q_i may conservatively be evaluated at height $h(q_i = q_h)$
G = gust-effect factor, see Section 26.9
C_p = external pressure coefficient from Figs. 27.4-1, 27.4-2 and 27.4-3
(GC_{pi}) = internal pressure coefficient from Table 26.11-1

q and q_i shall be evaluated using exposure defined in Section 26.7.3. Pressure shall be applied simultaneously on windward and leeward walls and on roof surfaces as defined in Figs. 27.4-1, 27.4-2 and 27.4-3.

27.4.2 Enclosed and Partially Enclosed Flexible Buildings

Design wind pressures for the MWFRS of flexible buildings shall be determined from the following equation:

$$p = qG_fC_p - q_i(GC_{pi}) \text{ (lb/ft}^2\text{) (N/m}^2\text{)} \quad (27.4\text{-}2)$$

where q, q_i, C_p, and (GC_{pi}) are as defined in Section 27.4.1 and G_f (gust-effect factor) is determined in accordance with Section 26.9.5.

27.4.3 Open Buildings with Monoslope, Pitched, or Troughed Free Roofs

The net design pressure for the MWFRS of open buildings with monoslope, pitched, or troughed roofs shall be determined by the following equation:

$$p = q_hGC_N \quad (27.4\text{-}3)$$

where

q_h = velocity pressure evaluated at mean roof height h using the exposure as defined in Section 26.7.3 that results in the highest wind loads for any wind direction at the site
G = gust-effect factor from Section 26.9
C_N = net pressure coefficient determined from Figs. 27.4-4 through 27.4-7

Net pressure coefficients, C_N, include contributions from top and bottom surfaces. All load cases shown for each roof angle shall be investigated. Plus and minus signs signify pressure acting toward and away from the top surface of the roof, respectively.

For free roofs with an angle of plane of roof from horizontal θ less than or equal to 5° and containing fascia panels, the fascia panel shall be considered an inverted parapet. The contribution of loads on the fascia to the MWFRS loads shall be determined using Section 27.4.5 with q_p equal to q_h.

27.4.4 Roof Overhangs

The positive external pressure on the bottom surface of windward roof overhangs shall be determined using $C_p = 0.8$ and combined with the top surface pressures determined using Fig. 27.4-1.

27.4.5 Parapets

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

$$p_p = q_p(GC_{pn}) \text{ (lb/ft}^2\text{)} \quad (27.4\text{-}4)$$

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

27.4.6 Design Wind Load Cases

The MWFRS of buildings of all heights, whose wind loads have been determined under the provisions of this chapter, shall be designed for the wind load cases as defined in Fig. 27.4-8.

EXCEPTION: Buildings meeting the requirements of Section D1.1 of Appendix D need only be designed for Case 1 and Case 3 of Fig. 27.4-8.

The eccentricity e for rigid structures shall be measured from the geometric center of the building face and shall be considered for each principal axis (e_X, e_Y). The eccentricity e for flexible structures shall be determined from the following equation and shall be considered for each principal axis (e_X, e_Y):

$$e = \frac{e_Q + 1.7I_{\bar{z}}\sqrt{(g_Q Q e_Q)^2 + (g_R R e_R)^2}}{1 + 1.7I_{\bar{z}}\sqrt{(g_Q Q)^2 + (g_R R)^2}} \quad (27.4\text{-}5)$$

where

e_Q = eccentricity e as determined for rigid structures in Fig. 27.4-8
e_R = distance between the elastic shear center and center of mass of each floor
$I_{\bar{z}}$, g_Q, Q, g_R, and R shall be as defined in Section 26.9

The sign of the eccentricity e shall be plus or minus, whichever causes the more severe load effect.