



Main Wind Force Resisting System (V = 115 mph; Exposure D; h = 12.4 ft; Angle = 15 deg)

Reference: **ASCE 7-10 (Section 27.4.3)**

$$P = q_h G C_N \quad \text{Eqn. (27.4-3)}$$

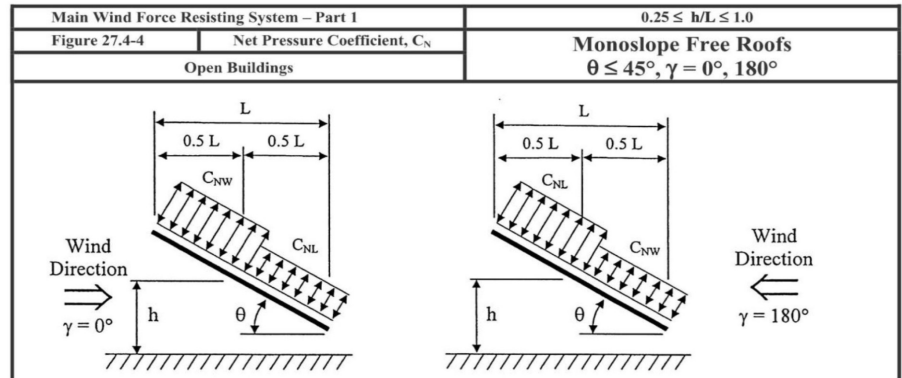
$$q_h = 0.00256 K_z K_{zt} K_d V^2 \quad \text{Eqn. (27.3-1)}$$

Velocity pressure exposure coefficient $K_z = 1.03$
Topographic factor $K_{zt} = 1$
Wind directionality factor $K_d = 0.85$
Basic wind speed $V = 115 \text{ mph}$

Velocity pressure $q_h = 29.65 \text{ psf}$

Gust effect factor $G = 0.85$

Net pressure coefficient $C_N = \text{From Fig. 27.4-4}$



Notes:

1. C_{NW} and C_{NL} denote net pressures (contributions from top and bottom surfaces) for windward and leeward half of roof surfaces, respectively.
2. Clear wind flow denotes relatively unobstructed wind flow with blockage less than or equal to 50%. Obstructed wind flow denotes objects below roof inhibiting wind flow (>50% blockage).
3. For values of θ between 7.5° and 45° , linear interpolation is permitted. For values of θ less than 7.5° , use load coefficients for 0° .
4. Plus and minus signs signify pressures acting towards and away from the top roof surface, respectively.
5. All load cases shown for each roof angle shall be investigated.
6. Notation:
 L : horizontal dimension of roof, measured in the along wind direction, ft. (m)
 h : mean roof height, ft. (m)
 γ : direction of wind, degrees
 θ : angle of plane of roof from horizontal, degrees

Roof θ (degree)	Load Case	Wind Direction, $\gamma = 0$ degrees				Wind Direction, $\gamma = 180$ degrees			
		Clear Wind Flow		Obstructed Wind Flow		Clear Wind Flow		Obstructed Wind Flow	
		C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}
15	A	-0.9	-1.3	-1.1	-1.5	1.3	1.6	0.4	-1.1
	P (psf)	-22.7	-32.8	-27.7	-37.8	32.8	40.3	10.1	-27.7
	B	-1.9	0	-2.1	-0.6	1.8	0.6	1.2	-0.3
	P (psf)	-47.9	0.0	-52.9	-15.1	45.4	15.1	30.2	-7.6
Roof θ (degree)	Load Case	Wind Direction, $\gamma = 0$ degrees				Wind Direction, $\gamma = 180$ degrees			
		Clear Wind Flow		Obstructed Wind Flow		Clear Wind Flow		Obstructed Wind Flow	
		C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}
22.5	A	-1.5	-1.6	-1.5	-1.7	1.7	1.8	0.5	-1
	P (psf)	-37.8	-40.3	-37.8	-42.8	42.8	45.4	12.6	-25.2
	B	-2.4	-0.3	-2.3	-0.9	2.2	0.7	1.3	0
	P (psf)	-60.5	-7.6	-58.0	-22.7	55.4	17.6	32.8	0.0
Roof θ (degree)	Load Case	Wind Direction, $\gamma = 0$ degrees				Wind Direction, $\gamma = 180$ degrees			
		Clear Wind Flow		Obstructed Wind Flow		Clear Wind Flow		Obstructed Wind Flow	
		C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}	C_{NW}	C_{NL}
15.00	A	-0.9	-1.3	-1.1	-1.5	1.3	1.6	0.4	-1.1
	P (psf)	-22.7	-32.8	-27.7	-37.8	32.8	40.3	10.1	-27.7
	B	-1.9	0	-2.1	-0.6	1.8	0.6	1.2	-0.3
	P (psf)	-47.9	0.0	-52.9	-15.1	45.4	15.1	30.2	-7.6