CDC
CURTAINWALL DESIGN CONSULTING™

PROJECT: ***HD500-T HURRICANE IMPACT -TDI SUBMISSION***

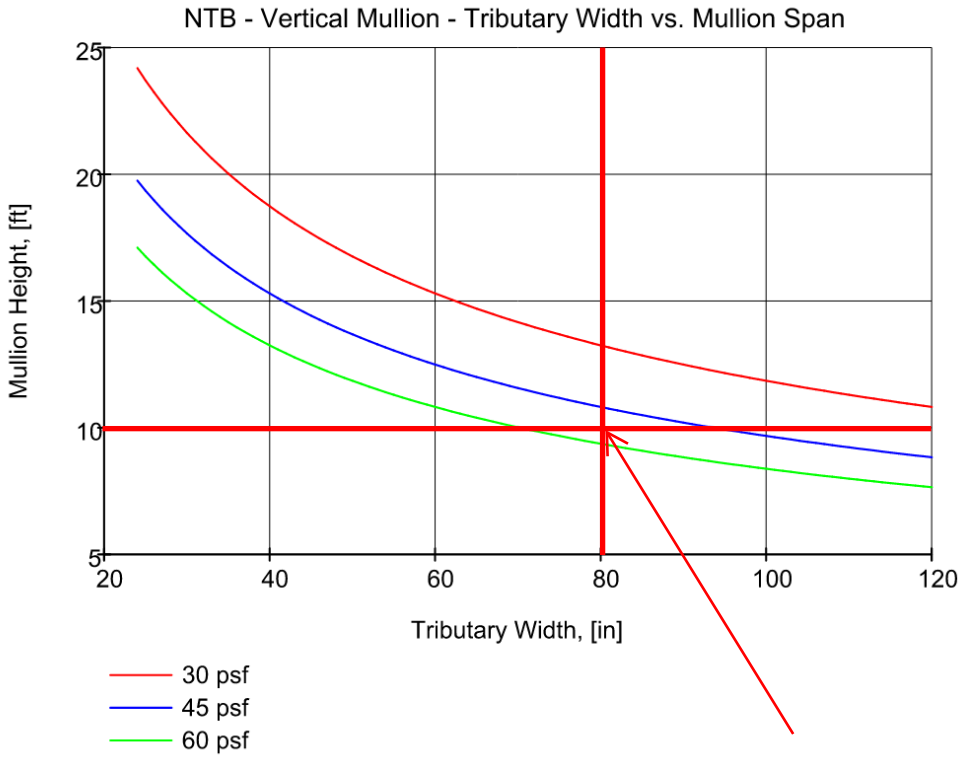
CLIENT: ***ATLAS INC.***

SUBJECT: ***HD500-T STOREFRONT STRUCTURAL CALCULATIONS - WIND LOAD CHARTS 30 PSF, 45PSF, 60PSF***

DATE: ***12 NOVEMBER 2021***

The following Windload Charts were created to show the relationship between the intermediate mullion tributary width and mullion span. The charts include provisions for 30 psf, 45 psf, and 60 psf, respectively. The charts analyze the relationship between the tributary width and span and compare the results to the allowable moment capacities as determined by ADM 2015. The solid line indicates a 100% utilization and serve as a cutoff for varying mullion height and tributary width combinations.

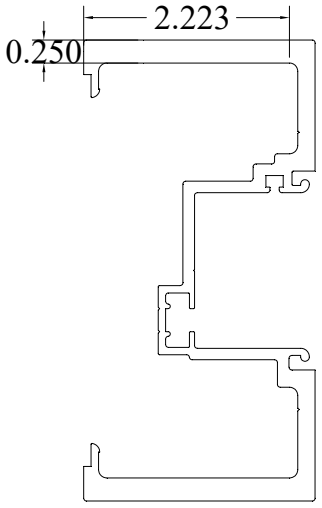
See example below,



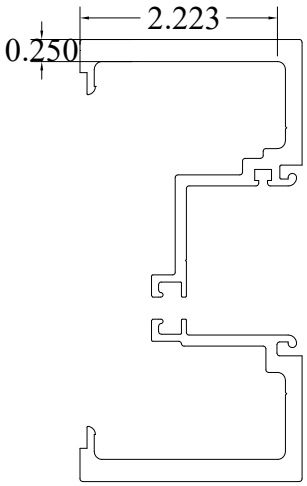
From the above chart, at 60 psf, the moment capacity of the mullion under a simply supported beam case will be considered over allowable per ADM 2015 capacities when the tributary width is 80 [in] and the mullion height is 10 [ft].

The moment at this condition is then, M== (60psf)*(80")*(10')^2*8^-1==60,000 lbf*in
The allowable moment capacity is, Ma== 52,651 lbf*in Utlization is therefore 1.14

- HD500-T - SYSTEM - TYPICAL INTERMEDIATE MULLION - WIND LOAD CHART -

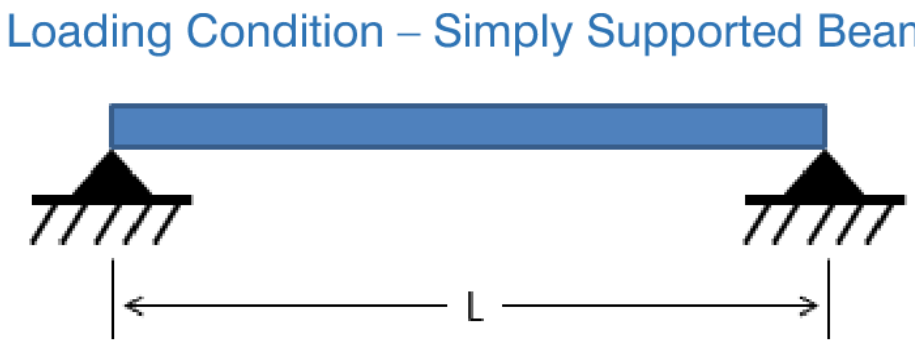


Non-Thermally Broken Vertical



Thermally Broken Vertical Mullion

Assumed Loading Condition



Moment of Inertia

Allowable Bending Moment
(Ref. Shape Properties, Appendix)

$M_1 := M_A = 52651 \cdot lbf \cdot in$

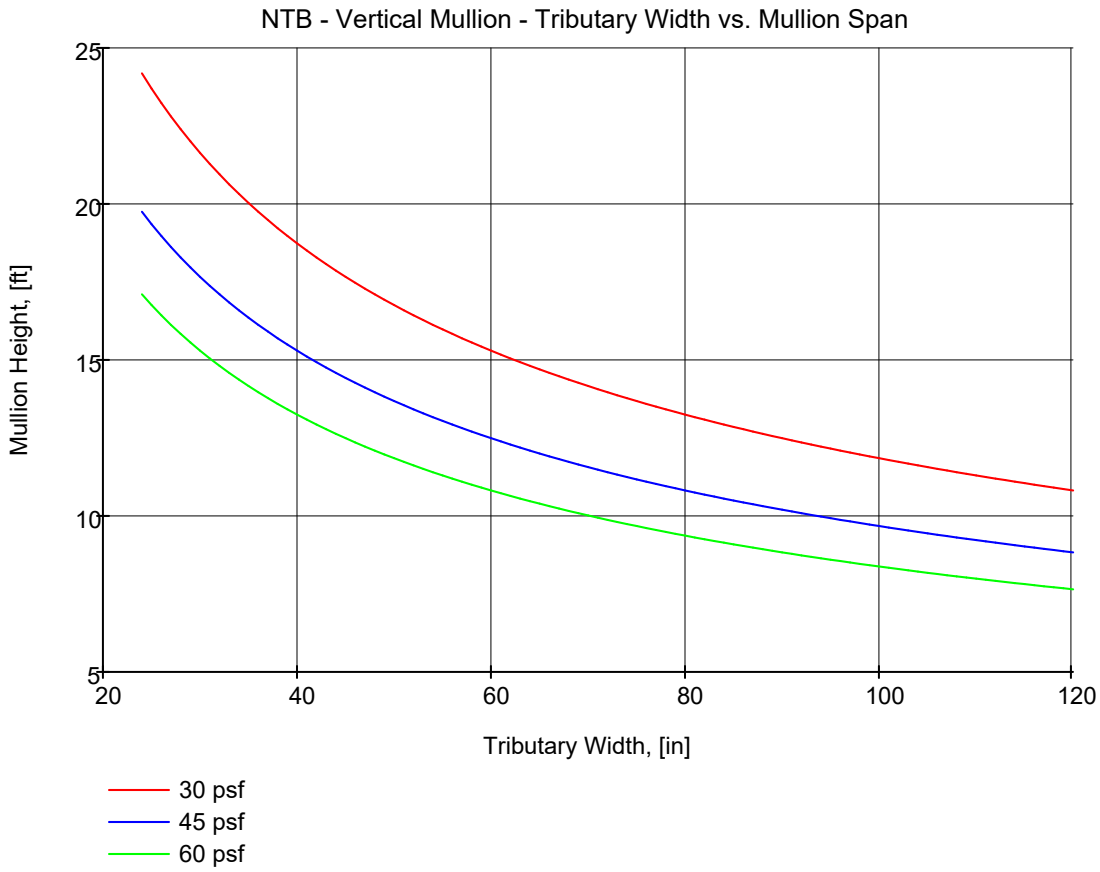


Figure 1. The solid lines serve as the mullion utilization for the specified wind pressures. Mull. height and Trib. Width combinations that fall above this line are considered a mullion failure under ADM 2015 provisions.

Note* Above Chart is for Stresses Only, Allowable Deflections Still Must be Taken into Consideration When Using Design Chart

Table 1: Developed Allowable Wind Load Table for Non-Thermally Broken System. Allowable Deflection per AAMA TIR A11 Considered.

$L^T =$ (·in)

TW (·in) \ L^T	96	102	108	114	120	126
48	137	116	97	83	71	61
54	122	103	87	74	63	54
60	110	92	78	66	57	49
66	100	84	71	60	52	45
72	91	77	65	55	47	41
78	84	71	60	51	44	38

(·psf)

Thermally Broken Vertical Mullion

Moment of Inertia

Allowable Bending Moment
(Ref. Shape Properties, Appendix)

$M_1 := M_A = 44690 \cdot lbf \cdot in$

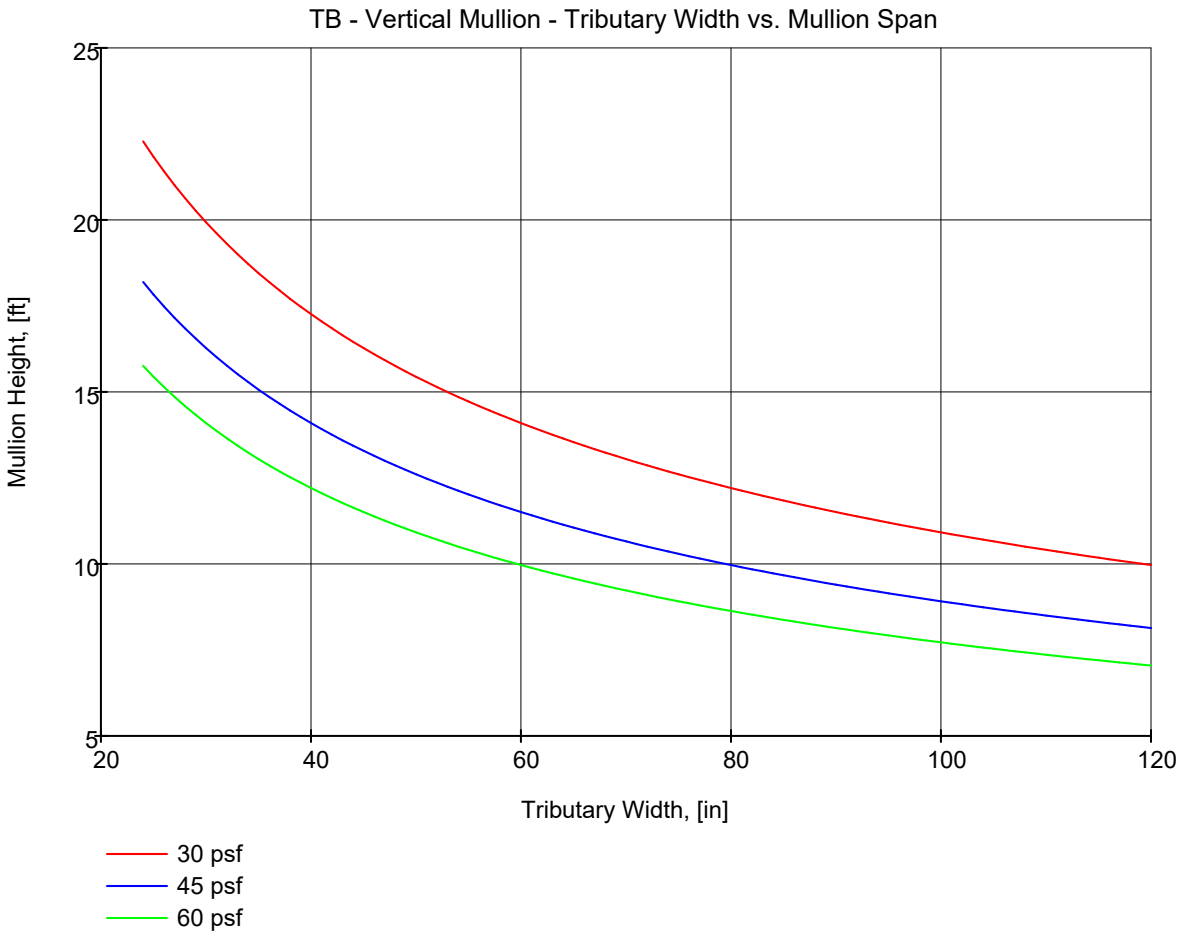


Figure 2. The solid lines serve as the mullion utilization for the specified wind pressures. Mull. height and Trib. Width combinations that fall above this line are considered a mullion failure under ADM 2015 provisions.

Note* Above Chart is for Stresses Only, Allowable Deflections Still Must be Taken into Consideration When Using Design Chart

Table 2: Developed Allowable Wind Load Table for Thermally Broken System. Allowable Deflection per AAMA TIR A11 Considered.

L^T =

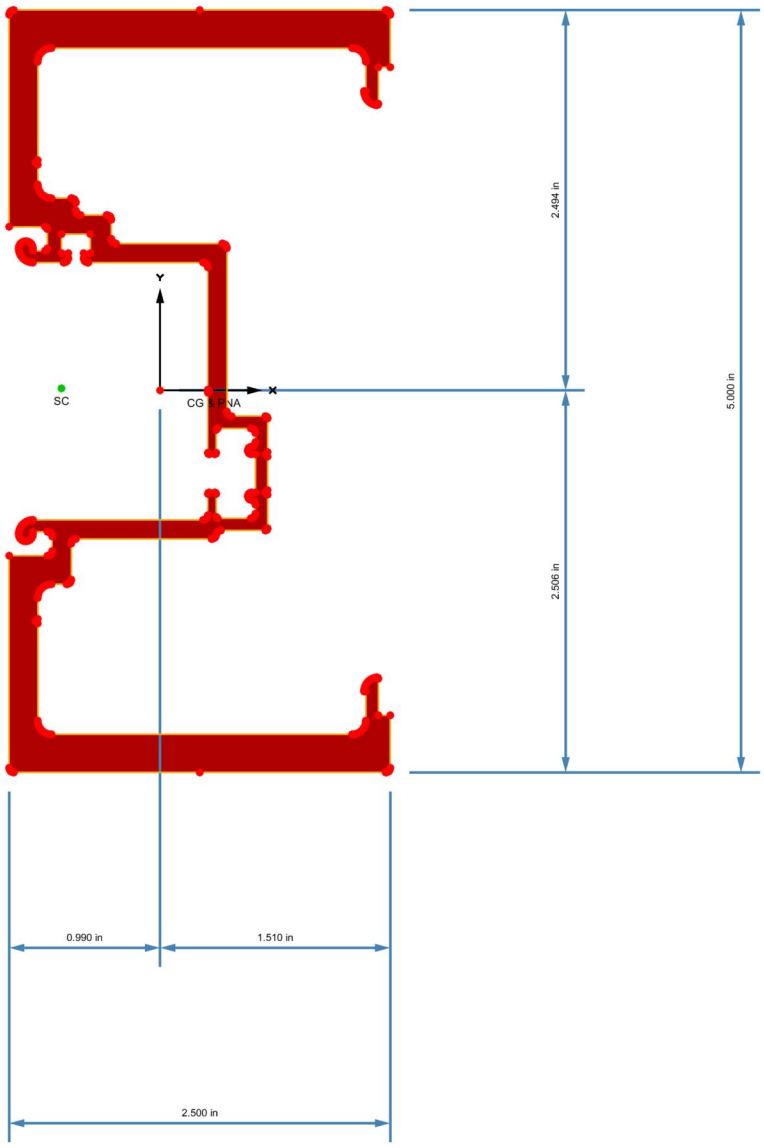
96	102	108	114	120	126

·in

TW =

48	116	98	83	70	60	52
54	103	87	74	63	54	46
60	93	79	66	56	48	42
66	85	71	60	51	44	38
72	78	65	55	47	40	35
78	72	60	51	43	37	32

·in ·psf



Geometric Properties

Area	2.490	in^2
Ix	9.222	in^4
Ixy	-0.032	in^4
Iy	1.435	in^4
Sx+	3.698	in^3
Sx-	3.680	in^3
Sy+	0.951	in^3
Sy-	1.450	in^3
Xc	0.000	in

Principal Properties

I1	9.223	in^4
I2	1.435	in^4
S1+	3.692	in^3
S1-	3.671	in^3
S2+	0.944	in^3
S2-	1.435	in^3
r1	1.925	in
r2	0.759	in
α	0.237	deg

Overall Properties

Depth	5.000	in
Perimeter	29.073	in
Weight	0.707	lb/in
Width	2.500	in

Geometric Properties

Yc	0.000	in
rx	1.925	in
ry	0.759	in

Principal Properties

Plastic Properties

Xpna	-0.068	in
Ypna	-0.042	in
Zx	4.445	in^3
Zy	1.648	in^3

Polar Properties

Ip	10.658	in^4
rp	2.069	in

Applied Loads

Ma	0.000	lb-in
Mb	0.000	lb-in
P	0.000	lb
T	0.000	lb-in
Va	0.000	lb
Vb	0.000	lb

Loads applied to: Centroidal Axes

FEA Mesh Properties

Elements	13206.000	
Largest Element	0.001	in^2
Nodes	14279.000	

Maximum Results

Combined τxz	0.000	psi
Combined τyz	0.000	psi
Flexural τxz	0.000	psi
Flexural τyz	0.000	psi
Normal Stress σz	0.000	psi
Resultant τ	0.000	psi
St. Venant τxz	0.000	psi
St. Venant τyz	0.000	psi
Warping Function	4.396	in^2

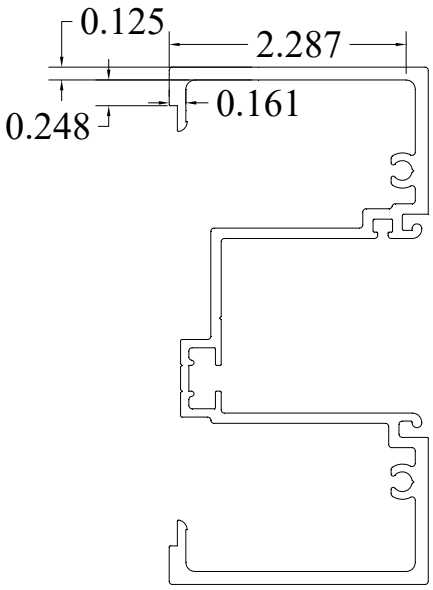
Minimum Results

Combined τxz	0.000	psi
Combined τyz	0.000	psi
Flexural τxz	0.000	psi
Flexural τyz	0.000	psi
Normal Stress σz	0.000	psi
Resultant τ	0.000	psi
St. Venant τxz	0.000	psi
St. Venant τyz	0.000	psi
Warping Function	-4.413	in^2

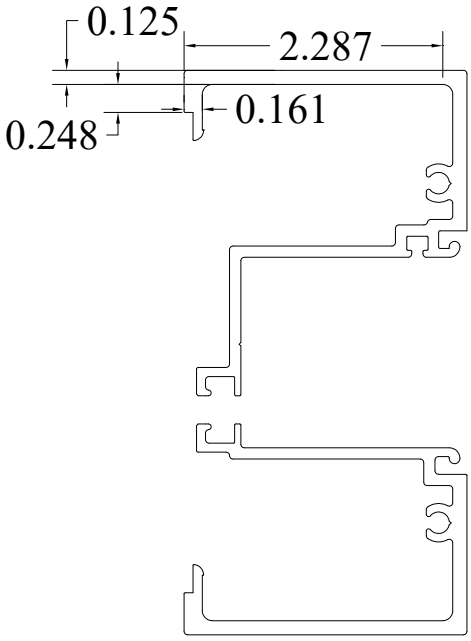
Torsion Properties

Cw	9.375	in^6
H	0.911	
J	0.036	in^4
Xsc	-0.647	in
Ysc	0.013	in
ro	2.168	in
B1	-0.048	in

- HD500-T - SYSTEM - TYPICAL JAMB MULLION - WIND LOAD CHART -

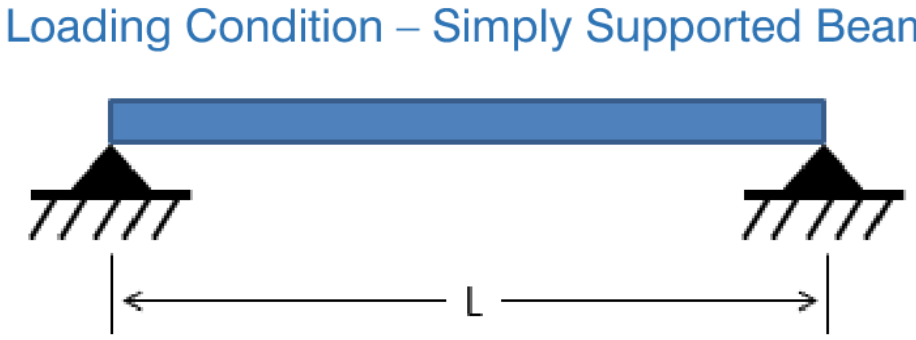


Non-Thermally Broken Jamb



Thermally Broken Jamb

Assumed Loading Condition



Moment of Inertia

Allowable Bending Moment
(Ref. Shape Properties, Appendix)

$M_1 := M_A = 25836 \cdot lbf \cdot in$

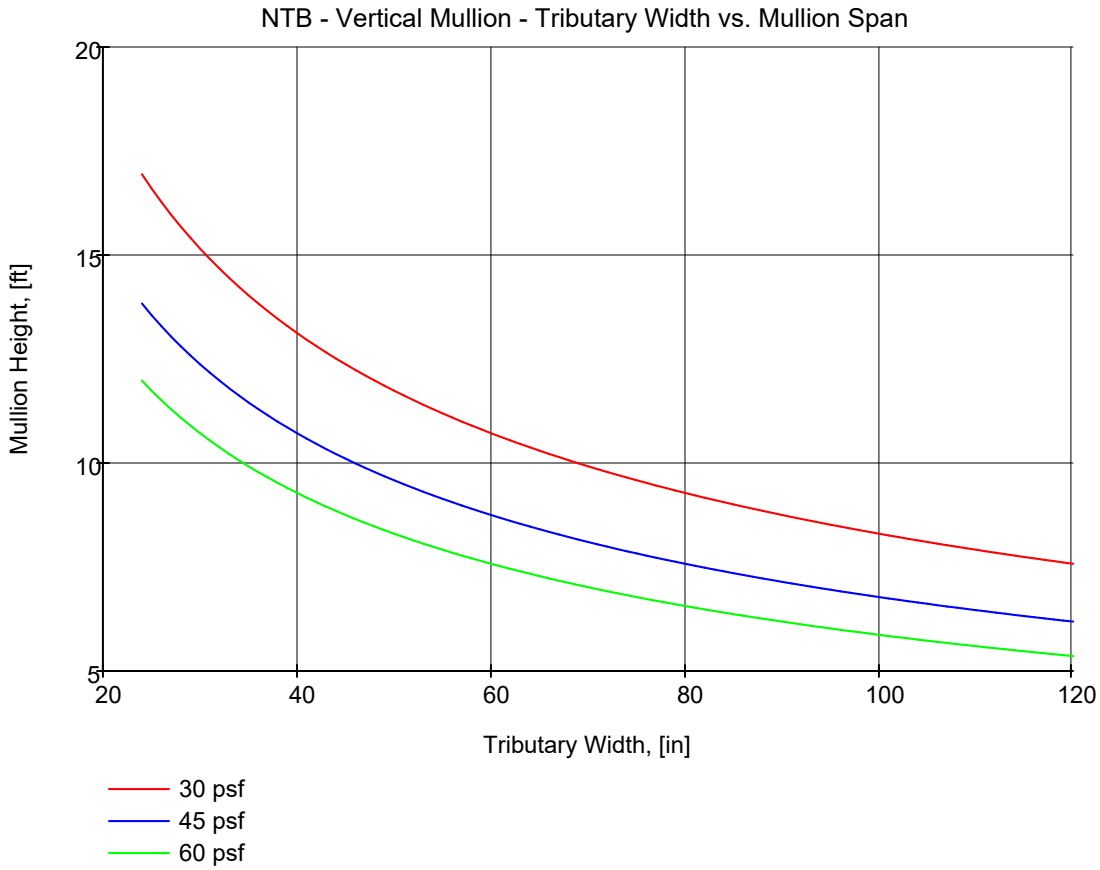


Figure 1. The solid lines serve as the mullion utilization for the specified wind pressures. Mull. height and Trib. Width combinations that fall above this line are considered a mullion failure under ADM 2015 provisions.

Note* Above Chart is for Stresses Only, Allowable Deflections Still Must be Taken into Consideration When Using Design Chart

Table 1: Developed Allowable Wind Load Table for Non-Thermally Broken System. Allowable Deflection per AAMA TIR A11 Considered.

L^T =

96	102	108	114	120	126

·in

TW =

24	135	119	106	95	86	78
30	108	95	85	76	69	62
36	90	79	71	64	57	52
42	77	68	61	55	49	45
48	67	60	53	48	43	39
54	60	53	47	42	38	35

·in = ·psf

Thermally Broken Vertical Mullion

Moment of Inertia

Allowable Bending Moment
(Ref. Shape Properties, Appendix)

$M_1 := M_A = 21961 \cdot lbf \cdot in$

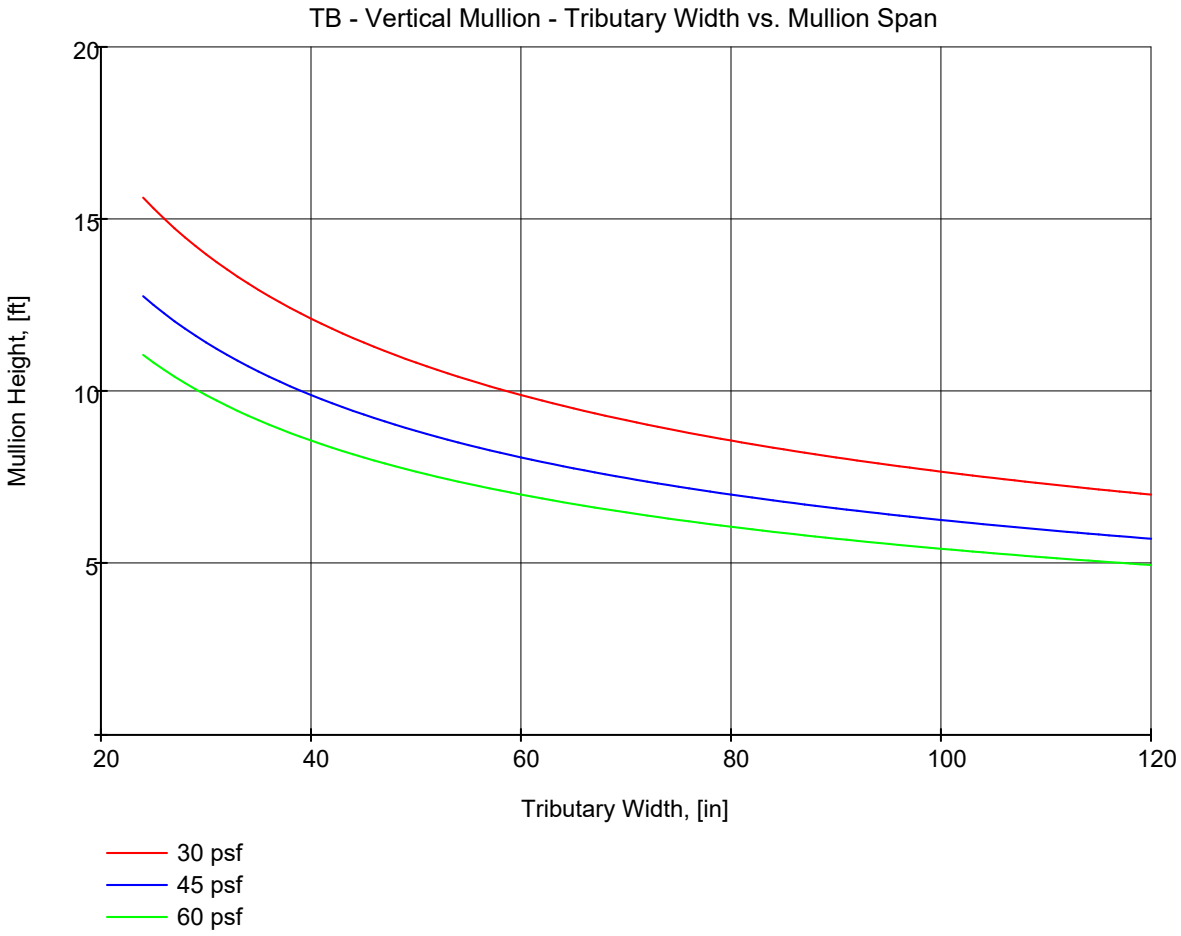


Figure 2. The solid lines serve as the mullion utilization for the specified wind pressures. Mull. height and Trib. Width combinations that fall above this line are considered a mullion failure under ADM 2015 provisions.

Note* Above Chart is for Stresses Only, Allowable Deflections Still Must be Taken into Consideration When Using Design Chart

Table 2: Developed Allowable Wind Load Table for Thermally Broken System. Allowable Deflection per AAMA TIR A11 Considered.

L^T =

96	102	108	114	120	126

·in

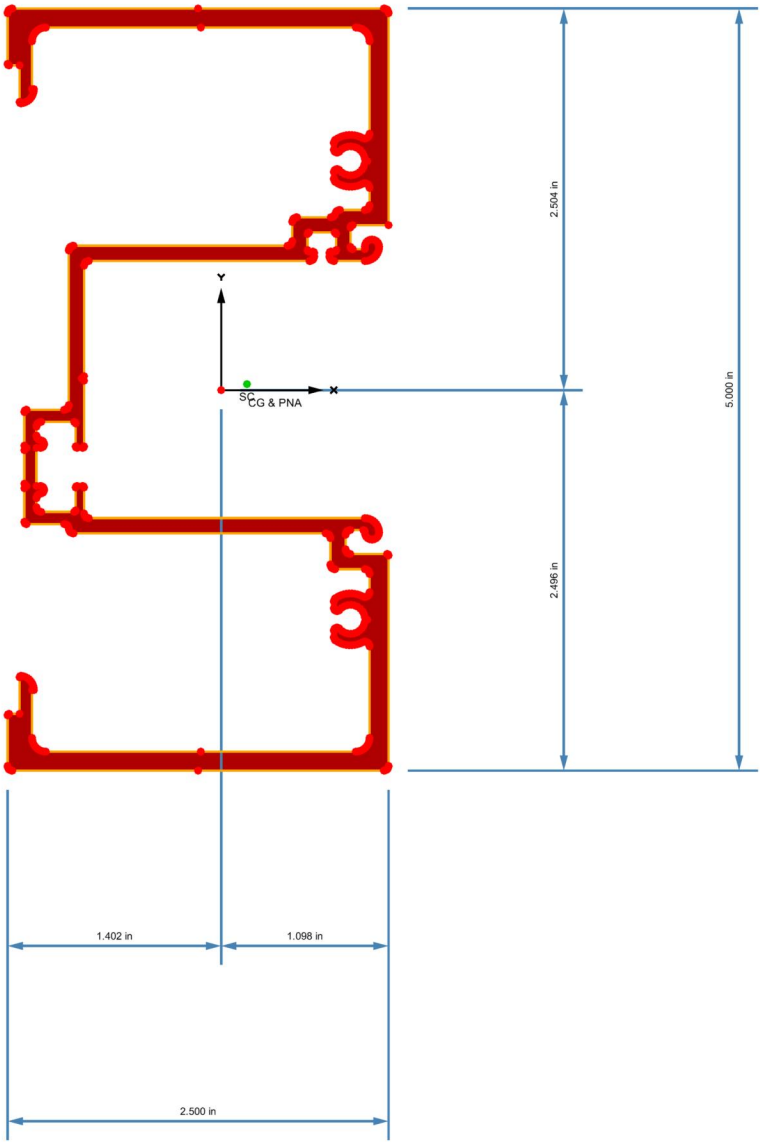
TW =

24
30
36
42
48
54

·in =

114	101	90	81	73	66
92	81	72	65	59	53
76	68	60	54	49	44
65	58	52	46	42	38
57	51	45	41	37	33
51	45	40	36	33	30

·psf



Geometric Properties

Area	1.891	in^2
Ix	6.024	in^4
Ixy	0.053	in^4
Iy	1.420	in^4
Sx+	2.406	in^3
Sx-	2.413	in^3
Sy+	1.293	in^3
Sy-	1.013	in^3
Xc	0.000	in

Principal Properties

I1	6.025	in^4
I2	1.420	in^4
S1+	2.395	in^3
S1-	2.399	in^3
S2+	1.260	in^3
S2-	0.993	in^3
r1	1.785	in
r2	0.866	in
α	-0.654	deg

Overall Properties

Depth	5.000	in
Perimeter	34.299	in
Weight	0.537	lb/in
Width	2.500	in

Geometric Properties

Yc	0.000	in
rx	1.785	in
ry	0.867	in

Principal Properties

Plastic Properties

Xpna	0.102	in
Ypna	-0.144	in
Zx	3.054	in^3
Zy	1.485	in^3

Polar Properties

Ip	7.444	in^4
rp	1.984	in

Applied Loads

Ma	0.000	lb-in
Mb	0.000	lb-in
P	0.000	lb
T	0.000	lb-in
Va	0.000	lb
Vb	0.000	lb

Loads applied to: Centroidal Axes

FEA Mesh Properties

Elements	15219.000	
Largest Element	0.001	in^2
Nodes	16759.000	

Maximum Results

Combined τxz	0.000	psi
Combined τyz	0.000	psi
Flexural τxz	0.000	psi
Flexural τyz	0.000	psi
Normal Stress σz	0.000	psi
Resultant τ	0.000	psi
St. Venant τxz	0.000	psi
St. Venant τyz	0.000	psi
Warping Function	4.749	in^2

Minimum Results

Combined τxz	0.000	psi
Combined τyz	0.000	psi
Flexural τxz	0.000	psi
Flexural τyz	0.000	psi
Normal Stress σz	0.000	psi
Resultant τ	0.000	psi
St. Venant τxz	0.000	psi
St. Venant τyz	0.000	psi
Warping Function	-4.678	in^2

Torsion Properties

Cw	9.950	in^6
H	0.992	
J	0.009	in^4
Xsc	0.169	in
Ysc	0.039	in
ro	1.992	in
B1	-0.077	in