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Desgin Wind Pressure, p, Equation 30.3-1 (ASCE 7-16).

System Type	Structure Type	Equation
Components and Cladding (Envelope Procedure)	Low-Rise Buildings with h <= 60 ft Gabled & Hipped Roofs	*p* : qh[(GCp) – (GCpi)] qh : velocity pressure at h GCp : Figures 30.3-1 & 30.3-2 GCpi : Table 26.13-1

Velocity Pressure Calculations:

Velocity pressure qh is calculated in accordance with section 26.10.

qh = Velocity pressure @ mean roof height (h)

qh = Constant · Kh · Kzt · Kd · V ² (Eq 26.10-1)

Where : Constant	=	Numerical Constant	(Section C26.10)
	=	½ · [(Air density lb/ cu ft) / (32.2 ft/s²)] ·[(mi/h)(5280 ft/mi) · (1 hr/3600 s)] ²	
	=	0.00256	
Mean Sea Level	=	0.00 ft	
Air Density @MSL	=	0.0765 lb/cu ft	(Table C26.9-1)
Occupancy Category	=	II	(Table 1.5-1)
Exposure Category	=	C	(Section 26.7.3)
α	=	9.50	(Table 26.11-1)
Zg	=	900.00 ft	(Table 26.11-1)
Basic Wind Speed	=	115.00 mph	(Figure 26.5-1&2 A-D)
Mean Roof Height	=	60.00 ft	
Where : Kh	=	Velocity pressure coefficient @ height h	
	=	2.01·(Z/Zg) ^ (2/α) for 15 ft <= Z <= Zg	(Table 26.10-1)
	=	2.01 · (15/Zg) ^ (2/α) for Z < 15 ft	
	=	1.14	
Kzt	=	Topographic factor	(Figure 26.8-1)
	=	(1 + K1 · K2 · K3) ²	
Topography	=	None	
Kzt @h	=	1.00	
Kd	=	Wind directionality factor	(Table 26.6-1)
	=	0.85	
qh	=	32.71 (psf)	

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Internal Pressure Coefficient, GCpi, Table 26.11-1

Enclosure Classification	GCpi+	GCPi-	Aog (sq. ft.)	Vi (cu. ft.)	Ri	GCpi+	GCPi-
Open buildings	0.00	0.00	60	5,000,000	1.00	0.00	0.00

External Pressure Coefficients, GCp, Figure 30.3-2 (roof) and Figure 30.3-1 (walls)

Zone	Area (sq. ft.)	Angle (deg)	GCp+	GCp-	GCp R. O.
1	50.00	23.00	0.37	-1.26	-1.93
2e	50.00	23.00	0.37	-1.26	-1.93
2n	50.00	23.00	0.37	-1.73	-2.52
2r	50.00	23.00	0.37	-1.73	-2.52
3e	50.00	23.00	0.37	-1.80	-2.30
3r	50.00	23.00	0.37	-1.73	-2.47
4	75.00	All	0.85	-0.95	-
5	75.00	All	0.85	-1.09	-

Design Wind Pressure, p, Equation 30.3-1.

Zone	qh (psf)	GCp+	GCp-	GCpi+	GCpi-	p1+ (psf)	p2+ (psf)	p1- (psf)	p2- (psf)
1	32.71	0.37	-1.26	0.00	0.00	12.13	12.13	-41.32	-41.32
2e	32.71	0.37	-1.26	0.00	0.00	12.13	12.13	-41.32	-41.32
2n	32.71	0.37	-1.73	0.00	0.00	12.13	12.13	-56.50	-56.50
2r	32.71	0.37	-1.73	0.00	0.00	12.13	12.13	-56.50	-56.50
3e	32.71	0.37	-1.80	0.00	0.00	12.13	12.13	-58.87	-58.87
3r	32.71	0.37	-1.73	0.00	0.00	12.13	12.13	-56.50	-56.50
4	32.71	0.85	-0.95	0.00	0.00	27.65	27.65	-30.92	-30.92
5	32.71	0.85	-1.09	0.00	0.00	27.65	27.65	-35.68	-35.68

Positive and negative values of external and internal pressures are combined to determine four possible pressures:

p1+ uses GCp+ and GCpi+ *p1- uses GCp- and GCpi+*

p2+ uses GCp+ and GCpi- *p2- uses GCp- and GCpi-*

Roof Overhang Pressure, p, Equation 30.9-1.

Wind pressures acting on the roof overhang (soffit pressures not included).

Zone	qh (psf)	GCp- (R.O.)	GCpi+	GCpi-	p1- (psf)	p2- (psf)
1	32.71	-1.93	0.00	0.00	-63.20	-63.20
2e	32.71	-1.93	0.00	0.00	-63.20	-63.20
2n	32.71	-2.52	0.00	0.00	-82.57	-82.57
2r	32.71	-2.52	0.00	0.00	-82.57	-82.57
3e	32.71	-2.30	0.00	0.00	-75.23	-75.23
3r	32.71	-2.47	0.00	0.00	-80.82	-80.82

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Design Wind Pressure of Parapet, p, Equation 30.8-1

kp = 2.01·(Parapet Height / Zg) ^ (2/α)

kpt = (1 + K1 · K2 · K3) ², where z = parapet height in the k3 multiplier

qp = Constant · Kp · Kpt ·Kd · V ²

p = qp (GCp - GCpi)

Parapet Input Parameters

Elevation	=	62.00 ft
Enclosure Classification	=	Enclosed
+GCpi	=	0.18
-GCpi	=	-0.18

Load Case A - windward parapet (Figure 30.6-1)

Zone	GCp	kp	kpt	qp (psf)	GCpi+	GCpi-	p+ (psf)	p- (psf)
p1 - Outside Face	0.85	1.14	1.00	32.93	0.18	-0.18	21.92	33.77
p1 - Outside Face, Corner	0.85	1.14	1.00	32.93	0.18	-0.18	21.92	33.77
p2 - Inside Face	-1.26	1.14	1.00	32.93	0.18	-0.18	-47.53	-35.67
p2 - Inside Face, Corner	-1.80	1.14	1.00	32.93	0.18	-0.18	-65.21	-53.35

p+ uses GCpi+ *p- uses GCpi-*

Load Case B - leeward parapet (Figure 30.6-1)

Zone	GCp	kp	kpt	qp (psf)	GCpi+	GCpi-	p+ (psf)	p- (psf)
p4 - Outside Face	-0.95	1.14	1.00	32.93	0.18	-0.18	-37.07	-25.21
p4 - Outside Face, corner	-1.09	1.14	1.00	32.93	0.18	-0.18	-41.86	-30.00
p3 - Inside Face	0.85	1.14	1.00	32.93	0.18	-0.18	21.92	33.77
p3 - Inside Face, Corner	0.85	1.14	1.00	32.93	0.18	-0.18	21.92	33.77

p+ uses GCpi+ *p- uses GCpi-*