Table 28.2-1 Steps to Determine Wind Loads on MWFRS Low-Rise Buildings

Step 1: Determine risk category of building or other structure, see Table 1.5-1

Step 2: Determine the basic wind speed, V, for applicable risk category, see Fig. 26.5-1A, B or C

Step 3: Determine wind load parameters:
- Wind directionality factor, K_d, see Section 26.6 and Table 26.6-1
- Exposure category B, C or D, see Section 26.7
- Topographic factor, K_{zt}, see Section 26.8 and Fig. 26.8-1
- Enclosure classification, see Section 26.10
- Internal pressure coefficient, (GC_{pi}), see Section 26.11 and Table 26.11-1

Step 4: Determine velocity pressure exposure coefficient, K_z or K_h, see Table 28.3-1

Step 5: Determine velocity pressure, q_z or q_h, Eq. 28.3-1

Step 6: Determine external pressure coefficient, (GC_p), using Fig. 28.4-1 for flat and gable roofs.

User Note: See Commentary Fig. C28.4-1 for guidance on hip roofs.

Step 7: Calculate wind pressure, p, from Eq. 28.4-1

rational analysis method defined in the recognized literature.

28.3.2 Velocity Pressure

Velocity pressure, q_z, evaluated at height z shall be calculated by the following equation:

$$q_z = 0.00256\, K_z K_{zt} K_d V^2 \text{ (lb/ft}^2\text{)} \qquad (28.3\text{-}1)$$

[In SI: $q_z = 0.613\, K_z K_{zt} K_d V^2$ (N/m^2); V in m/s]
where

K_d = wind directionality factor defined in Section 26.6
K_z = velocity pressure exposure coefficient defined in Section 28.3.1
K_{zt} = topographic factor defined in Section 26.8.2
V = basic wind speed from Section 26.5.1
q_h = velocity pressure q_z calculated using Eq. 28.3-1 at mean roof height h

The numerical coefficient 0.00256 (0.613 in SI) shall be used except where sufficient climatic data are available to justify the selection of a different value of this factor for a design application.

28.4 WIND LOADS—MAIN WIND-FORCE RESISTING SYSTEM

28.4.1 Design Wind Pressure for Low-Rise Buildings

Design wind pressures for the MWFRS of low-rise buildings shall be determined by the following equation:

$$p = q_h[(GC_{pf}) - (GC_{pi})] \text{ (lb/ft}^2\text{) (N/m}^2\text{)} \qquad (28.4\text{-}1)$$

where

q_h = velocity pressure evaluated at mean roof height h as defined in Section 26.3
(GC_{pf}) = external pressure coefficient from Fig. 28.4-1
(GC_{pi}) = internal pressure coefficient from Table 26.11-1

28.4.1.1 External Pressure Coefficients (GC_{pf})

The combined gust effect factor and external pressure coefficients for low-rise buildings, (GC_{pf}), are not permitted to be separated.

28.4.2 Parapets

The design wind pressure for the effect of parapets on MWFRS of low-rise buildings with flat, gable, or hip roofs shall be determined by the following equation:

$$p_p = q_p(GC_{pn}) \text{ (lb/ft}^2\text{)} \qquad (28.4\text{-}2)$$

where

p_p = combined net pressure on the parapet due to the combination of the net pressures from the front and back parapet surfaces. Plus (and minus) signs signify net pressure acting toward (and away from) the front (exterior) side of the parapet
q_p = velocity pressure evaluated at the top of the parapet
GC_{pn} = combined net pressure coefficient
= +1.5 for windward parapet
= –1.0 for leeward parapet

28.4.3 Roof Overhangs

The positive external pressure on the bottom surface of windward roof overhangs shall be determined using $C_p = 0.7$ in combination with the top surface pressures determined using Fig. 28.4-1.

28.4.4 Minimum Design Wind Loads

The wind load to be used in the design of the MWFRS for an enclosed or partially enclosed building shall not be less than 16 lb/ft^2 (0.77 kN/m^2)