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Product Approval
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FL #	FL21144-R5								
Application Type	Revision								
Code Version	2023								
Application Status	Approved								
Comments									
Archived	☐								
Product Manufacturer	WinDoor Inc.								
Address/Phone/Email	104 Triple Diamond Blvd N Venice, FL 34275 (941) 486-0100 jrosowski@pgtindustries.com								
Authorized Signature	Jens Rosowski jrosowski@pgtindustries.com								
Technical Representative	Lynn Miller, P.E.								
Address/Phone/Email	1070 Technology Dr N Venice, FL 34275 (941) 486-0100 Ext 21142 lmiller@pgtindustries.com								
Quality Assurance Representative									
Address/Phone/Email									
Category	Windows								
Subcategory	Mullions								
Compliance Method	Evaluation Report from a Florida Registered Architect or a Licensed Florida Professional Engineer ☐ Evaluation Report - Hardcopy Received								
Florida Engineer or Architect Name who developed the Evaluation Report	A. Lynn Miller, P.E.								
Florida License	PE-58705								
Quality Assurance Entity	Keystone Certifications, Inc.								
Quality Assurance Contract Expiration Date	12/31/2032								
Validated By	Steven M. Urlich, PE ☒ Validation Checklist - Hardcopy Received								
Certificate of Independence	FL21144_R5_COI_Cert of Independence.pdf								
Referenced Standard and Year (of Standard)	<table> <thead> <tr> <th>Standard</th><th>Year</th></tr> </thead> <tbody> <tr> <td>TAS 201</td><td>1994</td></tr> <tr> <td>TAS 202</td><td>1994</td></tr> <tr> <td>TAS 203</td><td>1994</td></tr> </tbody> </table>	Standard	Year	TAS 201	1994	TAS 202	1994	TAS 203	1994
Standard	Year								
TAS 201	1994								
TAS 202	1994								
TAS 203	1994								
Equivalence of Product Standards Certified By									
Sections from the Code									

Product Approval Method

Method 1 Option D

Date Submitted

10/20/2023

Date Validated

10/20/2023

Date Pending FBC Approval

11/01/2023

Date Approved

12/13/2023

Summary of Products

FL #	Model, Number or Name	Description
21144.1	Estate Tube Mullions	HVHZ, Large Missile Resistant, Aluminum Mullions
Limits of Use Approved for use in HVHZ: Yes Approved for use outside HVHZ: Yes Impact Resistant: Yes Design Pressure: N/A Other: Please see the enclosed documents for product performance information, anchorage details, and anchor type, size, and spacing information.		Installation Instructions FL21144 R5 II WinDoor Estate Mullions - REV A.pdf Verified By: A. Lynn Miller, P.E. PE-58705 Created by Independent Third Party: No Evaluation Reports FL21144 R5 AE WinDoor Estate Mullions Eng Eval - REV A.pdf Created by Independent Third Party: No
21144.2	Legacy Tube Mullions	HVHZ, Large Missile Resistant, Aluminum w/wo Thermal Break Mullions
Limits of Use Approved for use in HVHZ: Yes Approved for use outside HVHZ: Yes Impact Resistant: Yes Design Pressure: N/A Other: Please see the enclosed documents for product performance information, anchorage details, and anchor type, size, and spacing information.		Installation Instructions FL21144 R5 II WinDoor Legacy Mullions - REV A.pdf Verified By: A. Lynn Miller, P.E. PE-58705 Created by Independent Third Party: No Evaluation Reports FL21144 R5 AE WinDoor Legacy Mullions Eng Eval - REV A.pdf Created by Independent Third Party: No

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Product Approval Accepts:



Credit Card
Safe

securityMETRICS

Engineering Evaluation Report – MULL2-042423

Prepared by:

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

Manufacturer:

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

Product Description:

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

Compliance:

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

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

Supporting Technical Documentation:

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

2. Test Reports:

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

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

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

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

Limitations and Conditions of use:

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



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

FLORIDA PRODUCT APPROVAL #21144

DESIGN PRESSURE RATING

SEE TABLES 1A - 14A

IMPACT RATING

RATED FOR LARGE & SMALL
MISSILE IMPACT RESISTANCE

1) MULLIONS AND CLIPS HAVE BEEN DESIGNED & TESTED TO COMPLY WITH THE REQUIREMENTS OF THE FLORIDA BUILDING CODE, AND ARE APPROVED FOR IMPACT AND NON-IMPACT APPLICATIONS IN THE HVHZ. MULLIONS ARE ONLY TO BE USED WITH THE MANUFACTURER'S 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 BEST INSTALLATION METHOD. OPTIONAL 1X OR 2X WOOD BUCKS IF USED, MUST BE ANCHORED PROPERLY TO TRANSFER LOADS AND ARE TO BE DESIGNED BY OTHERS.

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

4) THE ANCHORAGE METHODS SHOWN HAVE BEEN DESIGNED TO RESIST THE WINDLOADS CORRESPONDING TO THE REQUIRED DESIGN PRESSURE. MULLIONS ARE CALCULATED TO DEFLECT NO MORE THAN L/180. THE 1/3 STRESS INCREASE WAS NOT USED IN THIS ANCHOR EVALUATION. THE 1.6 LOAD DURATION FACTOR WAS USED FOR THE EVALUATION OF WOOD SCREWS.

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

6) USE THE COMBINED WIDTH OR HEIGHT OF ONLY TWO ADJACENT 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 BEYOND WALL DRESSING OR STUCCO. WOOD BUCKS 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) REFERENCE: DEWALT ULTRACON+, DEWALT/ELCO AGGRE-GATOR & CRETEFLEX NOA'S.

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

10) SUBSTRATES: CONCRETE SHALL CONFORM TO ACI 301 SPECIFICATIONS. HOLLOW AND GROUT-FILLED CONCRETE BLOCK UNIT (CMU) SHALL CONFORM TO ASTM C-90. WOOD SHALL BE SOUTHERN YELLOW PINE WITH AN SG OF 0.55. ALUMINUM SHALL BE 6063-T5 AND BE A MINIMUM OF .125" THICK. STEEL STUDS TO BE A MINIMUM GRADE 33 AND 0.045" THICK (18 GAUGE). STRUCTURAL STEEL TO BE AT LEAST 0.125" THICK AND A36. ALL ANCHORS INTO METAL SHALL EXTEND AT LEAST 3 SCREW THREADS BEYOND THE MATERIAL. #12 & #14 ANCHORS INTO WOOD MAY BE STEEL, 18-8 S.S. OR 410 S.S.

ANCHOR CAPACITY ADJUSTMENT FORMULA:

$$(DP_{REQ}) \times \left(\frac{ANCHOR CAP. FROM TABLE}{MULLION CAP. FROM TABLE} \right) = ANCHOR CAP. REQ.$$

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.

FIGURE 1: MULTIPLE MULLIONS

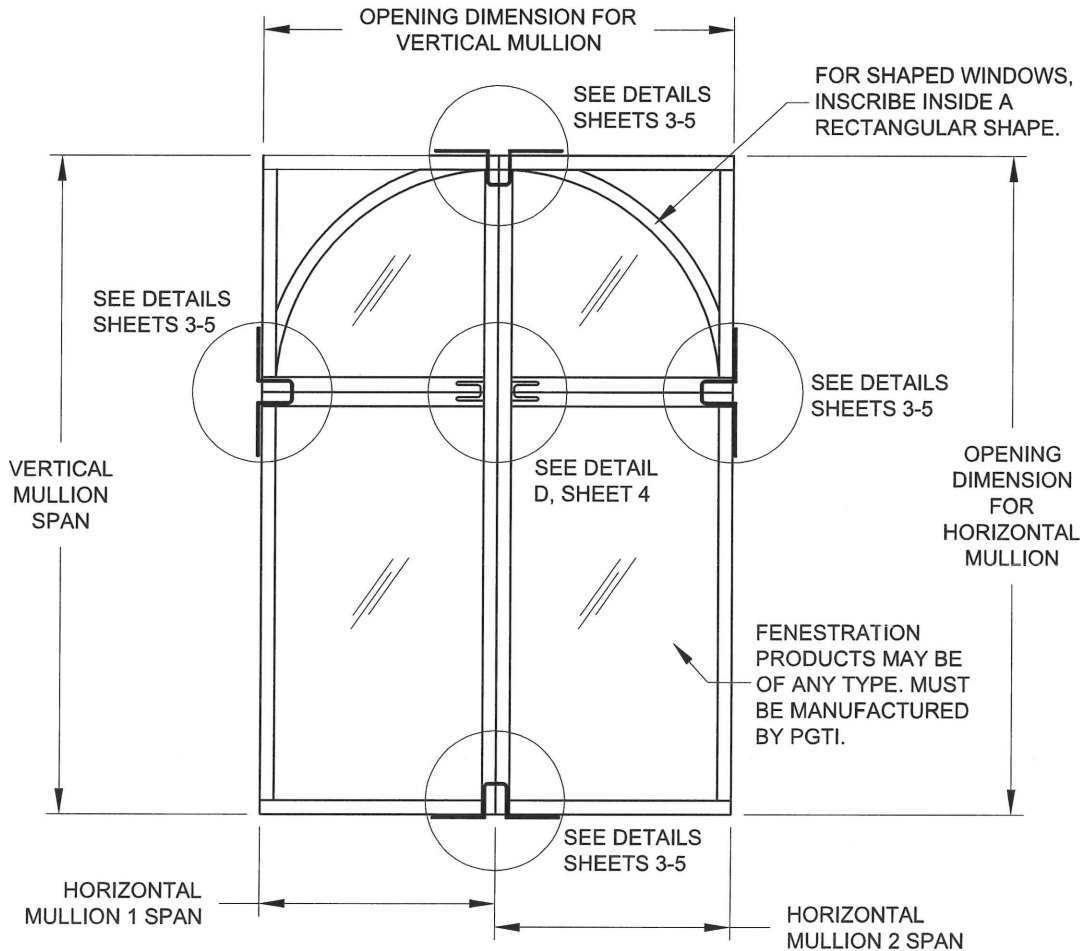
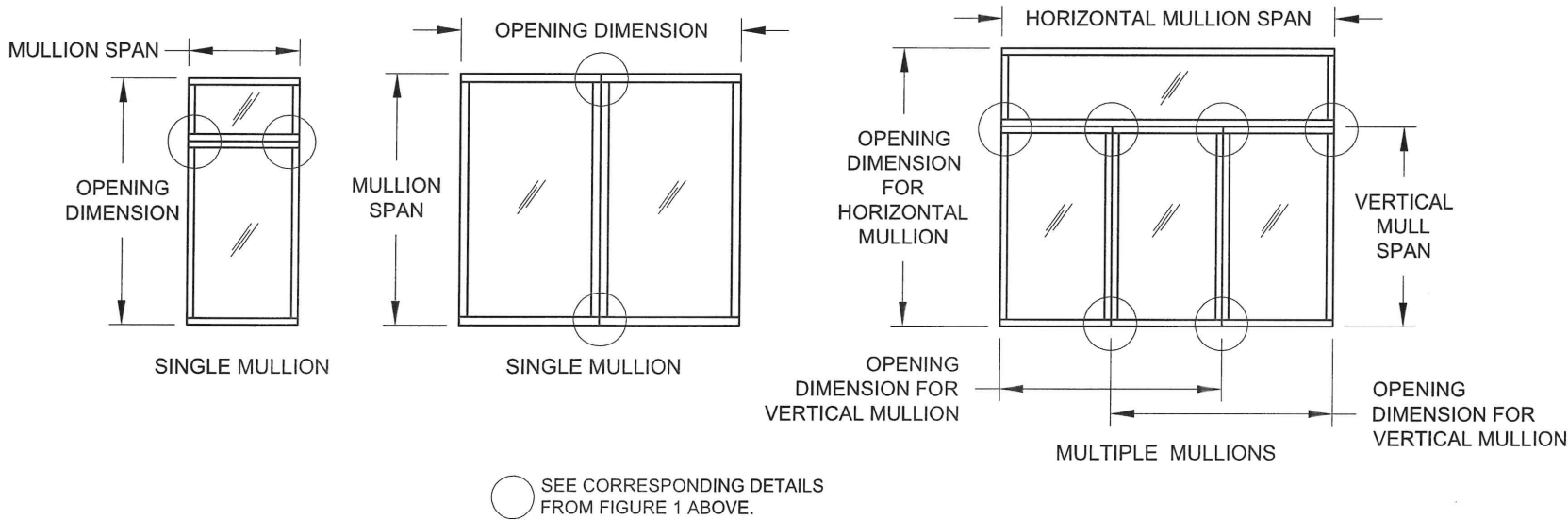


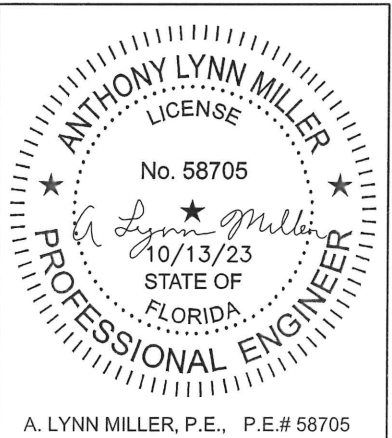
FIGURE 2: ADDITIONAL EXAMPLES OF MULLION CONFIGURATIONS:



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WINDOOR®		PREPARED BY A. LYNN MILLER 1070 TECHNOLOGY DRIVE N. VENICE, FL 34275 (941) 480-1600	
INCORPORATED		REGISTRATION #29296	
104 TRIPLE DIAMOND BLVD. N. VENICE, FL 34275 (407) 481-8400		COPYRIGHT © 2023 WINDOOR, INC., LIMITED LICENSE TO PRINT COPIES FOR PERMITTING.	
ALUMINUM MULLIONS, CLIPPED (LM)		Date	
GENERAL NOTES & ELEVATIONS		By Drawn	JENS ROSOWSKI
MULLS-1		DWG No.	TUBEMULL-2
NTS		1 OF 21	
Scale		Sheet	Rev.
Series	Title	Desc.	



1) DETERMINE THE ALLOWABLE STRESS DESIGN PRESSURE REQUIREMENT (LBS/FT²) FOR THE OPENING USING THE **ASCE-7 STANDARD**.

2) TO FIND THE DESIGN PRESSURE OF THE MULLION, USE TABLES 1A THROUGH 14A. THE MULLION DESIGN PRESSURE OBTAINED SHALL MEET OR EXCEED THE DESIGN PRESSURE REQUIREMENT FOR THE OPENING OBTAINED IN STEP 1. NOTE THAT YOU MUST FIRST DETERMINE WHETHER YOU HAVE A POINT LOADED MULLION OR A UNIFORMLY LOADED MULLION FROM FIGURES 1-4, THIS SHEET.

3) AFTER OBTAINING THE MULLION'S DESIGN PRESSURE, FIND THE VALUE IN THE COLUMN TITLED "ANCHOR CAPACITY REQUIRED (LBS)". THIS VALUE REPRESENTS THE 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 FENESTRATION 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 USED AND TABLE VALUES USED IN A SPECIFIC APPLICATION WHEN USING THIS APPROVAL TO APPLY FOR A PERMIT.

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

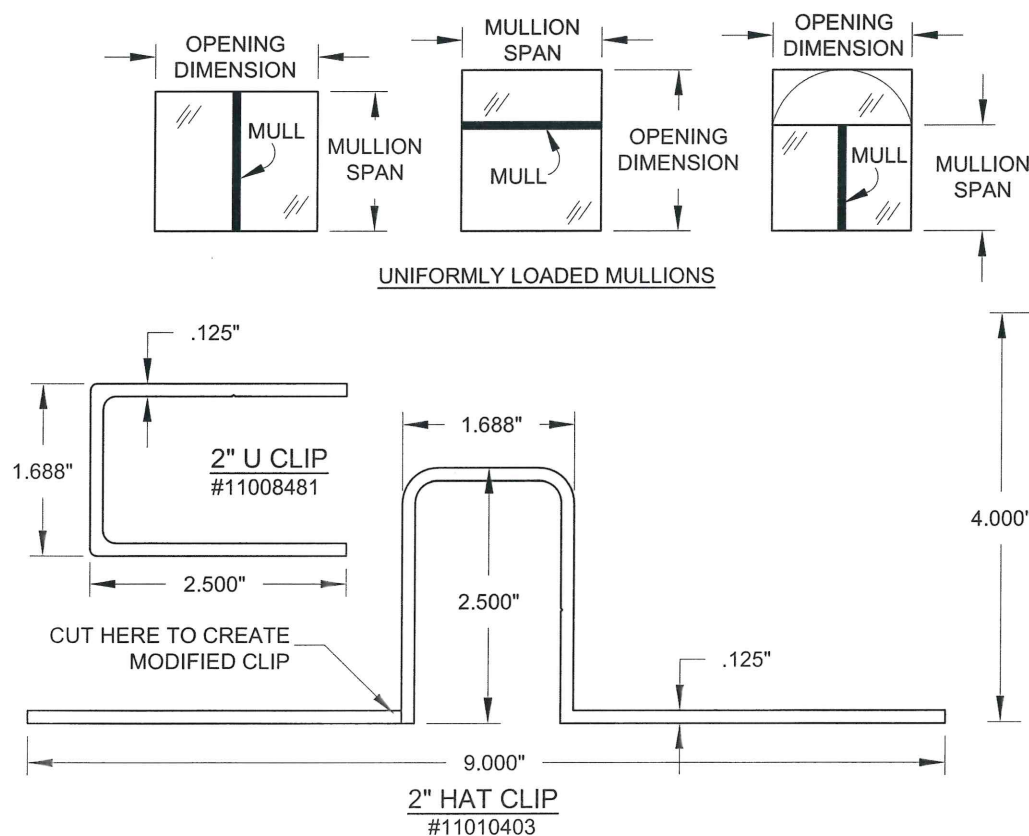
RES 1 - 4:

The diagram illustrates a cross-section of a mullion. The horizontal dimension is labeled 'MULLION SPAN' with arrows indicating the span between two vertical supports. The vertical dimension is labeled 'OPENING DIMENSION' with arrows indicating the height of the opening. The mullion is shown as a vertical line with a semi-circular top. A horizontal line across the top of the mullion is labeled 'MULL' with arrows pointing to it. A vertical line from the center of the mullion to the bottom is labeled 'POINT LOAD' with an arrow pointing to it. The entire assembly is labeled 'POINT LOADED MULLION' at the bottom.

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

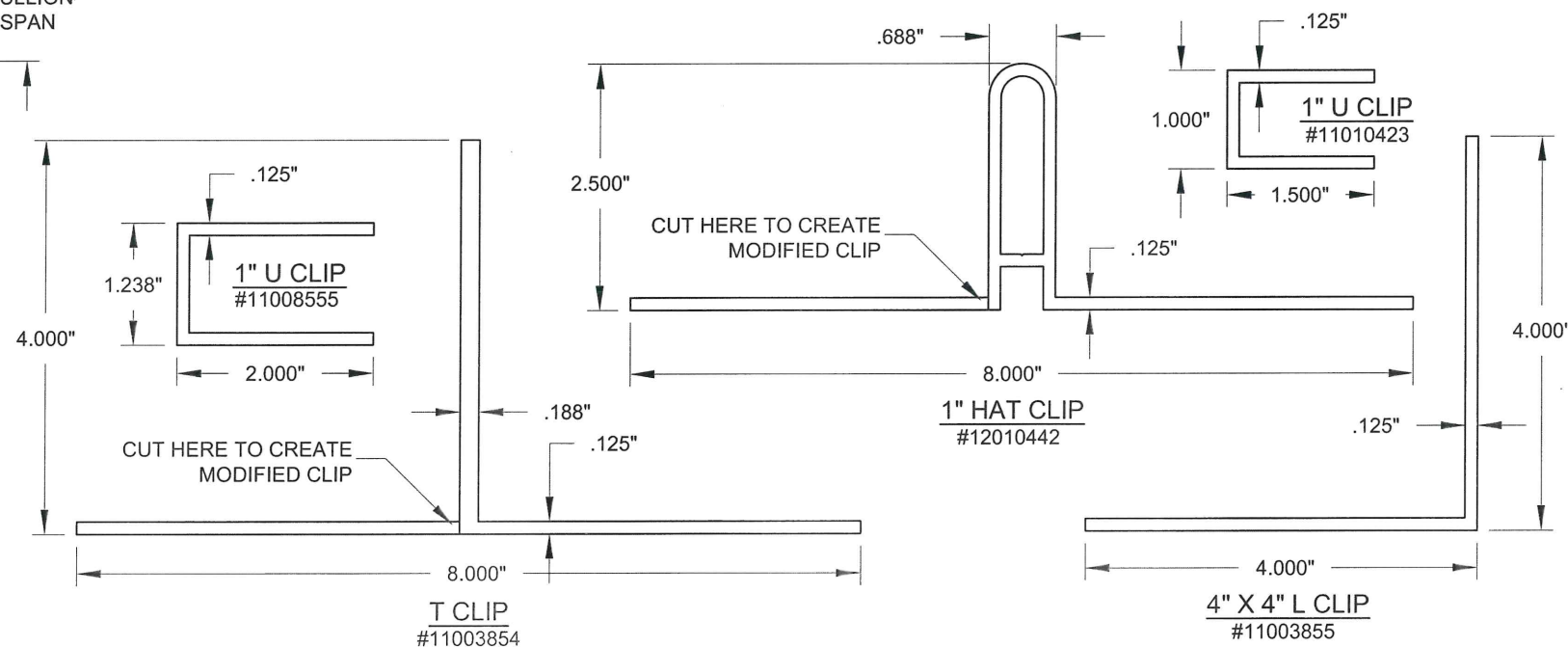
JOINT LOADED MULLION

UNIFORMLY LOADED MULLIONS

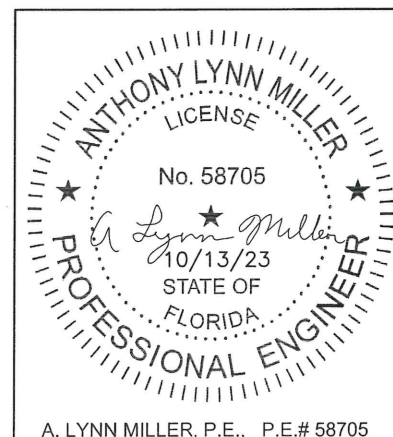


Sheet	Mullion Description	Typ. Frame Width	Mullion Part #	Mullion Clip Description	Mullion Clip Part # - Fab #	U Clip Part # - Fab #
6	2" x 4" x 3/8" Tube Mullion	3-1/4"	12006672	2" Hat Clip	11010403-15062	11008481-15062
7	2" x 6" x 3/8" Tube Mullion	4-9/16"	12010243	2" Hat Clip	11010403-15062	11008481-15062
8	2" x 8" x 3/8" Tube Mullion	up to 7-5/8"	12010244	2" Hat Clip	11010403-15062	11008481-15062
9	8", 135° Tube Mullion	up to 7-5/8"	12003544	L Clip	11003855-3855C	N/A
10	2" x 4-1/8" Thermally-Broken Tube Mullion	3-1/4"	13902A06 Opt. Adapter: 11055404& 11055405	2" Hat Clip	11010403-15337	11008481-15062
11	1-1/2" x 4-1/4" Thermally-Broken Tube Mullion w/Pressure Bar	3-1/4"	139020A4 Pressure Bar: 11049672 & 11049673	T Clip	11003854-15178	11010245-15316
12	3-5/8" Thermally-Broken, HD, 135° Tube Mullion	3-1/4"	1309060A5	L Clip	11003855-15172	N/A
13	1-1/2" x 5-1/2" Thermally-Broken Tube Mullion w/Pressure Bar	3-1/4" or 4-9/16"	139AMU12 Opt. Pressure Bar: 11045530 & 11045625 Opt. Adaptor: 11007139 & 11007138	T Clip	11003854-15173	11010245-15283
14	5-3/8" Thermally-Broken, 135° Tube Mullion	4-9/16"	1390A345 Pressure Bar: 12010433 & 11010432	L Clip	11003855-15132 (3-5/8") 11003855-15172 (1-1/16")	N/A
15	5-3/8" Thermally-Broken, Adjustable Bay Mullion	up to 4-9/16"	139AMU56 & 139AMU78	L Clip	11003855-15132	N/A
16	2" x 4-1/4" Thermally-Broken Tube Mullion w/Drip Cap	3-1/4"	13902A06 Opt. Pressure Bar: 11055404 & 11055405	2" Hat Clip	11010403-15337 (REV E)	11008481-15062
17	2" x 5-3/4" Thermally-Broken Tube Mullion w/Drip Cap	4-9/16"	13900A01	T Clip	11003854-15133	N/A
18	1-1/4" x 4" Thermally-Broken Tube Mullion	3-1/4"	13010416	1" Hat Clip	12010442-15305	11010423-15306
19	2" x 5-5/8" Thermally-Broken Tube Mullion	4-9/16"	13010424	T Clip	11003854-15316	11010245-15316

ALL MULLIONS & CLIPS ARE 6063-T6 ALUMINUM.



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ALUMINUM MULLIONS, CLIPPED (LM) Date		By Drawn		JENS ROSOWSKI Rev.	
INSTRUCTIONS & CLIP INFO Scale		2 OF 21 sheet		TUBEMULL-2 DWG	
MULLS-1 Notes		NTS Notes		TUBEMULL-2 DWG	



TYP. ANCHOR
PER SUBSTRATE,
SEE TABLES 1B-14B

OPTIONAL 1X
WOOD BUCKSTRIP

2" HAT CLIP SHOWN.
OTHER CLIP STYLES
SIMILAR, SEE SHEET 2.

EDGE DISTANCE
FOR MASONRY
ANCHORS

EDGE DISTANCE FOR
MASONRY
ANCHORS

EXTERIOR

SUBSTRATE
WOOD, STONE,
MASS CONCRETE
APPROPRIATE

2" HAT CLIP SHOWN.
-OTHER CLIP STYLES
SIMILAR, SEE SHEET 2.

EDGE DISTANCE — FOR MASONRY ANCHORS

SUBSTRATE MAY BE
WOOD, STEEL, ALUM OR
MASONRY. USE
APPROPRIATE ANCHORS.

TYP. ANCHOR
— PER SUBSTRATE,
SEE TABLES 1B-14B

BUCKSTRIP
ATTACHMENT
BY OTHERS,
SEE NOTE 2,
SHEET 1.

EMBEDMENT

MIN 2.7 KSI CONCRETE OR CMU

FRONT VIEW

4) FOR MASONRY APPLICATIONS, USE ONLY DEWALT ULTRA CON, DEWALT ULTRA CON+, ELCO 1/4" AGGREGATOR OR ELCO CRETEFLEX MASONRY ANCHORS AS LISTED IN TABLES 1B-14B.

TO MASONRY STRUCTURE

BUCKSTRIP NOTCHED TO PROVIDE CLEARANCE FOR MULL CLIP.

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

BUCKSTRIP AND ATTACHMENT BY OTHERS, SEE NOTE 1, SHEET 1.

MIN 2.7 KSI CONCRETE OR CMU

T CLIP SHOWN. OTHER CLIP STYLES SIMILAR, SEE SHEET 2.

TYP. ANCHOR PER SUBSTRATE, SEE TABLES 1B-14B

EDGE DISTANCE FOR MASONRY ANCHORS

EDGE DISTANCE FOR MASONRY ANCHORS

EXTERIOR

BUCKSTRIP AND ATTACHMENT BY OTHERS, SEE NOTE 2, SHEET 1.

BUCKSTRIP
AND
ATTACHMENT
BY OTHERS,
SEE NOTE 1,
SHEET 1.

BUCKSTRIP
NOTCHED TO
PROVIDE
CLEARANCE
FOR MULL
CLIP.

MIN 2.7 KSI
CONCRETE
OR CMU

T CLIP SHOWN. OTHER
CLIP STYLES SIMILAR,
SEE SHEET 2.

TYP. ANCHOR
— PER SUBSTRATE,
SEE TABLES 1B-14B

EDGE DISTANCE
— FOR MASONRY
ANCHORS

EXTERIOR

EDGE DISTANCE FOR MASONRY ANCHORS

BUCKSTRIP
AND
ATTACHMENT
BY OTHERS,
SEE NOTE 2,
SHEET 1.

TYP. ANCHOR
PER SUBSTRATE,
SEE TABLES 1B-14B

EMBEDMENT

MIN 2.7 KSI CONCRETE OR CMU

FRONT VIEW

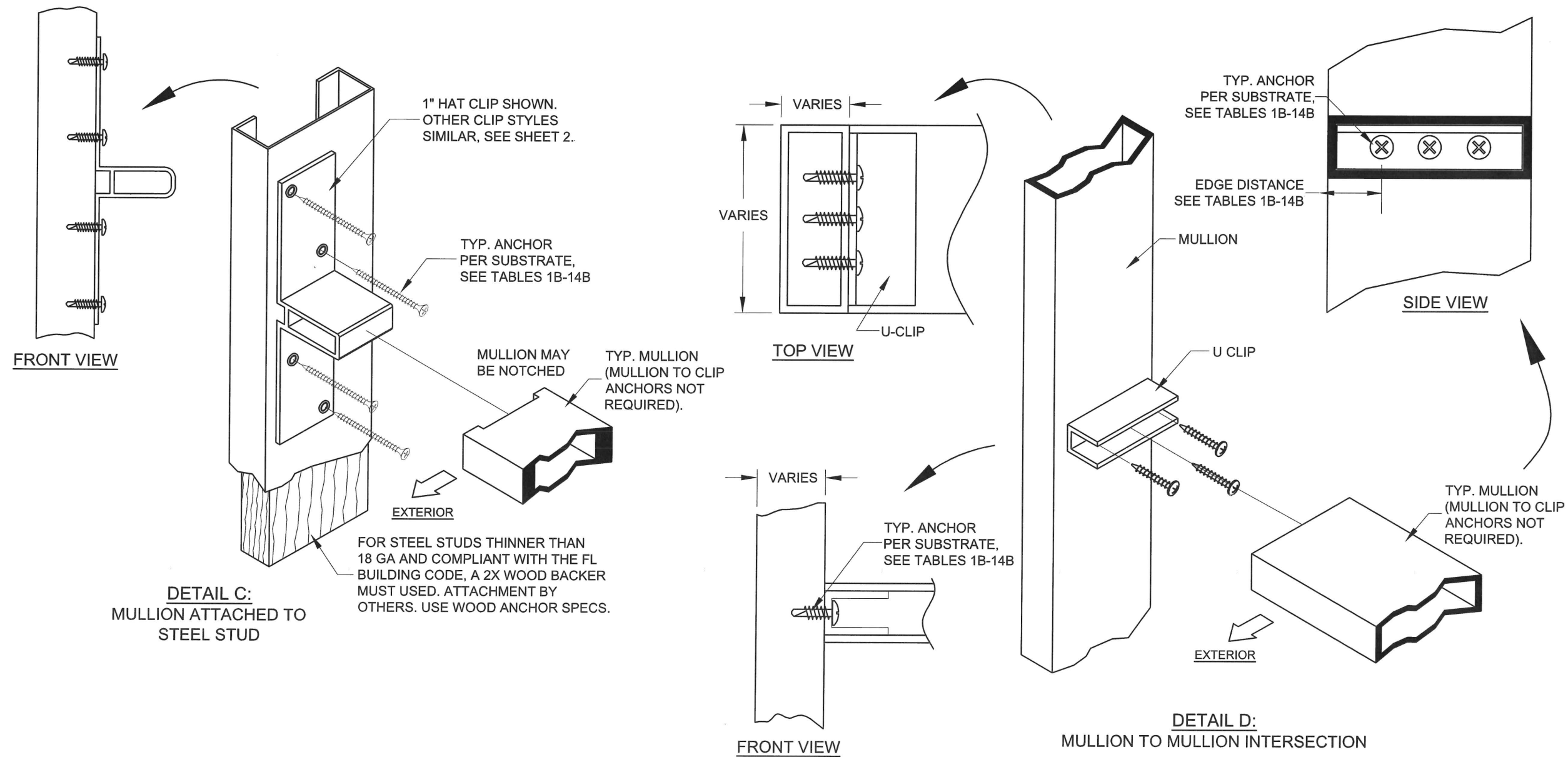
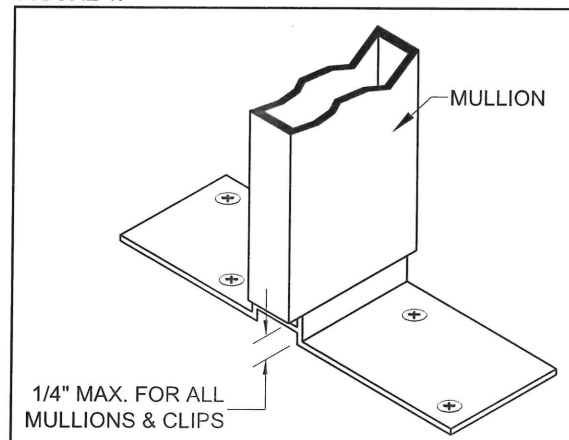


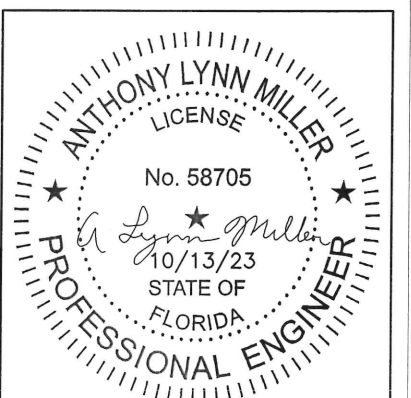
FIGURE 1:



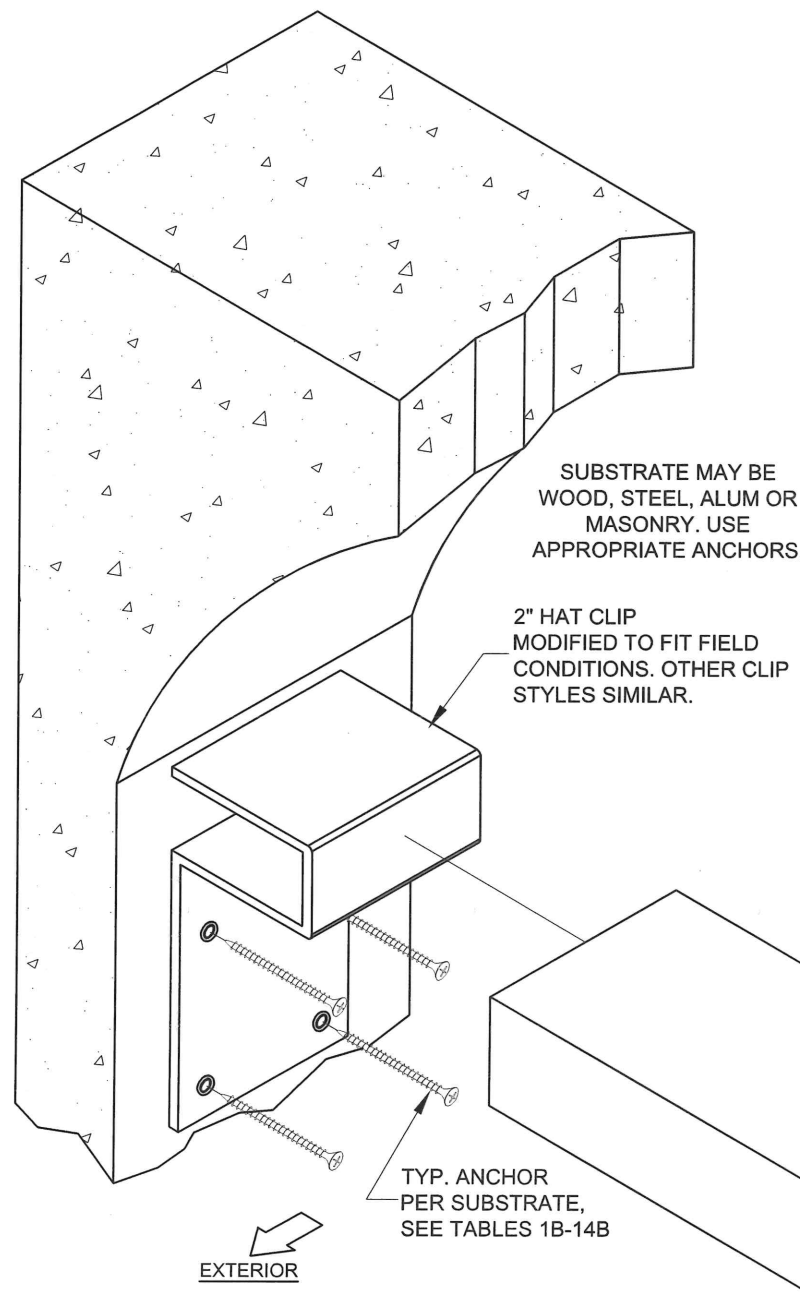
INSTALLATION NOTES:

- 1) ANCHOR EMBEDMENT TO SUBSTRATE SHALL BE BEYOND WALL DRESSING OR STUCCO. SUBSTRATE MAY VARY FROM DETAILS, SEE TABLES 1B-14B FOR SUBSTRATE PROPERTIES.
- 2) QUANTITY OF ANCHORS, MULLION TYPES AND MULLION CLIP TYPES AND STYLES SHOWN ABOVE ARE FOR PICTORIAL REPRESENTATION ONLY. BECAUSE THE ANCHOR CAPACITY IS BASED PARTLY ON THE ANCHOR TO ANCHOR DISTANCE, THE CORRECT QUANTITY AND LOCATION OF ANCHORS MUST BE FOLLOWED, REFER TO THE TABLES ON THE FOLLOWING SHEETS.
- 3) MULLIONS MAY BE INSTALLED HORIZONTALLY OR VERTICALLY UNLESS OTHERWISE SPECIFIED. L CLIPS, IF USED, MUST BE INSTALLED IN PAIRS AND PULLED AGAINST THE MULLION'S INSIDE WALL FOR A SECURE FIT.
- 4) FOR MASONRY APPLICATIONS, USE ONLY DEWALT ULTRAICON, DEWALT ULTRAICON+, ELCO 1/4" AGGREGATOR OR ELCO CRETEFLEX MASONRY ANCHORS AS LISTED IN TABLES 1B-14B.

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WINDOOR [®] INCORPORATED 104 TRIPLE DIAMOND BLVD. N. VENICE, FL 34275 (407) 481-8400		JENS ROSOWSKI		TUBEMULL-2	
INSTALLATION INSTRUCTIONS		4 OF 21		MULLS-1	
NTS		Scale		Sheet	
Series		Title		Desc.	

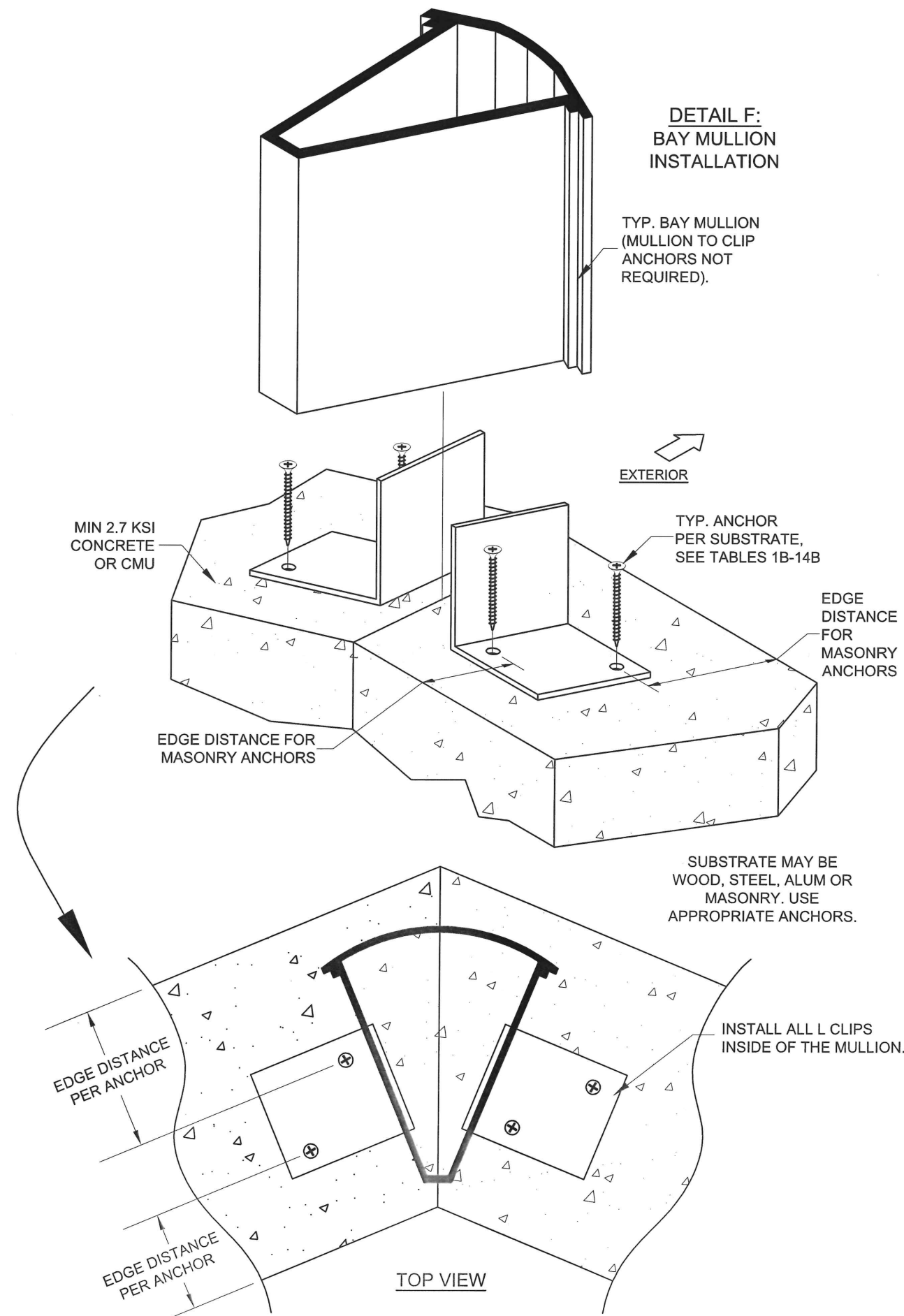
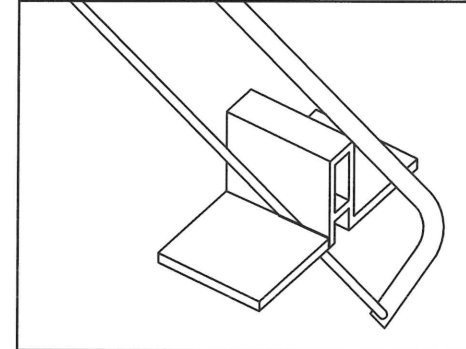


A. LYNN MILLER, P.E., P.E.# 58705



DETAIL E:
OPTIONAL MODIFIED
MULLION CLIP

MULLION CLIP TO BE MODIFIED IN-FIELD:



DETAIL F:
BAY MULLION
INSTALLATION

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

EXTERIOR

TYP. ANCHOR
PER SUBSTRATE,
SEE TABLES 1B-14B

EDGE
DISTANCE
FOR
MASONRY
ANCHORS

SUBSTRATE MAY BE
WOOD, STEEL, ALUM OR
MASONRY. USE
APPROPRIATE ANCHORS.

INSTALL ALL L CLIPS
INSIDE OF THE MULLION.

INSTALLATION NOTES:

- 1) ANCHOR EMBEDMENT TO SUBSTRATE SHALL BE BEYOND WALL DRESSING OR STUCCO. SUBSTRATE MAY VARY FROM DETAILS, SEE TABLES 1B-14B FOR SUBSTRATE PROPERTIES.
- 2) QUANTITY OF ANCHORS, MULLION TYPES AND MULLION CLIP TYPES AND STYLES SHOWN ABOVE ARE FOR PICTORIAL REPRESENTATION ONLY. BECAUSE THE ANCHOR CAPACITY IS BASED PARTLY ON THE ANCHOR TO ANCHOR DISTANCE, THE CORRECT QUANTITY AND LOCATION OF ANCHORS MUST BE FOLLOWED, REFER TO THE TABLES ON THE FOLLOWING SHEETS.
- 3) MULLIONS MAY BE INSTALLED HORIZONTALLY OR VERTICALLY UNLESS OTHERWISE SPECIFIED. L CLIPS, IF USED, MUST BE INSTALLED IN PAIRS AND PULLED AGAINST THE MULLION'S INSIDE WALL FOR A SECURE FIT.
- 4) FOR MASONRY APPLICATIONS, USE ONLY DEWALT ULTRACON, DEWALT ULTRACON+, ELCO 1/4" AGGREGATOR OR ELCO CRETEFLEX MASONRY ANCHORS AS LISTED IN TABLES 1B-14B.

PREPARED BY A. LYNN MILLER 1070 TECHNOLOGY DRIVE N. VENICE, FL 34275 (941) 480-1600		REGISTRATION #29296 COPYRIGHT © 2023 WINDOOR, INC., LIMITED LICENSE TO PRINT COPIES FOR PERMITTING.	
WINDOOR® INCORPORATED 104 TRIPLE DIAMOND BLVD. N. VENICE, FL 34275 (407) 481-8400		ALUMINUM MULLIONS, CLIPPED (LM)	
INSTALLATION INSTRUCTIONS		JENS ROSOWSKI	
MULLS-1		TUBEMULL-2	
5 OF 21		5 OF 21	
NTS		NTS	
Scale		Scale	
Sheet		Sheet	
Series		Series	
Title		Title	
Desc.		Desc.	

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

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

TABLE 1A:

2" x 4" x 3/8" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																																			
		50 in				60 in				80 in				100 in				120 in				140 in				160 in				180 in				200 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 Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)				
Mullion Span	42 in	150.0	547	150.0	384	150.0	656	150.0	422	150.0	875	150.0	458	150.0	1094	150.0	459	150.0	1313	150.0	459	150.0	1531	150.0	459	150.0	1750	150.0	459	150.0	1969	150.0	459	150.0	2188	150.0	459
	48 in	150.0	625	150.0	462	150.0	750	150.0	516	150.0	1000	150.0	583	150.0	1250	150.0	600	150.0	1500	150.0	600	150.0	1750	150.0	600	150.0	2000	150.0	600	150.0	2250	150.0	600	150.0	2500	150.0	600
	50.625 in	150.0	659	150.0	496	150.0	791	150.0	557	150.0	1055	150.0	638	150.0	1318	150.0	667	150.0	1582	150.0	667	150.0	1846	150.0	667	150.0	2109	150.0	667	150.0	2373	150.0	667	150.0	2637	150.0	667
	54 in	150.0	703	150.0	540	150.0	844	150.0	609	150.0	1125	150.0	708	150.0	1406	150.0	755	150.0	1688	150.0	759	150.0	1969	150.0	759	150.0	2250	150.0	759	150.0	2531	150.0	759	150.0	2813	150.0	759
	60 in	150.0	781	150.0	618	150.0	938	150.0	703	150.0	1250	150.0	833	150.0	1563	150.0	911	150.0	1875	150.0	938	150.0	2188	150.0	938	150.0	2500	150.0	938	150.0	2813	150.0	938	150.0	3125	150.0	938
	63 in	150.0	820	150.0	658	150.0	984	150.0	750	150.0	1313	150.0	896	150.0	1641	150.0	990	150.0	1969	150.0	1031	150.0	2297	150.0	1034	150.0	2625	150.0	1034	150.0	2953	150.0	1034	139.3	3047	150.0	1034
	66 in	150.0	859	150.0	697	150.0	1031	150.0	797	150.0	1375	150.0	958	150.0	1719	150.0	1068	150.0	2063	150.0	1125	150.0	2406	150.0	1134	150.0	2750	150.0	1134	134.6	2776	150.0	1134	121.1	2776	150.0	1134
	72 in	150.0	938	150.0	775	150.0	1125	150.0	891	150.0	1500	150.0	1083	150.0	1875	150.0	1224	150.0	2250	150.0	1313	133.3	2333	150.0	1349	116.6	2333	150.0	1350	103.7	2333	150.0	1350	93.3	2333	150.0	1350
	84 in	150.0	1094	150.0	931	150.0	1313	150.0	1078	146.9	1714	150.0	1333	117.5	1714	136.1	1394	97.9	1714	121.4	1366	83.9	1714	113.2	1349	73.4	1714	109.7	1341	65.3	1714	109.3	1339	58.8	1714	109.3	1339
	96 in	150.0	1250	150.0	1087	131.2	1312	136.5	1152	98.4	1312	105.7	1115	78.7	1312	88.0	1085	65.6	1312	77.2	1061	56.2	1312	70.4	1043	49.2	1312	66.4	1032	43.7	1312	64.4	1027	39.4	1312	64.1	1025
	108 in	110.6	1037	113.0	936	92.2	1037	95.1	921	69.1	1037	73.1	894	55.3	1037	60.4	870	46.1	1037	52.3	850	39.5	1037	47.0	835	34.6	1037	43.6	823	30.7	1037	41.4	816	27.6	1037	40.3	812
	126 in	69.6	762	70.7	697	58.0	762	59.4	686	43.5	762	45.3	668	34.8	762	37.1	651	29.0	762	31.8	637	24.9	762	28.2	625	21.8	762	25.7	615	19.3	762	24.0	607	17.4	762	22.8	601
	144 in	46.7	583	47.2	539	38.9	583	39.5	531	29.2	583	30.1	518	23.3	583	24.5	506	19.4	583	20.9	496	16.7	583	18.4	486	14.6	583	16.6	478	13.0	583	15.2	472				
	162 in	32.8	461	33.0	429	27.3	461	27.7	424	20.5	461	21.0	414	16.4	461	17.0	405																				
180 in	23.9	373	24.0	350	19.9	373	20.1	346	14.9	373	15.2	338																									
198 in	17.9	308	18.0	291	15.0	308	15.1	287																													

TABLE 1B:

2" x 4" x 3/8" Tube Mullion Clip/Anchor Capacity	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 CreteFlex	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"	0.54"	0.60"	0.324"
	Embedment (in.):	1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/8"	1-3/8"	See Sheet 1
4 Anchors @ 3" Min. O.C. / Mullion Clip (Fig. 1):		620 lbs	1260 lbs	440 lbs	1740 lbs	1896 lbs	460 lbs	740 lbs	640 lbs	1160 lbs	988 lbs	748 lbs	340 lbs	652 lbs	1892 lbs	885 lbs	1073 lbs	1073 lbs
8 Anchors @ 1.75" Min. O.C. / Mullion Clip (Fig. 2):		973 lbs	2520 lbs	813 lbs	3413 lbs	N/A	687 lbs	1480 lbs	847 lbs	1987 lbs	1749 lbs	N/A	680 lbs	884 lbs	N/A	1770 lbs	2146 lbs	2146 lbs
3 Anchors @ 1.219" Min. O.C. / U-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	805 lbs
4 Anchors @ 1.75" Min. O.C. / Modified Clip (Fig. 4):		487 lbs	1260 lbs	407 lbs	1707 lbs	N/A	343 lbs	740 lbs	423 lbs	993 lbs	875 lbs	N/A	340 lbs	442 lbs	N/A	885 lbs	1073 lbs	1073 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1.

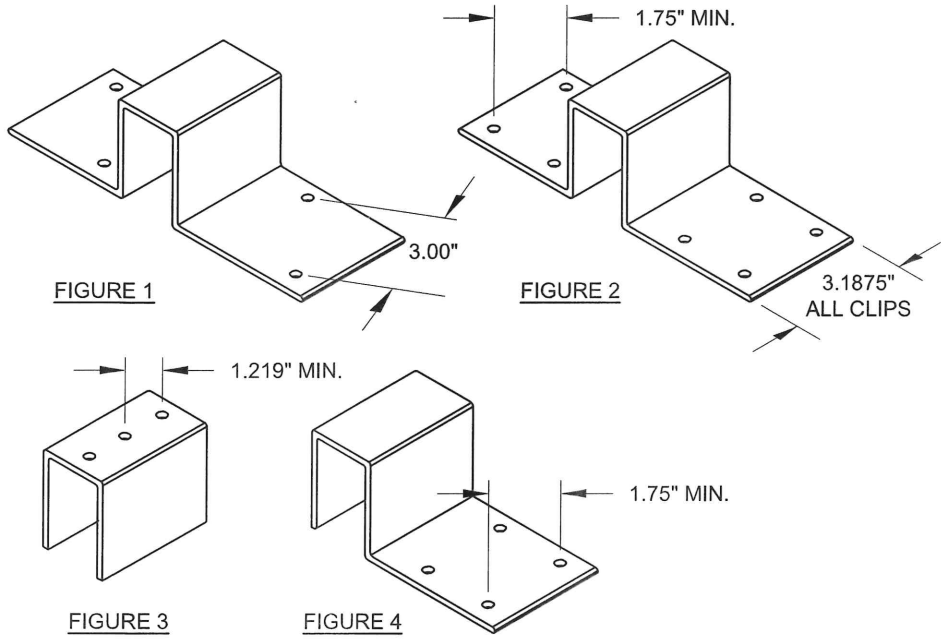
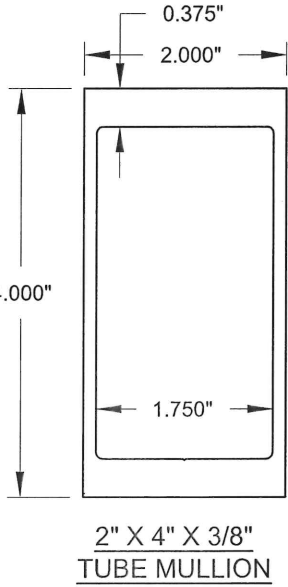


TABLE NOTES:

- 1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT/UNIFORMLY LOADED CLARIFICATION.
- 2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 3/8" O.C. FROM CLIP EDGE.
- 3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.
- 4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



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104 TRIPLE DIAMOND BLVD.
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ALUMINUM MULLIONS, CLIPPED (LM)

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

6 OF 21

NTS

MULLS-1

JENS ROSOWSKI

TUBEMULL-2

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

Rev.

10/10/23

NO CHANGES, THIS SHEET.

S.B.

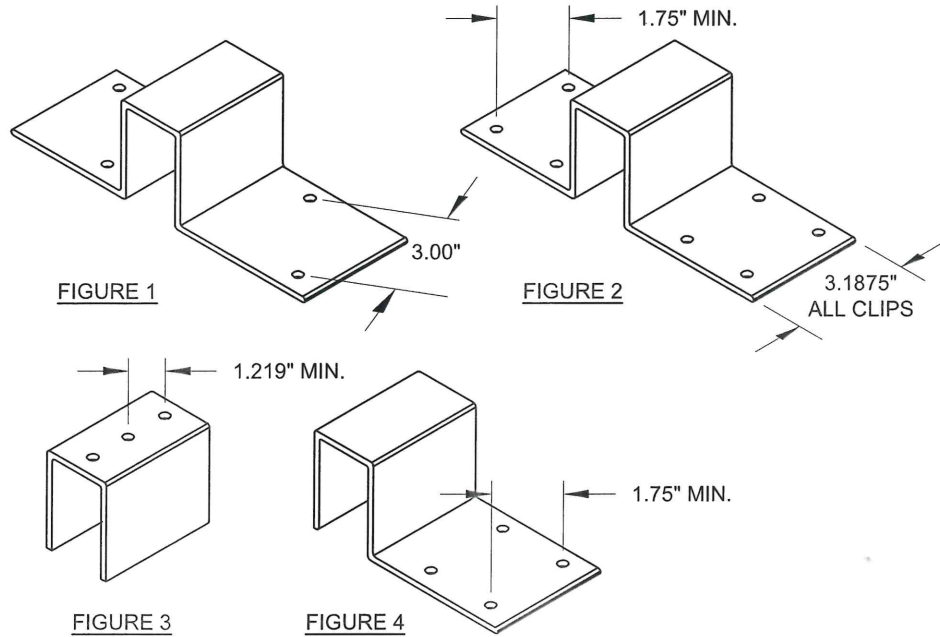
TABLE 2A:

2" x 6" x 3/8" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																																			
		50 in				60 in				80 in				100 in				120 in				140 in				160 in				180 in				200 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 Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)				
Mullion Span	42 in	150.0	547	150.0	384	150.0	656	150.0	422	150.0	875	150.0	458	150.0	1094	150.0	459	150.0	1313	150.0	459	150.0	1531	150.0	459	150.0	1750	150.0	459	150.0	1969	150.0	459	150.0	2188	150.0	459
	48 in	150.0	625	150.0	462	150.0	750	150.0	516	150.0	1000	150.0	583	150.0	1250	150.0	600	150.0	1500	150.0	600	150.0	1750	150.0	600	150.0	2000	150.0	600	150.0	2250	150.0	600	150.0	2500	150.0	600
	50.625 in	150.0	659	150.0	496	150.0	791	150.0	557	150.0	1055	150.0	638	150.0	1318	150.0	667	150.0	1582	150.0	667	150.0	1846	150.0	667	150.0	2109	150.0	667	150.0	2373	150.0	667	150.0	2637	150.0	667
	54 in	150.0	703	150.0	540	150.0	844	150.0	609	150.0	1125	150.0	708	150.0	1406	150.0	755	150.0	1688	150.0	759	150.0	1969	150.0	759	150.0	2250	150.0	759	150.0	2531	150.0	759	150.0	2813	150.0	759
	60 in	150.0	781	150.0	618	150.0	938	150.0	703	150.0	1250	150.0	833	150.0	1563	150.0	911	150.0	1875	150.0	938	150.0	2188	150.0	938	150.0	2500	150.0	938	150.0	2813	150.0	938	150.0	3125	150.0	938
	63 in	150.0	820	150.0	658	150.0	984	150.0	750	150.0	1313	150.0	896	150.0	1641	150.0	990	150.0	1969	150.0	1031	150.0	2297	150.0	1034	150.0	2625	150.0	1034	150.0	2953	150.0	1034	150.0	3281	150.0	1034
	66 in	150.0	859	150.0	697	150.0	1031	150.0	797	150.0	1375	150.0	958	150.0	1719	150.0	1068	150.0	2063	150.0	1125	150.0	2406	150.0	1134	150.0	2750	150.0	1134	150.0	3094	150.0	1134	148.9	3413	150.0	1134
	72 in	150.0	938	150.0	775	150.0	1125	150.0	891	150.0	1500	150.0	1083	150.0	1875	150.0	1224	150.0	2250	150.0	1313	150.0	2625	150.0	1349	150.0	3000	150.0	1350	150.0	3375	150.0	1350	136.5	3413	150.0	1350
	84 in	150.0	1094	150.0	931	150.0	1313	150.0	1078	150.0	1750	150.0	1333	150.0	2188	150.0	1536	150.0	2625	150.0	1688	150.0	3063	150.0	1786	146.3	3413	150.0	1833	130.0	3413	150.0	1838	117.0	3413	150.0	1838
	96 in	150.0	1250	150.0	1087	150.0	1500	150.0	1266	150.0	2000	150.0	1583	150.0	2500	150.0	1849	150.0	3000	150.0	2063	146.3	3413	150.0	2224	128.0	3413	150.0	2333	113.8	3413	150.0	2391	102.4	3413	150.0	2400
	108 in	150.0	1406	150.0	1243	150.0	1688	150.0	1453	150.0	2250	150.0	1833	150.0	2813	150.0	2161	125.0	2813	142.0	2307	107.1	2813	127.6	2265	93.8	2813	118.2	2234	83.3	2813	112.4	2213	75.0	2813	109.3	2202
	126 in	150.0	1641	150.0	1478	150.0	1969	150.0	1734	118.1	2066	123.0	1811	94.5	2066	100.8	1767	78.7	2066	86.4	1728	67.5	2066	76.6	1695	59.0	2066	69.8	1668	52.5	2066	65.1	1647	47.2	2066	61.8	1632
	144 in	126.6	1582	128.0	1461	105.5	1582	107.3	1442	79.1	1582	81.6	1406	63.3	1582	66.5	1373	52.7	1582	56.6	1345	45.2	1582	49.8	1320	39.6	1582	44.9	1298	35.2	1582	41.3	1279	31.6	1582	38.7	1264
162 in	88.9	1250	89.7	1164	74.1	1250	75.1	1149	55.6	1250	56.9	1123	44.4	1250	46.2	1099	37.0	1250	39.2	1077	31.7	1250	34.3	1058	27.8	1250	30.7	1041	24.7	1250	28.0	1025	22.2	1250	26.0	1012	
180 in	64.8	1013	65.2	949	54.0	1013	54.6	938	40.5	1013	41.3	918	32.4	1013	33.4	900	27.0	1013	28.3	883	23.1	1013	24.6	868	20.3	1013	22.0	854	18.0	1013	19.9	842	16.2	1013	18.4	831	
198 in	48.7	837	48.9	788	40.6	837	40.9	780	30.4	837	30.9	764	24.3	837	25.0	750	20.3	837	21.1	737	17.4	837	18.3	725	15.2	837	16.3	714									

TABLE 2B:

2" x 6" x 3/8" Tube Mullion Clip/Anchor Capacity	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 CreteFlex	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"	0.54"	0.60"	0.324"
	Embedment (in):		1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/8"	1-3/8"	See Sheet 1
4 Anchors @ 3" Min. O.C. / Mullion Clip (Fig. 1):		620 lbs	1260 lbs	440 lbs	1740 lbs	1896 lbs	460 lbs	740 lbs	640 lbs	1160 lbs	988 lbs	748 lbs	340 lbs	652 lbs	1892 lbs	885 lbs	1073 lbs	1073 lbs	
8 Anchors @ 1.75" Min. O.C. / Mullion Clip (Fig. 2):		973 lbs	2520 lbs	813 lbs	3413 lbs	N/A	687 lbs	1480 lbs	847 lbs	1987 lbs	1749 lbs	N/A	680 lbs	884 lbs	N/A	1770 lbs	2146 lbs	2146 lbs	
3 Anchors @ 1.219" Min. O.C. / U-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	805 lbs	
4 Anchors @ 1.75" Min. O.C. / Modified Clip (Fig. 4):		487 lbs	1260 lbs	407 lbs	1707 lbs	N/A	343 lbs	740 lbs	423 lbs	993 lbs	875 lbs	N/A	340 lbs	442 lbs	N/A	885 lbs	1073 lbs	1073 lbs	

SEE SUBSTRATE PROPERTIES, SHEET 1.



CIRCLED VALUES ARE USED IN THE EXAMPLE ON SHEET 20.

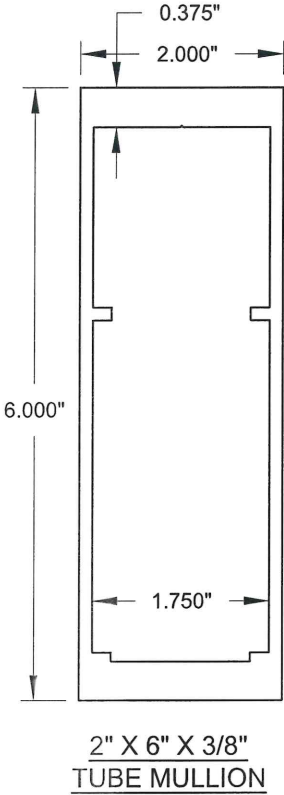
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3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.

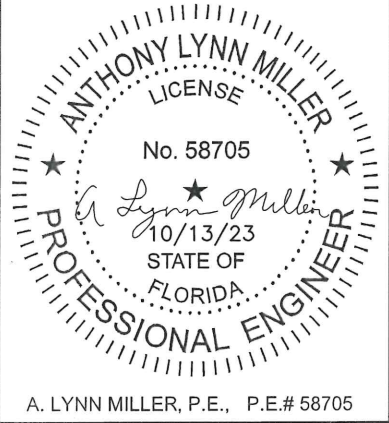
4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



106 : 2x6x26

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1070 TECHNOLOGY DRIVE
N. VENICE, FL 34275
(941) 480-1600

WINDOOR[®]
INCORPORATED
104 TRIPLE DIAMOND BLVD.
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(407) 481-8400



JENS ROSOWSKI
TUBEMULL-2
7 OF 21
MULLS-1
NTS
Scale

NO CHANGES, THIS SHEET.
S.B.
10/10/23
Rev. # A

TABLE 3A:

2" x 8" x 3/8" Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																																			
		50 in				60 in				80 in				100 in				120 in				140 in				160 in				180 in				200 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 Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)				
Mullion Span	42 in	150.0	547	150.0	384	150.0	656	150.0	422	150.0	875	150.0	458	150.0	1094	150.0	459	150.0	1313	150.0	459	150.0	1531	150.0	459	150.0	1750	150.0	459	150.0	1969	150.0	459	150.0	2188	150.0	459
	48 in	150.0	625	150.0	462	150.0	750	150.0	516	150.0	1000	150.0	583	150.0	1250	150.0	600	150.0	1500	150.0	600	150.0	1750	150.0	600	150.0	2000	150.0	600	150.0	2250	150.0	600	150.0	2500	150.0	600
	50.625 in	150.0	659	150.0	496	150.0	791	150.0	557	150.0	1055	150.0	638	150.0	1318	150.0	667	150.0	1582	150.0	667	150.0	1846	150.0	667	150.0	2109	150.0	667	150.0	2373	150.0	667	150.0	2637	150.0	667
	54 in	150.0	703	150.0	540	150.0	844	150.0	609	150.0	1125	150.0	708	150.0	1406	150.0	755	150.0	1688	150.0	759	150.0	1969	150.0	759	150.0	2250	150.0	759	150.0	2531	150.0	759	150.0	2813	150.0	759
	60 in	150.0	781	150.0	618	150.0	938	150.0	703	150.0	1250	150.0	833	150.0	1563	150.0	911	150.0	1875	150.0	938	150.0	2188	150.0	938	150.0	2500	150.0	938	150.0	2813	150.0	938	150.0	3125	150.0	938
	63 in	150.0	820	150.0	658	150.0	984	150.0	750	150.0	1313	150.0	896	150.0	1641	150.0	990	150.0	1969	150.0	1031	150.0	2297	150.0	1034	150.0	2625	150.0	1034	150.0	2953	150.0	1034	150.0	3281	150.0	1034
	66 in	150.0	859	150.0	697	150.0	1031	150.0	797	150.0	1375	150.0	958	150.0	1719	150.0	1068	150.0	2063	150.0	1125	150.0	2406	150.0	1134	150.0	2750	150.0	1134	150.0	3094	150.0	1134	150.0	3438	150.0	1134
	72 in	150.0	938	150.0	775	150.0	1125	150.0	891	150.0	1500	150.0	1083	150.0	1875	150.0	1224	150.0	2250	150.0	1313	150.0	2625	150.0	1349	150.0	3000	150.0	1350	150.0	3375	150.0	1350	150.0	3750	150.0	1350
	84 in	150.0	1094	150.0	931	150.0	1313	150.0	1078	150.0	1750	150.0	1333	150.0	2188	150.0	1536	150.0	2625	150.0	1688	150.0	3063	150.0	1786	150.0	3500	150.0	1833	150.0	3938	150.0	1838	150.0	4375	150.0	1838
	96 in	150.0	1250	150.0	1087	150.0	1500	150.0	1266	150.0	2000	150.0	1583	150.0	2500	150.0	1849	150.0	3000	150.0	2063	150.0	3500	150.0	2224	150.0	4000	150.0	2333	150.0	4500	150.0	2391	150.0	5000	150.0	2400
	108 in	150.0	1406	150.0	1243	150.0	1688	150.0	1453	150.0	2250	150.0	1833	150.0	2813	150.0	2161	150.0	3375	150.0	2438	150.0	3938	150.0	2661	150.0	4500	150.0	2833	150.0	5063	150.0	2953	150.0	5625	150.0	3021
	126 in	150.0	1641	150.0	1478	150.0	1969	150.0	1734	150.0	2625	150.0	2208	150.0	3281	150.0	2630	150.0	3938	150.0	3000	144.3	4418	150.0	3318	126.2	4418	149.3	3566	112.2	4418	139.1	3521	101.0	4418	132.2	3488
	144 in	150.0	1875	150.0	1712	150.0	2250	150.0	2016	150.0	3000	150.0	2583	135.3	3383	142.1	2937	112.8	3383	121.1	2875	96.7	3383	106.5	2821	84.6	3383	96.0	2775	75.2	3383	88.4	2735	67.7	3383	82.8	2703
	162 in	150.0	2109	150.0	1947	150.0	2531	150.0	2297	118.8	2673	121.7	2401	95.0	2673	98.8	2350	79.2	2673	83.8	2304	67.9	2673	73.3	2262	59.4	2673	65.7	2225	52.8	2673	60.0	2192	47.5	2673	55.7	2164
180 in	138.6	2165	139.5	2028	115.5	2165	116.7	2005	86.6	2165	88.3	1962	69.3	2165	71.5	1923	57.7	2165	60.4	1888	49.5	2165	52.6	1855	43.3	2165	47.0	1826	38.5	2165	42.7	1799	34.6	2165	39.3	1776	
198 in	104.1	1789	104.7	1685	86.8	1789	87.5	1667	65.1	1789	66.1	1634	52.1	1789	53.4	1604	43.4	1789	45.0	1576	37.2	1789	39.1	1550	32.5	1789	34.8	1527	28.9	1789	31.5	1505	26.0	1789	28.9	1485	

TABLE 3B:

2" x 8" x 3/8" Tube Mullion Clip/Anchor Capacity	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 CreteFlex	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"	2"	1"	1"	2"	0.54"	0.60"	0.324"
	Embedment (in):	1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/8"	1-3/8"	See Sheet 1
8 Anchors @ 3" Min. O.C. / Mullion Clip (Fig. 1):		1240 lbs	2520 lbs	880 lbs	3480 lbs	3792 lbs	920 lbs	1480 lbs	1280 lbs	2320 lbs	1976 lbs	1496 lbs	680 lbs	1304 lbs	3784 lbs	1770 lbs	2146 lbs	2146 lbs
16 Anchors @ 1.75" Min. O.C. / Mullion Clip (Fig. 2):		1947 lbs	5040 lbs	1627 lbs	6827 lbs	N/A	1373 lbs	2960 lbs	1693 lbs	3973 lbs	3499 lbs	N/A	1360 lbs	1768 lbs	N/A	3539 lbs	4293 lbs	4291 lbs
6 Anchors @ 1.219" Min. O.C. / U-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	1609 lbs
8 Anchors @ 1.75" Min. O.C. / Modified Clip (Fig. 4):		973 lbs	2520 lbs	813 lbs	3413 lbs	N/A	687 lbs	1480 lbs	847 lbs	1987 lbs	1749 lbs	N/A	680 lbs	884 lbs	N/A	1770 lbs	2146 lbs	2146 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1.

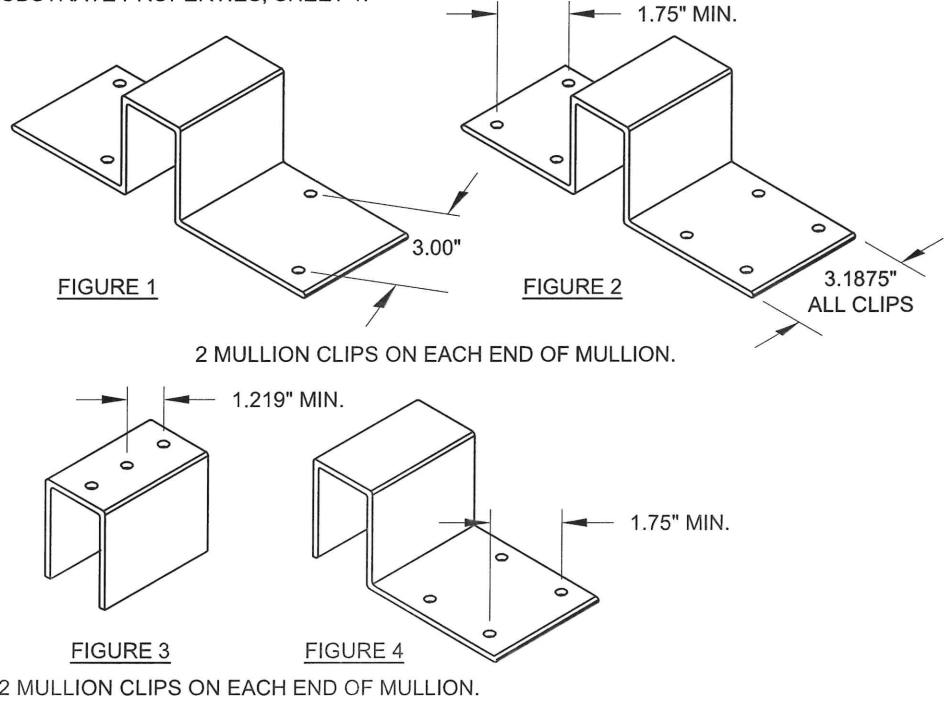
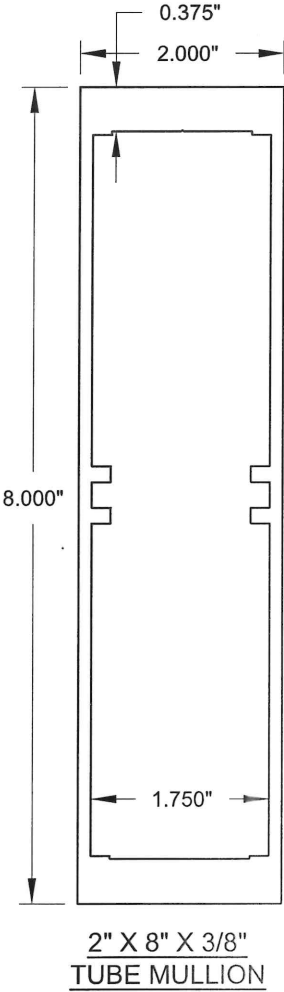


TABLE NOTES:

- 1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT/UNIFORMLY LOADED CLARIFICATION.
- 2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 3/8" O.C. FROM CLIP EDGE.
- 3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.
- 4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



PREPARED BY A. LYNN MILLER
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ALUMINUM MULLIONS, CLIPPED (LM)

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

8 OF 21

NTS

MULLS-1

JENS ROSOWSKI

TUBEMULL-2

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

10/13/23

STATE OF FLORIDA

PROFESSIONAL ENGINEER

ANTHONY LYNN MILLER
LICENSE
No. 58705

TABLE 4A:

8", 135° Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																																			
		50 in				60 in				80 in				100 in				120 in				140 in				160 in				180 in				200 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 Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)				
Mullion Span	54 in	150.0	703	150.0	540	150.0	844	150.0	609	150.0	1125	150.0	708	150.0	1406	150.0	755	150.0	1688	150.0	759	150.0	1969	150.0	759	150.0	2250	150.0	759	150.0	2531	150.0	759	150.0	2813	150.0	759
	60 in	150.0	781	150.0	618	150.0	938	150.0	703	150.0	1250	150.0	833	150.0	1563	150.0	911	150.0	1875	150.0	938	150.0	2188	150.0	938	150.0	2500	150.0	938	150.0	2813	150.0	938	150.0	3125	150.0	938
	66.000 in	150.0	859	150.0	697	150.0	1031	150.0	797	150.0	1375	150.0	958	150.0	1719	150.0	1068	150.0	2063	150.0	1125	150.0	2406	150.0	1134	150.0	2750	150.0	1134	150.0	3094	150.0	1134	150.0	3438	150.0	1134
	72 in	150.0	938	150.0	775	150.0	1125	150.0	891	150.0	1500	150.0	1083	150.0	1875	150.0	1224	150.0	2250	150.0	1313	150.0	2625	150.0	1349	150.0	3000	150.0	1350	150.0	3375	150.0	1350	150.0	3750	150.0	1350
	78 in	150.0	1016	150.0	853	150.0	1219	150.0	984	150.0	1625	150.0	1208	150.0	2031	150.0	1380	150.0	2438	150.0	1500	150.0	2844	150.0	1568	150.0	3250	150.0	1584	150.0	3656	150.0	1584	140.0	3792	150.0	1584
	84 in	150.0	1094	150.0	931	150.0	1313	150.0	1078	150.0	1750	150.0	1333	150.0	2188	150.0	1536	150.0	2625	150.0	1688	150.0	3063	150.0	1786	150.0	3500	150.0	1833	144.5	3792	150.0	1838	130.0	3792	150.0	1838
	90 in	150.0	1172	150.0	1009	150.0	1406	150.0	1172	150.0	1875	150.0	1458	150.0	2344	150.0	1693	150.0	2813	150.0	1875	150.0	3281	150.0	2005	150.0	3750	150.0	2083	134.8	3792	150.0	2109	121.3	3792	150.0	2109
	96 in	150.0	1250	150.0	1087	150.0	1500	150.0	1266	150.0	2000	150.0	1583	150.0	2500	150.0	1849	150.0	3000	150.0	2063	150.0	3500	150.0	2224	142.2	3792	150.0	2333	126.4	3792	150.0	2391	113.8	3792	150.0	2400
	102 in	150.0	1328	150.0	1165	150.0	1594	150.0	1359	150.0	2125	150.0	1708	150.0	2656	150.0	2005	150.0	3188	150.0	2250	150.0	3719	150.0	2443	133.8	3792	150.0	2583	119.0	3792	150.0	2672	107.1	3792	150.0	2708
	108 in	150.0	1406	150.0	1243	150.0	1688	150.0	1453	150.0	2250	150.0	1833	150.0	2813	150.0	2161	150.0	3375	150.0	2438	144.5	3792	150.0	2661	126.4	3792	150.0	2833	112.4	3792	150.0	2953	101.1	3792	150.0	3021
	114 in	150.0	1484	150.0	1322	150.0	1781	150.0	1547	150.0	2375	150.0	1958	150.0	2969	150.0	2318	150.0	3563	150.0	2625	136.9	3792	150.0	2880	119.7	3792	150.0	3083	106.4	3792	150.0	3234	95.8	3792	150.0	3333
	120 in	150.0	1563	150.0	1400	150.0	1875	150.0	1641	150.0	2500	150.0	2083	150.0	3125	150.0	2474	150.0	3750	150.0	2813	130.0	3792	150.0	3099	113.8	3792	150.0	3333	101.1	3792	150.0	3516	91.0	3792	150.0	3646
	126 in	150.0	1641	150.0	1478	150.0	1969	150.0	1734	150.0	2625	150.0	2208	150.0	3281	150.0	2630	144.5	3792	150.0	3000	123.8	3792	150.0	3318	108.3	3792	150.0	3583	96.3	3792	149.8	3792	86.7	3792	143.7	3792
	132 in	150.0	1719	150.0	1556	150.0	2063	150.0	1828	150.0	2750	150.0	2333	150.0	3438	150.0	2786	137.9	3792	150.0	3188	118.2	3792	150.0	3536	103.4	3792	142.1	3632	91.9	3792	131.8	3583	82.7	3792	124.6	3547
138 in	150.0	1797	150.0	1634	150.0	2156	150.0	1922	150.0	2875	150.0	2458	150.0	3594	150.0	2943	131.9	3792	150.0	3375	113.1	3792	135.7	3397	98.9	3792	122.7	3341	87.9	3792	113.4	3294	79.1	3792	106.6	3258	
144 in	150.0	1875	150.0	1712	150.0	2250	150.0	2016	150.0	3000	150.0	2583	150.0	3750	150.0	3099	125.3	3760	134.6	3196	107.4	3760	118.4	3136	94.0	3760	106.8	3084	83.6	3760	98.3	3040	75.2	3760	92.1	3005	

TABLE 4B:

8", 135° Tube Mullion Clip/Anchor Capacity	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 CreteFlex	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"	0.54"	0.60"	0.324"
	Embedment (in):	1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/8"	1-3/8"	See Sheet 1
4 Total Anchors @ 4.33" O.C. thru 4x4 Angle Clip Pair (Fig. 1):		620 lbs	1260 lbs	440 lbs	1740 lbs	3092 lbs	460 lbs	740 lbs	640 lbs	1160 lbs	1018 lbs	748 lbs	340 lbs	820 lbs	1892 lbs	885 lbs	1073 lbs	1073 lbs
8 Total Anchors @ 3" O.C. thru 4x4 Angle Clip Pair (Fig. 2):		1240 lbs	2520 lbs	880 lbs	3480 lbs	3792 lbs	920 lbs	1480 lbs	1280 lbs	2320 lbs	1976 lbs	1496 lbs	680 lbs	1304 lbs	3784 lbs	1770 lbs	2146 lbs	2146 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1.

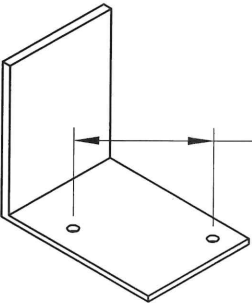


FIGURE 1

2 MULLION CLIPS ON EACH END OF MULLION.

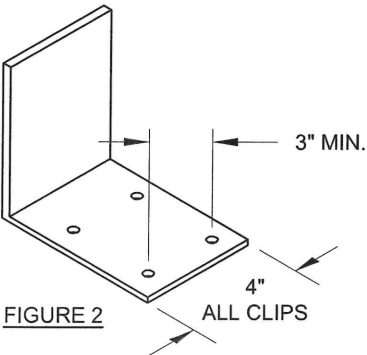


FIGURE 2

ALL CLIPS

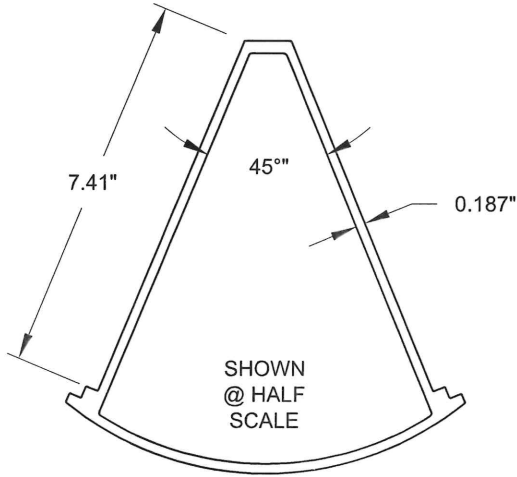
TABLE NOTES:

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

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

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

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



8", 135° TUBE MULLION
VERTICAL APPLICATIONS ONLY.

PREPARED BY A. LYNN MILLER
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ALUMINUM MULLIONS, CLIPPED (LM)

8", 135° TUBE MULLION

MULLS-1

9 OF 21

NTS

TUBEMULL-2

Rev.

Date

By

Drawn

No.

DWG

Sheet

Scale

Series

Rev.

Date

By

Drawn

No.

DWG

Sheet

Scale

Series

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

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

TABLE 5A:

2" x 4-1/8" Thermally-Broken Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																																			
		50 in				60 in				80 in				100 in				120 in				140 in				160 in				180 in				200 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 Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)				
Mullion Span	54 in	150.0	703	150.0	540	150.0	844	150.0	609	150.0	1125	150.0	708	150.0	1406	150.0	755	150.0	1688	150.0	759	150.0	1969	150.0	759	143.1	2146	150.0	759	127.2	2146	150.0	759	114.5	2146	150.0	759
	60 in	150.0	781	150.0	618	150.0	938	150.0	703	150.0	1250	150.0	833	150.0	1563	150.0	911	150.0	1875	150.0	938	147.2	2146	150.0	938	128.8	2146	150.0	938	114.5	2146	150.0	938	103.0	2146	150.0	938
	66.000 in	150.0	859	150.0	697	150.0	1031	150.0	797	150.0	1375	150.0	958	150.0	1719	150.0	1068	150.0	2063	150.0	1125	133.8	2146	150.0	1134	117.1	2146	150.0	1134	104.0	2146	150.0	1134	93.6	2146	150.0	1134
	72 in	150.0	938	150.0	775	150.0	1125	150.0	891	150.0	1500	150.0	1083	150.0	1875	150.0	1224	137.2	2058	150.0	1313	117.6	2058	150.0	1349	102.9	2058	150.0	1350	91.4	2058	150.0	1350	82.3	2058	150.0	1350
	78 in	150.0	1016	150.0	853	150.0	1219	150.0	984	150.0	1625	150.0	1208	129.5	1753	150.0	1380	107.9	1753	138.8	1388	92.5	1753	131.5	1374	80.9	1753	129.7	1370	71.9	1753	129.7	1370	64.7	1753	129.7	1370
	84 in	150.0	1094	150.0	931	150.0	1313	150.0	1078	129.6	1512	142.2	1264	103.7	1512	120.0	1229	86.4	1512	107.1	1205	74.0	1512	99.9	1189	64.8	1512	96.7	1182	57.6	1512	96.4	1181	51.8	1512	96.4	1181
	90 in	150.0	1172	150.0	1009	140.5	1317	147.0	1148	105.3	1317	114.2	1111	84.3	1317	95.7	1080	70.2	1317	84.6	1057	60.2	1317	77.9	1041	52.7	1317	74.3	1033	46.8	1317	73.2	1029	42.1	1317	73.2	1029
	96 in	138.9	1157	142.7	1034	115.7	1157	120.4	1016	86.8	1157	93.2	984	69.4	1157	77.6	957	57.9	1157	68.1	936	49.6	1157	62.1	920	43.4	1157	58.5	911	38.6	1157	56.8	906	34.7	1157	56.5	904
	102 in	115.8	1025	118.6	921	96.5	1025	99.9	906	72.4	1025	77.1	878	57.9	1025	63.9	854	48.2	1025	55.7	835	41.4	1025	50.4	820	36.2	1025	47.0	810	32.2	1025	45.1	804	28.9	1025	44.4	801
	108 in	97.5	914	99.6	826	81.3	914	83.9	812	61.0	914	64.5	788	48.8	914	53.3	767	40.6	914	46.2	750	34.8	914	41.5	736	30.5	914	38.4	726	27.1	914	36.5	720	24.4	914	35.6	716
	114 in	82.9	821	84.5	745	69.1	821	71.1	733	51.8	821	54.5	712	41.5	821	44.9	693	34.6	821	38.7	678	29.6	821	34.6	665	25.9	821	31.9	655	23.0	821	30.1	648	20.7	821	29.0	644
	120 in	71.1	741	72.3	675	59.3	741	60.8	665	44.4	741	46.5	646	35.6	741	38.2	630	29.6	741	32.8	616	25.4	741	29.2	604	22.2	741	26.8	595	19.8	741	25.1	588	17.8	741	24.0	583
	126 in	61.4	672	62.4	614	51.2	672	52.4	605	38.4	672	40.0	589	30.7	672	32.8	574	25.6	672	28.1	562	21.9	672	24.9	551	19.2	672	22.7	542	17.1	672	21.2	535	15.4	672	20.1	530
	132 in	53.4	612	54.2	562	44.5	612	45.4	554	33.4	612	34.7	539	26.7	612	28.3	526	22.3	612	24.2	515	19.1	612	21.4	505	16.7	612	19.4	497	14.8	612	18.0	490	13.4	612	17.0	485
	138 in	46.8	560	47.3	516	39.0	560	39.7	509	29.2	560	30.2	496	23.4	560	24.7	484	19.5	560	21.1	474	16.7	560	18.6	465	14.6	560	16.8	457	13.0	560	15.5	451				
	144 in	41.2	514	41.6	475	34.3	514	34.9	469	25.7	514	26.5	457	20.6	514	21.6	447	17.1	514	18.4	437	14.7	514	16.2	429	12.9	514	14.6	422								

TABLE 5B:

2" x 4-1/8" Thermally-Broken Tube Mullion Clip/Anchor Capacity	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 CreteFlex	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"	0.54"	0.60"	0.324"
	Embedment (in):		1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/8"	1-3/8"	See Sheet 1
4 Anchors @ 2.15" Min. O.C. / Mullion Clip (Fig. 1):			587 lbs	1260 lbs	417 lbs	1717 lbs	795 lbs	378 lbs	740 lbs	488 lbs	1043 lbs	909 lbs	N/A	340 lbs	505 lbs	N/A	885 lbs	1073 lbs	1073 lbs
8 Anchors @ 1.25" Min. O.C. / Mullion Clip (Fig. 2):			707 lbs	2520 lbs	760 lbs	N/A	N/A	N/A	1480 lbs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1770 lbs	2146 lbs	2146 lbs
3 Anchors @ 0.5" Min. O.C. / U-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	805 lbs
4 Anchors @ 1.25" Min. O.C. / F-Clip (Fig. 4):			353 lbs	1260 lbs	380 lbs	N/A	N/A	N/A	740 lbs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	885 lbs	1073 lbs	1073 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1.

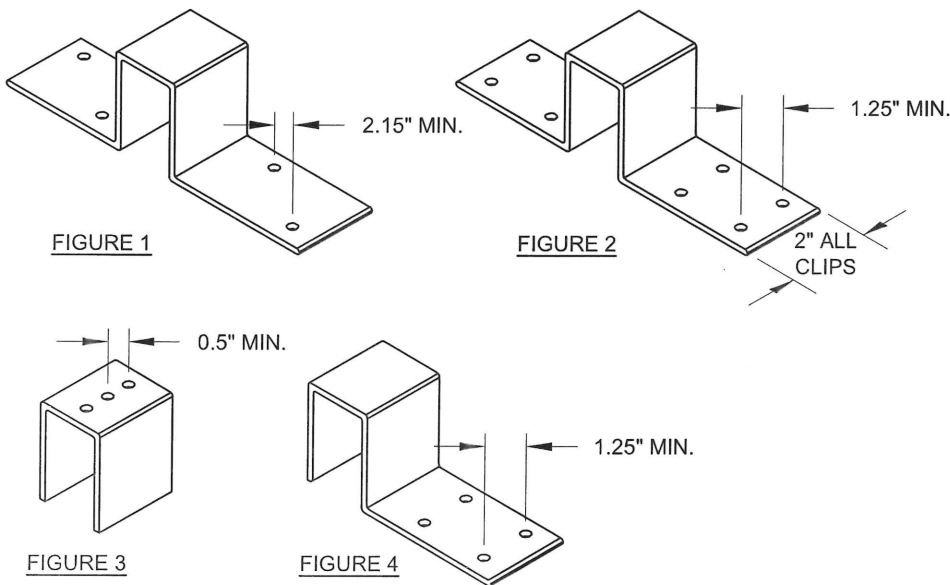


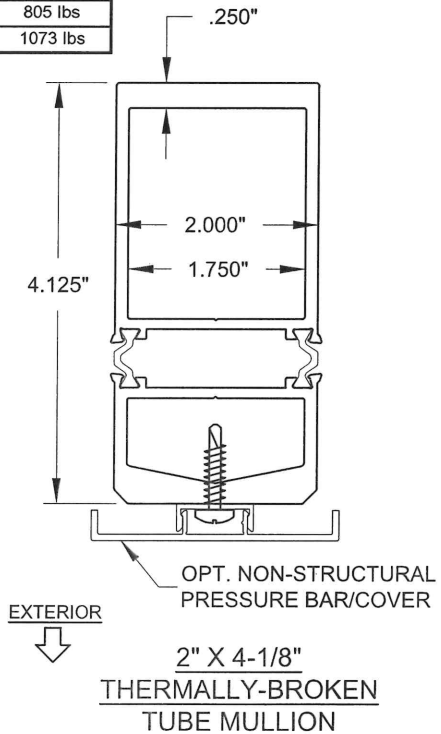
TABLE NOTES:

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

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

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

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



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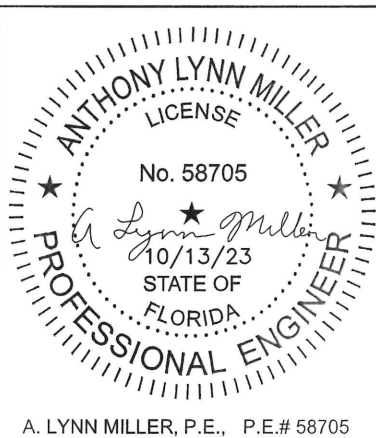
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ALUMINUM MULLIONS, CLIPPED (LM)

2" X 4-1/8" TB TUBE MULLION

JENS ROSOWSKI

Rev. No. DWG. 10 OF 21 Sheet Scale Series
MULLS-1 NTS
TUBEMULL-2



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

Rev. No. DWG. 10 OF 21 Sheet Scale Series
MULLS-1 NTS
TUBEMULL-2

NO CHANGES, THIS SHEET.

Date

10/10/23

Rev. No. DWG. 10 OF 21 Sheet Scale Series
MULLS-1 NTS
TUBEMULL-2

TABLE 7A:

3-5/8" Thermally-Broken, HD, 135° Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																																			
		50 in				60 in				80 in				100 in				120 in				140 in				160 in				180 in				200 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 Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)
Mullion Span	54 in	150.0	703	150.0	540	150.0	844	150.0	609	150.0	1125	150.0	708	150.0	1406	150.0	755	150.0	1688	150.0	759	150.0	1969	150.0	759	150.0	2250	150.0	759	138.6	2339	150.0	759	124.8	2339	150.0	759
	60 in	150.0	781	150.0	618	150.0	938	150.0	703	150.0	1250	150.0	833	150.0	1563	150.0	911	150.0	1875	150.0	938	150.0	2188	150.0	938	140.3	2339	150.0	938	124.8	2339	150.0	938	112.3	2339	150.0	938
	66 in	150.0	859	150.0	697	150.0	1031	150.0	797	150.0	1375	150.0	958	150.0	1719	150.0	1068	150.0	2063	150.0	1125	145.8	2339	150.0	1134	127.6	2339	150.0	1134	113.4	2339	150.0	1134	102.1	2339	150.0	1134
	72 in	150.0	938	150.0	775	150.0	1125	150.0	891	150.0	1500	150.0	1083	150.0	1875	150.0	1224	150.0	2250	150.0	1313	133.7	2339	150.0	1349	117.0	2339	150.0	1350	104.0	2339	150.0	1350	93.6	2339	150.0	1350
	78 in	150.0	1016	150.0	853	150.0	1219	150.0	984	150.0	1625	150.0	1208	150.0	2031	150.0	1380	143.9	2339	150.0	1500	123.4	2339	150.0	1568	108.0	2339	150.0	1584	96.0	2339	150.0	1584	86.4	2339	150.0	1584
	84 in	150.0	1094	150.0	931	150.0	1313	150.0	1078	150.0	1750	150.0	1333	150.0	2188	150.0	1536	133.7	2339	150.0	1688	114.6	2339	150.0	1786	100.2	2339	150.0	1833	89.1	2339	150.0	1838	80.2	2339	150.0	1838
	90 in	150.0	1172	150.0	1009	150.0	1406	150.0	1172	150.0	1875	150.0	1458	149.7	2339	150.0	1693	124.8	2339	150.0	1875	106.9	2339	150.0	2005	93.6	2339	150.0	2083	83.2	2339	150.0	2109	74.9	2339	150.0	2109
	96 in	150.0	1250	150.0	1087	150.0	1500	150.0	1266	150.0	2000	150.0	1583	140.3	2339	150.0	1849	117.0	2339	150.0	2063	100.2	2339	150.0	2224	87.7	2339	150.0	2333	78.0	2339	146.8	2339	70.2	2339	146.2	2339
	102 in	150.0	1328	150.0	1165	150.0	1594	150.0	1359	150.0	2125	150.0	1708	132.1	2339	150.0	2005	110.1	2339	150.0	2250	94.4	2339	136.9	2229	82.6	2339	127.8	2202	73.4	2339	122.7	2186	66.0	2339	120.6	2178
	108 in	150.0	1406	150.0	1243	150.0	1688	150.0	1453	150.0	2250	150.0	1833	124.8	2339	144.7	2085	104.0	2339	125.4	2038	89.1	2339	112.8	2001	78.0	2339	104.5	1973	69.3	2339	99.3	1955	62.4	2339	96.6	1946
	114 in	150.0	1484	150.0	1322	150.0	1781	150.0	1547	140.9	2230	148.1	1934	112.7	2230	121.9	1884	93.9	2230	105.2	1842	80.5	2230	94.1	1807	70.4	2230	86.6	1780	62.6	2230	81.7	1762	56.3	2230	78.8	1750
	120 in	150.0	1563	150.0	1400	150.0	1875	150.0	1641	120.8	2013	126.4	1755	96.6	2013	103.7	1711	80.5	2013	89.2	1673	69.0	2013	79.4	1641	60.4	2013	72.7	1616	53.7	2013	68.1	1597	48.3	2013	65.2	1584
	126 in	150.0	1641	150.0	1478	139.1	1826	142.3	1645	104.3	1826	108.7	1600	83.5	1826	89.0	1561	69.6	1826	76.3	1527	59.6	1826	67.7	1498	52.2	1826	61.7	1474	46.4	1826	57.5	1455	41.7	1826	54.6	1442
	132 in	145.2	1664	147.2	1527	121.0	1664	123.5	1505	90.7	1664	94.2	1465	72.6	1664	77.0	1430	60.5	1664	65.8	1399	51.9	1664	58.2	1372	45.4	1664	52.8	1350	40.3	1664	49.0	1332	36.3	1664	46.3	1318
138 in	127.1	1522	128.7	1402	105.9	1522	107.9	1382	79.4	1522	82.2	1347	63.5	1522	67.0	1315	52.9	1522	57.2	1287	45.4	1522	50.4	1263	39.7	1522	45.6	1242	35.3	1522	42.1	1225	31.8	1522	39.6	1211	
144 in	111.8	1398	113.1	1291	93.2	1398	94.8	1274	69.9	1398	72.1	1242	55.9	1398	58.7	1214	46.6	1398	50.0	1188	39.9	1398	44.0	1166	34.9	1398	39.7	1147	31.1	1398	36.5	1130	28.0	1398	34.2	1117	

TABLE 7B:

3-5/8" Thermally-Broken, HD, 135° Tube Mullion Clip/Anchor Capacity	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 CreteFlex	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"	0.54"	0.60"	0.324"
	Embedment (in):		1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/8"	1-3/8"	See Sheet 1
	8 Total Anchors @ 1.75" O.C. thru (4) 4x4 Angle Clips (Fig. 1):		973 lbs	2520 lbs	813 lbs	3413 lbs	N/A	687 lbs	1480 lbs	847 lbs	1987 lbs	1749 lbs	N/A	680 lbs	884 lbs	N/A	1770 lbs	2146 lbs	2146 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1.

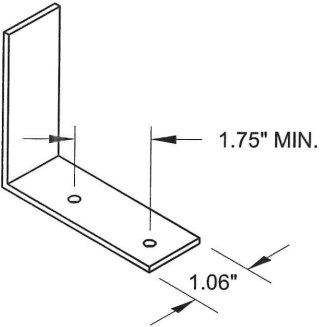
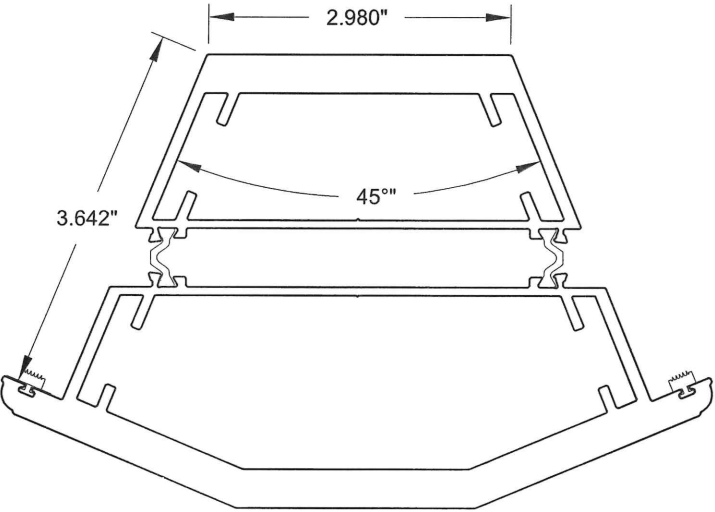


FIGURE 1

4 MULLION CLIPS ON EACH END OF MULLION.

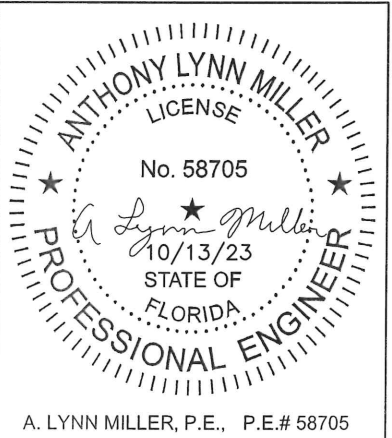
TABLE NOTES:

- 1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT/UNIFORMLY LOADED CLARIFICATION.
- 2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 3/8" O.C. FROM CLIP EDGE.
- 3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.
- 4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



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

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WINDOOR [®] INCORPORATED 104 TRIPLE DIAMOND BLVD. N. VENICE, FL 34275 (407) 481-8400		ALUMINUM MULLIONS, CLIPPED (LM)		12 OF 21	Sheet	TUBEMULL-2	
3-5/8" TB, HD, 135° TUBE MULL		MULLS-1		NTS	Scale		
Series		Title		Desc.		No.	



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

TABLE 8A:

1-1/2" x 5-1/2" Thermally-Broken Tube Mullion w/Pressure Bar Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																																			
		50 in				60 in				80 in				100 in				120 in				140 in				160 in				180 in				200 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 Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)				
Mullion Span	54 in	150.0	703	150.0	540	150.0	844	150.0	609	150.0	1125	150.0	708	150.0	1406	150.0	755	150.0	1688	150.0	759	150.0	1969	150.0	759	150.0	2250	150.0	759	150.0	2531	150.0	759	150.0	2813	150.0	759
	60 in	150.0	781	150.0	618	150.0	938	150.0	703	150.0	1250	150.0	833	150.0	1563	150.0	911	150.0	1875	150.0	938	150.0	2188	150.0	938	150.0	2500	150.0	938	150.0	2813	150.0	938	150.0	3125	150.0	938
	66 in	150.0	859	150.0	697	150.0	1031	150.0	797	150.0	1375	150.0	958	150.0	1719	150.0	1068	150.0	2063	150.0	1125	150.0	2406	150.0	1134	150.0	2750	150.0	1134	150.0	3094	150.0	1134	150.0	3438	150.0	1134
	72 in	150.0	938	150.0	775	150.0	1125	150.0	891	150.0	1500	150.0	1083	150.0	1875	150.0	1224	150.0	2250	150.0	1313	150.0	2625	150.0	1349	150.0	3000	150.0	1350	150.0	3375	150.0	1350	150.0	3750	150.0	1350
	78 in	150.0	1016	150.0	853	150.0	1219	150.0	984	150.0	1625	150.0	1208	150.0	2031	150.0	1380	150.0	2438	150.0	1500	150.0	2844	150.0	1568	150.0	3250	150.0	1584	150.0	3656	150.0	1584	146.4	3964	150.0	1584
	84 in	150.0	1094	150.0	931	150.0	1313	150.0	1078	150.0	1750	150.0	1333	150.0	2188	150.0	1536	150.0	2625	150.0	1688	150.0	3063	150.0	1786	150.0	3500	150.0	1833	150.0	3938	150.0	1838	135.9	3964	150.0	1838
	90 in	150.0	1172	150.0	1009	150.0	1406	150.0	1172	150.0	1875	150.0	1458	150.0	2344	150.0	1693	150.0	2813	150.0	1875	150.0	3281	150.0	2005	150.0	3750	150.0	2083	140.9	3964	150.0	2109	126.8	3964	150.0	2109
	96 in	150.0	1250	150.0	1087	150.0	1500	150.0	1266	150.0	2000	150.0	1583	150.0	2500	150.0	1849	150.0	3000	150.0	2063	150.0	3500	150.0	2224	145.8	3888	150.0	2333	129.6	3888	150.0	2391	116.6	3888	150.0	2400
	102 in	150.0	1328	150.0	1165	150.0	1594	150.0	1359	150.0	2125	150.0	1708	150.0	2656	150.0	2005	150.0	3188	150.0	2250	138.9	3444	150.0	2443	121.5	3444	150.0	2583	108.0	3444	150.0	2672	97.2	3444	149.1	2692
	108 in	150.0	1406	150.0	1243	150.0	1688	150.0	1453	150.0	2250	150.0	1833	150.0	2813	150.0	2161	136.5	3072	150.0	2438	117.0	3072	139.4	2473	102.4	3072	129.1	2439	91.0	3072	122.8	2417	81.9	3072	119.4	2405
	114 in	150.0	1484	150.0	1322	150.0	1781	150.0	1547	150.0	2375	150.0	1958	139.3	2757	150.0	2318	116.1	2757	130.1	2277	99.5	2757	116.3	2234	87.1	2757	107.1	2201	77.4	2757	101.0	2178	69.7	2757	97.3	2163
	120 in	150.0	1563	150.0	1400	150.0	1875	150.0	1641	149.3	2488	150.0	2083	119.4	2488	128.2	2115	99.5	2488	110.3	2068	85.3	2488	98.2	2029	74.6	2488	89.9	1997	66.4	2488	84.2	1974	59.7	2488	80.6	1958
	126 in	150.0	1641	150.0	1478	150.0	1969	150.0	1734	129.0	2257	134.4	1978	103.2	2257	110.0	1930	86.0	2257	94.4	1887	73.7	2257	83.7	1851	64.5	2257	76.2	1821	57.3	2257	71.0	1798	51.6	2257	67.5	1782
	132 in	150.0	1719	150.0	1556	149.6	2056	150.0	1828	112.2	2056	116.4	1811	89.7	2056	95.2	1768	74.8	2056	81.4	1730	64.1	2056	72.0	1697	56.1	2056	65.3	1669	49.9	2056	60.6	1647	44.9	2056	57.2	1630
138 in	150.0	1797	150.0	1634	130.9	1881	133.3	1708	98.2	1881	101.6	1665	78.5	1881	82.9	1626	65.4	1881	70.7	1591	56.1	1881	62.3	1561	49.1	1881	56.4	1535	43.6	1881	52.1	1514	39.3	1881	49.0	1497	
144 in	138.2	1728	139.8	1596	115.2	1728	117.2	1574	86.4	1728	89.1	1535	69.1	1728	72.6	1500	57.6	1728	61.8	1469	49.4	1728	54.4	1441	43.2	1728	49.1	1417	38.4	1728	45.2	1397	34.6	1728	42.3	1381	

TABLE 8B:

1-1/2" x 5-1/2" Thermally-Broken Tube Mullion w/Pressure Bar Clip/Anchor Capacity	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 CreteFlex	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"	0.54"	0.60"	0.324"
	Embedment (in):	1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/8"	1-3/8"	See Sheet 1
4 Anchors @ 3.5" Min. O.C. / Mullion Clip (Fig. 1):		620 lbs	1260 lbs	440 lbs	1740 lbs	2525 lbs	460 lbs	740 lbs	640 lbs	1160 lbs	999 lbs	748 lbs	340 lbs	736 lbs	1892 lbs	885 lbs	1073 lbs	1073 lbs
8 Anchors @ 2" Min. O.C. / Mullion Clip (Fig. 2):		1107 lbs	2520 lbs	827 lbs	3427 lbs	1275 lbs	733 lbs	1480 lbs	933 lbs	2053 lbs	1795 lbs	N/A	680 lbs	968 lbs	N/A	1770 lbs	2146 lbs	2146 lbs
10 Anchors @ 1.75" Min. O.C. / Mullion Clip (Fig. 3):		1217 lbs	3150 lbs	1017 lbs	4267 lbs	N/A	858 lbs	1850 lbs	1058 lbs	2483 lbs	2187 lbs	N/A	850 lbs	1105 lbs	N/A	2212 lbs	2683 lbs	2682 lbs
3 Anchors @ 0.625" Min. O.C. / U-Clip (Fig. 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	805 lbs
4 Anchors @ 2" Min. O.C. / Modified Clip (Fig. 5):		553 lbs	1260 lbs	413 lbs	1713 lbs	637 lbs	367 lbs	740 lbs	467 lbs	1027 lbs	897 lbs	N/A	340 lbs	484 lbs	N/A	885 lbs	1073 lbs	1073 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1.

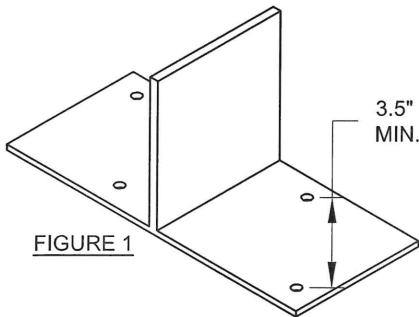


FIGURE 1

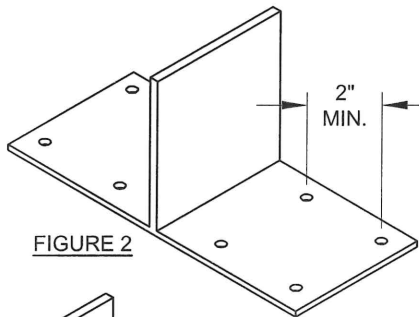


FIGURE 2

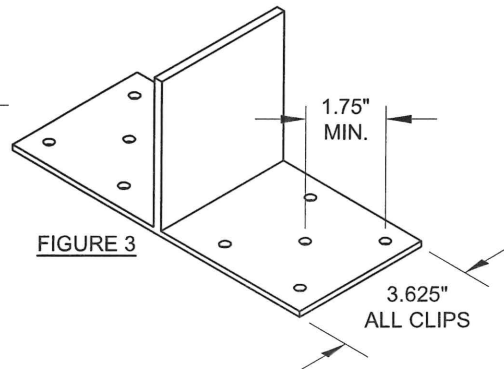


FIGURE 3

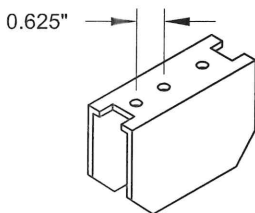


FIGURE 4

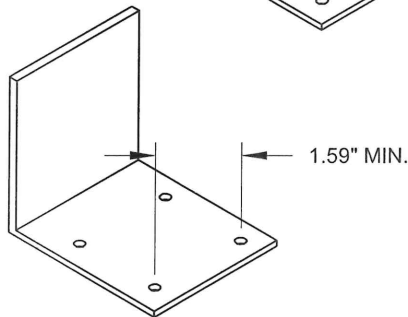


FIGURE 5

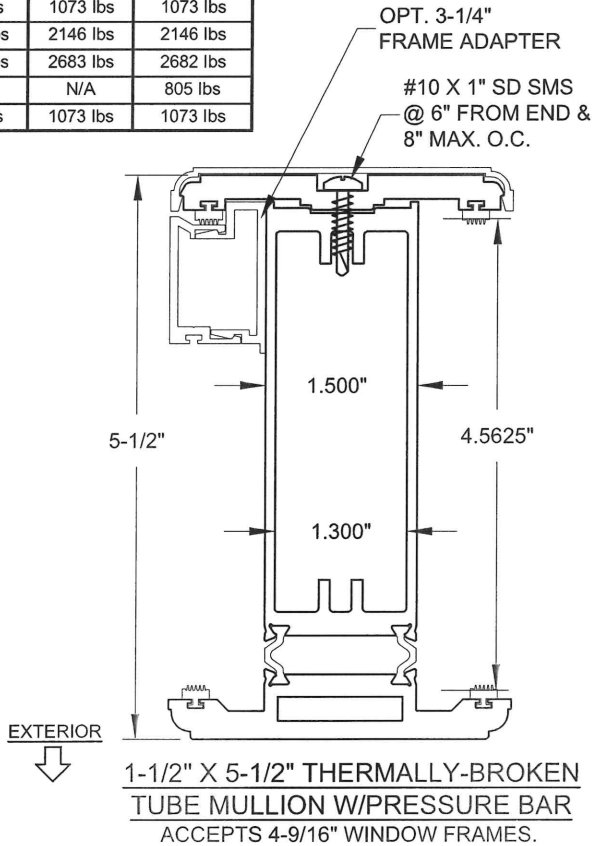
TABLE NOTES:

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

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

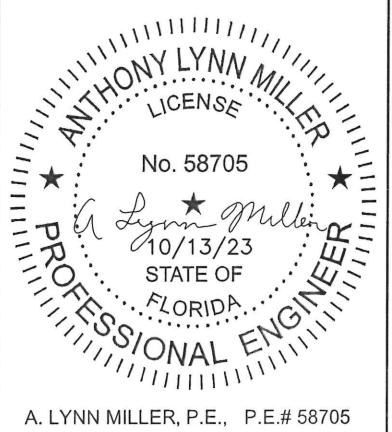
3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.

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



Rev.#	Date
A	10/10/23
CORRECT MULL DESCRIPTION. SB	

PREPARED BY A. LYNN MILLER 1070 TECHNOLOGY DRIVE N. VENICE, FL 34275 (941) 480-1600		REGISTRATION #29296 COPYRIGHT © 2023 WINDOOR, INC., LIMITED LICENSE TO PRINT COPIES FOR PERMITTING.		JENS ROSOWSKI	
WINDOOR [®] INCORPORATED 104 TRIPLE DIAMOND BLVD. N. VENICE, FL 34275 (407) 481-8400		ALUMINUM MULLIONS, CLIPPED (LM)		5-5/8" X 1-1/2" TB TUBE MULLION	
13 OF 21		NTS		MULLS-1	
TUBEMULL-2		Rev.		Date	



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

5-3/8" Thermally-Broken, 135° Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																																			
		50 in				60 in				80 in				100 in				120 in				140 in				160 in				180 in				200 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 Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft²)	Anchor Capacity Required (lbs)				
Mullion Span	54 in	150.0	703	150.0	540	150.0	844	150.0	609	150.0	1125	150.0	708	150.0	1406	150.0	755	150.0	1688	150.0	759	150.0	1969	150.0	759	150.0	2250	150.0	759	150.0	2531	150.0	759	150.0	2813	150.0	759
	60 in	150.0	781	150.0	618	150.0	938	150.0	703	150.0	1250	150.0	833	150.0	1563	150.0	911	150.0	1875	150.0	938	150.0	2188	150.0	938	150.0	2500	150.0	938	150.0	2813	150.0	938	150.0	3125	150.0	938
	66 in	150.0	859	150.0	697	150.0	1031	150.0	797	150.0	1375	150.0	958	150.0	1719	150.0	1068	150.0	2063	150.0	1125	150.0	2406	150.0	1134	150.0	2750	150.0	1134	150.0	3094	150.0	1134	150.0	3438	150.0	1134
	72 in	150.0	938	150.0	775	150.0	1125	150.0	891	150.0	1500	150.0	1083	150.0	1875	150.0	1224	150.0	2250	150.0	1313	150.0	2625	150.0	1349	150.0	3000	150.0	1350	150.0	3375	150.0	1350	150.0	3750	150.0	1350
	78 in	150.0	1016	150.0	853	150.0	1219	150.0	984	150.0	1625	150.0	1208	150.0	2031	150.0	1380	150.0	2438	150.0	1500	150.0	2844	150.0	1568	150.0	3250	150.0	1584	150.0	3656	150.0	1584	150.0	4063	150.0	1584
	84 in	150.0	1094	150.0	931	150.0	1313	150.0	1078	150.0	1750	150.0	1333	150.0	2188	150.0	1536	150.0	2625	150.0	1688	150.0	3063	150.0	1786	150.0	3500	150.0	1833	150.0	3938	150.0	1838	146.3	4267	150.0	1838
	90 in	150.0	1172	150.0	1009	150.0	1406	150.0	1172	150.0	1875	150.0	1458	150.0	2344	150.0	1693	150.0	2813	150.0	1875	150.0	3281	150.0	2005	150.0	3750	150.0	2083	150.0	4219	150.0	2109	136.5	4267	150.0	2109
	96 in	150.0	1250	150.0	1087	150.0	1500	150.0	1266	150.0	2000	150.0	1583	150.0	2500	150.0	1849	150.0	3000	150.0	2063	150.0	3500	150.0	2224	147.7	3938	150.0	2333	131.3	3938	150.0	2391	118.1	3938	150.0	2400
	102 in	150.0	1328	150.0	1165	150.0	1594	150.0	1359	150.0	2125	150.0	1708	150.0	2656	150.0	2005	150.0	3188	150.0	2250	140.7	3488	150.0	2443	123.1	3488	150.0	2583	109.4	3488	150.0	2672	98.5	3488	150.0	2708
	108 in	150.0	1406	150.0	1243	150.0	1688	150.0	1453	150.0	2250	150.0	1833	150.0	2813	150.0	2161	138.3	3111	15																	

5-3/8" Thermally-Broken, 135° Tube Mullion Clip/Anchor Capacity	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 CreteFlex		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"	0.54"	0.60"	0.324"		
	Embedment (in):	1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"		1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/8"	1-3/8"	See Sheet 1		
4 Total Anchors @ 3.5" O.C. thru 4x4x3.6 Angle Clip Pair (Fig. 1):	620 lbs	1260 lbs	440 lbs	1740 lbs	2525 lbs		460 lbs	740 lbs	640 lbs	1160 lbs	999 lbs	748 lbs	340 lbs	736 lbs	1892 lbs	885 lbs	1073 lbs	1073 lbs			
8 Total Anchors @ 2" O.C. thru 4x4x3.6 Angle Clip Pair (Fig. 2):	1107 lbs	2520 lbs	827 lbs	3427 lbs	1275 lbs		733 lbs	1480 lbs	933 lbs	2053 lbs	1795 lbs	N/A	680 lbs	968 lbs	N/A	1770 lbs	2146 lbs	2146 lbs			
10 Total Anchors @ 1.75" O.C. thru 4x4x3.6 Angle Clip Pair (Fig. 3):	1217 lbs	3150 lbs	1017 lbs	4267 lbs	N/A		858 lbs	1850 lbs	1058 lbs	2483 lbs	2187 lbs	N/A	850 lbs	1105 lbs	N/A	2212 lbs	2683 lbs	2682 lbs			
8 Total Anchors @ 1.75" O.C. thru 4x4x1 Angle Clip Pair (Fig. 4):	973 lbs	2520 lbs	813 lbs	3413 lbs	N/A		687 lbs	1480 lbs	847 lbs	1987 lbs	1749 lbs	N/A	680 lbs	884 lbs	N/A	1770 lbs	2146 lbs	2146 lbs			

FIGURE 1

3.5" MIN.

FIGURE 2

2" MIN.

FIGURE 3

1.75" MIN.

3.60"

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

FIGURE 4

1.75" MIN.

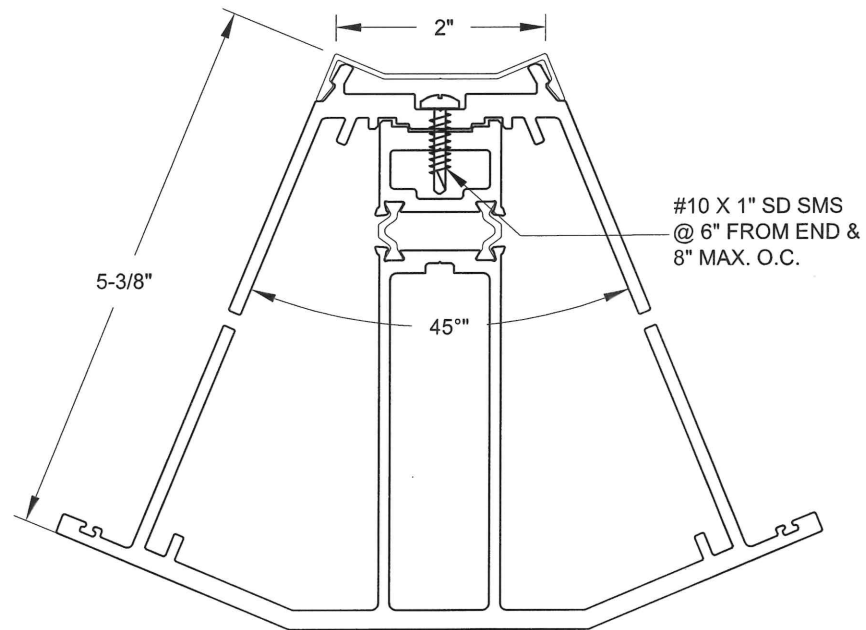
1.06"

MULLION CLIPS ON EACH END OF MULLION.

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

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

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



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

Rev.	CORRECT MULL DESCRIPTIONS. S.B.	Date	10/10/23	Rev.#	A
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W[®] INDOOR INCORPORATED 104 TRIPLE DIAMOND BLVD. N. VENICE, FL 34275 (407) 481-8400		PREPARED BY A. LYNN MILLER 1070 TECHNOLOGY DRIVE N. VENICE, FL 34275 (941) 480-1600	
		REGISTRATION #29296	
		COPYRIGHT © 2023 WINDOOR, INC., LIMITED LICENSE TO PRINT COPIES FOR PERMITTING.	
ALUMINUM MULLIONS, CLIPPED (LM)		Date	
Series	MULLS-1	Scale	NTS
Title	5-3" TB, 135° TUBE MULLION	Drawn By	JENS ROSOWSKI
Sheet	14 OF 21	DWG No.	TUBEMULL-2
Rev.			

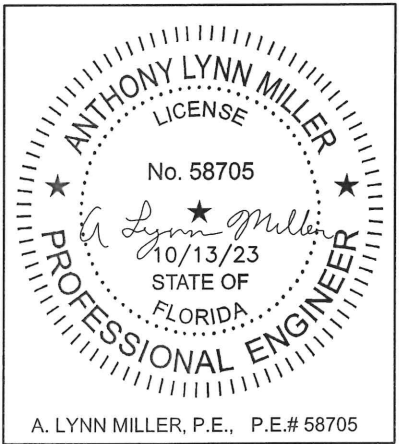


TABLE 10A:

5-3/8" Thermally-Broken, Adjustable Bay Mullion Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																																			
		50 in				60 in				80 in				100 in				120 in				140 in				160 in				180 in				200 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 Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)				
Mullion Span	54 in	150.0	703	150.0	540	150.0	844	150.0	609	150.0	1125	150.0	708	150.0	1406	150.0	755	150.0	1688	150.0	759	150.0	1969	150.0	759	150.0	2250	150.0	759	150.0	2531	150.0	759	150.0	2813	150.0	759
	60 in	150.0	781	150.0	618	150.0	938	150.0	703	150.0	1250	150.0	833	150.0	1563	150.0	911	150.0	1875	150.0	938	150.0	2188	150.0	938	150.0	2500	150.0	938	150.0	2813	150.0	938	150.0	3125	150.0	938
	66 in	150.0	859	150.0	697	150.0	1031	150.0	797	150.0	1375	150.0	958	150.0	1719	150.0	1068	150.0	2063	150.0	1125	150.0	2406	150.0	1134	150.0	2750	150.0	1134	150.0	3094	150.0	1134	150.0	3438	150.0	1134
	72 in	150.0	938	150.0	775	150.0	1125	150.0	891	150.0	1500	150.0	1083	150.0	1875	150.0	1224	150.0	2250	150.0	1313	150.0	2625	150.0	1349	150.0	3000	150.0	1350	150.0	3375	150.0	1350	150.0	3750	150.0	1350
	78 in	150.0	1016	150.0	853	150.0	1219	150.0	984	150.0	1625	150.0	1208	150.0	2031	150.0	1380	150.0	2438	150.0	1500	150.0	2844	150.0	1568	150.0	3250	150.0	1584	150.0	3656	150.0	1584	150.0	4063	150.0	1584
	84 in	150.0	1094	150.0	931	150.0	1313	150.0	1078	150.0	1750	150.0	1333	150.0	2188	150.0	1536	150.0	2625	150.0	1688	150.0	3063	150.0	1786	150.0	3500	150.0	1833	150.0	3938	150.0	1838	146.3	4267	150.0	1838
	90 in	150.0	1172	150.0	1009	150.0	1406	150.0	1172	150.0	1875	150.0	1458	150.0	2344	150.0	1693	150.0	2813	150.0	1875	150.0	3281	150.0	2005	150.0	3750	150.0	2083	139.0	3911	150.0	2109	125.1	3911	150.0	2109
	96 in	150.0	1250	150.0	1087	150.0	1500	150.0	1266	150.0	2000	150.0	1583	150.0	2500	150.0	1849	150.0	3000	150.0	2063	147.3	3437	150.0	2224	128.9	3437	150.0	2333	114.6	3437	150.0	2391	103.1	3437	150.0	2400
	102 in	150.0	1328	150.0	1165	150.0	1594	150.0	1359	150.0	2125	150.0	1708	150.0	2656	150.0	2005	143.3	3045	150.0	2250	122.8	3045	149.6	2436	107.5	3045	139.7	2406	95.5	3045	134.1	2388	86.0	3045	131.8	2380
	108 in	150.0	1406	150.0	1243	150.0	1688	150.0	1453	150.0	2250	150.0	1833	144.8	2716	150.0	2161	120.7	2716	137.1	2228	103.5	2716	123.2	2187	90.5	2716	114.2	2157	80.5	2716	108.5	2137	72.4	2716	105.6	2126
	114 in	150.0	1484	150.0	1322	150.0	1781	150.0	1547	150.0	2375	150.0	1958	123.2	2437	133.3	2059	102.6	2437	115.0	2013	88.0	2437	102.9	1975	77.0	2437	94.7	1946	68.4	2437	89.3	1925	61.6	2437	86.1	1913
	120 in	150.0	1563	150.0	1400	150.0	1875	150.0	1641	132.0	2200	138.1	1918	105.6	2200	113.4	1870	88.0	2200	97.5	1828	75.4	2200	86.8	1793	66.0	2200	79.5	1766	58.7	2200	74.4	1745	52.8	2200	71.2	1731
	126 in	150.0	1641	150.0	1478	150.0	1969	150.0	1734	114.0	1995	118.8	1749	91.2	1995	97.3	1706	76.0	1995	83.4	1668	65.2	1995	74.0	1637	57.0	1995	67.4	1610	50.7	1995	62.8	1590	45.6	1995	59.7	1575
	132 in	150.0	1719	150.0	1556	132.2	1818	135.0	1645	99.2	1818	102.9	1601	79.3	1818	84.1	1563	66.1	1818	72.0	1529	56.7	1818	63.6	1500	49.6	1818	57.7	1475	44.1	1818	53.5	1456	39.7	1818	50.6	1441
	138 in	138.9	1663	140.6	1532	115.7	1663	117.9	1510	86.8	1663	89.8	1472	69.4	1663	73.3	1437	57.9	1663	62.5	1407	49.6	1663	55.1	1380	43.4	1663	49.9	1357	38.6	1663	46.1	1338	34.7	1663	43.3	1324
	144 in	122.2	1528	123.6	1411	101.8	1528	103.6	1392	76.4	1528	78.8	1357	61.1	1528	64.2	1326	50.9	1528	54.7	1299	43.6	1528	48.1	1274	38.2	1528	43.4	1253	33.9	1528	39.9	1235	30.6	1528	37.4	1221

TABLE 10B:

5-3/8" Thermally-Broken, Adjustable Bay Mullion Clip/Anchor Capacity	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 CreteFlex	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"	2"	1"	1"	2"	0.54"	0.60"	0.324"
	Embedment (in):	1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/8"	1-3/8"	See Sheet 1
4 Total Anchors @ 3.5" O.C. thru 4x4 Angle Clip Pair (Fig. 1):		620 lbs	1260 lbs	440 lbs	1740 lbs	2525 lbs	460 lbs	740 lbs	640 lbs	1160 lbs	999 lbs	748 lbs	340 lbs	736 lbs	1892 lbs	885 lbs	1073 lbs	1073 lbs
8 Total Anchors @ 2" O.C. thru 4x4 Angle Clip Pair (Fig. 2):		1107 lbs	2520 lbs	827 lbs	3427 lbs	1275 lbs	733 lbs	1480 lbs	933 lbs	2053 lbs	1795 lbs	N/A	680 lbs	968 lbs	N/A	1770 lbs	2146 lbs	2146 lbs
10 Total Anchors @ 1.75" O.C. thru 4x4 Angle Clip Pair (Fig. 3):		1217 lbs	3150 lbs	1017 lbs	4267 lbs	N/A	858 lbs	1850 lbs	1058 lbs	2483 lbs	2187 lbs	N/A	850 lbs	1105 lbs	N/A	2212 lbs	2683 lbs	2682 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1.

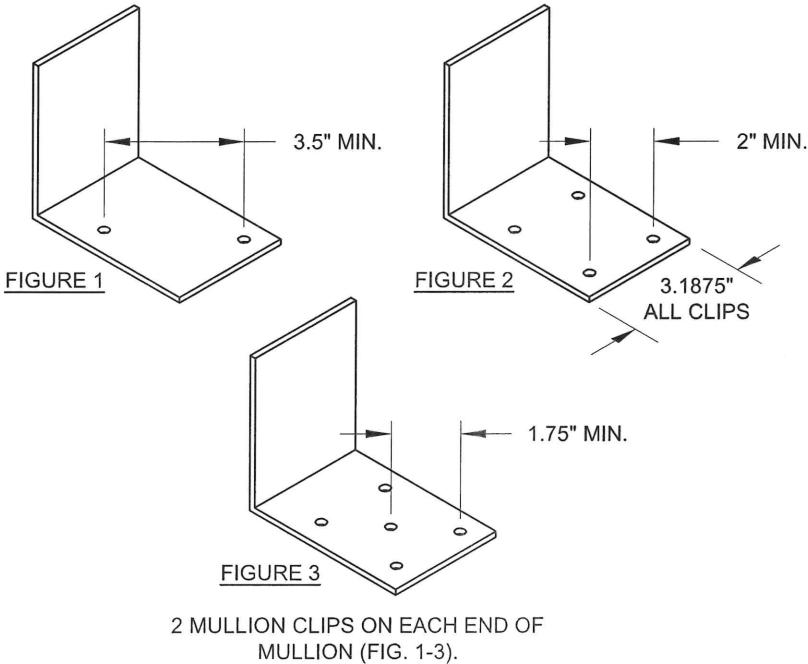


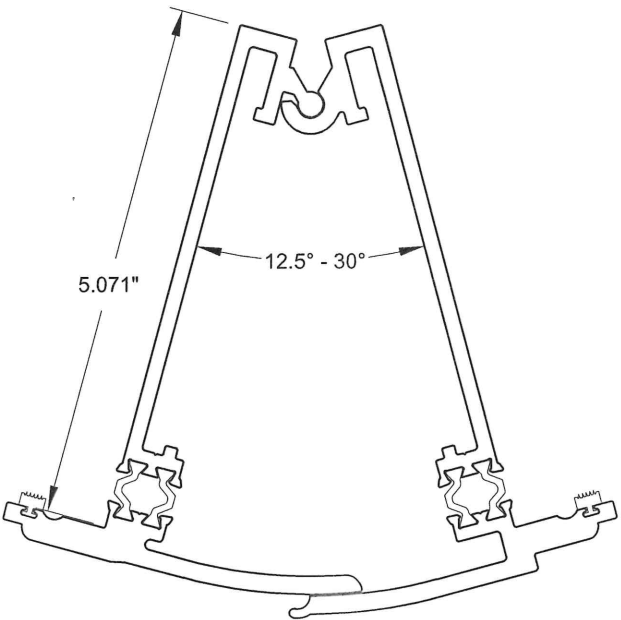
TABLE NOTES:

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

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

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

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



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

PREPARED BY A. LYNN MILLER
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ALUMINUM MULLIONS, CLIPPED (LM)

5-3/8" TB, ADJUSTABLE BAY MULLION

JENS ROSOWSKI

MULLS-1

NTS

15 OF 21

TUBEMULL-2

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

10/13/23
STATE OF FLORIDA

PROFESSIONAL ENGINEER

ANTHONY LYNN MILLER
LICENSE
No. 58705

TABLE 11A:

2" x 4-1/4" Thermally- Broken Tube Mullion w/Drip Cap Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																																			
		50 in				60 in				80 in				100 in				120 in				140 in				160 in				180 in				200 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 Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)
Mullion Span	54 in	150.0	703	150.0	540	150.0	844	150.0	609	150.0	1125	150.0	708	150.0	1406	150.0	755	150.0	1688	150.0	759	150.0	1969	150.0	759	150.0	2250	150.0	759	149.3	2520	150.0	759	134.4	2520	150.0	759
	60 in	150.0	781	150.0	618	150.0	938	150.0	703	150.0	1250	150.0	833	150.0	1563	150.0	911	150.0	1875	150.0	938	150.0	2188	150.0	938	150.0	2500	150.0	938	134.4	2520	150.0	938	121.0	2520	150.0	938
	66 in	150.0	859	150.0	697	150.0	1031	150.0	797	150.0	1375	150.0	958	150.0	1719	150.0	1068	150.0	2063	150.0	1125	150.0	2406	150.0	1134	137.5	2520	150.0	1134	122.2	2520	150.0	1134	110.0	2520	150.0	1134
	72 in	150.0	938	150.0	775	150.0	1125	150.0	891	150.0	1500	150.0	1083	150.0	1875	150.0	1224	150.0	2250	150.0	1313	144.0	2520	150.0	1349	126.0	2520	150.0	1350	112.0	2520	150.0	1350	100.8	2520	150.0	1350
	78 in	150.0	1016	150.0	853	150.0	1219	150.0	984	150.0	1625	150.0	1208	150.0	2031	150.0	1380	137.6	2236	150.0	1500	117.9	2236	150.0	1568	103.2	2236	150.0	1584	91.7	2236	150.0	1584	82.5	2236	150.0	1584
	84 in	150.0	1094	150.0	931	150.0	1313	150.0	1078	150.0	1750	150.0	1333	132.2	1928	150.0	1536	110.1	1928	136.5	1536	94.4	1928	127.4	1517	82.6	1928	123.4	1508	73.4	1928	122.9	1506	66.1	1928	122.9	1506
	90 in	150.0	1172	150.0	1009	150.0	1406	150.0	1172	134.3	1679	145.7	1416	107.5	1679	122.0	1377	89.6	1679	107.8	1348	76.8	1679	99.3	1328	67.2	1679	94.8	1317	59.7	1679	93.3	1312	53.7	1679	93.3	1312
	96 in	150.0	1250	150.0	1087	147.6	1476	150.0	1266	110.7	1476	118.8	1254	88.5	1476	99.0	1220	73.8	1476	86.8	1193	63.2	1476	79.2	1174	55.3	1476	74.7	1161	49.2	1476	72.5	1155	44.3	1476	72.1	1153
	102 in	147.6	1307	150.0	1165	123.0	1307	127.4	1155	92.3	1307	98.3	1119	73.8	1307	81.5	1089	61.5	1307	71.0	1065	52.7	1307	64.2	1046	46.1	1307	60.0	1033	41.0	1307	57.6	1025	36.9	1307	56.6	1022
	108 in	124.4	1166	127.1	1053	103.6	1166	106.9	1036	77.7	1166	82.2	1005	62.2	1166	67.9	978	51.8	1166	58.9	956	44.4	1166	52.9	939	38.9	1166	49.0	926	34.5	1166	46.6	918	31.1	1166	45.3	913
	114 in	105.8	1047	107.8	950	88.1	1047	90.6	935	66.1	1047	69.5	907	52.9	1047	57.2	884	44.1	1047	49.4	864	37.8	1047	44.2	848	33.0	1047	40.6	835	29.4	1047	38.3	827	26.4	1047	37.0	821
	120 in	90.7	945	92.2	861	75.6	945	77.5	847	56.7	945	59.3	824	45.3	945	48.7	803	37.8	945	41.9	785	32.4	945	37.3	770	28.3	945	34.1	758	25.2	945	32.0	749	22.7	945	30.6	743
	126 in	78.3	857	79.5	784	65.3	857	66.8	772	49.0	857	51.0	751	39.2	857	41.8	732	32.6	857	35.8	716	28.0	857	31.8	703	24.5	857	28.9	691	21.8	857	27.0	683	19.6	857	25.6	676
	132 in	68.1	781	69.1	716	56.8	781	57.9	706	42.6	781	44.2	687	34.1	781	36.1	671	28.4	781	30.9	657	24.3	781	27.3	644	21.3	781	24.8	633	18.9	781	23.0	625	17.0	781	21.7	619
138 in	59.6	714	60.4	658	49.7	714	50.6	648	37.3	714	38.6	632	29.8	714	31.5	617	24.8	714	26.8	604	21.3	714	23.7	592	18.6	714	21.4	583	16.6	714	19.8	575	14.9	714	18.6	568	
144 in	52.5	656	53.1	606	43.7	656	44.5	598	32.8	656	33.8	583	26.2	656	27.6	569	21.9	656	23.5	558	18.7	656	20.6	547	16.4	656	18.6	538	14.6	656	17.1	530	13.1	656	16.1	524	

TABLE 11B:

2" x 4-1/4" Thermally-Broken Tube Mullion w/Drip Cap Clip/Anchor Capacity	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 CreteFlex	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"	0.54"	0.60"	0.324"
	Embedment (in):		1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/8"	1-3/8"	See Sheet 1
4 Anchors @ 2.15" Min. O.C. / Mullion Clip (Fig. 1):		587 lbs	1260 lbs	417 lbs	1717 lbs	795 lbs	378 lbs	740 lbs	488 lbs	1043 lbs	909 lbs	N/A	340 lbs	505 lbs	N/A	885 lbs	1073 lbs	1073 lbs	
8 Anchors @ 1.25" Min. O.C. / Mullion Clip (Fig. 2):		707 lbs	2520 lbs	760 lbs	N/A	N/A	N/A	1480 lbs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1770 lbs	2146 lbs	2146 lbs	
3 Anchors @ 0.5" Min. O.C. / U-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	805 lbs	
4 Anchors @ 1.25" Min. O.C. / Modified Clip (Fig. 4):		353 lbs	1260 lbs	380 lbs	N/A	N/A	N/A	740 lbs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	885 lbs	1073 lbs	1073 lbs	

SEE SUBSTRATE PROPERTIES, SHEET 1.

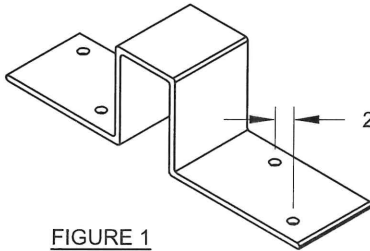


FIGURE 1

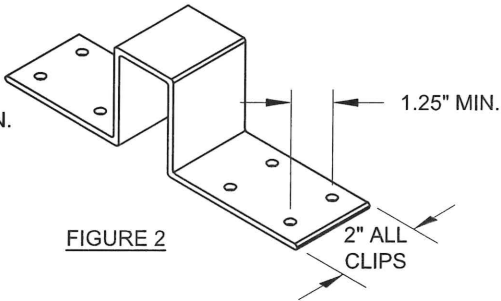


FIGURE 2

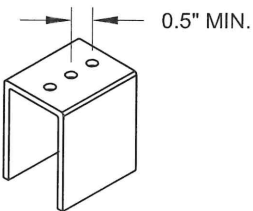


FIGURE 3

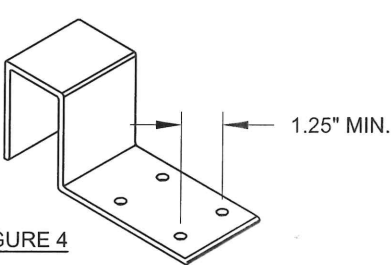


FIGURE 4

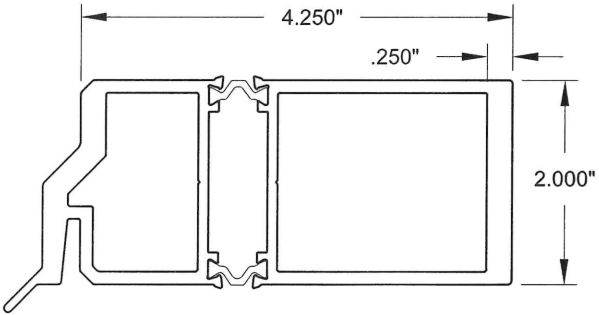
TABLE NOTES:

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

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

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

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



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104 TRIPLE DIAMOND BLVD.
N. VENICE, FL 34275
(407) 481-8400

PREPARED BY A. LYNN MILLER
1070 TECHNOLOGY DRIVE
N. VENICE, FL 34275
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ALUMINUM MULLIONS, CLIPPED (LM)

2" X 4-1/4" TB TUBE MULLION

JENS ROSOWSKI

Drawn By

Date

MULLS-1

Scale

NTS

Sheet

16 OF 21

DWG

No.

TUBEMULL-2

Rev.

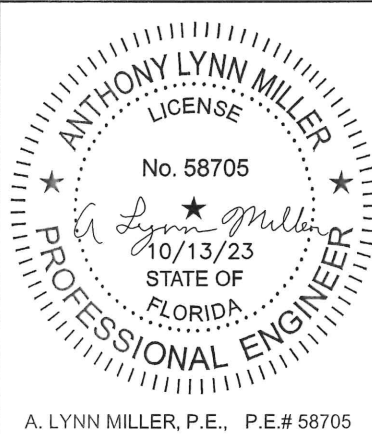
Date

10/10/23

Rev. #

A

NO CHANGES, THIS SHEET.
S.B.



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

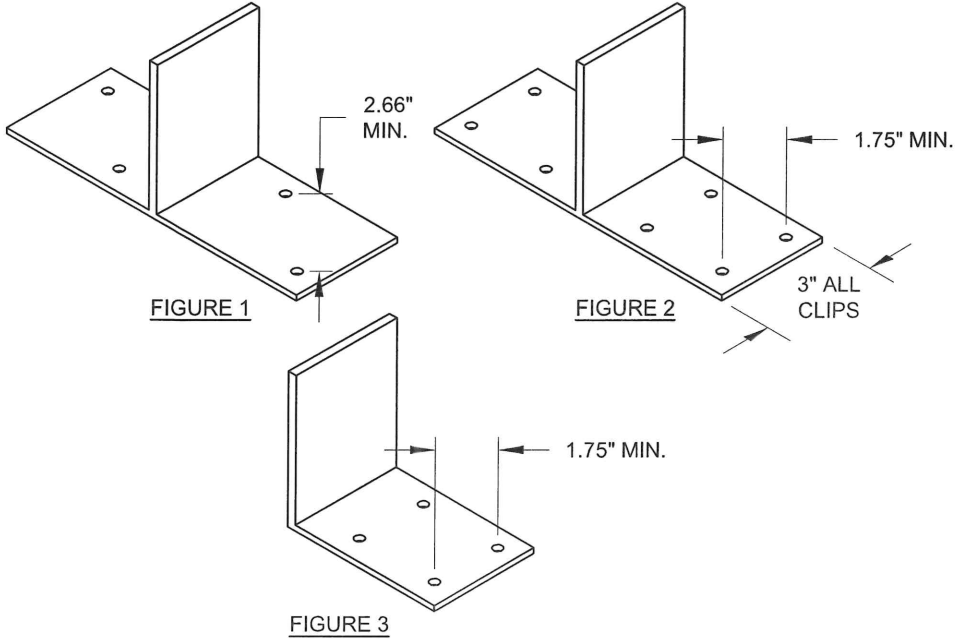
TABLE 12A:

2" x 5-3/4" Thermally- Broken Tube Mullion w/Drip Cap Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																																			
		50 in				60 in				80 in				100 in				120 in				140 in				160 in				180 in				200 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 Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)				
Mullion Span	54 in	150.0	703	150.0	540	150.0	844	150.0	609	150.0	1125	150.0	708	150.0	1406	150.0	755	150.0	1688	150.0	759	150.0	1969	150.0	759	150.0	2250	150.0	759	149.3	2520	150.0	759	134.4	2520	150.0	759
	60 in	150.0	781	150.0	618	150.0	938	150.0	703	150.0	1250	150.0	833	150.0	1563	150.0	911	150.0	1875	150.0	938	150.0	2188	150.0	938	150.0	2500	150.0	938	134.4	2520	150.0	938	121.0	2520	150.0	938
	66 in	150.0	859	150.0	697	150.0	1031	150.0	797	150.0	1375	150.0	958	150.0	1719	150.0	1068	150.0	2063	150.0	1125	150.0	2406	150.0	1134	137.5	2520	150.0	1134	122.2	2520	150.0	1134	110.0	2520	150.0	1134
	72 in	150.0	938	150.0	775	150.0	1125	150.0	891	150.0	1500	150.0	1083	150.0	1875	150.0	1224	150.0	2250	150.0	1313	144.0	2520	150.0	1349	126.0	2520	150.0	1350	112.0	2520	150.0	1350	100.8	2520	150.0	1350
	78 in	150.0	1016	150.0	853	150.0	1219	150.0	984	150.0	1625	150.0	1208	150.0	2031	150.0	1380	150.0	2438	150.0	1500	132.9	2520	150.0	1568	116.3	2520	150.0	1584	103.4	2520	150.0	1584	93.0	2520	150.0	1584
	84 in	150.0	1094	150.0	931	150.0	1313	150.0	1078	150.0	1750	150.0	1333	150.0	2188	150.0	1536	144.0	2520	150.0	1688	123.4	2520	150.0	1786	108.0	2520	150.0	1833	96.0	2520	150.0	1838	86.4	2520	150.0	1838
	90 in	150.0	1172	150.0	1009	150.0	1406	150.0	1172	150.0	1875	150.0	1458	150.0	2344	150.0	1693	134.4	2520	150.0	1875	115.2	2520	150.0	2005	100.8	2520	150.0	2083	89.6	2520	150.0	2109	80.6	2520	150.0	2109
	96 in	150.0	1250	150.0	1087	150.0	1500	150.0	1266	150.0	2000	150.0	1583	150.0	2500	150.0	1849	126.0	2520	150.0	2063	108.0	2520	150.0	2224	94.5	2520	150.0	2333	84.0	2520	150.0	2391	75.6	2520	150.0	2400
	102 in	150.0	1328	150.0	1165	150.0	1594	150.0	1359	150.0	2125	150.0	1708	142.3	2520	150.0	2005	118.6	2520	150.0	2250	101.6	2520	150.0	2443	88.9	2520	146.3	2520	79.1	2520	141.5	2520	71.2	2520	139.6	2520
	108 in	150.0	1406	150.0	1243	150.0	1688	150.0	1453	150.0	2250	150.0	1833	134.4	2520	150.0	2161	112.0	2520	146.6	2382	96.0	2520	131.8	2339	84.0	2520	122.1	2306	74.7	2520	116.1	2285	67.2	2520	112.9	2274
	114 in	150.0	1484	150.0	1322	150.0	1781	150.0	1547	150.0	2375	150.0	1958	127.3	2520	142.5	2202	106.1	2520	123.0	2153	90.9	2520	110.0	2112	79.6	2520	101.2	2081	70.7	2520	95.5	2059	63.7	2520	92.0	2045
	120 in	150.0	1563	150.0	1400	150.0	1875	150.0	1641	141.2	2353	147.7	2051	112.9	2353	121.2	2000	94.1	2353	104.3	1955	80.7	2353	92.8	1918	70.6	2353	85.0	1888	62.7	2353	79.6	1866	56.5	2353	76.2	1851
	126 in	150.0	1641	150.0	1478	150.0	1969	150.0	1734	121.9	2134	127.0	1870	97.5	2134	104.0	1824	81.3	2134	89.2	1784	69.7	2134	79.1	1750	61.0	2134	72.1	1722	54.2	2134	67.2	1700	48.8	2134	63.8	1685
	132 in	150.0	1719	150.0	1556	141.4	1944	144.3	1759	106.1	1944	110.1	1712	84.8	1944	90.0	1671	70.7	1944	77.0	1635	60.6	1944	68.0	1604	53.0	1944	61.7	1578	47.1	1944	57.3	1557	42.4	1944	54.1	1541
138 in	148.5	1779	150.0	1634	123.8	1779	126.1	1615	92.8	1779	96.0	1574	74.3	1779	78.3	1537	61.9	1779	66.9	1504	53.0	1779	59.0	1476	46.4	1779	53.3	1451	41.3	1779	49.2	1431	37.1	1779	46.3	1416	
144 in	130.7	1634	132.2	1509	108.9	1634	110.8	1489	81.7	1634	84.3	1451	65.4	1634	68.6	1418	54.5	1634	58.5	1389	46.7	1634	51.4	1363	40.8	1634	46.4	1340	36.3	1634	42.7	1321	32.7	1634	40.0	1306	

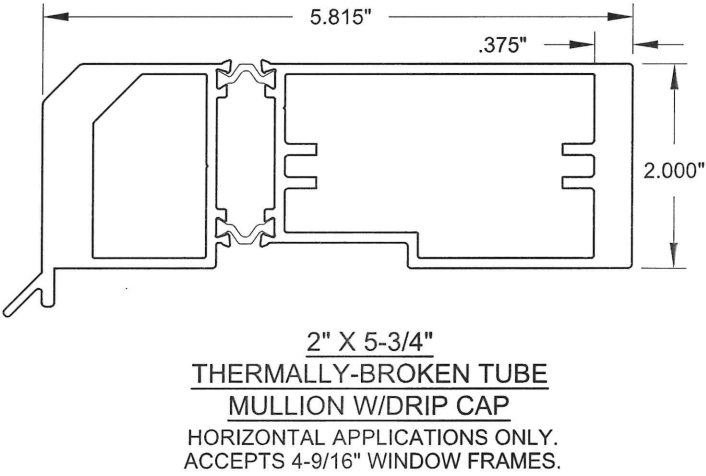
TABLE 12B:

2" x 5-3/4" Thermally-Broken Tube Mullion w/Drip Cap Clip/Anchor Capacity	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 CreteFlex	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"	0.54"	0.60"	0.324"
	Embedment (in):	1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/8"	1-3/8"	See Sheet 1
4 Anchors @ 2.66" Min. O.C. / Mullion Clip (Fig. 1):		620 lbs	1260 lbs	430 lbs	1730 lbs	1424 lbs	425 lbs	740 lbs	575 lbs	1110 lbs	954 lbs	N/A	340 lbs	589 lbs	N/A	885 lbs	1073 lbs	1073 lbs
8 Anchors @ 1.75" Min. O.C. / Mullion Clip (Fig. 2):		973 lbs	2520 lbs	813 lbs	3413 lbs	N/A	687 lbs	1480 lbs	847 lbs	1987 lbs	1749 lbs	N/A	680 lbs	884 lbs	N/A	1770 lbs	2146 lbs	2146 lbs
4 Anchors @ 1.75" Min. O.C. / Modified Clip (Fig. 3):		487 lbs	1260 lbs	407 lbs	1707 lbs	N/A	343 lbs	740 lbs	423 lbs	993 lbs	875 lbs	N/A	340 lbs	442 lbs	N/A	885 lbs	1073 lbs	1073 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1.



- TABLE NOTES:
- 1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT/UNIFORMLY LOADED CLARIFICATION.
- 2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 3/8" O.C. FROM CLIP EDGE.
- 3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.
- 4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



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INCORPORATED
104 TRIPLE DIAMOND BLVD.
N. VENICE, FL 34275
(407) 481-8400

ALUMINUM MULLIONS, CLIPPED (LM)

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

JENS ROSOWSKI

17 OF 21

TUBEMULL-2

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

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

TABLE 13A:

1-1/4" x 4" Thermally- Broken Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																																			
		50 in				60 in				80 in				100 in				120 in				140 in				160 in				180 in				200 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 Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)				
Mullion Span	54 in	150.0	703	150.0	540	150.0	844	150.0	609	150.0	1125	150.0	708	150.0	1406	150.0	755	150.0	1688	150.0	759	150.0	1969	150.0	759	143.1	2146	150.0	759	127.2	2146	150.0	759	114.5	2146	150.0	759
	60 in	150.0	781	150.0	618	150.0	938	150.0	703	150.0	1250	150.0	833	150.0	1563	150.0	911	150.0	1875	150.0	938	147.2	2146	150.0	938	128.8	2146	150.0	938	114.5	2146	150.0	938	103.0	2146	150.0	938
	66 in	150.0	859	150.0	697	150.0	1031	150.0	797	150.0	1375	150.0	958	150.0	1719	150.0	1068	150.0	2063	150.0	1125	133.1	2135	150.0	1134	116.5	2135	150.0	1134	103.5	2135	150.0	1134	93.2	2135	150.0	1134
	72 in	150.0	938	150.0	775	150.0	1125	150.0	891	150.0	1500	150.0	1083	143.5	1794	150.0	1224	119.6	1794	150.0	1313	102.5	1794	150.0	1349	89.7	1794	150.0	1350	79.7	1794	150.0	1350	71.8	1794	150.0	1350
	78 in	150.0	1016	150.0	853	150.0	1219	150.0	984	141.1	1529	150.0	1208	112.9	1529	133.9	1232	94.1	1529	121.0	1210	80.6	1529	114.6	1198	70.5	1529	113.1	1194	62.7	1529	113.1	1194	56.4	1529	113.1	1194
	84 in	150.0	1094	150.0	931	150.0	1313	150.0	1078	113.0	1318	124.0	1102	90.4	1318	104.6	1072	75.3	1318	93.4	1050	64.6	1318	87.1	1037	56.5	1318	84.4	1031	50.2	1318	84.1	1030	45.2	1318	84.1	1030
	90 in	147.0	1148	150.0	1009	122.5	1148	128.1	1001	91.9	1148	99.6	968	73.5	1148	83.5	942	61.2	1148	73.7	922	52.5	1148	67.9	908	45.9	1148	64.8	900	40.8	1148	63.8	897	36.7	1148	63.8	897
	96 in	121.1	1009	124.4	902	100.9	1009	105.0	886	75.7	1009	81.3	858	60.5	1009	67.7	834	50.5	1009	59.3	816	43.2	1009	54.1	803	37.8	1009	51.0	794	33.6	1009	49.6	790	30.3	1009	49.3	788
	102 in	101.0	894	103.4	803	84.1	894	87.1	790	63.1	894	67.2	765	50.5	894	55.7	745	42.1	894	48.5	728	36.1	894	43.9	715	31.5	894	41.0	706	28.0	894	39.4	701	25.2	894	38.7	699
	108 in	85.0	797	86.9	720	70.9	797	73.1	708	53.2	797	56.2	687	42.5	797	46.4	669	35.4	797	40.2	654	30.4	797	36.2	642	26.6	797	33.5	633	23.6	797	31.9	627	21.3	797	31.0	624
	114 in	72.3	716	73.7	649	60.3	716	62.0	639	45.2	716	47.5	620	36.2	716	39.1	604	30.1	716	33.8	591	25.8	716	30.2	580	22.6	716	27.8	571	20.1	716	26.2	565	18.1	716	25.3	561
	120 in	62.0	646	63.1	588	51.7	646	53.0	579	38.7	646	40.5	563	31.0	646	33.3	549	25.8	646	28.6	537	22.1	646	25.5	527	19.4	646	23.3	518	17.2	646	21.9	512	15.5	646	20.9	508
	126 in	53.6	586	54.4	536	44.6	586	45.7	528	33.5	586	34.9	513	26.8	586	28.6	501	22.3	586	24.5	490	19.1	586	21.7	480	16.7	586	19.8	473	14.9	586	18.4	467	13.4	586	17.5	462
	132 in	46.6	534	47.2	490	38.8	534	39.6	483	29.1	534	30.2	470	23.3	534	24.7	459	19.4	534	21.1	449	16.6	534	18.7	440	14.6	534	16.9	433	12.9	534	15.7	427				
	138 in	40.8	488	41.3	450	34.0	488	34.6	443	25.5	488	26.4	432	20.4	488	21.5	422	17.0	488	18.4	413	14.6	488	16.2	405												
	144 in	35.9	448	36.3	414	29.9	448	30.4	409	22.4	448	23.1	398	17.9	448	18.8	389	14.9	448	16.1	381																

TABLE 13B:

1-1/4" x 4" Thermally-Broken Tube Mullion Clip/Anchor Capacity	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 CreteFlex	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"	0.54"	0.60"	0.324"
	Embedment (in):	1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/8"	1-3/8"	See Sheet 1
4 Anchors @ 2.1" Min. O.C. / Mullion Clip (Fig. 1):		570 lbs	1260 lbs	415 lbs	1715 lbs	716 lbs	373 lbs	740 lbs	478 lbs	1035 lbs	903 lbs	N/A	340 lbs	495 lbs	N/A	885 lbs	1073 lbs	1073 lbs
8 Anchors @ 0.9375" Min. O.C. / Mullion 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	1770 lbs	2146 lbs	2146 lbs
3 Anchors @ 0.5" Min. O.C. / U-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	805 lbs
4 Anchors @ 0.9375" Min. O.C. / Modified Clip (Fig. 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	885 lbs	1073 lbs	1073 lbs

SEE SUBSTRATE PROPERTIES, SHEET 1.

CIRCLED VALUES ARE USED IN THE EXAMPLE ON SHEET 21.

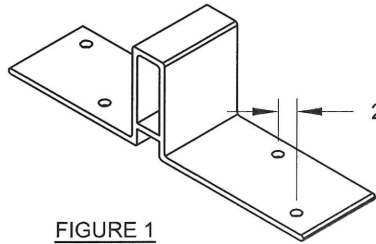


FIGURE 1

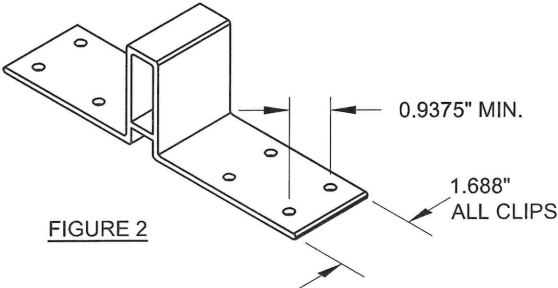


FIGURE 2

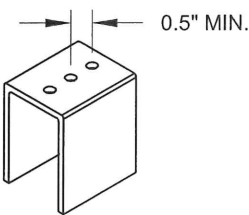


FIGURE 3

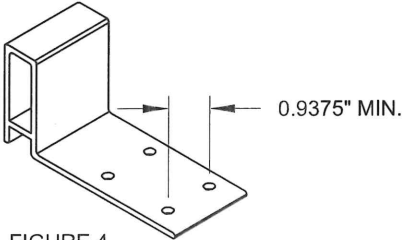
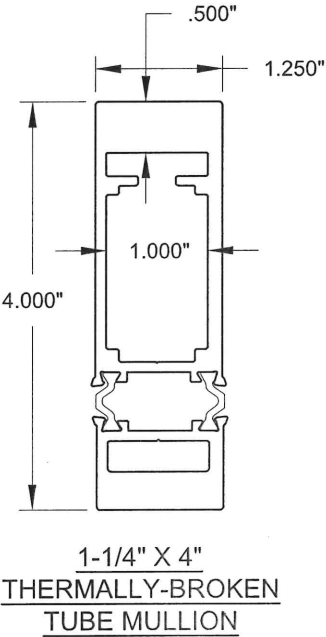


FIGURE 4

TABLE NOTES:

- 1) LINEAR INTERPOLATION BETWEEN MULLION SPANS AND/OR OPENING DIMENSIONS IS ALLOWABLE. SEE SHEET 2 FOR POINT/UNIFORMLY LOADED CLARIFICATION.
- 2) MULLION AND MULLION CLIPS SHOWN ARE NOT TO SCALE. FOR EXACT DIMENSIONS, SEE SHEET 2. HOLES MAY BE DRILLED IN THE FIELD FOLLOWING DIMENSIONAL RESTRICTIONS SHOWN ON THIS SHEET. FIGURES SHOW SUGGESTED, APPROXIMATE HOLE LOCATIONS. CLIP HOLES TO BE NO CLOSER THAN 3/8" O.C. FROM CLIP EDGE.
- 3) SEE SHEET 1 FOR ADDITIONAL ANCHOR/SUBSTRATE NOTES.
- 4) IF A LOWER DESIGN PRESSURE AND ANCHOR QUANTITY IS DESIRED, SEE THE ANCHOR CAPACITY ADJUSTMENT FORMULA ON SHEET 1.



PREPARED BY A. LYNN MILLER
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WINDOOR®
INCORPORATED
104 TRIPLE DIAMOND BLVD.
N. VENICE, FL 34275
(407) 481-8400

ALUMINUM MULLIONS, CLIPPED (LM)

JENS ROSOWSKI

TUBEMULL-2

18 OF 21

NTS

MULLS-1

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

Scale

Series

Title

Desc

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

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

2" x 5-5/8" Thermally-Broken Tube Mullion Design Pressure & Clip/Anchor Capacity Requirement		Opening Dimension																																			
		50 in				60 in				80 in				100 in				120 in				140 in				160 in				180 in				200 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 Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)	Mullion Capacity (lbs/ft ²)	Anchor Capacity Required (lbs)				
Mullion Span	54 in	150.0	703	150.0	540	150.0	844	150.0	609	150.0	1125	150.0	708	150.0	1406	150.0	755	150.0	1688	150.0	759	150.0	1969	150.0	759	150.0	2250	150.0	759	150.0	2531	150.0	759	150.0	2813	150.0	759
	60 in	150.0	781	150.0	618	150.0	938	150.0	703	150.0	1250	150.0	833	150.0	1563	150.0	911	150.0	1875	150.0	938	150.0	2188	150.0	938	150.0	2500	150.0	938	150.0	2813	150.0	938	150.0	3125	150.0	938
	66 in	150.0	859	150.0	697	150.0	1031	150.0	797	150.0	1375	150.0	958	150.0	1719	150.0	1068	150.0	2063	150.0	1125	150.0	2406	150.0	1134	150.0	2750	150.0	1134	150.0	3094	150.0	1134	148.9	3413	150.0	1134
	72 in	150.0	938	150.0	775	150.0	1125	150.0	891	150.0	1500	150.0	1083	150.0	1875	150.0	1224	150.0	2250	150.0	1313	150.0	2625	150.0	1349	150.0	3000	150.0	1350	150.0	3375	150.0	1350	136.5	3413	150.0	1350
	78 in	150.0	1016	150.0	853	150.0	1219	150.0	984	150.0	1625	150.0	1208	150.0	2031	150.0	1380	150.0	2438	150.0	1500	150.0	2844	150.0	1568	150.0	3250	150.0	1584	140.0	3413	150.0	1584	126.0	3413	150.0	1584
	84 in	150.0	1094	150.0	931	150.0	1313	150.0	1078	150.0	1750	150.0	1333	150.0	2188	150.0	1536	150.0	2625	150.0	1688	150.0	3063	150.0	1786	146.3	3413	150.0	1833	130.0	3413	150.0	1838	117.0	3413	150.0	1838
	90 in	150.0	1172	150.0	1009	150.0	1406	150.0	1172	150.0	1875	150.0	1458	150.0	2344	150.0	1693	150.0	2813	150.0	1875	150.0	3281	150.0	2005	136.5	3413	150.0	2083	121.4	3413	150.0	2109	109.2	3413	150.0	2109
	96 in	150.0	1250	150.0	1087	150.0	1500	150.0	1266	150.0	2000	150.0	1583	150.0	2500	150.0	1849	150.0	3000	150.0	2063	146.3	3413	150.0	2224	128.0	3413	150.0	2333	113.8	3413	150.0	2391	102.4	3413	150.0	2400
	102 in	150.0	1328	150.0	1165	150.0	1594	150.0	1359	150.0	2125	150.0	1708	150.0	2656	150.0	2005	150.0	3188	150.0	2250	134.9	3344	150.0	2443	118.0	3344	150.0	2583	104.9	3344	147.3	2623	94.4	3344	144.8	2614
	108 in	150.0	1406	150.0	1243	150.0	16																														

2" x 5-5/8" Thermally-Broken Tube Mullion Clip/Anchor Capacity	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 CreteFlex	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"	0.54"	0.60"	0.324"	
	Embedment (in):		1-3/4"	1-3/4"	1-3/4"	1-3/4"	2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-3/4"	1-3/4"	2"	1-3/8"	1-3/8"	See Sheet 1	
4 Anchors @ 2.65" Min. O.C. / Mullion Clip (Fig. 1):		620 lbs	1260 lbs	430 lbs	1730 lbs	1424 lbs	425 lbs	740 lbs	575 lbs	1110 lbs	954 lbs	N/A	340 lbs	589 lbs	N/A	885 lbs	1073 lbs	1073 lbs		
8 Anchors @ 1.75" Min. O.C. / Mullion Clip (Fig. 2):		973 lbs	2520 lbs	813 lbs	3413 lbs	N/A	687 lbs	1480 lbs	847 lbs	1987 lbs	1749 lbs	N/A	680 lbs	884 lbs	N/A	1770 lbs	2146 lbs	2146 lbs		
3 Anchors @ 0.625" Min. O.C. / U-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	805 lbs		
4 Anchors @ 1.75" Min. O.C. / Modified Clip (Fig. 4):		487 lbs	1260 lbs	407 lbs	1707 lbs	N/A	343 lbs	740 lbs	423 lbs	993 lbs	875 lbs	N/A	340 lbs	442 lbs	N/A	885 lbs	1073 lbs	1073 lbs		

FIGURE 1

2.65"

FIGURE 2

1.75" MIN.

3.375"

ALL CLIPS

FIGURE 3

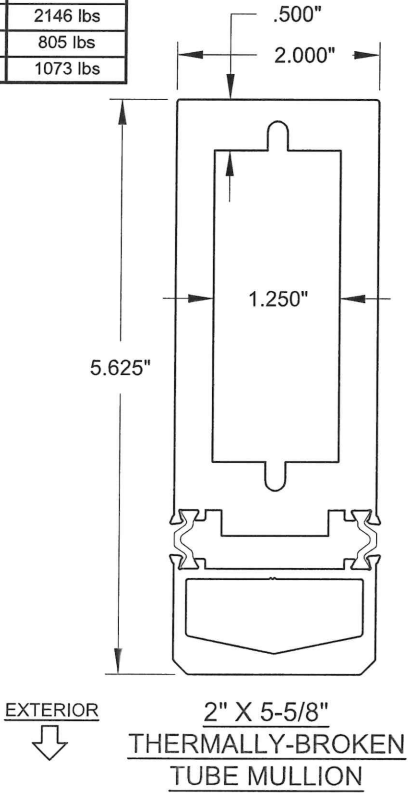
0.625" MIN.

FIGURE 4

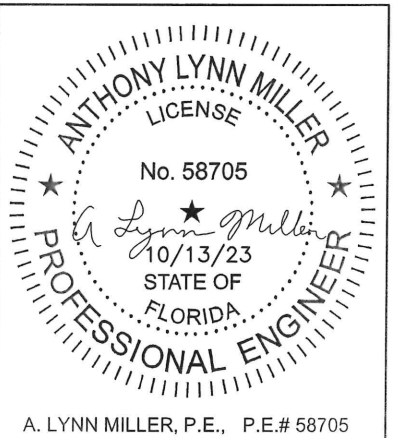
1.75" MIN.

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.

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



WINDOOR® INCORPORATED 104 TRIPLE DIAMOND BLVD. N. VENICE, FL 34275 (407) 481-8400		PREPARED BY A. LYNN MILLER 1070 TECHNOLOGY DRIVE N. VENICE, FL 34275 (941) 480-1600	
		REGISTRATION #29296	
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ALUMINUM MULLIONS, CLIPPED (LM)			
Desc	Date		
2" X 5-5/8" TB TUBE MULLION		By	JENS ROSOWSKI
MULLS-1		DWC	TUBEMULL-2
Scale	NTS	No.	Rev.
		19 OF 21	



EXAMPLE 1: MULTIPLE MULLIONS

THE BUILDING SUBSTRATE IS KNOWN TO BE HOLLOW CMU ON THE JAMBS AND USES A CONCRETE HEADER AND SILL. THE WINDOW FRAME DEPTH IS 4-9/16". THE OPENING REQUIRES A DESIGN PRESSURE OF +110.0/-130.0 PSF.

FOR THE VERTICAL MULLION:

1) INITIALLY ASSUMING THAT A 1" WIDE MULLION IS SUITABLE, THE MULLION SPAN IS 32"+72"+1"=105" AND THE OPENING DIMENSION IS 36"+36"+1" =73". REFERENCING SHEET 2, THE MULLION IS POINT LOADED. SCAN THE MULLION TABLES FOR A MULLION THAT IS AT LEAST THE WINDOW FRAME DEPTH OF 4-9/16" AND WILL MEET OR EXCEED THE REQUIRED DESIGN PRESSURE OF +110.0/-130.0 PSF. IF THE TABLE DOES NOT SHOW THE EXACT SIZE, USE THE NEXT LARGER SIZE AVAILABLE.

FROM TABLE 2A, SHEET 7, THE 2" X 6" X 0.375" MULLION (SPAN = 108", OPENING DIMENSION = 80") HAS A DESIGN PRESSURE OF +/-150.0 PSF WHICH EXCEEDS THE REQUIREMENTS FOR THE OPENING AND MAY BE USED IN THIS APPLICATION. NOTE THE CORRESPONDING ANCHOR CAPACITY REQUIRED OF 2250 LBS.

BECAUSE IT IS NOW KNOWN THAT THE MULLION WILL ADD 2" TO THE WIDTH OF THE MULLED UNIT INSTEAD OF 1", THE ADJUSTED OPENING DIMENSION IS 36"+36"+2"=74", NOT 73" 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 73" DIMENSION (35-1/2"+35-1/2"+2"=73").

2) USE TABLE 2B TO FIND THE ANCHOR TYPE, ANCHOR QUANTITY AND CLIP TYPE REQUIRED FOR THE CONCRETE SUBSTRATE. IN THIS EXAMPLE, ASSUME THE POURED CONCRETE HEADER AND SILL ARE 8" WIDE. IF THE MULLION CLIP WERE TO BE CENTERED WITHIN THE 8", CARE MUST BE TAKEN TO MAINTAIN THE FASTENER'S EDGE DISTANCE. USING THE STANDARD CLIP WITH (8) 3/16" ULTRACON+ ANCHORS AT AN EDGE DISTANCE OF 2-1/2" GIVES AN ANCHOR CAPACITY OF 2520 LBS WHICH IS GREATER, AND THEREFORE SUITABLE, FOR THE REQUIRED ANCHOR CAPACITY OF 2250 LBS.

FOR THE HORIZONTAL MULLIONS:

BECAUSE THE VERTICAL MULL WILL BE A 2" X 6" X 0.375" MULLION, IN THIS EXAMPLE WE WILL MATCH THE HORIZONTAL AND VERTICAL MULLIONS, ALTERNATIVELY, ANOTHER MULLION TYPE COULD BE CHOSEN.

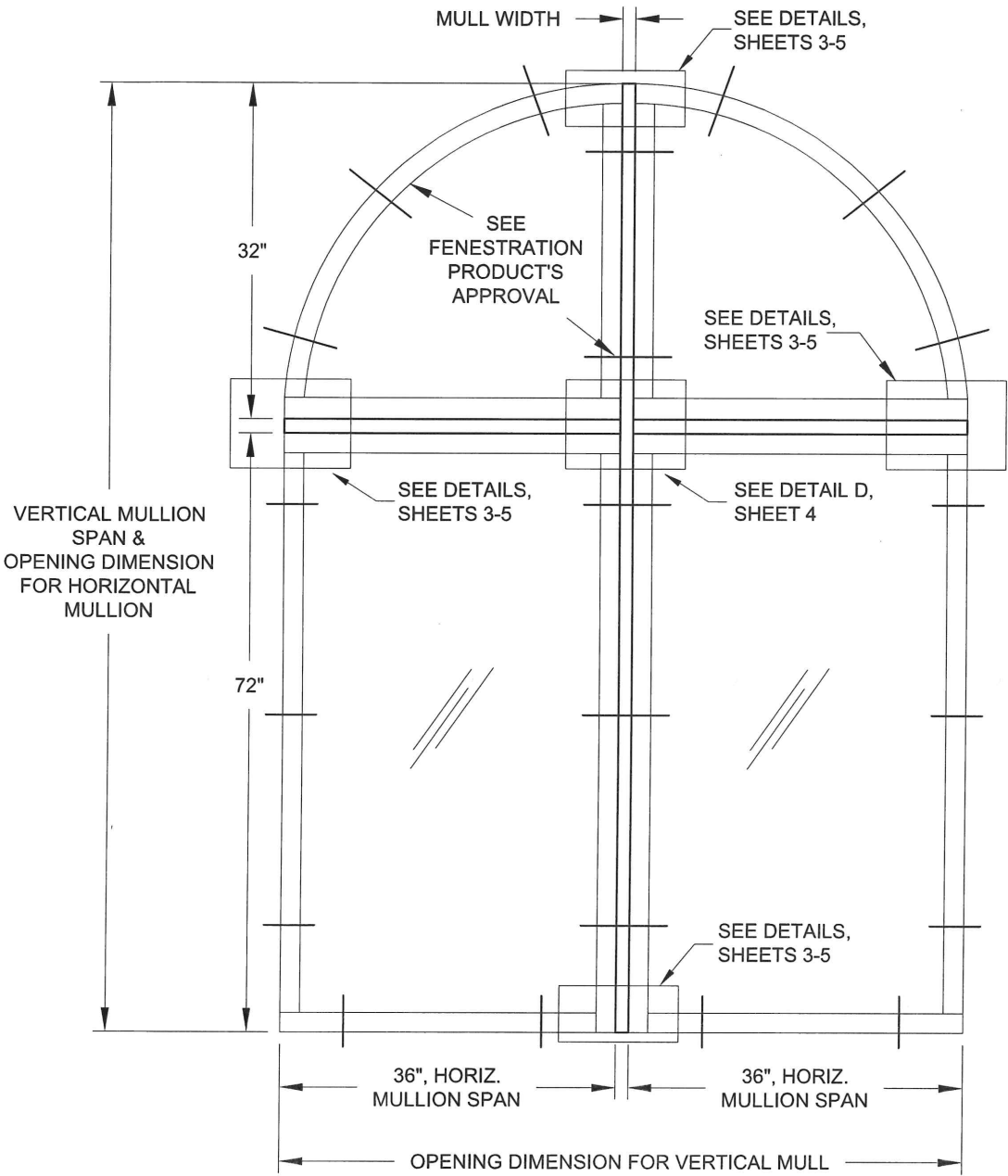
1) THE MULLION SPAN IS 36" AND THE OPENING DIMENSION IS 32"+72"+2" =106". REFERENCING SHEET 2, THE MULLION IS UNIFORMLY LOADED. FROM TABLE 2A, SHEET 7, THE 2" X 6" X 0.375" MULLION (@ SPAN = 42", OPENING DIMENSION = 120") HAS A DESIGN PRESSURE OF +/-150.0 PSF WHICH EXCEEDS THE REQUIREMENTS FOR THE OPENING AND MAY BE USED IN THIS APPLICATION. NOTE THE CORRESPONDING ANCHOR CAPACITY REQUIRED OF 459 LBS.

2) USE TABLE 2B 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 MULL CLIPS WITH (4) 3/16" ULTRACON+ ANCHORS AT AN EDGE DISTANCE OF 2-1/2" GIVES AN ANCHOR CAPACITY OF 740 LBS WHICH IS GREATER, AND THEREFORE SUITABLE, FOR THE REQUIRED ANCHOR CAPACITY OF 459 LBS. THE SAME ANCHOR TYPES WERE CHOSEN AS BEFORE FOR SIMPLICITY, HOWEVER ANY ANCHOR MEETING THE REQUIREMENTS COULD HAVE BEEN USED.

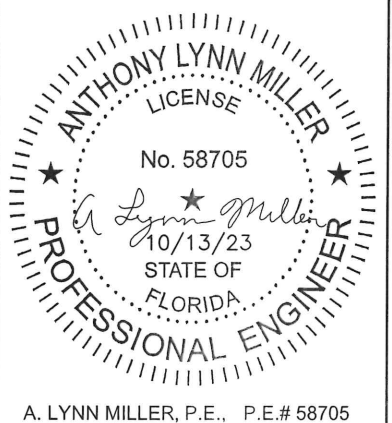
3) FOR THE U-CLIP IN THE HORIZONTAL MULLION TO VERTICAL MULLION, USE THE SAME ANCHOR CAPACITY OF 521 LBS. TABLE 2B FOR THE U-CLIP SHOWS THE ANCHOR CAPACITY IS 805 LBS WHEN USING 3 ANCHORS, WHICH IS GREATER, AND THEREFORE SUITABLE, FOR THE REQUIRED ANCHOR CAPACITY REQUIREMENT OF 459 LBS. THE ANCHOR TYPE IS A #12 STEEL SCREW.

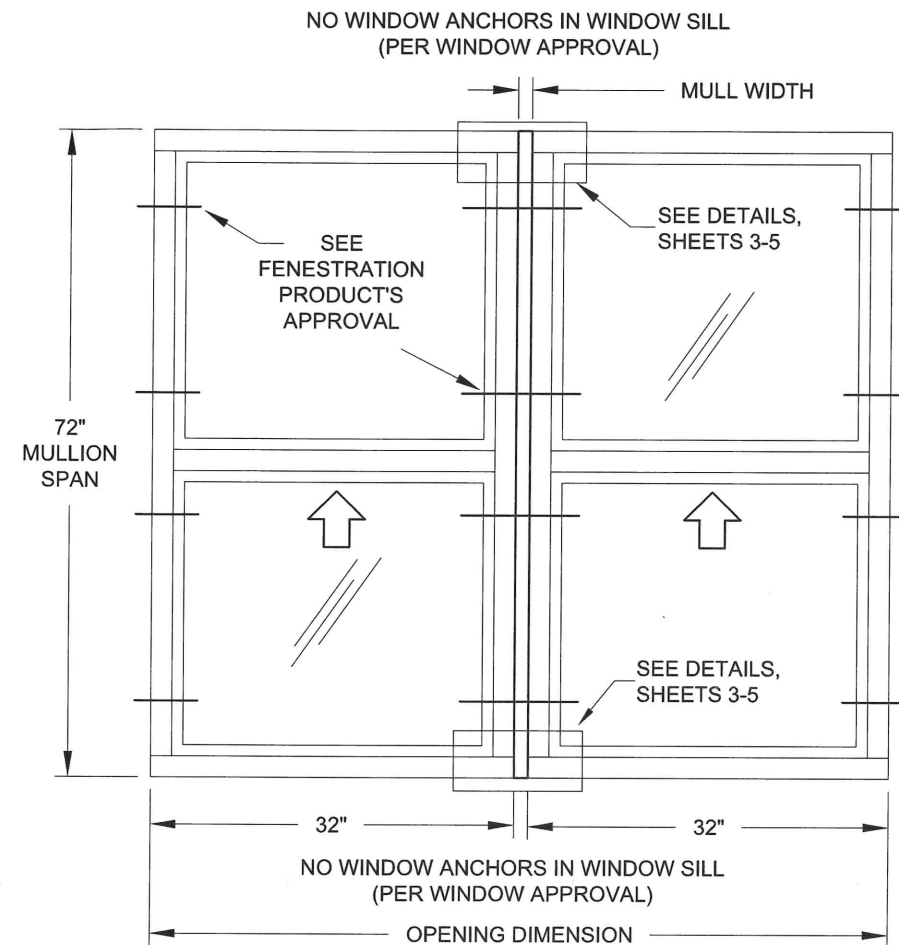
FROM THE ABOVE STEPS, OUR MULLION DESIGN PRESSURE IS:
+/-150.0 PSF FROM THE VERTICAL MULLION;
+/-150.0 PSF FROM THE 36" HORIZONTAL MULLION ATTACHING TO CMU;
+/-150.0 PSF FROM THE 36" HORIZONTAL MULLION ATTACHING TO THE VERTICAL MULLION (INTERSECTION).
THE LOWEST DESIGN PRESSURE IS +/-150.0 PSF AND WOULD APPLY TO ALL OF THE MULLIONS.

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



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WINDOOR® INCORPORATED 104 TRIPLE DIAMOND BLVD. N. VENICE, FL 34275 (407) 481-8400		ALUMINUM MULLIONS, CLIPPED (LM)		EXAMPLE 1	
Series		Title		Desc.	
MULLS-1		NTS		20 OF 21	
Scale		Sheet		DWG	
No.		By		Date	





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 32"+32"+1" = 65". REFERENCING SHEET 2, THE MULLION IS UNIFORMLY LOADED. SCAN THE MULLION TABLES FOR A MULLION THAT IS AT LEAST THE WINDOW FRAME DEPTH OF 2-3/4" AND WILL MEET OR EXCEED THE REQUIRED DESIGN PRESSURE OF +60.0/-60.0 PSF. IF THE TABLE DOES NOT SHOW THE EXACT SIZE, USE THE NEXT LARGER SIZE AVAILABLE.

FROM TABLE 13A, SHEET 18 THE 1-1/4" X 4" MULLION (SPAN = 72", OPENING DIMENSION = 70") HAS A DESIGN PRESSURE OF +/-150.0 PSF WHICH EXCEEDS THE REQUIREMENTS FOR THE OPENING AND MAY BE USED IN THIS APPLICATION. NOTE THE ANCHOR CAPACITY REQUIRED OF 1083 LBS.

2) USE TABLE 13B TO FIND THE ANCHOR TYPE, ANCHOR QUANTITY AND CLIP TYPE REQUIRED FOR THE WOOD SUBSTRATE. THE STANDARD CLIP WITH (8) #12 ANCHORS HAS A CAPACITY OF 1770 LBS WHICH IS GREATER, AND THEREFORE SUITABLE, FOR THE REQUIRED ANCHOR CAPACITY OF 1083 LBS.

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

IN THIS EXAMPLE, THE DESIGN PRESSURE REQUIRED WAS +/-60.0 PSF. THE OVERALL MULLION SYSTEM WAS DETERMINED TO BE +/-150.0 PSF WITH AN ANCHOR CAPACITY OF 1770 LBS. ALTERNATIVELY, THE ANCHOR CAPACITY ADJUSTMENT FORMULA COULD HAVE BEEN USED TO CALCULATE THE ANCHOR CAPACITY REQUIRED FOR THE EXACT DESIGN PRESSURE OF 60.0 PSF:

$$(60 \text{ PSF}) \times \left(\frac{1770 \text{ LBS}}{150.0 \text{ PSF}} \right) = 708.0 \text{ LBS} \text{ (I.E. YOU COULD USE A LOWER CAPACITY ANCHORAGE OPTION OF 708.0 LBS SINCE YOU ONLY REQUIRE A DESIGN PRESSURE OF 60 PSF.)}$$

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WINDOOR® INCORPORATED 104 TRIPLE DIAMOND BLVD. N. VENICE, FL 34275 (407) 481-8400		ALUMINUM MULLIONS, CLIPPED (LM)		EXAMPLE 2	
MULLS-1		NTS		21 OF 21	
Series		Title		Desc.	
A. LYNN MILLER, P.E., P.E.# 58705		10/13/23		STATE OF FLORIDA	