



Wind Load Report - Akers 3 Home Villa

1. Site & Building Data

Roof Type: Gable
 Wind Speed (ult): 115 mph
 Exposure Category: C
 Enclosure Class: Enclosed
 Building Width (W): 117 ft.
 Building Length (L): 146 ft.
 Eave Height (h_e): 11 ft.
 Foundation Height (h_f): 0 ft.
 Roof Pitch: 1.5 /12
 Eave Overhang (OH_e): 1.5 ft.
 Gable Overhang (OH_g): 1.5 ft.

2. Parameters & Coefficients

Topographic Factor (K_{zt}): 1.0
 Directionality Factor (K_d): .85
 Roof Angle (θ): 7.13 deg.
 Mean Roof Height (h): 14.66 ft.
 Ridge Height (h_r): 18.31 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): 24.43 psf
 End Zone Width (a): 5.86 ft.
 Zone 2/2E Dist.: 27.50 ft.

3. Design Assumptions and Notes

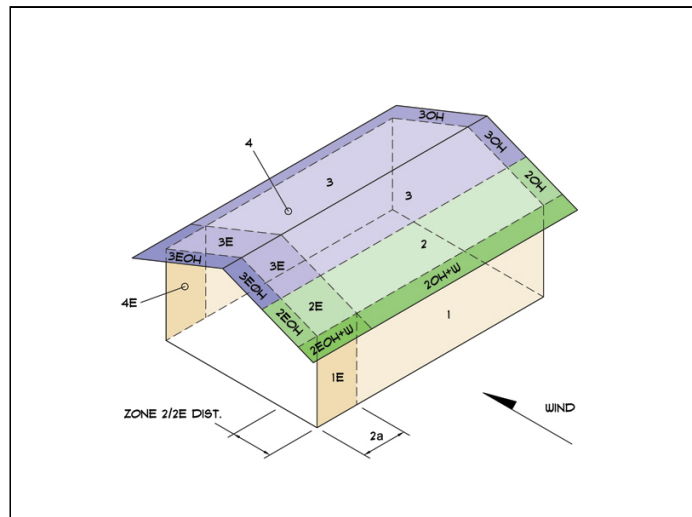
Code Standard: ASCE 7-10
 Geometry: Regular-Shaped Bldg.
 Height Class: Low-Rise Building
 Notes:

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	0.42	5.82	14.62
2	-0.69	-21.25	-12.46
3	-0.39	-13.82	-5.02
4	-0.31	-11.97	-3.17
1E	0.64	11.16	19.96
2E	-1.07	-30.54	-21.74
3E	-0.55	-17.90	-9.10
4E	-0.46	-15.63	-6.83
2OH	-0.69	-16.86	
2EOH	-1.07	-26.14	
3OH	-0.39	-9.42	
3EOH	-0.55	-13.50	
2OH+W	-0.69/-0.7	-33.96	
2EOH+W	-1.07/-0.7	-43.24	



- 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.

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Load Case B: Longitudinal Direction

Surface	GCpf	Design Pressure (psf)	
		(w/ +GCpi)	(w/ -GCpi)
1	-0.45	-15.39	-6.60
2	-0.69	-21.25	-12.46
3	-0.37	-13.44	-4.64
4	-0.45	-15.39	-6.60
5	0.40	5.37	14.17
6	-0.29	-11.48	-2.69
1E	-0.48	-16.12	-7.33
2E	-1.07	-30.54	-21.74
3E	-0.53	-17.34	-8.55
4E	-0.48	-16.12	-7.33
5E	0.61	10.50	19.30
6E	-0.43	-14.90	-6.11
2OH	-0.69	-16.86	
2EOH	-1.07	-26.14	
3OH	-0.37	-9.04	
3EOH	-0.53	-12.95	
2EOH+W	-1.07/-0.7	-43.24	
3EOH+W	-0.53/-0.7	-30.05	



- a) (+) and (-) signs signify wind pressures acting toward & away from surfaces.
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Torsional Load Cases

Surface	Load Case	GCpf	Design Pressure (psf)	
			(w/ +GCpi)	(w/ -GCpi)
1T	A	-	1.46	3.65
2T	A	-	-5.31	-3.11
3T	A	-	-3.45	-1.26
4T	A	-	-2.99	-0.79
5T	B	-	1.34	3.54
6T	B	-	-2.87	-0.67



- 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.

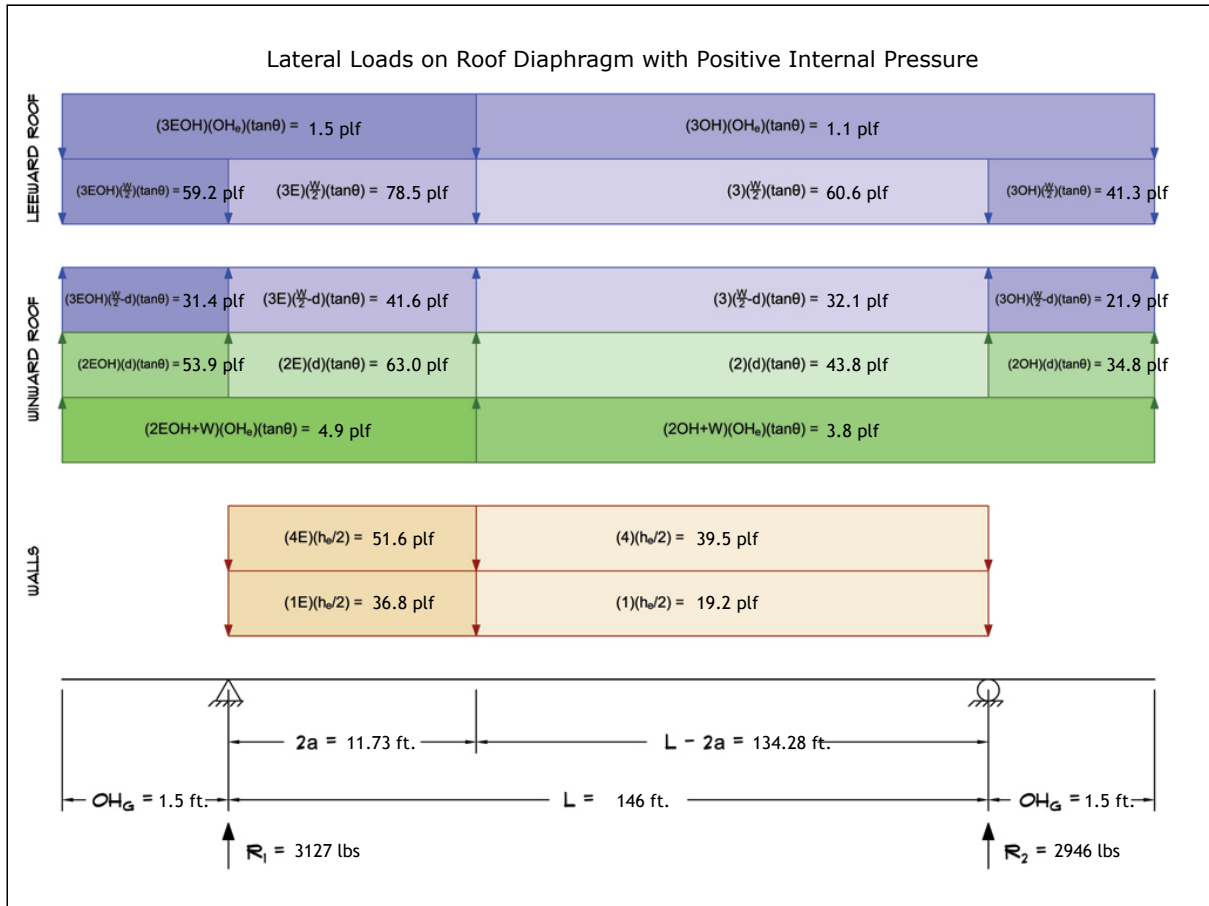
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5. Wind Load Calculations

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 ₁ (lbs)	R ₂ (lbs)
Positive Internal Pressure	8920	-2365	-481	6073	3127	2946
Negative Internal Pressure	8920	-2365	-481	6073	3127	2946
Roof Pressure = 0	8920	0	0	8920	4620	4300
Min. Pressures (8 psf, 16 psf)	7709	5125	239	13073	6536	6536

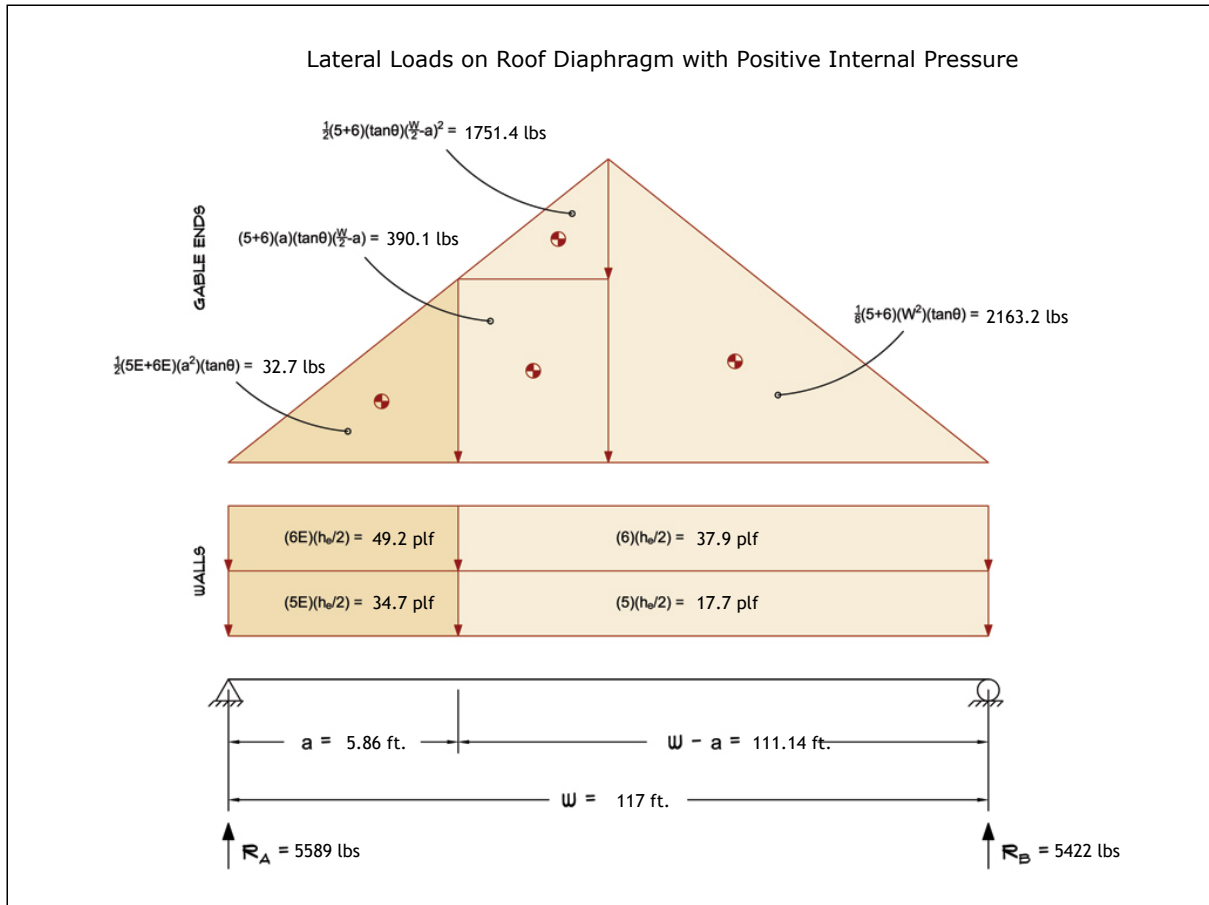
- a) Bottom half of wall neglected in tributary area calculations.
- b) Strength design values multiplied by 0.6 to obtain ASD values.

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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 _A (lbs)	R _B (lbs)
Positive Internal Pressure	6673	4337	0	11011	5589	5422
Negative Internal Pressure	6673	4337	0	11011	5589	5422
Roof Pressure = 0	6673	4337	0	11011	5589	5422
Min. Pressures (8 psf, 16 psf)	6178	4107	0	10284	5142	5142

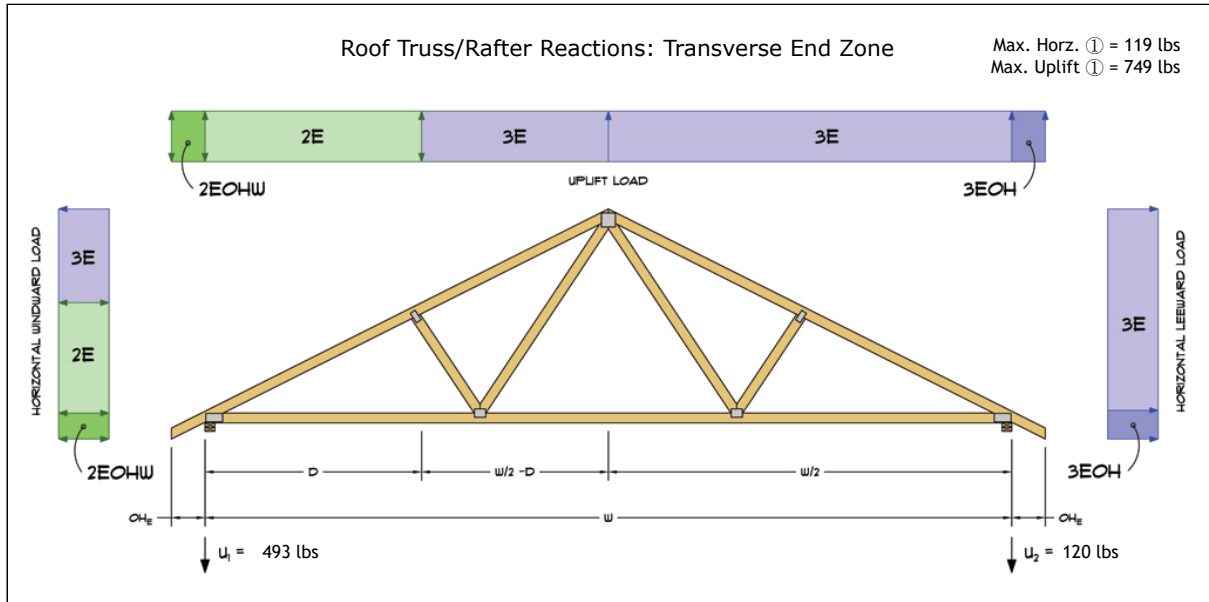
- a) Bottom half of wall neglected in tributary area calculations.
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3.) Roof Truss Reactions:



- 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 ₁ (lbs)	U ₂ (lbs)
Transverse Int. Zone	36	2263	-157	38	-194
Transverse End Zone	59	3032	612	493	120
Longitudinal Int. Zone	70	2482	62	175	-113
Longitudinal End Zone	119	3432	1012	749	262

- 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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