Table 29.1-1 Steps to Determine Wind Loads on MWFRS Rooftop Equipment and Other Structures

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 Figure 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 Figure 26.8-1
- Gust Effect Factor, G, see Section 26.9

Step 4: Determine velocity pressure exposure coefficient, K_z or K_h, see Table 29.2-1

Step 5: Determine velocity pressure q_z or q_h, see Eq. 29.3-1

Step 6: Determine force coefficient, C_f:
- Solid freestanding signs or solid freestanding walls, Fig. 29.4-1
- Chimneys, tanks, rooftop equipment Fig. 29.5-1
- Open signs, lattice frameworks Fig. 29.5-2
- Trussed towers Fig. 29.4-3

Step 7: Calculate wind force, F:
- Eq. 29.4-1 for signs and walls
- Eq. 29-6-1 and Eq. 29.6-2 for rooftop structures and equipment
- Eq. 29.5-1 for other structures

q_h = velocity pressure calculated using Eq. 29.3-1 at 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.

29.4 DESIGN WIND LOADS—SOLID FREESTANDING WALLS AND SOLID SIGNS

29.4.1 Solid Freestanding Walls and Solid Freestanding Signs

The design wind force for solid freestanding walls and solid freestanding signs shall be determined by the following formula:

$$F = q_h G C_f A_s \text{ (lb) (N)} \qquad (29.4\text{-}1)$$

where

q_h = the velocity pressure evaluated at height h (defined in Fig. 29.4-1) as determined in accordance with Section 29.3.2

G = gust-effect factor from Section 26.9

C_f = net force coefficient from Fig. 29.4-1

A_s = the gross area of the solid freestanding wall or freestanding solid sign, in ft^2 (m^2)

29.4.2 Solid Attached Signs

The design wind pressure on a solid sign attached to the wall of a building, where the plane of the sign is parallel to and in contact with the plane of the wall, and the sign does not extend beyond the side or top edges of the wall, shall be determined using procedures for wind pressures on walls in accordance with Chapter 30, and setting the internal pressure coefficient (GC_{pi}) equal to 0.

This procedure shall also be applicable to solid signs attached to but not in direct contact with the wall, provided the gap between the sign and wall is no more than 3 ft (0.9 m) and the edge of the sign is at least 3 ft (0.9 m) in from free edges of the wall, i.e., side and top edges and bottom edges of elevated walls.

29.5 DESIGN WIND LOADS—OTHER STRUCTURES

The design wind force for other structures (chimneys, tanks, rooftop equipment for $h > 60°$, and similar structures, open signs, lattice frameworks, and trussed towers) shall be determined by the following equation:

$$F = q_z G C_f A_f \text{ (lb) (N)} \qquad (29.5\text{-}1)$$

where

q_z = velocity pressure evaluated at height z as defined in Section 29.3, of the centroid of area A_f

G = gust-effect factor from Section 26.9

C_f = force coefficients from Figs. 29.5-1 through 29.5-3

A_f = projected area normal to the wind except where C_f is specified for the actual surface area, in ft^2 (m^2)

29.5.1 ROOFTOP STRUCTURES AND EQUIPMENT FOR BUILDINGS WITH $h \le 60$ ft (18.3 m)

The lateral force F_h on rooftop structures and equipment located on buildings with a mean roof height $h \le 60$ ft (18.3 m) shall be determined from Eq. 29.5-2.

$$F_h = q_h (G C_r) A_f \text{ (lb) (N)} \qquad (29.5\text{-}2)$$