

COVER SHEET ADDED FOR KEITH REVIEW STAMP

**GARY MATZNER PARK
CONENGINEERS CONSTRUCTION
KEITH PROJECT #: 13861.00**

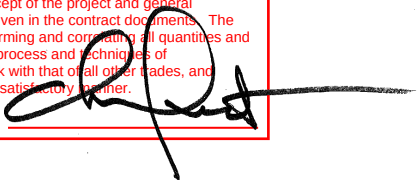
DATE: 07/27/2026

SUBMITTAL ### FENCING

NOTE:

The following pages were provided by the General Contractor (ConEngineers) and were originally digitally signed and sealed by Adolfo Espino. When the drawings and calculations were combined into this submittal for KEITH's review, the original digital signatures were invalidated. Accordingly, this document is intended solely to document that the submitted fence shop drawings are consistent with and compliant with the original design intent drawings.

ConEngineers shall provide identical shop drawings bearing valid digital signatures and seals, as required for permitting and record purposes.

	KEITH	954-788-3400 301 E. Atlantic Blvd Pompano Beach, FL 33060
☒	NO EXCEPTION OBSERVED	
☐	MAKE NOTED CORRECTIONS - RESUBMISSION NOT REQUIRED	
☐	REVISE AND RESUBMIT - SEE COMMENTS	
Corrections or comments made on the shop drawings during this review do not release the Contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for confirming and correcting all quantities and dimensions, selecting fabrication process and techniques of construction, coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner.		
Date:	<u>07/27/2026</u>	By: 

CONSIGN, LLC

CONSULTING ENGINEERS

CERTIFICATION OF AUTH. # 31618

14021 SW 143RD COURT - BAY 1, MIAMI, FL 33186 - PHONE - FAX # (305) 253-9442

Cover Sheet ***Structural Calculations***

PROJECT:

GARY MATZNER PARK CONSTRUCTION

**6610 SW 88TH ST
PINECREST, 33156**

CUSTOMER: CONENGINEERS BUILDERS, LLC

**DESIGNER: Adolfo Espino P.E.
STATE OF FLORIDA REG. # 98949**

CODES AND SPECIFICATIONS:

**ALUMINUM DESIGN MANUAL 2020
FLORIDA BUILDING CODE 2023
A.S.C.E 7-22**

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DESIGN CRITERIA & APPLICABLE CODES

CODES:

- F.B.C 2023
- ADM 2020

- A.S.C.E 7-22

SOLID FREESTANDING WALL WIND LOAD CALCULATIONS

WIND CODE= ASCE 7-22

WINDSPEED= 115 MPH

MEAN HEIGHT:

EXPOSURE CATEGORY=

Aef=Effective area= 5.00

Kzt= 1 - Section 26.8-2 ASCE 7-22

Ke= 1 - Table 26.9-1 ASCE 7-22

Kd= 0.85 - Section 26.6-1 ASCE 7-22

Kz= 0.85 - Table 26.10-1 ASCE 7-22

qh= $0.00256 * Kz * Kzt * Ke * V^2$ - Section 30.3-1

28.78 psf

And:

B= 5.00 ft - Width of Panel

s= 6.00 ft - Height of Panel

h= 6.00 ft - Vertical distance from top of panel to ground surface

B/s= 0.83 - Aspect ratio

s/h= 1.00 - Clearance ratio

G= 0.85 - Gust-effect factor from section 26.11

Cf= 1.45 - Fig. 29.3-1

W design = qh x G x Cf x Kd - Wind design Pressure Section 29.3.1

30.15 Psf

Opening 50%

$P_{ASD} = 0.6 * W_{design} = 9.04$ Psf - CRITICAL ASD PRESSURE

CHECKING LOADS COMBINATIONS - ASCE 7-22

1.- D+L

2.- 0.6D+0.6W

CHECKING CRITICAL ALUMINUM FENCE

CHECKING CRITICAL POST ELEMENT

Try	Aluminum	SQ. TUBE 2.00" x 1/4"
Sxx=	0.91	in3
Critical Span =	6.00	ft
Fb	=	13.6 ksi
Welded		
w=	P_{ASD}	*
M=	$\frac{54.27}{2}$	x 6.00 = 54.27 lb-ft
M=	$\frac{977}{2}$	lb-ft = 11722 lb-in
S r q'd =	$\frac{11722}{13600}$	= 0.86 in3
Sxx=	0.91	in3
		> 0.86 in3

USE: Aluminum SQ. TUBE 2.00" x 1/4"

CHECKING CRITICAL TOP AND BOTTOM RAIL

Try	Aluminum	RT TUBE 2.00"x1.00"x1/8" (h)
Sxx=	0.33	in3
Critical Span =	6.00	ft
Fb	=	13.6 ksi
Welded		
w=	P_{ASD}	*
M=	$\frac{27.13}{2}$	x 3.00 = 27.13 lb-ft
M=	$\frac{488}{2}$	lb-ft = 5861 lb-in
S r q'd =	$\frac{5861}{13600}$	= 0.43 in3
Sxx=	0.33	in3
		> 0.43 in3

USE: Aluminum RT TUBE 2.00"x1.00"x1/8" (h)

CHECKING CRITICAL PICKET

Try	Aluminum	SQ. TUBE 1.00" x 1/8"
Sxx=	0.11	in3
Critical Span =	3.50	ft
Fb	=	31.8 ksi
UnWelded		
w=	P_{ASD}	*
M=	$\frac{3.01}{8}$	x 0.33 = 3.01 lb-ft
M=	$\frac{5}{8}$	lb-ft = 55 lb-in
S r q'd =	$\frac{55}{31800}$	= 0.0017 in3
Sxx=	0.11	in3
		> 0.0017 in3

USE: Aluminum SQ. TUBE 1.00" x 1/8"

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CHECKING CRITICAL FOOTING EMBEDMENT AS PER F.B.C 2023 - SECTION 1807.3

For Constrained: $d = \sqrt[4]{4.25 \cdot (P \cdot h) / (S_3 \cdot b)}$
For Unconstrained: $d = 0.5A(1 + (1 + (4.36h/A))^2)^{1/2}$ $A = 2.34 P / (S_1b)$
 $b =$ diameter of round post or diagonal dimension of square post or footing, ft
 $d =$ depth of embedment in earth in feet but not exceed 12 feet for purpose of this calculation
 $P =$ applied load, in lbs, at a distance h from the ground
 $h =$ distance in feet from ground to point of application of P .
 $S_1 =$ allowable lateral soil bearing pressure in pfs as per table 1806.2 based on a depth of $1/3d$.
 $S_3 =$ allowable soil bearing pressure in pfs as per table 1806.2 based on a depth equal to d .
 $d =$ 2.2 ft
Enter $b =$ 1.00 ft (12" ϕ)
Enter $P =$ 163 lb
Enter $h =$ 6.00 ft
Lateral Bearing = 400 psf/ft - As 1806.2 - Worst Case
 $S_1 =$ 293 psf
 $S_3 =$ 880 psf
 $A =$ 1.299 ft²
Then : $d =$ 2.2 ft

CHECKING CRITICAL ALUMINUM SLIDING GATE

CHECKING CRITICAL POST ELEMENT

Try Aluminum SQ. TUBE 3.00" x 1/4"
Critical Span = $S_{xx} = 6.00$ ft
 $F_b =$ 31.8 ksi UnWelded
 $w = P_{ASD} = 122.10$ lb/ft
 $M = \frac{122.10 \times 6.00}{2} = 366.30$ lb-ft
 $M = \frac{2198}{2} = 1099$ lb-ft
 $S_{rq'd} = \frac{26374}{31800} = 0.83$ in³
 $S_{xx} = 2.33$ in³ > 0.83 in³

USE: Aluminum SQ. TUBE 3.00" x 1/4"

CHECKING CRITICAL FRAME

Try Aluminum SQ. TUBE 2.00" x 1/4"
Critical Span = $S_{xx} = 6.00$ ft
 $F_b =$ 13.6 ksi Welded
 $w = P_{ASD} = 56.53$ lb/ft
 $M = \frac{56.53 \times 6.00}{2} = 169.59$ lb-ft
 $M = \frac{1017}{2} = 508.5$ lb-ft
 $S_{rq'd} = \frac{12210}{13600} = 0.90$ in³
 $S_{xx} = 0.91$ in³ > 0.90 in³

USE: Aluminum SQ. TUBE 2.00" x 1/4"

CHECKING CRITICAL PICKET

Try Aluminum SQ. TUBE 1.00" x 1/8"
Critical Span = $S_{xx} = 5.50$ ft
 $F_b =$ 31.8 ksi UnWelded
 $w = P_{ASD} = 3.01$ lb/ft
 $M = \frac{3.01 \times 5.50}{2} = 8.28$ lb-ft
 $M = \frac{11}{2} = 5.5$ lb-ft
 $S_{rq'd} = \frac{137}{31800} = 0.0043$ in³
 $S_{xx} = 0.11$ in³ > 0.0043 in³

USE: Aluminum SQ. TUBE 1.00" x 1/8"

CHECKING CRITICAL FOOTING EMBEDMENT AS PER F.B.C 2023 - SECTION 1807.3

For Constrained: $d = \sqrt[4]{4.25 \cdot (P \cdot h) / (S_3 \cdot b)}$
For Unconstrained: $d = 0.5A(1 + (1 + (4.36h/A))^2)^{1/2}$ $A = 2.34 P / (S_1b)$
 $b =$ diameter of round post or diagonal dimension of square post or footing, ft
 $d =$ depth of embedment in earth in feet but not exceed 12 feet for purpose of this calculation
 $P =$ applied load, in lbs, at a distance h from the ground
 $h =$ distance in feet from ground to point of application of P .
 $S_1 =$ allowable lateral soil bearing pressure in pfs as per table 1806.2 based on a depth of $1/3d$.
 $S_3 =$ allowable soil bearing pressure in pfs as per table 1806.2 based on a depth equal to d .
 $d =$ 2.9 ft
Enter $b =$ 1.00 ft (12" ϕ)
Enter $P =$ 366 lb
Enter $h =$ 6.00 ft
Lateral Bearing = 400 psf/ft - As 1806.2 - Worst Case
 $S_1 =$ 380 psf
 $S_3 =$ 1140 psf
 $A =$ 2.256 ft²
Then : $d =$ 2.9 ft

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CHECKING CRITICAL ALUMINUM PEDESTRIAN GATE

CHECKING CRITICAL POST ELEMENT

Try	Aluminum	SQ. TUBE 2.00" x 1/4"
Sxx=	0.91	in3
Critical Span =	4.00	ft
Fb	=	31.8 ksi
UnWelded		
w=	P_{ASD}	*
M=	$\frac{36.18}{2}$	x 4.00 = 36.18 lb/ft
M=	$\frac{289}{3473}$	lb-ft = 3473 lb-in
S r q'd =	$\frac{31800}{0.91}$	in3 > 0.11 in3

USE: Aluminum SQ. TUBE 2.00" x 1/4"

CHECKING CRITICAL FRAME

Try	Aluminum	SQ. TUBE 2.00" x 1/8"
Sxx=	0.53	in3
Critical Span =	8.00	ft
Fb	=	13.6 ksi
Welded		
w=	P_{ASD}	*
M=	$\frac{18.09}{2}$	x 2.00 = 18.09 lb/ft
M=	$\frac{579}{6946}$	lb-ft = 6946 lb-in
S r q'd =	$\frac{13600}{0.53}$	in3 > 0.51 in3

USE: Aluminum SQ. TUBE 2.00" x 1/8"

CHECKING CRITICAL PICKET

Try	Aluminum	SQ. TUBE 1.00" x 1/8"
Sxx=	0.11	in3
Critical Span =	3.50	ft
Fb	=	31.8 ksi
UnWelded		
w=	P_{ASD}	*
M=	$\frac{3.01}{8}$	x 0.33 = 3.01 lb/ft
M=	$\frac{5}{55}$	lb-ft = 55 lb-in
S r q'd =	$\frac{31800}{0.11}$	in3 > 0.0017 in3

USE: Aluminum SQ. TUBE 1.00" x 1/8"

CHECKING CRITICAL FOOTING EMBEDMENT AS PER F.B.C 2023 - SECTION 1807.3

For Constrained:	d=	SQRT(4.25 * ((P*h)/(S3 * b)))	
For Unconstrained:	d=	0.5A(1+(1+(4.36h/A))^(1/2)) A = 2.34 P / (S1b)	
	b=	diameter of round post or diagonal dimension of square post or footing, ft	
	d=	depth of embedment in earth in feet but not exceed 12 feet for purpose of this calculation	
	P=	applied load, in lbs, at a distance h from the ground	
	h=	distance in feet from ground to point of application of P.	
	S1=	allowable lateral soil bearing pressure in pfs as per table 1806.2 based on a depth of 1/3d.	
	S3=	allowable soil bearing pressure in pfs as per table 1806.2 based on a depth equal to d.	
	d=	1.5	ft
	Enter b =	1.00	ft (12" ϕ)
	Enter P =	72	lb
	Enter h=	4.00	ft
Lateral Bearing=		400	psf/ft - As 1806.2 - Worst Case
	S1=	193	psf
	S3=	580	psf
	A=	0.876	ft2
Then :	d =	1.5	ft

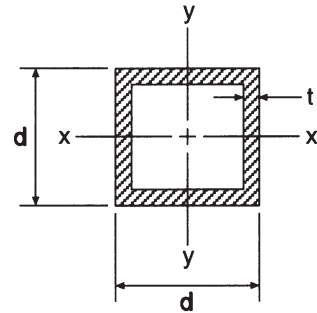
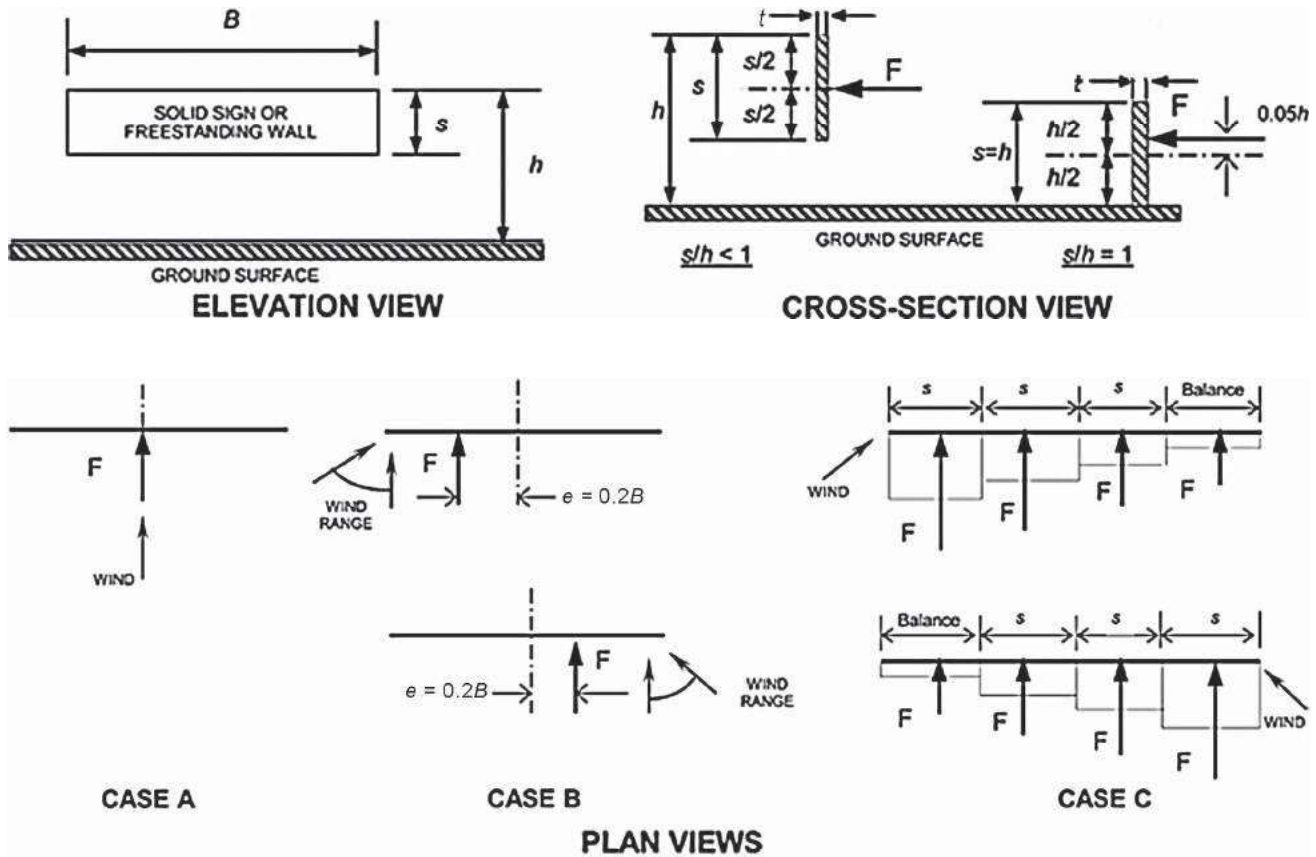


Table 23
SQUARE TUBES

Designation	Depth width <i>d</i> in.	Thickness <i>t</i> in.	Weight lb/ft	Area <i>A</i> in ²	Axis x-x, y-y			<i>J</i> in ⁴
					<i>I_x, I_y</i> in ⁴	<i>S_x, S_y</i> in ³	<i>r_x, r_y</i> in.	
RT 1 × 1 × .065	1.000	0.065	0.286	0.243	0.0356	0.0712	0.383	0.0531
RT 1 × 1 × .095	1.000	0.095	0.404	0.344	0.0475	0.0949	0.371	0.0704
RT 1 × 1 × .125	1.000	0.125	0.515	0.438	0.0570	0.114	0.361	0.0837
RT 1.25 × 1.25 × .065	1.250	0.065	0.362	0.308	0.0723	0.116	0.485	0.108
RT 1.25 × 1.25 × .095	1.250	0.095	0.516	0.439	0.0982	0.157	0.473	0.146
RT 1.25 × 1.25 × .125	1.250	0.125	0.662	0.563	0.120	0.192	0.462	0.178
RT 1.375 × 1.375 × .125	1.375	0.125	0.735	0.625	0.164	0.239	0.513	0.244
RT 1.5 × 1.5 × .065	1.500	0.065	0.439	0.373	0.128	0.171	0.586	0.192
RT 1.5 × 1.5 × .078	1.500	0.078	0.522	0.444	0.150	0.200	0.581	0.224
RT 1.5 × 1.5 × .095	1.500	0.095	0.628	0.534	0.176	0.235	0.575	0.263
RT 1.5 × 1.5 × .125	1.500	0.125	0.809	0.688	0.218	0.291	0.564	0.325
RT 1.5 × 1.5 × .250	1.500	0.250	1.47	1.25	0.339	0.451	0.520	0.488
RT 1.75 × 1.75 × .125	1.750	0.125	0.956	0.813	0.360	0.411	0.665	0.536
RT 2 × 2 × .095	2.000	0.095	0.851	0.724	0.439	0.439	0.779	0.657
RT 2 × 2 × .125	2.000	0.125	1.10	0.938	0.552	0.552	0.767	0.824
RT 2 × 2 × .156	2.000	0.156	1.35	1.15	0.657	0.657	0.755	0.978
RT 2 × 2 × .188	2.000	0.188	1.60	1.36	0.754	0.754	0.744	1.12
RT 2 × 2 × .250	2.000	0.250	2.06	1.75	0.911	0.911	0.722	1.34
RT 2.25 × 2.25 × .125	2.250	0.125	1.25	1.06	0.802	0.713	0.869	1.20
RT 2.5 × 2.5 × .125	2.500	0.125	1.40	1.19	1.12	0.896	0.971	1.67
RT 2.5 × 2.5 × .188	2.500	0.188	2.04	1.74	1.56	1.25	0.947	2.32
RT 2.5 × 2.5 × .250	2.500	0.250	2.65	2.25	1.92	1.54	0.924	2.85
RT 2.75 × 2.75 × .125	2.750	0.125	1.54	1.31	1.51	1.10	1.07	2.26
RT 2.75 × 2.75 × .188	2.750	0.188	2.27	1.93	2.12	1.54	1.05	3.16
RT 3 × 3 × .095	3.000	0.095	1.30	1.10	1.55	1.04	1.19	2.33
RT 3 × 3 × .125	3.000	0.125	1.69	1.44	1.98	1.32	1.17	2.97
RT 3 × 3 × .188	3.000	0.188	2.49	2.11	2.80	1.87	1.15	4.18
RT 3 × 3 × .250	3.000	0.250	3.23	2.75	3.49	2.33	1.13	5.20
RT 3 × 3 × .375	3.000	0.375	4.63	3.94	4.61	3.08	1.08	6.78
RT 3.5 × 3.5 × .125	3.500	0.125	1.98	1.69	3.21	1.83	1.38	4.81
RT 3.5 × 3.5 × .250	3.500	0.250	3.82	3.25	5.76	3.29	1.33	8.58
RT 3.5 × 3.5 × .375	3.500	0.375	5.51	4.69	7.74	4.42	1.28	11.4
RT 4 × 4 × .125	4.000	0.125	2.28	1.94	4.85	2.43	1.58	7.27
RT 4 × 4 × .188	4.000	0.188	3.37	2.87	6.96	3.48	1.56	10.4
RT 4 × 4 × .250	4.000	0.250	4.41	3.75	8.83	4.41	1.53	13.2
RT 4 × 4 × .375	4.000	0.375	6.39	5.44	12.0	6.02	1.49	17.9
RT 4 × 4 × .500	4.000	0.500	8.23	7.00	14.6	7.29	1.44	21.4

Diagrams



Notation

- B = Horizontal dimension of wall or sign, ft (m)
- e = Eccentricity of force, ft (m)
- F = Design wind force for other structures, lb (N)
- h = Height of the wall or sign, ft (m)
- L_r = Horizontal dimension of return corner, ft (m)
- $R_{\min} = t/\min(B \text{ and } s)$
- $R_{\max} = t/\max(B \text{ and } s)$
- s = Vertical dimension of the wall or sign, ft (m)
- t = Thickness of the wall or sign, ft (m)
- e = Ratio of solid area to gross area

Force Coefficients, C_f , for Case A and Case B

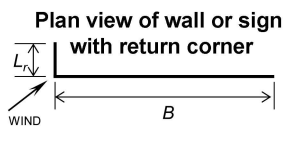
Clearance Ratio, s/h	Aspect Ratio, B/s											
	≤ 0.05	0.1	0.2	0.5	1	2	4	5	10	20	30	≥ 45
1	1.80	1.70	1.65	1.55	1.45	1.40	1.35	1.35	1.30	1.30	1.30	1.30
0.9	1.85	1.75	1.70	1.60	1.55	1.50	1.45	1.45	1.40	1.40	1.40	1.40
0.7	1.90	1.85	1.75	1.70	1.65	1.60	1.60	1.55	1.55	1.55	1.55	1.55
0.5	1.95	1.85	1.80	1.75	1.75	1.70	1.70	1.70	1.70	1.70	1.70	1.75
0.3	1.95	1.90	1.85	1.80	1.80	1.80	1.80	1.80	1.80	1.85	1.85	1.85
0.2	1.95	1.90	1.85	1.80	1.80	1.80	1.80	1.80	1.85	1.90	1.90	1.95
≤ 0.16	1.95	1.90	1.85	1.85	1.80	1.80	1.85	1.85	1.85	1.90	1.90	1.95

Figure 29.3-1. Design wind loads (all heights): force coefficients, C_f , for other structures—solid freestanding walls and solid freestanding signs.

Force Coefficients, C_f , for Case C

Region (horizontal distance from windward edge)	Aspect Ratio, B/s										
	2	3	4	5	6	7	8	9	10	13	≥ 45
0 to s	2.25	2.60	2.90	3.10*	3.30*	3.40*	3.55*	3.65*	3.75*	4.00*	4.30*
s to $2s$	1.50	1.70	1.90	2.00	2.15	2.25	2.30	2.35	2.45	2.60	2.55
$2s$ to $3s$		1.15	1.30	1.45	1.55	1.65	1.70	1.75	1.85	2.00	1.95
$3s$ to $10s$			1.10	1.05	1.05	1.05	1.05	1.00	0.95		
$3s$ to $4s$										1.50	1.85
$4s$ to $5s$										1.35	1.85
$5s$ to $10s$										0.90	1.10
$> 10s$										0.55	0.55

*Values shall be multiplied by the following reduction factor when a return corner is present:

L_r/s	Reduction Factor	
0.3	0.90	
1.0	0.75	
≥ 2	0.60	

Notes

- Force coefficients for solid walls or signs with openings less than 30% of gross area shall be permitted to be multiplied by the reduction factor $(1 - (1 - \varepsilon)^{1.5})$.
- To allow for both normal and oblique wind directions, the following cases shall be considered:
For $s/h < 1$:
Case A: Resultant force acts normal to the face of the wall or sign through the geometric center.
Case B: Resultant force acts normal to the face of the wall or sign at a distance from the geometric center toward the windward edge equal to 0.2 times the average width of the wall or sign.
For double-faced signs with all sides enclosed and $R_{\max} \leq 0.4$, it is permitted to use force eccentricity, $e = (0.2 - 0.25R_{\max})B$.
For double-faced signs with all sides enclosed and $R_{\min} \leq 0.75$, it is permitted to multiply tabulated C_f values in Cases A and B by the reduction factor, $(1 - 0.133R_{\min})$.
For $B/s \geq 2$, Case B need not be considered, while Case C must be considered;
Case C: Resultant forces act normal to the face of the wall or sign through the geometric centers of each region.
For $s/h = 1$:
The same cases as above except that the vertical locations of the resultant forces occur at a distance above the geometric center equal to 0.05 times the average height of the wall or sign.
- For Case C where $s/h > 0.8$, for coefficients shall be multiplied by the reduction factor $(1.8 - s/h)$. It is permitted to apply this reduction with those specified in Note 2.
- Linear interpolation is permitted for values of s/h , B/s , and L_r/s other than shown.

Figure 29.3-1 (Continued). Design wind loads (all heights): force coefficients, C_f , for other structures—solid freestanding walls and solid freestanding signs.

$$q_z = 0.00256 K_z K_{zt} K_e V^2 (\text{lb/ft}^2); V, \text{mi/h} \quad (26.10-1)$$

$$q_z = 0.613 K_z K_{zt} K_e V^2 (\text{N/m}^2); V, \text{m/s} \quad (26.10-1.SI)$$

where

K_z = Velocity pressure exposure coefficient, see Section 26.10.1;

K_{zt} = Topographic factor, see Section 26.8.2;

K_e = Ground elevation factor, see Section 26.9;

V = Basic wind speed, see Section 26.5; and

q_z = Velocity pressure at height z .

The velocity pressure at mean roof height is computed as $q_h = q_z$ evaluated from Equation (26.10-1) using K_z at mean roof height h .

The basic wind speed, V , used in determination of design wind loads on rooftop structures, rooftop equipment, and other building appurtenances shall consider the Risk Category equal to the greater of the following:

1. Risk category for the building on which the equipment or appurtenance is located, or
2. Risk category for any building or other structure to which the equipment or appurtenance provides a necessary service.

26.11 GUST EFFECTS

26.11.1 Gust-Effect Factor The gust-effect factor for a rigid building or other structure is permitted to be taken as 0.85.

26.11.2 Frequency Determination To determine whether a building or other structure is rigid or flexible as defined in Section 26.2, the fundamental natural frequency, n_1 , shall be established using the structural properties and deformational characteristics of the resisting elements in a properly substantiated analysis. Low-rise buildings, as defined in Section 26.2, are permitted to be considered rigid.

26.11.2.1 Limitations for Approximate Natural Frequency As an alternative to performing an analysis to determine n_1 , the approximate building natural frequency, n_a , shall be permitted to be calculated in accordance with Section 26.11.3 for structural steel, concrete, or masonry buildings meeting the following requirements:

1. The building height is less than or equal to 300 ft (91 m).
2. The building height is less than four times its effective length, L_{eff} .

The effective length, L_{eff} , in the direction under consideration shall be determined from the following equation:

$$L_{\text{eff}} = \frac{\sum_{i=1}^n h_i L_i}{\sum_{i=1}^n h_i} \quad (26.11-1)$$

The summations are over the height of the building, where h_i is the height above grade of level i , and L_i is the building length at level i parallel to the wind direction.

26.11.3 Approximate Natural Frequency The approximate lower bound natural frequency (n_a), in Hz, of concrete or structural steel buildings meeting the conditions of

Table 26.10-1. Velocity Pressure Exposure Coefficients, K_h and K_z .

Height above Ground Level, z or h		Exposure		
ft	m	B	C	D
0–15	0–4.6	0.57 (0.70)*	0.85	1.03
20	6.1	0.62 (0.70)*	0.90	1.08
25	7.6	0.66 (0.70)*	0.94	1.12
30	9.1	0.70	0.98	1.16
40	12.2	0.74	1.04	1.22
50	15.2	0.79	1.09	1.27
60	18.3	0.83	1.13	1.31
70	21.3	0.86	1.17	1.34
80	24.4	0.90	1.21	1.38
90	27.4	0.92	1.24	1.40
100	30.5	0.95	1.26	1.43
120	36.6	1.00	1.31	1.48
140	42.7	1.04	1.34	1.52
160	48.8	1.08	1.39	1.55
180	54.9	1.11	1.41	1.58
200	61.0	1.14	1.44	1.61
250	76.2	1.21	1.51	1.68
300	91.4	1.27	1.57	1.73
350	106.7	1.33	1.62	1.78
400	121.9	1.38	1.66	1.82
450	137.2	1.42	1.70	1.86
500	152.4	1.46	1.74	1.89

*Use 0.70 in Chapter 28, Exposure B, when $z < 30$ ft (9.1 m).

Notes:

1. Velocity pressure exposure coefficient K_z may be determined from the following formula:

For $z < 15$ ft	$K_z = 2.41 (15/z_g)^{2/\alpha}$
For $z < 4.6$ m	$K_z = 2.41 (4.6/z_g)^{2/\alpha}$
For $15 \text{ ft } (4.6 \text{ m}) \leq z \leq z_g$	$K_z = 2.41 (z/z_g)^{2/\alpha}$
For $z_g < z \leq 3,280 \text{ ft } (1,000 \text{ m})$	$K_z = 2.41$

2. α and z_g are tabulated in Table 26.11-1.
3. Linear interpolation for intermediate values of height z is acceptable.
4. Exposure categories are defined in Section 26.7.

Section 26.11.2.1 is permitted to be determined from one of the following equations.

For structural steel moment-resisting frame buildings,

$$n_a = 22.2/h^{0.8} \quad (26.11-2)$$

$$n_a = 8.58/h^{0.8} \quad (26.11-2.SI)$$

For concrete moment-resisting frame buildings,

$$n_a = 43.5/h^{0.9} \quad (26.11-3)$$

$$n_a = 14.93/h^{0.9} \quad (26.11-3.SI)$$

Table 2-19

ALLOWABLE STRESSES F/Ω FOR BUILDING-TYPE STRUCTURES (UNWELDED)

Allowable Stresses F/Ω (k/in ²)		Section		F/Ω	
Axial Tension		D.2b		19.5	
axial tension stress on net effective area		D.2a		21.2	
Shear or torsion		G. H.2		11.7	
Bearing		J.3.6a, J.4.6		39.0	
bolts or rivets on holes		J.3.6b,		25.9	
bolts on slots, pins on holes, flat surfaces		J.6.5, J.8		25.3	
screws in holes		J.5.5.1		25.3	
		Slenderness λ			
Axial Compression		E.2		21.2	
member buckling		F.4		see F.4.2	
Flexure		B.5.4.1		b/l	
Elements - Uniform Compression		B.5.4.1		b/l	
flat elements supported on one edge in columns		B.5.4.2		b/l	
whose buckling axis is not an axis of symmetry		B.5.4.4		λ_s	
flat elements supported on one edge in all other columns and all beams		B.5.4.5		$(R_p/t)^{1/2}$	
flat elements supported on both edges		B.5.4.6		λ_{eq}	
flat elements supported on both edges and with an intermediate stiffener		B.5.5.1		b/l	
round hollow elements		B.5.5.2		b/l	
flat elements - direct strength method		B.5.5.3		b/l	
Elements - Flexural Compression		B.5.5.4		$(R_p/t)^{1/2}$	
flat elements supported on both edges		B.5.5.5		λ_{eq}	
flat elements supported on tension edge, compression edge free		G.2		b/l	
flat elements supported on both edges and with a longitudinal stiffener		G.3		b/l	
round hollow elements		G.4		$2.9(R_p/t)^{3/8} (L_p/R_p)^{1/4}$	
flat elements - direct strength method		H.2.1		$2.9(R_p/t)^{3/8} (L_p/R_p)^{1/4}$	
Elements - Shear					
flat elements supported on both edges					
flat elements supported on one edge					
pipes and round or oval tubes					
Torsion					
pipes and round or oval tubes					

6061 - T6 ASTM B221, B241, B429
 6061 - T6510 ASTM B221
 6061 - T6511 ASTM B221
 6061 - T6 ASTM B247 0.000 to 4.000 in. thick
 6061 - T6 ASTM B308 0.062 in. thick and greater
 6351 - T5 ASTM B221 0.000 to 1.000 in. thick

$F_{ty} = 35 \text{ k/in}^2$
 $F_{cy} = 35 \text{ k/in}^2$
 $F_{tw} = 38 \text{ k/in}^2$
 $E = 10,100 \text{ k/in}^2$
 $k_1 = 1$

F/Ω for $\lambda \leq \lambda_1$		F/Ω for $\lambda_1 < \lambda < \lambda_2$		F/Ω for $\lambda \geq \lambda_2$	
λ_1	λ_2	λ_1	λ_2	λ_1	λ_2
17.8	66	0.00047 λ^2	0.232 $\lambda + 25.2$	66	51,352 λ^2
-	66	see F.4		66	60,414 λ^2
6.7	12	27.3 - 0.910 λ		12	2,417 λ^2
6.7	10.5	27.3 - 0.910 λ		10.5	186 λ
20.8	33	27.3 - 0.291 λ		33	580 λ
17.8	66	23.9 - 0.149 λ		66	60,414 λ^2
5.3	11.9	26.2 - 0.944 λ		11.9	3,776 $[\lambda^2(1+\lambda/35)^2]$
33.3	52	27.3 - 0.182 λ		52	928 λ
33.1	77	40.5 - 0.262 λ		77	1,563 λ
6.1	19	40.5 - 1.412 λ		19	4,932 λ^2
74.2	173	40.5 - 0.117 λ		173	3,502 λ
7.4	11.9	26.2 - 0.944 λ		11.9	3,776 $[\lambda^2(1+\lambda/35)^2]$
21.5	50	40.5 - 0.403 λ		50	1,016 λ
35.3	63	16.5 - 0.107 λ		63	38,665 λ^2
14.7	26	16.5 - 0.257 λ		26	6,713 λ^2
62.5	63	21.5 - 0.140 λ		63	50,264 λ^2
35.3	63	16.5 - 0.107 λ		63	38,665 λ^2

Table 2-19W

ALLOWABLE STRESSES F/Ω FOR BUILDING-TYPE STRUCTURES (WELDED)

Allowable Stresses F/Ω (ksi)		Section	F/Ω	6061 - T6 ASTM B221, B241, B429 6061 - T6510 ASTM B221 6061 - T6511 ASTM B221 6061 - T6 ASTM B247 0.000 to 4.000 thick 6061 - T6 ASTM B308 0.062 thick and greater 6351 - T5 ASTM B221 0.000 to 1.000 in. thick $E = 10,100 \text{ ksi}$ $k_t = 1$			
Axial Tension							
axial tension stress on net effective area		D.2b	12.3				
axial tension stress on gross area		D.2a	9.1				
Shear or torsion							
Shear or torsion rupture		G. H.2	7.4				
Bearing							
bolts or rivets on holes		J.3.6a, J.4.6	24.6				
bolts on slots, pins on holes, flat surfaces		J.3.6b, J.6.5, J.8	16.4				
screws in holes		J.5.5.1	16.0				
		Slenderness	λ				
Axial Compression							
member buckling		E.2	9.1				
Flexure							
lateral-torsional buckling		F.4	see F.4.2				
Elements - Uniform Compression							
flat elements supported on one edge in columns whose buckling axis is not an axis of symmetry		B.5.4.1	9.1				
flat elements supported on one edge in all other columns and all beams		B.5.4.1	9.1				
flat elements supported on both edges		B.5.4.2	9.1				
flat elements supported on both edges and with an intermediate stiffener		B.5.4.4	9.1				
round hollow elements		B.5.4.5	9.1				
flat elements - direct strength method		B.5.4.6	9.1				
Elements - Flexural Compression							
flat elements supported on both edges		B.5.5.1	13.6				
flat elements supported on tension edge, compression edge free		B.5.5.2	13.6				
flat elements supported on both edges and with a longitudinal stiffener		B.5.5.3	13.6				
round hollow elements		B.5.5.4	17.7 - 0.933 λ				
flat elements - direct strength method		B.5.5.5	13.6				
Elements - Shear							
flat elements supported on both edges		G.2	5.5				
flat elements supported on one edge		G.3	5.5				
pipes and round or oval tubes		G.4	5.5				
Torsion							
pipes and round or oval tubes		H.2.1	5.5				

$$F_{tyw} = 15 \text{ ksi}$$

$$F_{cyw} = 15 \text{ ksi}$$

$$F_{tw} = 24 \text{ ksi}$$