Wind Load Report

1. Site & Building Data

Roof Type:	Gable
Wind Speed (ult):	138 mph
Exposure Category:	B
Enclosure Class:	Enclosed
Building Width (W):	50 ft.
Building Length (L):	73 ft.
Eave Height (h_e):	10 ft.
Foundation Height (h_f):	0 ft.
Roof Pitch:	6 /12
Eave Overhang (OH_e):	1 ft.
Gable Overhang (OH_g):	1 ft.

2. Parameters & Coefficients

Topographic Factor (K_{zt}):	1.0
Directionality Factor (K_d):	.85
Roof Angle (θ):	26.57 deg.
Mean Roof Height (h):	16.25 ft.
Ridge Height (h_r):	22.50 ft.
Pos. Internal Pressure (+GCpi):	+0.18
Neg. Internal Pressure (-GCpi):	-0.18
Velocity Pressure Exp. Coeff. (K_h):	0.70 @ z=h
Velocity Pressure (q_h):	29.03 psf
End Zone Width (a):	3.00 ft.
Zone 2/2E Dist.:	25.00 ft.

3. Design Assumptions and Notes

Code Standard:	ASCE 7-10
Geometry:	Regular-Shaped Bldg.
Height Class:	Low-Rise Building
Notes:	

4. Design Loads

Top Chord Dead Load:	7 psf
Bottom Chord Dead Load:	10 psf
Truss/Rafter Spacing:	24 in. o/c

4. Design Wind Pressures: MWFRS Envelope Procedure

Load Case A: Transverse Direction

Surface	GCpf	Design Pressure (psf)	
		(w/ +GCpi)	(w/ -GCpi)
1	0.55	10.73	21.18
2	-0.10	-8.10	2.35
3	-0.45	-18.21	-7.76
4	-0.39	-16.57	-6.11
1E	0.73	15.90	26.36
2E	-0.19	-10.75	-0.30
3E	-0.58	-22.21	-11.76
4E	-0.53	-20.76	-10.31
2OH	-0.10	-2.88	
2EOH	-0.19	-5.52	
3OH	-0.45	-12.98	
3EOH	-0.58	-16.98	
2OH+W	-0.10/-0.7	-23.20	
2EOH+W	-0.19/-0.7	-25.85	

a) (+) and (-) signs signify wind pressures acting toward & away from surfaces.
b) External Pressure Coefficients linearly interpolated from Fig. 28.4-1 ASCE 7-10.
c) Design building for all wind directions, 4 load patterns per load case.
d) Total horizontal shear shall not be less than that by neglecting roof wind forces.
e) Min. wind load for enclosed or partially enclosed bldg.: 16 psf wall, 8 psf roof.
f) Design pressures are for strength design, multiply by 0.6 for ASD.

Load Case B: Longitudinal Direction

Surface	GCpf	Design Pressure (psf) (w/ +GCpi)	Design Pressure (psf) (w/ -GCpi)
1	-0.45	-18.29	-7.84
2	-0.69	-25.26	-14.81
3	-0.37	-15.97	-5.52
4	-0.45	-18.29	-7.84
5	0.40	6.39	16.84
6	-0.29	-13.65	-3.19
1E	-0.48	-19.16	-8.71
2E	-1.07	-36.29	-25.84
3E	-0.53	-20.61	-10.16
4E	-0.48	-19.16	-8.71
5E	0.61	12.48	22.94
6E	-0.43	-17.71	-7.26
2OH	-0.69	-20.03	
2EOH	-1.07	-31.06	
3OH	-0.37	-10.74	
3EOH	-0.53	-15.39	
2EOH+W	-1.07/-0.7	-51.39	
3EOH+W	-0.53/-0.7	-35.71	

a) (+) and (-) signs signify wind pressures acting toward & away from surfaces.
b) External Pressure Coefficients linearly interpolated from Fig. 28.4-1 ASCE 7-10.
c) Design building for all wind directions, 4 load patterns per load case.
d) Total horizontal shear shall not be less than that by neglecting roof wind forces.
e) Min. wind load for enclosed or partially enclosed bldg.: 16 psf wall, 8 psf roof.
f) Design pressures are for strength design, multiply by 0.6 for ASD.

Torsional Load Cases

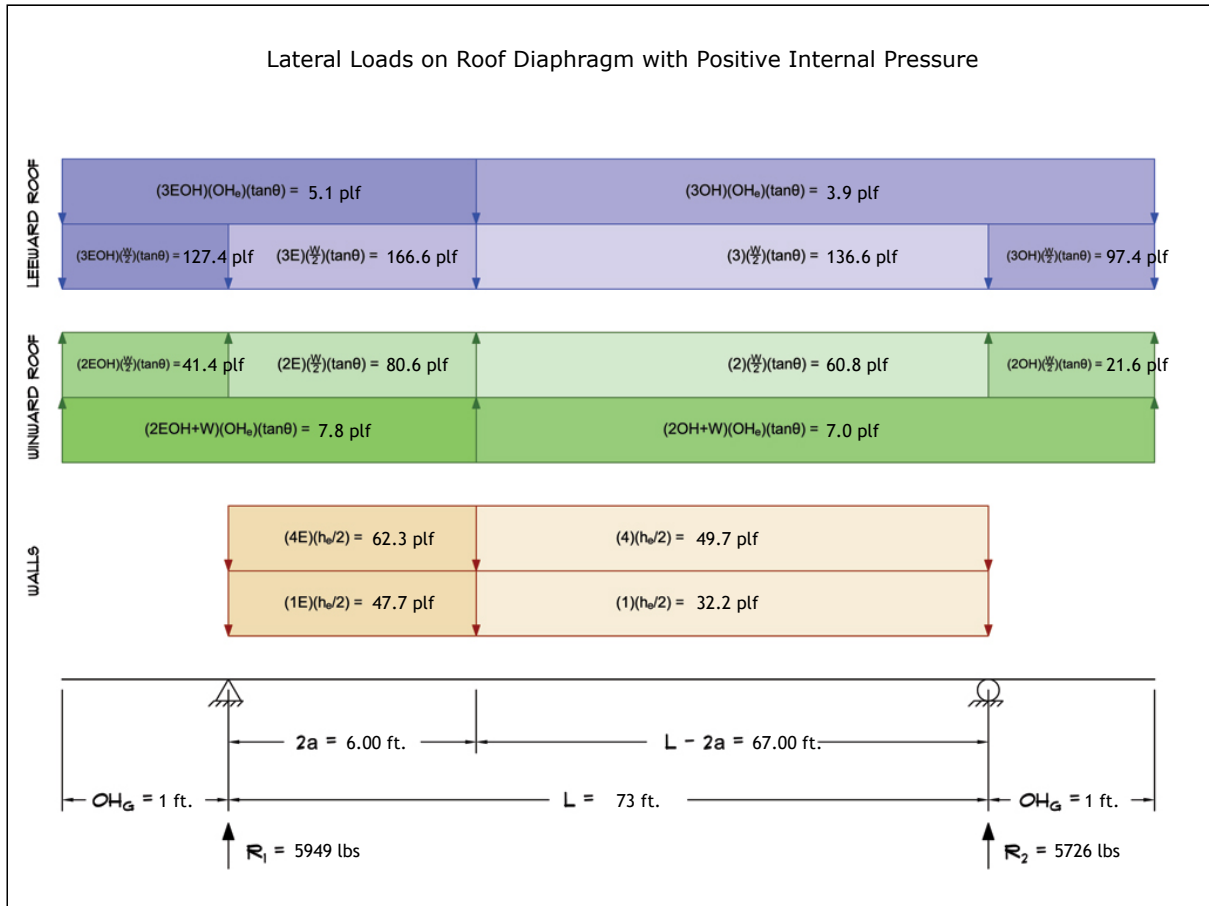| Surface	Load Case	GCpf	Design Pressure (psf) (w/ +GCpi)	Design Pressure (psf) (w/ -GCpi)
1T	A	-	2.68	5.30
2T	A	-	-2.03	0.59
3T	A	-	-4.55	-1.94
4T	A	-	-4.14	-1.53
5T	B	-	1.60	4.21
6T	B	-	-3.41	-0.80

a) (+) and (-) signs signify wind pressures acting toward & away from surfaces.
b) Pressures designated with a "T" are 25% of full design wind pressures.
c) Torsional loading shall apply to all 8 load patterns using the figures shown.
d) Design pressures are for strength design, multiply by 0.6 for ASD.
e) Torsional Design Exceptions: One story bldg. with h ≤ 30 ft,
   Two stories or less framed with light frame construction,
   Two stories or less with flexible diaphragms.

Case A Torsion — Transverse Direction

Case B Torsion — Longitudinal Direction

Subject	Customer	Location	Job No.
Wind Loads			2024D417

Engr.			Rev.
Engineer	Company Name	This report may not be copied, reproduced or distributed without the written consent of Company Name	-
Date	123 Street City, State 12345	STRUCTURAL ENGINEERS COMPANY LOGO	Page
12/10/2024	ph. (888) 777-5555 www.website.com	Copyright © 2024	2

5. Wind Load Calculations

1.) Lateral Loads - Transverse Direction:

Lateral Loads on Roof Diaphragm with Positive Internal Pressure

LEEWARD ROOF
- $(3EOH)(OH_e)(\tan\theta) = 5.1$ plf
- $(3OH)(OH_e)(\tan\theta) = 3.9$ plf
- $(3EOH)(\frac{\Psi}{2})(\tan\theta) = 127.4$ plf
- $(3E)(\frac{\Psi}{2})(\tan\theta) = 166.6$ plf
- $(3)(\frac{\Psi}{2})(\tan\theta) = 136.6$ plf
- $(3OH)(\frac{\Psi}{2})(\tan\theta) = 97.4$ plf

WINWARD ROOF
- $(2EOH)(\frac{\Psi}{2})(\tan\theta) = 41.4$ plf
- $(2E)(\frac{\Psi}{2})(\tan\theta) = 80.6$ plf
- $(2)(\frac{\Psi}{2})(\tan\theta) = 60.8$ plf
- $(2OH)(\frac{\Psi}{2})(\tan\theta) = 21.6$ plf
- $(2EOH+W)(OH_e)(\tan\theta) = 7.8$ plf
- $(2OH+W)(OH_e)(\tan\theta) = 7.0$ plf

WALLS
- $(4E)(h_e/2) = 62.3$ plf
- $(4)(h_e/2) = 49.7$ plf
- $(1E)(h_e/2) = 47.7$ plf
- $(1)(h_e/2) = 32.2$ plf

- $2a = 6.00$ ft.
- $L - 2a = 67.00$ ft.
- $OH_G = 1$ ft.
- $L = 73$ ft.
- $OH_G = 1$ ft.
- $R_1 = 5949$ lbs
- $R_2 = 5726$ lbs

a) (-) signs signify wind lateral forces acting opposite to the direction of the arrows shown.
b) Strength design values multiplied by 0.6 to obtain ASD values.

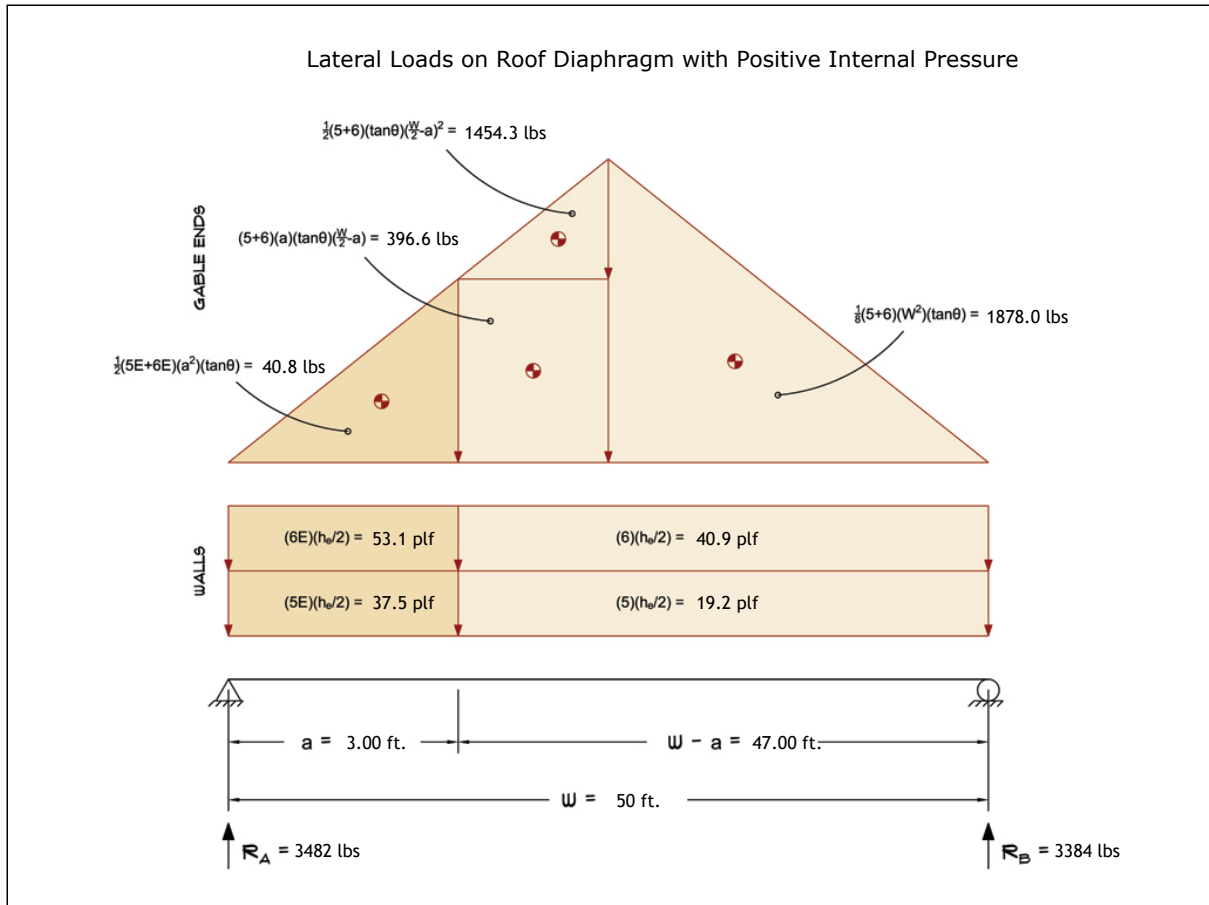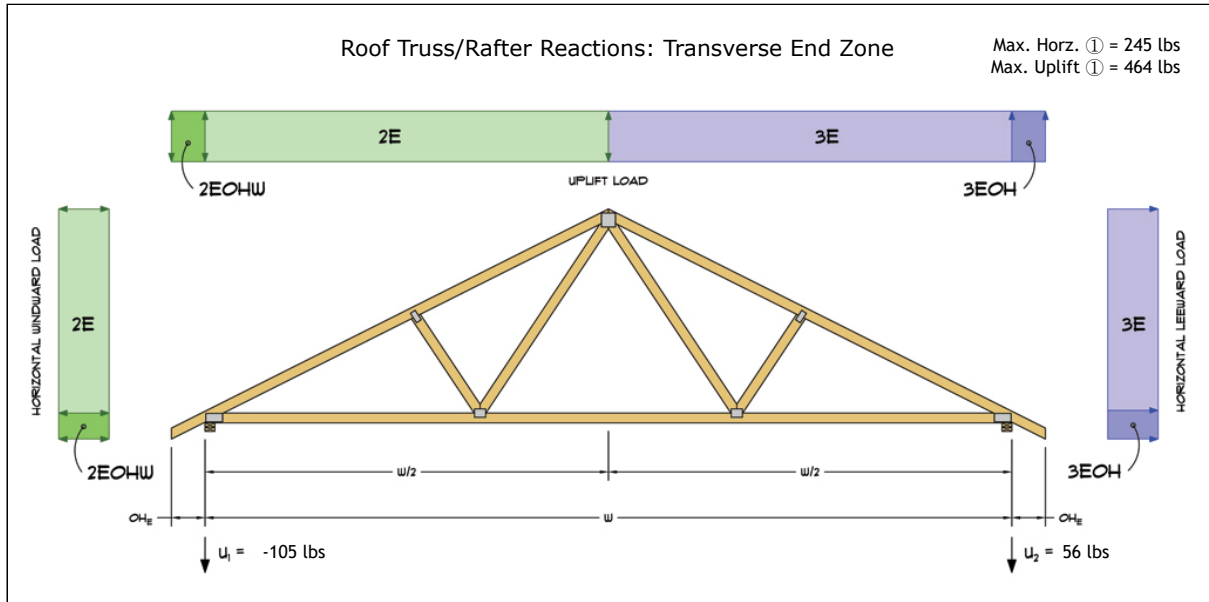| Wind Base Shear (ASD)						
Load Case A: Transverse Direction						
Load Case	Walls (lbs)	Roof (lbs)	Roof Overhangs (lbs)	Total Lateral Load (lbs)	R_1 (lbs)	R_2 (lbs)
Positive Internal Pressure	6147	5593	-65	11675	5949	5726
Negative Internal Pressure	6147	5593	-65	11675	5949	5726
Roof Pressure = 0	6147	0	0	6147	3151	2996
Min. Pressures (8 psf, 16 psf)	3504	4380	300	8184	4092	4092

a) Bottom half of wall neglected in tributary area calculations.
b) Strength design values multiplied by 0.6 to obtain ASD values.

Subject	Customer	Location		Job No.
Wind Loads				2024D417
Engr.			This report may not be copied, reproduced or distributed without the written consent of Company Name	Rev.
Engineer	**Company Name**	STRUCTURAL ENGINEERS COMPANY LOGO		-
Date	123 Street City, State 12345			Page
12/10/2024	ph. (888) 777-5555 www.website.com		Copyright © 2024	3

2.) Lateral Loads - Longitudinal Direction:

Lateral Loads on Roof Diaphragm with Positive Internal Pressure

$\frac{1}{2}(5+6)(\tan\theta)(\frac{W}{2}-a)^2 = 1454.3$ lbs

$(5+6)(a)(\tan\theta)(\frac{W}{2}-a) = 396.6$ lbs

$\frac{1}{8}(5+6)(W^2)(\tan\theta) = 1878.0$ lbs

$\frac{1}{2}(5E+6E)(a^2)(\tan\theta) = 40.8$ lbs

GABLE ENDS

WALLS

$(6E)(h_e/2) = 53.1$ plf

$(6)(h_e/2) = 40.9$ plf

$(5E)(h_e/2) = 37.5$ plf

$(5)(h_e/2) = 19.2$ plf

a = 3.00 ft.

W − a = 47.00 ft.

W = 50 ft.

R_A = 3482 lbs

R_B = 3384 lbs

a) (-) signs signify wind lateral forces acting opposite to the direction of the arrows shown.
b) Strength design values multiplied by 0.6 to obtain ASD values.
c) Where the length of building (L) exceeds 4X the mean roof height (h), wind drag forces should additionally be considered.

Wind Base Shear (ASD)						
Load Case B: Longitudinal Direction						
Load Case	Walls (lbs)	Gable Ends (lbs)	Roof (lbs)	Total Lateral Load (lbs)	R_A (lbs)	R_B (lbs)
Positive Internal Pressure	3096	3770	0	6866	3482	3384
Negative Internal Pressure	3096	3770	0	6866	3482	3384
Roof Pressure = 0	3096	3770	0	6866	3482	3384
Min. Pressures (8 psf, 16 psf)	2400	3000	0	5400	2700	2700

a) Bottom half of wall neglected in tributary area calculations.
b) Strength design values multiplied by 0.6 to obtain ASD values.

3.) Roof Truss Reactions:

Roof Truss/Rafter Reactions: Transverse End Zone

Max. Horz. ① = 245 lbs
Max. Uplift ① = 464 lbs

a) Strength design values multiplied by 0.6 to obtain ASD values.
b) Windward loads may be positive or negative depending on pitch of roof.

Roof Truss/Rafter Reactions (ASD)					
w/ Positive Internal Pressure					
Load Case	Horizontal Load (lbs)	Gross Uplift (lbs)	Net Uplift (lbs)	U_1 (lbs)	U_2 (lbs)
Transverse Int. Zone	-145	833	-256	-197	-58
Transverse End Zone	-167	1040	-48	-105	56
Longitudinal Int. Zone	145	1274	185	168	17
Longitudinal End Zone	245	1763	674	464	210

a) Gross Uplift calculations do not include any counteracting roof dead loads.
b) Net Uplift calculations include counteracting roof dead loads multiplied by 0.6 per load case (7) ASCE 7-10.
c) Strength design values multiplied by 0.6 to obtain ASD values for wind loads.
d) Loads based on truss spacing calculated at 24" o/c.
e) Negative values for horizontal load indicate load acting in windward direction (tranverse load cases).
f) Negative values for uplift indicate net downward force (zero uplift).

Subject	Customer	Location		Job No.
Wind Loads				2024D417
Engr. Engineer	**Company Name**		This report may not be copied, reproduced or distributed without the written consent of Company Name	Rev. -
Date 12/10/2024	123 Street City, State 12345 ph. (888) 777-5555 www.website.com	STRUCTURAL ENGINEERS COMPANY LOGO	Copyright © 2024	Page 5