

Company

Address
City, State
Phone
other

JOB TITLE Example 10 - ASCE7-02

JOB NO.	_____	SHEET NO.	_____
CALCULATED BY	_____	DATE	_____
CHECKED BY	_____	DATE	_____

www.struware.com

STRUCTURAL CALCULATIONS

FOR

Example 10 - Sign

Guide to the Use of the Wind Load Provisions of ASCE7-02

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Code Search

I. Code: ASCE 7 - 02

II. Occupancy:

Occupancy Group = B Business

III. Type of Construction:

Fire Rating:
Roof = 0.0 hr
Floor = 0.0 hr

IV. Live Loads:

Roof angle (θ) 0.00 / 12 0.0 deg
Roof
0 to 200 sf: 20 psf
200 to 600 sf: 24 - 0.02Area, but not less than 12 psf
over 600 sf: 12 psf

Floor 50 psf
Stairs & Exitways 100 psf
Balcony 100 psf
Mechanical N/A
Partitions 20 psf

V. Wind Loads : ASCE 7 - 02

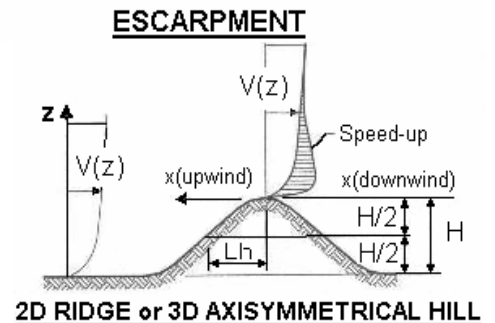
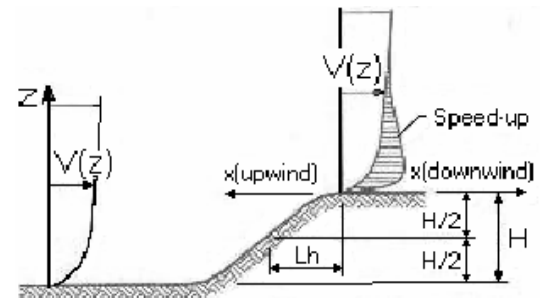
Importance Factor 0.87
Basic Wind speed 90 mph
Directionality (Kd) 0.85
Mean Roof Ht (h) 80.0 ft
Parapet ht above grd 0.0 ft
Exposure Category C
Enclosure Classif. Partially Enclosed
Internal pressure +/-0.55
Building length (L) 2.0 ft
Least width (B) 50.0 ft
Kh case 1 1.208
Kh case 2 1.208

Topographic Factor (Kzt)

Topography Flat
Hill Height (H) 80.0 ft
Half Hill Length (Lh) 100.0 ft
Actual H/Lh = 0.80
Use H/Lh = 0.50
Modified Lh = 160.0 ft
From top of crest: x= 50.0 ft
Bldg up/down wind? downwind

H/Lh= 0.50 K₁ = 0.000
x/Lh = 0.31 K₂ = 0.792
z/Lh = 0.50 K₃ = 1.000

At Mean Roof Ht:
 $K_{zt} = (1+K_1K_2K_3)^2 = 1.000$



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V. Wind Loads - cont.:**Gust Effect Factor**

h = 80.0 ft
 use this h : 20.0 ft
 B = 50.0 ft
 Calculated /z = 48.0 ft
 Use this /z : 70.0 ft

Flexible structure if natural frequency < 1 Hz (T > 1 second).

However, rule of thumb is if h/B < 4 then rigid structure.

h/B = 0.40 Therefore, probably rigid structure

G = 1.09 ▼

Rigid Structure

/ε = 0.20
 l = 500 ft
 Z_{min} = 15 ft
 c = 0.20
 g_Q, g_v = 3.4
 L_z = 581.1 ft
 Q = 0.93
 I_z = 0.18
 G = 0.89 use G = 0.85

Flexible or Dynamically Sensitive Structure

Natural Frequency (n₁) = 0.7 Hz
 Damping ratio (β) = 0.01
 /b = 0.65
 /α = 0.15
 V_z = 96.3
 N₁ = 4.22
 R_n = 0.056
 R_h = 0.304 η = 2.674 h = 80.0 ft
 R_B = 0.426 η = 1.672
 R_L = 0.866 η = 0.224
 g_R = 4.104
 R = 0.828
 G = 1.094

Enclosure Classification

Test for Enclosed Building: A building that does not qualify as open or partially enclosed.

Test for Open Building: All walls are at least 80% open.
 A_o ≥ 0.8A_g

Test for Partially Enclosed Building:

Input	Test
A _o ≥ 1.1A _{oi}	YES
A _o > 4' / 0.01A _g	NO
A _{oi} / A _{gi} ≤ 0.20	NO

Building is NOT Partially Enclosed.

Conditions to qualify as Partially Enclosed Building. Must satisfy all of the following:

A_o ≥ 1.1A_{oi}
 A_o > smaller of 4' or 0.01 A_g
 A_{oi} / A_{gi} ≤ 0.20

Where:

A_o = the total area of openings in a wall that receives positive external pressure.
 A_g = the gross area of that wall in which A_o is identified.
 A_{oi} = the sum of the areas of openings in the building envelope (walls and roof) not including A_o.
 A_{gi} = the sum of the gross surface areas of the building envelope (walls and roof) not including A_g.

Reduction Factor for large volume partially enclosed buildings (R_i):

If the partially enclosed building contains a single room that is unpartitioned, the internal pressure coefficient may be multiplied by the reduction factor R_i.

Total area of all wall & roof openings (A_{og}): 0 sf
 Unpartitioned internal volume (V_i): 0 cf
 R_i = 1.00

Altitude adjustment to constant 0.00256 :

Altitude = 0 feet Average Air Density = 0.0765 lbm/ft³
 Constant = 0.00256

