Wind Load Report

1. Site & Building Data

Roof Type:	Gable
Wind Speed (ult):	115 mph
Exposure Category:	C
Enclosure Class:	Enclosed
Building Width (W):	26 ft.
Building Length (L):	42 ft.
Eave Height (h_e):	10 ft.
Foundation Height (h_f):	0 ft.
Roof Pitch:	10 /12
Eave Overhang (OH_e):	1 ft.
Gable Overhang (OH_g):	0 ft.

2. Parameters & Coefficients

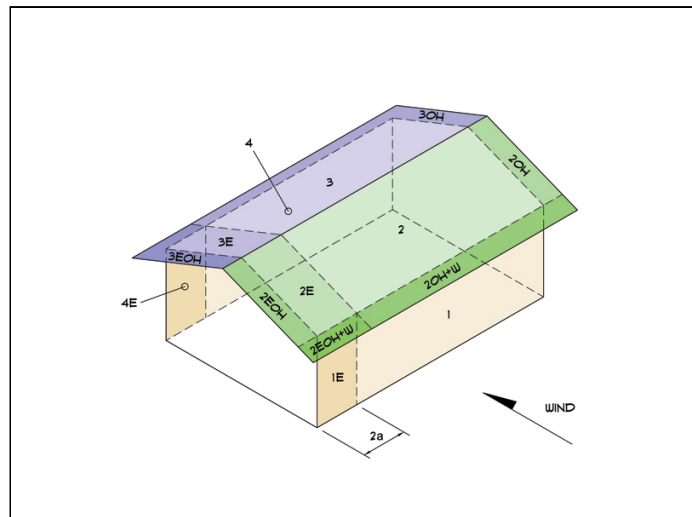|	
Topographic Factor (K_{zt}):	1.0
Directionality Factor (K_d):	.85
Roof Angle (θ):	39.81 deg.
Mean Roof Height (h):	15.42 ft.
Ridge Height (h_r):	20.83 ft.
Pos. Internal Pressure (+GCpi):	+0.18
Neg. Internal Pressure (-GCpi):	-0.18
Velocity Pressure Exp. Coeff. (K_h):	0.85 @ z=h
Velocity Pressure (q_h):	24.57 psf
End Zone Width (a):	3.00 ft.
Zone 2/2E Dist.:	13.00 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	0.56	9.34	18.18
2	0.21	0.74	9.58
3	-0.43	-14.99	-6.14
4	-0.37	-13.51	-4.67
1E	0.69	12.53	21.38
2E	0.27	2.21	11.06
3E	-0.53	-17.44	-8.60
4E	-0.48	-16.22	-7.37
2OH	0.21	5.16	
2EOH	0.27	6.63	
3OH	-0.43	-10.57	
3EOH	-0.53	-13.02	
2OH+W	0.21/-0.7	-11.94	
2EOH+W	0.27/-0.7	-10.47	

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.

Subject	Customer	Location	Job No.
Wind Loads			2025D35

Engr.			Rev.
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Load Case B: Longitudinal Direction

Surface	GCpf	Design Pressure (psf)	
		(w/ +GCpi)	(w/ -GCpi)
1	-0.45	-15.48	-6.63
2	-0.69	-21.38	-12.53
3	-0.37	-13.51	-4.67
4	-0.45	-15.48	-6.63
5	0.40	5.41	14.25
6	-0.29	-11.55	-2.70
1E	-0.48	-16.22	-7.37
2E	-1.07	-30.71	-21.87
3E	-0.53	-17.44	-8.60
4E	-0.48	-16.22	-7.37
5E	0.61	10.57	19.41
6E	-0.43	-14.99	-6.14
2OH	-0.69	-16.95	
2EOH	-1.07	-26.29	
3OH	-0.37	-9.09	
3EOH	-0.53	-13.02	
2EOH+W	-1.07/-0.7	-43.49	
3EOH+W	-0.53/-0.7	-30.22	

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)	(w/ -GCpi)
1T	A	-	2.33	4.55
2T	A	-	0.18	2.40
3T	A	-	-3.75	-1.54
4T	A	-	-3.38	-1.17
5T	B	-	1.35	3.56
6T	B	-	-2.89	-0.68

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,
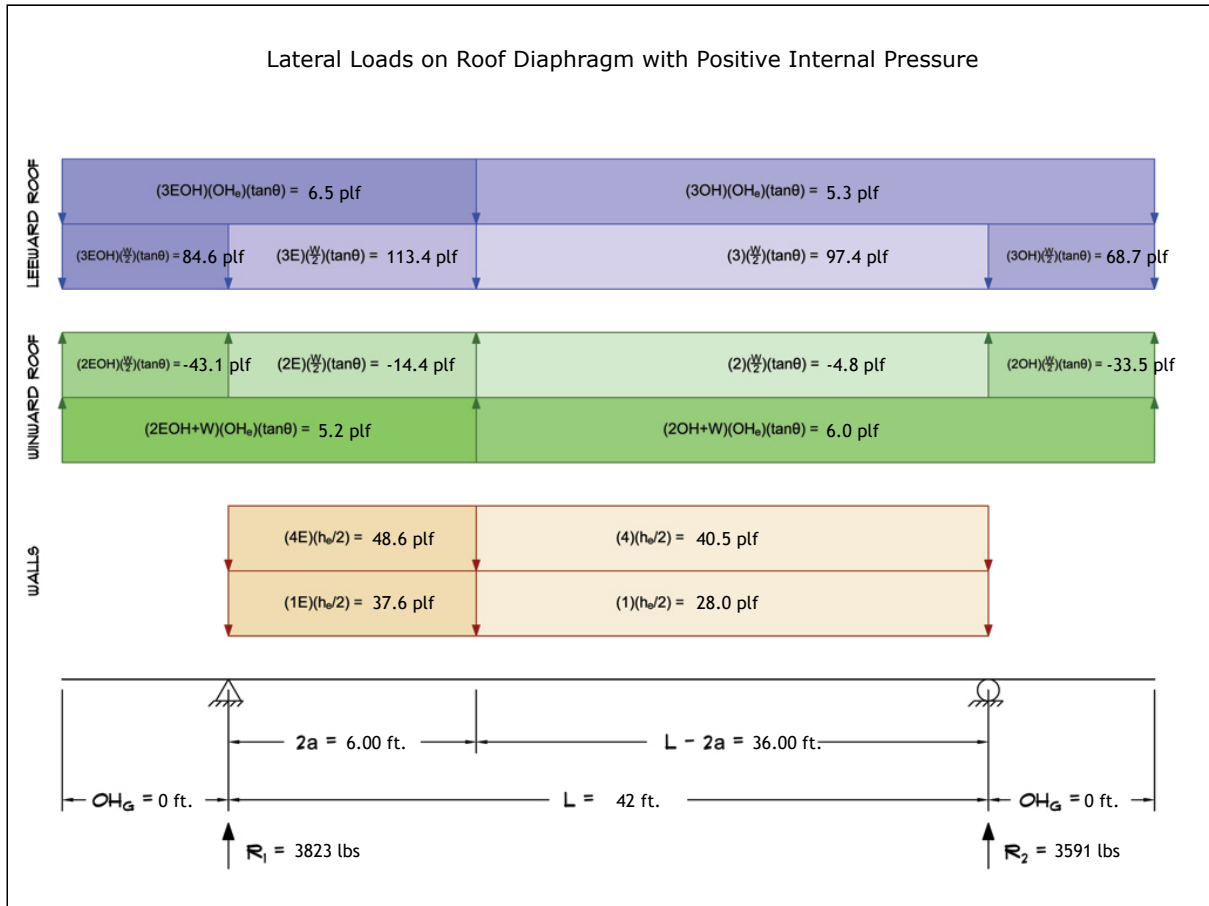 Two stories or less with flexible diaphragms.

Case A Torsion — Transverse Direction

Case B Torsion — Longitudinal Direction

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) = $ 6.5 plf
- $(3OH)(OH_e)(\tan\theta) = $ 5.3 plf
- $(3EOH)(\frac{W}{2})(\tan\theta) = $ 84.6 plf
- $(3E)(\frac{W}{2})(\tan\theta) = $ 113.4 plf
- $(3)(\frac{W}{2})(\tan\theta) = $ 97.4 plf
- $(3OH)(\frac{W}{2})(\tan\theta) = $ 68.7 plf

WINWARD ROOF
- $(2EOH)(\frac{W}{2})(\tan\theta) = $ -43.1 plf
- $(2E)(\frac{W}{2})(\tan\theta) = $ -14.4 plf
- $(2)(\frac{W}{2})(\tan\theta) = $ -4.8 plf
- $(2OH)(\frac{W}{2})(\tan\theta) = $ -33.5 plf
- $(2EOH+W)(OH_e)(\tan\theta) = $ 5.2 plf
- $(2OH+W)(OH_e)(\tan\theta) = $ 6.0 plf

WALLS
- $(4E)(h_e/2) = $ 48.6 plf
- $(4)(h_e/2) = $ 40.5 plf
- $(1E)(h_e/2) = $ 37.6 plf
- $(1)(h_e/2) = $ 28.0 plf

- $2a = $ 6.00 ft.
- $L - 2a = $ 36.00 ft.
- $OH_G = $ 0 ft.
- $L = $ 42 ft.
- $OH_G = $ 0 ft.
- $R_1 = $ 3823 lbs
- $R_2 = $ 3591 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.

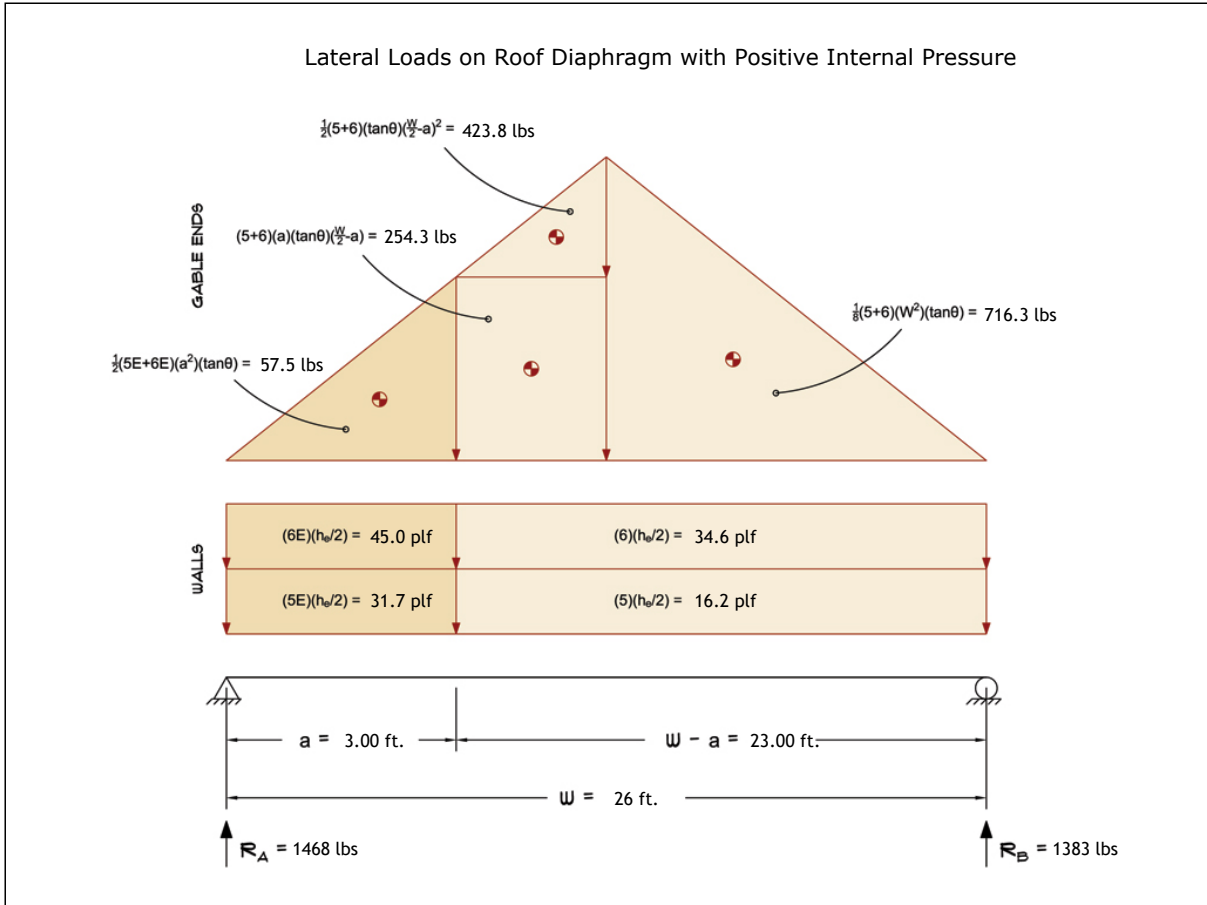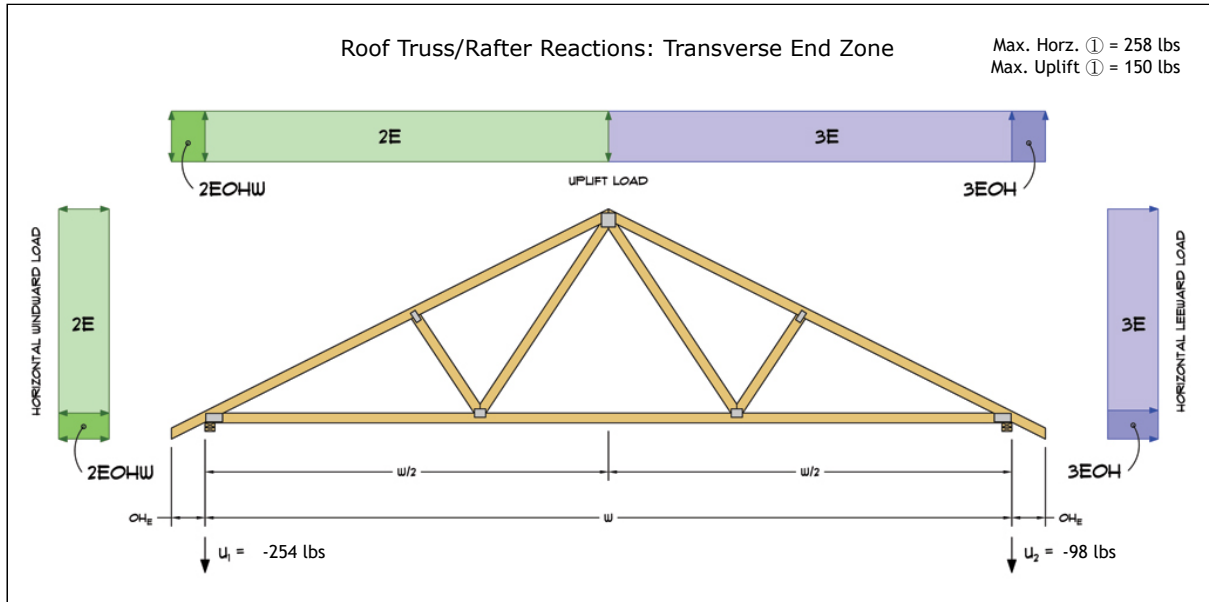| Wind Base Shear (ASD)						
Load Case A: Transverse Direction						
Load Case	Walls (lbs)	Roof (lbs)	Roof Overhangs (lbs)	Total Lateral Load (lbs)	R_1 (lbs)	R_2 (lbs)
Positive Internal Pressure	2985	4446	-17	7414	3823	3591
Negative Internal Pressure	2985	4446	-17	7414	3823	3591
Roof Pressure = 0	2985	0	0	2985	1538	1447
Min. Pressures (8 psf, 16 psf)	2016	2184	168	4368	2184	2184

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

2.) Lateral Loads - Longitudinal Direction:

Lateral Loads on Roof Diaphragm with Positive Internal Pressure

$\frac{1}{2}(5+6)(\tan\theta)(\frac{W}{2}-a)^2 = 423.8$ lbs

$(5+6)(a)(\tan\theta)(\frac{W}{2}-a) = 254.3$ lbs

$\frac{1}{8}(5+6)(W^2)(\tan\theta) = 716.3$ lbs

$\frac{1}{2}(5E+6E)(a^2)(\tan\theta) = 57.5$ lbs

GABLE ENDS

WALLS

$(6E)(h_e/2) = 45.0$ plf

$(6)(h_e/2) = 34.6$ plf

$(5E)(h_e/2) = 31.7$ plf

$(5)(h_e/2) = 16.2$ plf

$a = 3.00$ ft.

$W - a = 23.00$ ft.

$W = 26$ ft.

$R_A = 1468$ lbs

$R_B = 1383$ 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	1400	1452	0	2852	1468	1383
Negative Internal Pressure	1400	1452	0	2852	1468	1383
Roof Pressure = 0	1400	1452	0	2852	1468	1383
Min. Pressures (8 psf, 16 psf)	1248	1352	0	2600	1300	1300

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 = 258 lbs
Max. Uplift ① = 150 lbs

U_1 = -254 lbs U_2 = -98 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	-203	249	-369	-245	-124
Transverse End Zone	-258	266	-352	-254	-98
Longitudinal Int. Zone	110	576	-43	14	-57
Longitudinal End Zone	186	798	180	150	30

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				2025D35

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