

DESIGN CALCULATIONS

FOR

AYR WALL-MOUNTED SIGNS 1720 W US Hwy 90 – Lake City

GENERAL NOTES:

1. Design is in accordance with the Florida Building Code 7th Edition (2020) for use within and outside the High Velocity Hurricane Zone (HVHZ).
2. Wind loads have been calculated per the requirements of ASCE 7-16 as shown herein.
3. These engineering calculations pertain only to the structural integrity of those systems, components, and/or other construction explicitly specified herein and/or in accompanying engineering drawings. The existing host structure (if any) is assumed to be in good condition, capable of supporting the loaded system, subject to building department approval. No warranty, either expressed or implied, is contained herein.
4. System components shall be as noted herein. All references to named components and installation shall conform to manufacturer's or industry specifications as summarized herein.
5. Where site conditions deviate from those noted herein, revisions may be required or a separate site-specific engineering evaluation performed.
6. Aluminum components in contact with steel or embedded in concrete shall be protected as prescribed in the 2015 Aluminum Design Manual, Part 1. Steel components in contact with, but not encased in, concrete shall be coated, painted, or otherwise protected against corrosion.
7. Engineer seal affixed hereto validates structural design as shown only. Use of this specification by contractor, et. Al, indemnifies and saves harmless this engineer for all costs & damages including legal fees & appellate fees resulting from deviation from this design.

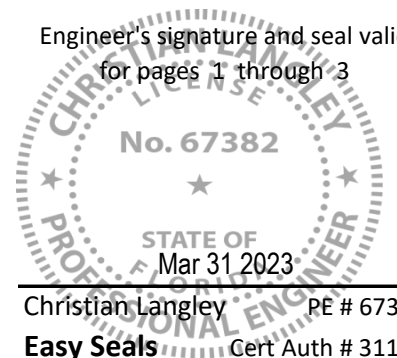
This document has been digitally signed and sealed by Christian Langley, PE on the date noted in this digital signature. Printed copies of this document are not considered signed & sealed, & the signature must be verified on any electronic copies.
Serial: 4A 49 8F 53 22 18 30 0D 22 9D 96 67

Digitally signed
by Christian
Langley
Date: 2023.03.31
13:15:12 -04'00'

Index:

Pg 1	Cover
Pg 2	Wind Loads
Pg 3	Anchor Design

Engineer's signature and seal valid
for pages 1 through 3



Christian Langley PE # 67382
Easy Seals Cert Auth # 31124

ASCE 7-16 Design Wind Loads

WALL-MOUNTED SIGNS

Building Specs

V = 130 mph *Basic wind speed (Vult)*
 Exposure C

ASD Load Combo Coeff: 0.6

Calculations

$\alpha = 9.5$ *3-sec gust speed power law exponent*
 $z_g = 900'$ *Nominal ht. of atmos. boundary layer*
 $G_{cpi} = 0$ *Internal pressure coeff*

Kd = 0.85 *Directionality factor*
 Kzt = 1.0 *Topographic factor*
 Ke = 1.0 *Ground elevation factor*
 A = 10 sq ft *Tributary area*

130 mph - Exp "C"						
WALL-MOUNTED SIGNS						
SIGN HEIGHT	ASD WIND PRESSURES		Kh = Kz	q _z	GCp (4)	GCp (5)
	CENTER (Zone 4)	CORNER (Zone 5)				
15 ft	20.6 psf	26.2 psf	0.85	18.7	-1.10	-1.40
20 ft	21.9 psf	27.9 psf	0.90	19.9	-1.10	-1.40
25 ft	22.9 psf	29.2 psf	0.95	20.9	-1.10	-1.40
30 ft	23.8 psf	30.3 psf	0.98	21.7	-1.10	-1.40
35 ft	24.6 psf	31.3 psf	1.01	22.4	-1.10	-1.40
40 ft	25.3 psf	32.2 psf	1.04	23.0	-1.10	-1.40
45 ft	26.0 psf	33.0 psf	1.07	23.6	-1.10	-1.40
50 ft	26.5 psf	33.8 psf	1.09	24.1	-1.10	-1.40
55 ft	27.1 psf	34.5 psf	1.12	24.6	-1.10	-1.40
60 ft	27.6 psf	35.1 psf	1.14	25.1	-1.10	-1.40
70 ft	28.3 psf	36.6 psf	1.17	25.9	-0.90	-1.80
80 ft	29.0 psf	38.0 psf	1.21	26.6	-0.90	-1.80
90 ft	29.6 psf	39.2 psf	1.24	27.3	-0.90	-1.80
100 ft	30.1 psf	40.3 psf	1.27	27.9	-0.90	-1.80
110 ft	30.6 psf	41.3 psf	1.29	28.5	-0.90	-1.80
120 ft	31.1 psf	42.2 psf	1.32	29.0	-0.90	-1.80
130 ft	31.6 psf	43.1 psf	1.34	29.5	-0.90	-1.80
140 ft	32.0 psf	44.0 psf	1.36	30.0	-0.90	-1.80
150 ft	32.4 psf	44.7 psf	1.38	30.4	-0.90	-1.80
175 ft	33.3 psf	46.6 psf	1.42	31.4	-0.90	-1.80
200 ft	34.1 psf	48.2 psf	1.46	32.3	-0.90	-1.80
250 ft	35.5 psf	51.0 psf	1.53	33.9	-0.90	-1.80

Wall Sign Anchor Design

Structure Dimensions & Loading

Design wind pressure:

P = 30.3 psf

Sign type:

Channel Letter

Sign size:

A = 12.3 sqft (per letter, critical)

Wall material:

Wood

CDX or equiv, thickness to match Min Embed

Anchor type/size:

1/4" Toggle Bolt (r)

Ref: Powers Strap-Toggle, catalog

Min Embedment: 0.5"

Min edge dist: 2"

Min Spacing: 1.5"

Anchor tensile capacity:

Tcap = 169.4 lb (per anchor)

Check Anchors for Pullout

Total Reaction:

Rt = 372 lb ... = P*A (per letter)

No. of anchors req'd:

n = 2.2 anchors per letter ... = Rt/cap**Total anchors required:****3 anchors per letter****OK, typical anchor option shown. Limit to min (3) per letter, bal.****Ref anchor schedule for other anchor options.**