

Transverse Diaphragm Design (ASCE 7-05)

Client: Excel Homes
Job Number: EXLH042314-42
Description: 31217 Calcs.

Building Geometry:

Total Width, L = 24.0 ft
Blocking Height, h_b = 18.0 in.
Sidewall/Eave Height, h_e = 244.0 in.
Roof Slope, a = 12.0 /12 pitch
Roof slope, a = 45.0 deg.
Sidewall Overhang, L_{OH} = 12.0 in.
Endwall Overhang, B_{OH} = 12.0 in.
Vertical Roof Projection = 13.0 ft
Wall Height = 9.0 ft (max.)
Misc. Framing Height = 1.7 ft/level

Wind Loading Conditions:

Wind Speed = 100 mph
Exposure Category: C
End Zone Length, 2a = 6.00 ft

Height Above Grade:

Stories Above Grade = 2.0
Sidewall Eave (z) = 21.8 ft
Roof Peak (z) = 34.8 ft
Mean Roof Height (h) = 28.3 ft

Seismic Design Parameters:

Seismic Use Group: II
Importance Category, I_E: 1.00
Site Class: D
Seismic Resisting System: A13 Light-frame walls with wood shear panels
Response Factor, R: 6.5
Overstrength Factor, Ω_o: 3.0
Deflection Amp. Factor, C_d: 4.0
Analysis Procedure: ASCE 7, Section 12.8 Simplified Analysis
ASD Adjustment Factor = 0.7
Seismic Design Cat.: D
IRC Seismic Design Cat.: C
S_{DS} = 0.54
C_s = 0.099

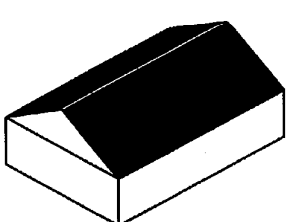
	Ground	Other	Roof
Wall Height, h _w (in.)	108	96	n/a
Wall Dead Weight (psf)	5	5	n/a
Floor/Level Dead Weight (psf)	10	10	20
Seismic Live Load (psf)	0	0	7.7

Effective Seismic Weight at Roof Level = 732 plf
Effective Seismic Weight at Floor Level = 375 plf
Additional Endwall Dead Weight = 1080 lbm

NET Horizontal Wind Loads (MWFRS)			
Transverse	Wall	End Zone	23.2
		Interior	23.2
	Roof	End Zone	0.0
		Interior	10.7
Longitudinal	Wall	End Zone	23.2
		Interior	23.2
	Roof	End Zone	--
		Interior	--

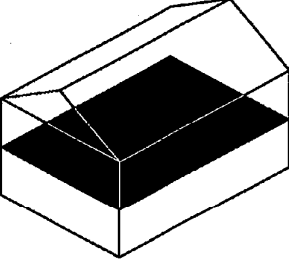
Diaphragm Loads			
	Zone	Wind	Seismic
Roof Diaphragm	End (plf)	183	--
	Interior (plf)	263	51
	Endwall Surcharge (lbf)	--	75
Above Ground Floor Diaphragm	End Zone (plf)	248	--
	Interior (plf)	248	26
	Endwall Surcharge (lbf)	--	75
Ground Level Floor Diaphragm	End Zone (plf)	124	--
	Interior (plf)	124	13
	Endwall Surcharge (lbf)	--	37

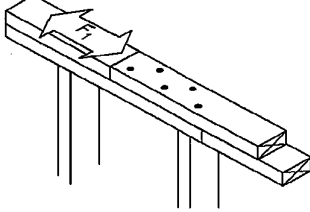
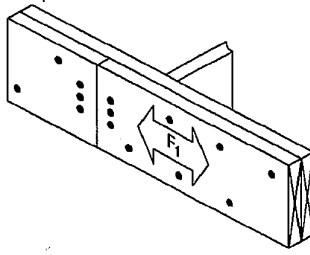
Transverse Diaphragm Design (ASCE 7-05)

<p>Roof Diaphragm (Case 1, No Unblocked Edges or Continuous Joints Parallel to Load)</p> 	Sheathing Configuration: 7/16" Sheathing (Case 1) Framing Species: SPF							
	Fastener: 0.131"x2.5" Nails							
	Type	Ratio	Boundary	Edge	Field	Wind	Seismic	Max. Module Length (ft)
	Unblocked	3	6	6	12	296	212	57
	Blocked	4	6	6	12	328	235	63
	Blocked	4	4	6	12	438	313	83
	Fastener: 1.5" x 16 Ga. Staples							
	Type	Ratio	Boundary	Edge	Field	Wind	Seismic	Max. Module Length (ft)
	Unblocked	3	6	6	6	178	127	36
	Blocked	3	6	6	6	270	193	52
Fastener: 1.5" x 15 Ga. Staples								
Type	Ratio	Boundary	Edge	Field	Wind	Seismic	Max. Module Length (ft)	
Unblocked	3	6	6	12	224	160	44	
Blocked	4	6	6	12	333	238	64	

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Transverse Diaphragm Design (ASCE 7-05)

Above Grade Floor Diaphragm (Case 1, No Unblocked Edges or Continuous Joints Parallel to Load)	Sheathing Configuration: 19/32" Sheathing (Case 1) Framing Species: SPF								
	Type	Ratio	Boundary	Edge	Field	Wind	Seismic	Max. Module Length (ft)	
	Fastener: 0.131"x2.5" Nails								
	Unblocked	3	6	6	12	309	221	59	
	Blocked	4	6	6	12	348	248	67	
	Blocked	4	4	6	12	464	331	89	
	Fastener: 1.5" x 16 Ga. Staples								
	Unblocked	3	6	6	6	178	127	34	
	Blocked	3	6	6	6	270	193	52	
	Fastener: 1.5" x 15 Ga. Staples								
	Unblocked	3	6	6	12	224	160	43	
	Blocked	4	6	6	12	333	238	64	
	Grade Level Floor Diaphragm (Case 1, No Unblocked Edges or Continuous Joints Parallel to Load)	Sheathing Configuration: 19/32" Sheathing (Case 1) Framing Species: SPF							
		Fastener: 0.131"x2.5" Nails							
Unblocked		3	6	6	12	309	221	72	
Blocked		4	6	6	12	348	248	96	
Blocked		4	4	6	12	464	331	96	
Fastener: 1.5" x 16 Ga. Staples									
Unblocked		3	6	6	6	178	127	68	
Blocked		3	6	6	6	270	193	72	
Fastener: 1.5" x 15 Ga. Staples									
Unblocked		3	6	6	12	224	160	72	
Blocked		4	6	6	12	333	238	96	

Connection (fastener size and position exaggerated for illustration purposes)	Module Length (ft)	Chord Force (F ₁) (lbf)	Quantity Each Side of Joint	
			Fastener: 0.131" x 3" Nails	Fastener: 2.5" x 15 Ga Staples
Double top plate  4-ft minimum lap. Fasteners at 2" on center in multiple rows 2" (min.) apart	40	2222	17	31
	45	2812	22	40
	50	3472	27	49
	60	5000	38	70
	70	6806	52	95
	80	8889	68	124
Rim Joist Splice  4-ft minimum lap. Fasteners at 2" on center in multiple rows 2" (min.) apart	40	2091	16	30
	45	2647	21	37
	50	3268	25	46
	60	4706	36	66
	70	6405	49	89
	80	8366	64	117

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