



# Y.J. INC.

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## Sign Design Based On FBC 7th Edition 2020 HVHZ 1620 with Wind Loads Per ASCE 7-16

Job # JTS\_131322  
Project Hardee's #CKE-H-F.41 - DT Canopy  
Job Location 279 W Duval St  
Lake City, FL

### INPUT DATA

Exposure category (B, C or D) = C  
Risk Category = II  
Ultimate Design Windspeed  $V_{ULT}$  = 130 MPH  
Topographic factor  $K_{zt}$  = 1 Flat  
Height of the sign  $h$  = 12.04 FT  
Average Vertical dimension (for wall,  $s = h$ )  $s$  = 1.92 FT  
Horizontal dimension  $B$  = 8.00 FT  
Dimension of return corner  $L_r$  = 0.50 FT

### ANALYSIS

#### Velocity pressure

$q_z = 0.00256 K_z K_{zt} K_d V^2 K_e$  = 31.26 PSF

where:

$q_z$  = velocity pressure at height  $h$ . (Eq. 26.10-1 page. 268)

$K_z$  = velocity pressure exposure coefficient = 0.85

evaluated at height above gRnd. level,  $h$  (Tab. 26.10-1, page 268)

$K_d$  = wind directionality factor. (Tab. 26.6-1, page 266) = 0.85

$K_e$  = ground elevation factor, see (Tab. 26.9-1, page 268) = 1.00

#### Wind Force Case A: resultant force through geometric center

Max horizontal wind pressure =  $p = q_z G C_f$  = 49 PSF  
where:  $G$  = gust effect factor. (Sec. 26.11-1, page 269) = 0.85  
 $C_f$  = net force coefficient. (Fig. 29.3-1, page 323) = 1.85  
 $A_s = B s$  = the gross area = 15.33 FT<sup>2</sup>  
Estimated sign cabinet weight = 93 LBS.

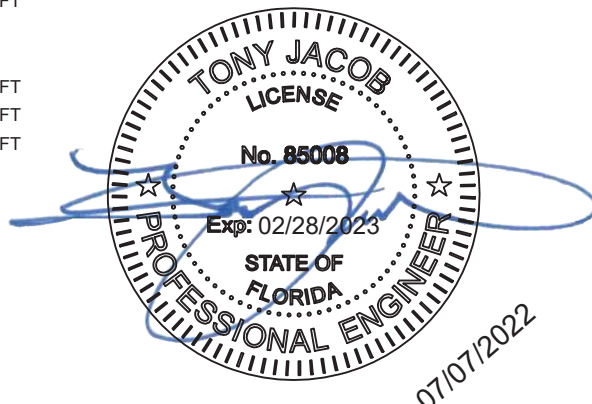
### DESIGN SUMMARY

Allowable Stress Design Wind Factor = 0.60  
Design Wind Pressure =  $0.6 \times p$  = 29.49 PSF  
Design Windforce,  $F$  =  $29.49 \times A_s$  = 0.45 KIPS  
Moment Arm = 8.50 FT  
Design Moment =  $F \times \text{Moment Arm}$  = 3.84 KIP-FT  
Top Area = 64.00 FT<sup>2</sup>  
Top Moment Arm = 2.94 FT  
Dead Load Moment =  $DL \times \text{Top Moment Arm}$  = 2.82 KIP-FT  
Top Wind Load Moment =  $p \times \text{Top Area} \times \text{Top Moment Arm}$  = 5.55 KIP-FT  
Total Moment = 12.21 KIP-FT

#### Footings Design (Nonconstrained)

Diameter = 2.00 FT  
Soil Pressure = 150.00 PSF/FT  
 $S_1$  = 413.00 PSF  
 $A$  = 1.28 FT  
EMBED. = 4.14 FT

24" DIA. DEPTH = 4' - 2"



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## Pole Design

ST'L. SQ. HSS  
USE A500 GR. B  
Fy= 46000 PSI  
S = 9.54 IN<sup>3</sup>  
t = 0.23 IN<sup>4</sup>  
b = 6.00 IN  
A = 5.24 IN<sup>2</sup>  
Sec.Mod. Req'd.  
S = 5.34  
Torsion Shear  
Torsion = 358 LB-FT  
Shear Stress  
V = 194.1  
Total V Stress= 471 allow fv = 18400  
Unity = ( 5.34 / 9.54 ) + ( 471 / 18400 ) = 0.59 < 1 (OK)

## Base Plate

ST'L. PLATE  
USE A36  
t = 0.75 (OK)  
Thickness Req'd.  
t = 0.73  
PL 16" x 16" x 3/4"

## Anchor Design

GALV. ST'L. ANCHOR BOLT  
USE F 1554 GR. 36  
T = 9610  
Tension Req'd.  
T = 6107  
Shear Req'd.  
V = 136  
V = 5130  
Unity = ( 6107 / 9610 ) + ( 136 / 5130 ) = 0.66 < 1 (OK)

