



# Wind Load Report - Roof wind load

## 1. Site & Building Data

Roof Type:	Gable
Wind Speed (ult):	180 mph
Exposure Category:	B
Enclosure Class:	Enclosed
Building Width (W):	12 ft.
Building Length (L):	36 ft.
Eave Height (h <sub>e</sub> ):	8.6 ft.
Foundation Height (h <sub>f</sub> ):	0 ft.
Roof Pitch:	8 /12
Eave Overhang (OH <sub>e</sub> ):	2 ft.
Gable Overhang (OH <sub>g</sub> ):	0 ft.

## 2. Parameters & Coefficients

Topographic Factor (K <sub>zt</sub> ):	1.0
Directionality Factor (K <sub>d</sub> ):	.85
Roof Angle (θ):	33.69 deg.
Mean Roof Height (h):	10.60 ft.
Ridge Height (h <sub>r</sub> ):	12.60 ft.
Pos. Internal Pressure (+GC <sub>pi</sub> ):	+0.18
Neg. Internal Pressure (-GC <sub>pi</sub> ):	-0.18
Velocity Pressure Exp. Coeff. (K <sub>h</sub> ):	0.70 @ z=h
Velocity Pressure (q <sub>h</sub> ):	49.39 psf
End Zone Width (a):	3.00 ft.
Zone 2/2E Dist.:	6.00 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:	15 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	GC <sub>pf</sub>	Design Pressure (psf)	
		(w/ +GC <sub>pi</sub> )	(w/ -GC <sub>pi</sub> )
1	0.56	18.77	36.55
2	0.21	1.48	19.26
3	-0.43	-30.13	-12.35
4	-0.37	-27.17	-9.38
1E	0.69	25.19	42.97
2E	0.27	4.45	22.23
3E	-0.53	-35.07	-17.29
4E	-0.48	-32.60	-14.82
2OH	0.21	10.37	
2EOH	0.27	13.34	
3OH	-0.43	-21.24	
3EOH	-0.53	-26.18	
2OH+W	0.21/-0.7	-24.20	
2EOH+W	0.27/-0.7	-21.24	



- 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 <b>Wind Loads</b>	Customer <b>Jerson Diaz</b>	Location <b>Santiago</b>	Job No. <b>Loft roof</b>
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### Load Case B: Longitudinal Direction

Surface	GCpf	Design Pressure (psf)	
		(w/ +GCpi)	(w/ -GCpi)
1	-0.45	-31.12	-13.34
2	-0.69	-42.97	-25.19
3	-0.37	-27.17	-9.38
4	-0.45	-31.12	-13.34
5	0.40	10.87	28.65
6	-0.29	-23.21	-5.43
1E	-0.48	-32.60	-14.82
2E	-1.07	-61.74	-43.96
3E	-0.53	-35.07	-17.29
4E	-0.48	-32.60	-14.82
5E	0.61	21.24	39.02
6E	-0.43	-30.13	-12.35
2OH	-0.69		-34.08
2EOH	-1.07		-52.85
3OH	-0.37		-18.28
3EOH	-0.53		-26.18
2EOH+W	-1.07/-0.7		-87.43
3EOH+W	-0.53/-0.7		-60.75



- 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	-	4.69	9.14
2T	A	-	0.37	4.82
3T	A	-	-7.53	-3.09
4T	A	-	-6.79	-2.35
5T	B	-	2.72	7.16
6T	B	-	-5.80	-1.36

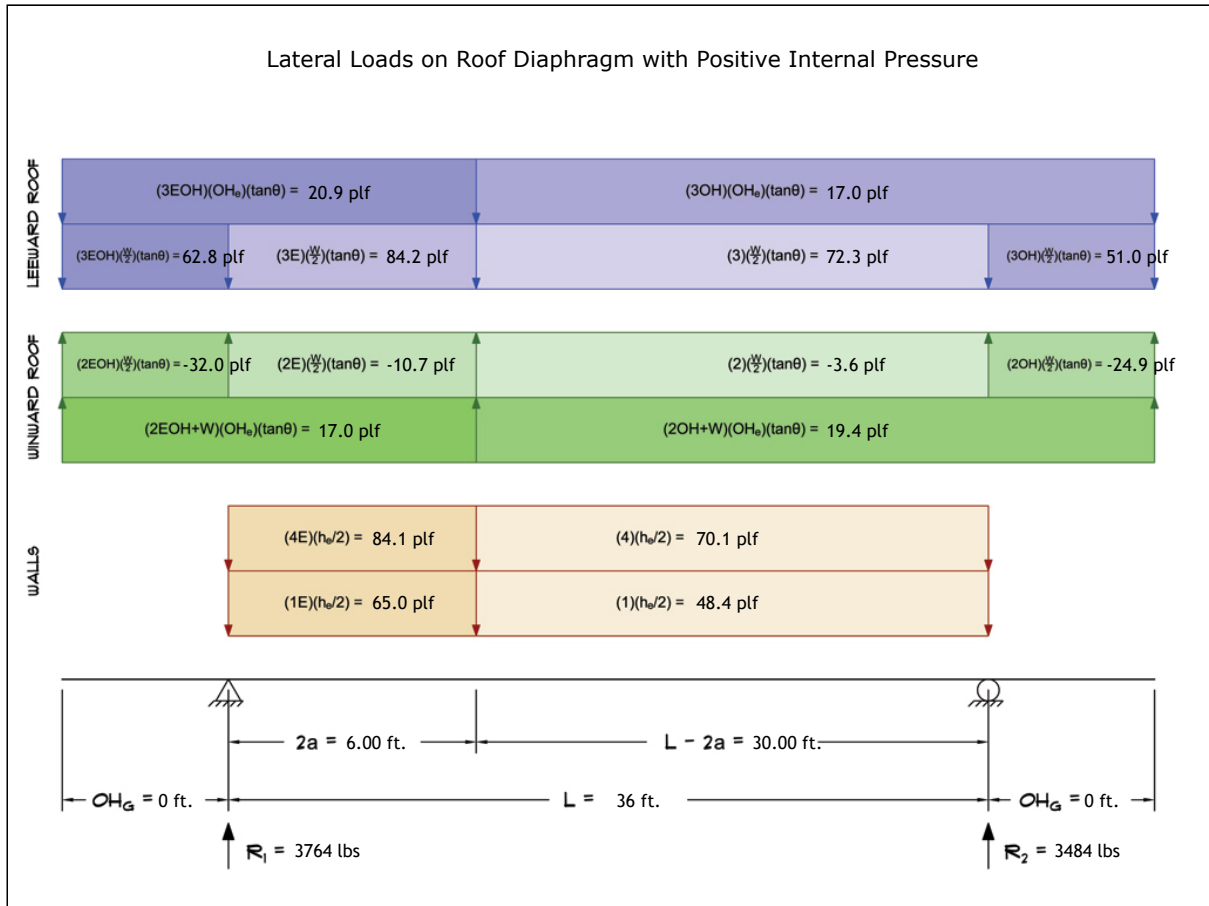


- a) (+) and (-) signs signify wind pressures acting toward & away from surfaces.
- b) Pressures designated with a "T" are 25% of full design wind pressures.
- c) Torsional loading shall apply to all 8 load patterns using the figures shown.
- d) Design pressures are for strength design, multiply by 0.6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

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Date	ph. (800) 000-0000 www.website.com		Page
11/25/2024			2
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# 5. Wind Load Calculations

## 1.) Lateral Loads - Transverse Direction:



- 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.

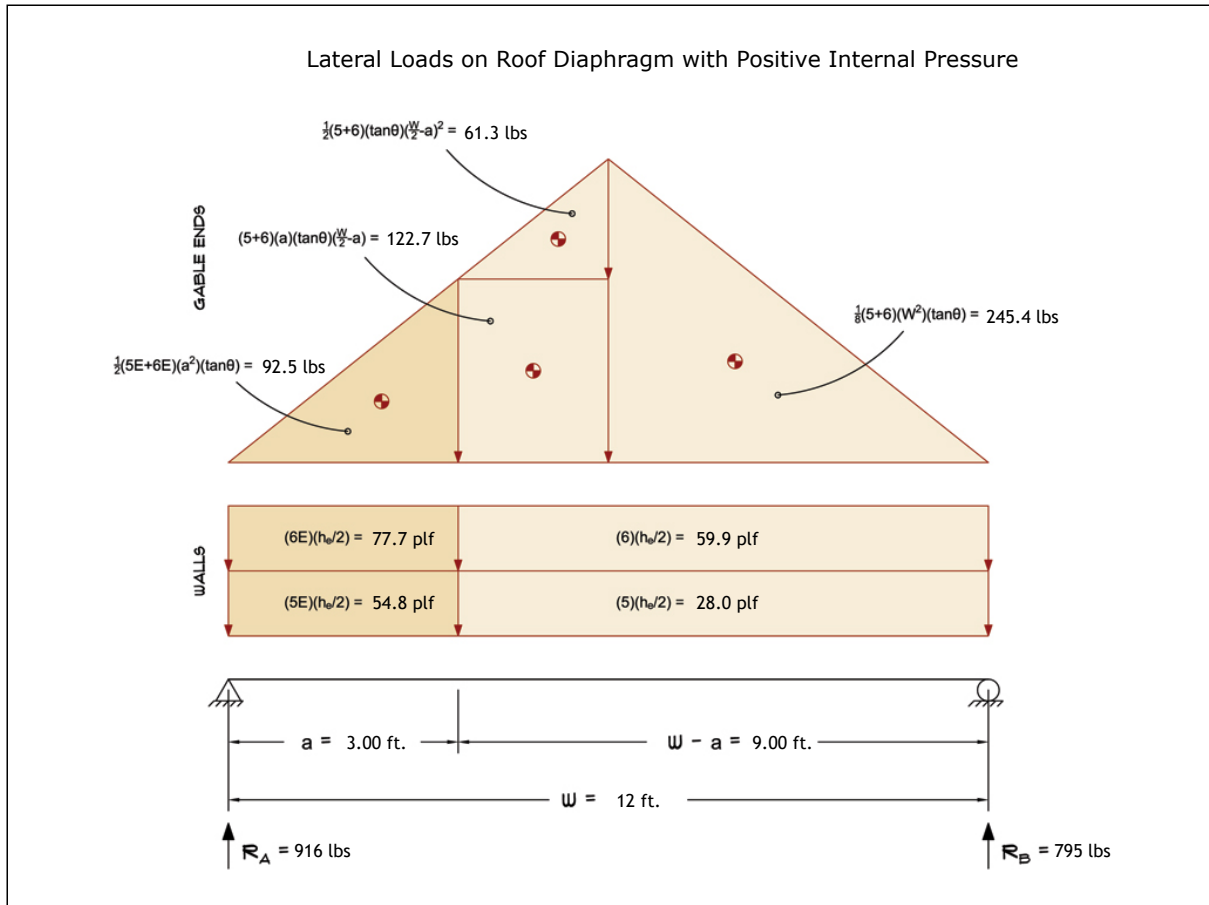
Wind Base Shear (ASD)						
Load Case A: Transverse Direction						
Load Case	Walls (lbs)	Roof (lbs)	Roof Overhangs (lbs)	Total Lateral Load (lbs)	R <sub>1</sub> (lbs)	R <sub>2</sub> (lbs)
Positive Internal Pressure	4450	2845	-47	7248	3764	3484
Negative Internal Pressure	4450	2845	-47	7248	3764	3484
Roof Pressure = 0	4450	0	0	4450	2301	2149
Min. Pressures (8 psf, 16 psf)	1486	691	230	2408	1204	1204

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

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2.) Lateral Loads - Longitudinal Direction:



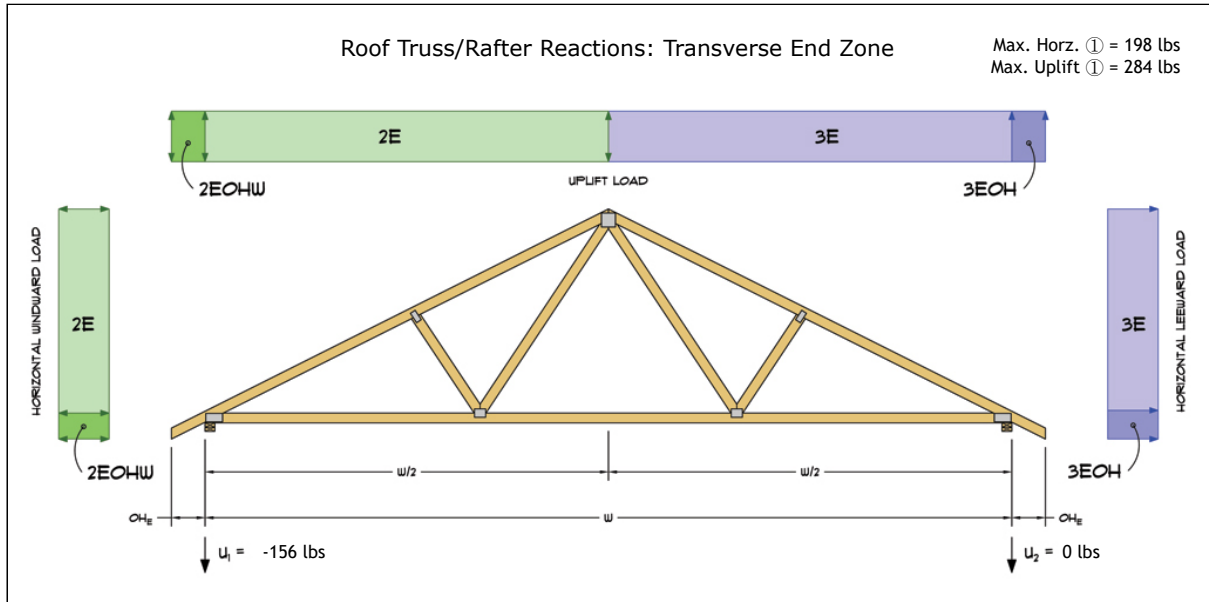
- a) (-) signs signify wind lateral forces acting opposite to the direction of the arrows shown.
- b) Strength design values multiplied by 0.6 to obtain ASD values.
- c) Where the length of building (L) exceeds 4X the mean roof height (h), wind drag forces should additionally be considered.

Wind Base Shear (ASD)						
Load Case B: Longitudinal Direction						
Load Case	Walls (lbs)	Gable Ends (lbs)	Roof (lbs)	Total Lateral Load (lbs)	R <sub>A</sub> (lbs)	R <sub>B</sub> (lbs)
Positive Internal Pressure	1189	522	0	1711	916	795
Negative Internal Pressure	1189	522	0	1711	916	795
Roof Pressure = 0	1189	522	0	1711	916	795
Min. Pressures (8 psf, 16 psf)	495	230	0	726	363	363

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

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3.) Roof Truss Reactions:



- 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 <sub>1</sub> (lbs)	U <sub>2</sub> (lbs)
Transverse Int. Zone	-147	315	-175	-140	-35
Transverse End Zone	-198	334	-156	-156	0
Longitudinal Int. Zone	101	631	141	121	20
Longitudinal End Zone	171	887	397	284	113

- 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 (transverse load cases).
- f) Negative values for uplift indicate net downward force (zero uplift).

\*Disclaimer: The calculations produced herein are for initial design and estimating purposes only. The calculations and drawings presented do not constitute a fully engineered design. All of the potential load cases required to fully design an actual structure may not be provided by this calculator. For the design of an actual structure, a registered and licensed professional should be consulted as per IRC 2012 Sec. R802.10.2 and designed according to the minimum requirements of ASCE 7-10. The wind load calculations provided by this online tool are for educational and illustrative purposes only. Medeek Design assumes no liability or loss for any designs presented and does not guarantee fitness for use.

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