

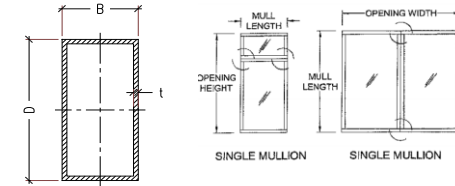
Model Ali Residence
Client Prestige Windows & Doors
Location Pinecrest, FL
Date 11/25/25
Calculated by S.N



Specialty Engineering and Design, LLC
 1599 SW 30 Avenue, Suite #1
 Boynton Beach, FL 334326

Section Properties of Tube

B	2.00 in
D	4.00 in
t_B	0.250 in
t_D	0.250 in
Area	2.8 in^2



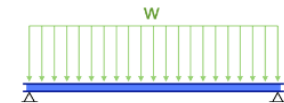
rho_al	0.0975 lb/in^3	density of aluminum	
w_al	3.22 plf	self weight	
lxx_1	10.67 in^4	Sxx_1	5.33 in^4
lyy_1	2.67 in^4	Syy_1	2.67 in^4
lxx_2	5.36 in^4	Sxx_2	3.06 in^4
lyy_2	0.98 in^4	Syy_2	1.31 in^4

lxx	5.307 in^4	Sxx	2.654 in^3
lyy	1.682 in^4	Syy	1.682 in^3

Al. Tube Calculation

Aluminum **6063-T6**

	Youngs Modulus	E	9910.0 ksi
	Density of Aluminum	rho_al	0.0975 lb/in^3
Total Span	40.75 in.	w_al	3.22 plf
		I_xx	5.307 in^4
Max M	451.8 ft-lbf	f_n (unwelded)	27600.0 psi
		S_xx	2.654 in^3
		allowable tension, extreme net section	
		allowable yield strength > Max Sigma	
		allowable tension > Max Moment	
sigma Max	2043.2 psi		



Deflection

Delta allowable	0.23 in	Deflection = Span/175	FBC 2020 1709.8.2
Delta =	$\frac{5wL^4}{384EI}$	=	0.0178 in
		allowable deflection > max deflection	

End Reactions

V=W*L/2	532.22 lb		
#12 Tek Screws	308.00 lb	# used	3
1/4" Tapcons	180.00 lb	# used	3
#14 Wood Screw	178.00 lb	# used	3
1/4" Tapcons	89.00 lb	# used	6
		Connection Strength	924 lb
		Connection Strength	540 lb
		Connection Strength	534 lb
		Connection Strength	534 lb
		Connection Strength > V	OK
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		Connection Strength > V	OK

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ASCE 7-22 Wind Loads

Mullion Zone **4** Is this Vertical? **no**
 W (if vertical) **-135.13 plf** W used **-313.46 plf**
 W (if horizontal) **-313.46 plf**

Loads specified are for Allowable Stress - 0.6*W(ult) 2.4.1 #7 (0.6D+0.6W)

For theta < 10 degrees the GCp values have been reduced by 10%

	width (in)	height (in)	Effective Area (ft^2)	Area used in calc.	GCp (positive, 4&5)	GCp (negative, 4)	GCp (negative, 5)	Zone 4 Unbreached		Zone 5 Unbreached	
								P positive	P negative	P positive	P negative
Openings Held											
# 16C	40.8	82.5	23.3	23.3	0.84	-0.93	-1.14	36.9	-40.1	36.9	-47.7
# 16D	40.8	106.8	30.2	30.2	0.82	-0.91	-1.11	36.2	-39.5	36.2	-46.5

ASCE 7-22, method 2, analytical procedure.

V (mph) **175** 1620 FBC for HVHZ, or Fig. 1609.3(1)
 I **1.0**
 Risk Category **II** Table 1.5-1, page 5
 Exposure **C** Section 26.7
 Length of Building (ft) **57 ft**
 Width of Building (ft) **46 ft**
 Mean Roof height (ft) **20 ft**
 Kz **0.90** Table 26.10-1, page 277
 Kd **0.85** Table 26.6-1, page 274
 Kzt **1** Figure 26.8-1, page 276
 pitch of roof **0/12** 0.0 degrees

theta 0.0 degrees
 qh (psf) 70.77 Reduction factor for slope of roof
 GCpi 0.18 Velocity Wind Pressure @ mean roof height (Ultimate)
 a1 4.60 -0.18 0.55 -0.55
 a2 5.70 10% of width 1
 a3 8 10% of width 2
 a 4.60 0.4*mean roof height
End Zone distance

$$P := q_h \cdot (GC_p - GC_{p_i})$$