS, OUR MULLION DESIGN PRESSURE IS:
+/-50.7 PSF FROM THE VERTICAL MULLION
+/-70.0 PSF FROM THE 28" HORIZONTAL MULLION ATTACHING TO CMU
+/-70.0 PSF FROM THE 28" HORIZONTAL MULLION ATTACHING TO THE VERTICAL MULLION INTERSECTION
THE LOWEST DESIGN PRESSURE IS +/-50.7 PSF AND WOULD APPLY TO ALL OF THE MULLIONS.

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

NO.	DESCRIPTION	DATE	BY
1	REVISED	11/11/22	

RECHARGE THIS SHEET

WINDOOR®
WINDOW INSTITUTE OF NORTH AMERICA
330 PFINGSTEN ROAD, SUITE 450
NORTHBROOK, IL 60062
T: 847.480.9538
F: 847.480.9282
WWW.WINDOOR.COM

DRAWN BY: (MM) DATE: 04/07/23
JENS ROSEWSKI

ALUMINUM TUBE MULLIONS CLOSE TO EDGE

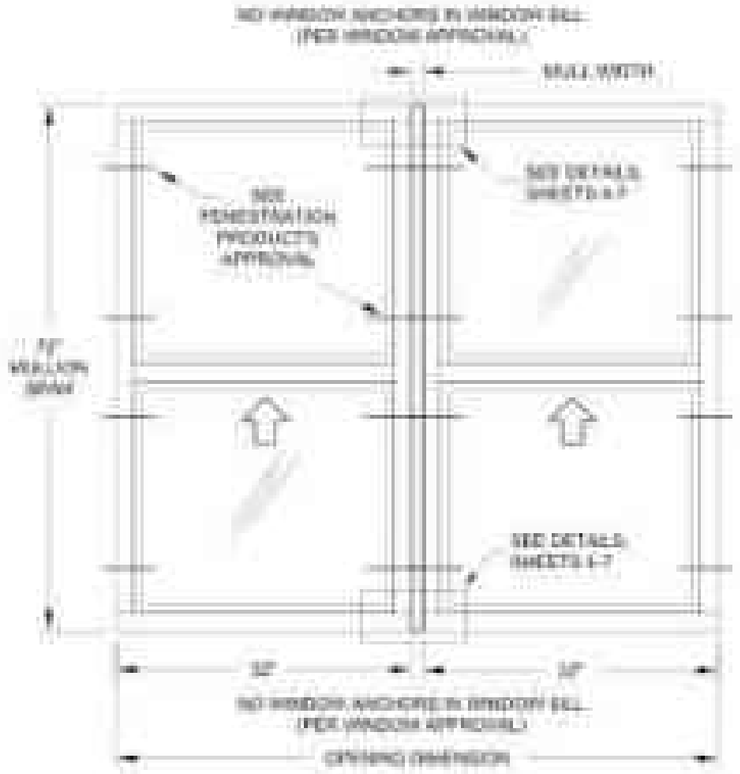
EXAMPLE 1

WALL WP-1

SHEET NO. 8 OF 8

ANTHONY LYNN MILLER
LICENSE
No. 56707
10/13/23
STATE OF
PENNSYLVANIA
PROFESSIONAL ENGINEER

A. LYNN MILLER, P.E. - PSEA 56707



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"+32+1" = 97". REFERENCING SHEET 2, THE POINT LOADED MULLION COLUMN MUST BE USED. 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 1A, SHEET 13, THE 1" X 3" X 1/8" MULLION (SPAN = 72", OPENING DIMENSION = 78") MEETS THE DEPTH REQUIRED. HOWEVER THE DESIGN PRESSURE IS ONLY +/-44.7 PSF AND WOULD NOT BE SUITABLE FOR THIS APPLICATION.

FROM TABLE 7A, SHEET 34, THE 1" X 4" X 1/8" MULLION (SPAN = 72", OPENING DIMENSION = 78") HAS A DESIGN PRESSURE OF +/-97.0 PSF WHICH EXCEEDS THE REQUIREMENTS FOR THE OPENING AND MAY BE USED IN THIS APPLICATION. NOTE THE ANCHOR CAPACITY REQUIRED OF 899 LBS.

2) USE TABLE 9B TO FIND THE ANCHOR TYPE, ANCHOR QUANTITY AND CLIP TYPE REQUIRED FOR THE WOOD SUBSTRATE. BOTH THE STANDARD CLIP WITH (4) #12 ANCHORS AND THE 2X3 ANGLE CLIPS WITH (4) #12 ANCHORS HAVE A CAPACITY OF 900 LBS. THOUGH EITHER ONE COULD BE USED, THE STANDARD CLIP IS EASIEST TO INSTALL.

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 ENGINEERED 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 97.0 PSF WITH AN ANCHOR CAPACITY OF 899 LBS. ALTERNATIVELY, THE ANCHOR CAPACITY ADJUSTMENT FORMULA COULD HAVE BEEN USED TO CALCULATE THE ANCHOR CAPACITY REQUIRED FOR THE EXACT DESIGN PRESSURE OF 60 PSF.

$$(899\ \text{PSF}) \times \left(\frac{882\ \text{LBS}}{97.0\ \text{PSF}}\right) = 547\ \text{LBS}$$

547 LBS. (I.E. YOU COULD USE A LOWER CAPACITY ANCHORAGE OPTION OF 547 LBS. SINCE YOU ONLY REQUIRE A DESIGN PRESSURE OF 60 PSF.)

4	07/24/13	REVISIONS PER CHANGES THIS SHEET	RS
3	07/24/13	REVISIONS PER CHANGES THIS SHEET	RS
2	07/24/13	REVISIONS PER CHANGES THIS SHEET	RS
1	07/24/13	REVISIONS PER CHANGES THIS SHEET	RS
	07/24/13	ISSUED FOR PERMIT	RS

WINDOOR®
ENGINEERED SYSTEMS
ENGINEERED FOR PERFORMANCE
ALUMINUM TUBE MULLION SYSTEM
EXAMPLE 2

BRITTANY LYNN MILLER
LICENSE
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