Table C27.3-1 Tabulated Exposure Coefficients

Transition from sea to station 1	$K_{33,u}$	$K_{33,d}$	$K_{50,d}$	$F_{\Delta K}$	ΔK_{50}	$K_{50}^{(1)}$
	1.215	0.667	0.758	0.220	0.137	0.895
Transition from station 1 to station 2	$K_{33,u}$	$K_{33,d}$	$K_{50,d}$	$F_{\Delta K}$	ΔK_{50}	$K_{50}^{(2)}$
	0.667	1.215	1.301	0.324	–0.190	1.111
Transition from station 2 to station 3	$K_{33,u}$	$K_{33,d}$	$K_{50,d}$	$F_{\Delta K}$	ΔK_{50}	$K_{50}^{(3)}$
	1.215	0.667	0.758	0.498	0.310	1.067

Note: The equilibrium values of the exposure coefficients, $K_{33,u}$, $K_{33,d}$ and $K_{50,d}$ (downwind value of K_z at 50 ft), were calculated from Eq. C27-1 using α and z_g values obtained from Eqs. C27-3 and C27-4 with the roughness values given. Then $F_{\Delta K}$ is calculated using Eqs. C27-7 and C27-8, and then the value of ΔK at 50 ft height, ΔK_{50}, is calculated from Eq. C27-6. Finally, the exposure coefficient at 50 ft at station i, $K_{50}^{(i)}$, is obtained from Eq. C27-5.

well below that for Exposure D, which would be 1.27, and similar to that for Exposure C, which would be 1.09.

27.3.2 Velocity Pressure

The basic wind speed is converted to a velocity pressure q_z in lb/ft^2 (N/m^2) at height z by the use of Eq. 27.3-1.

The constant 0.00256 (or 0.613 in SI) reflects the mass density of air for the standard atmosphere, that is, temperature of 59 °F (15 °C) and sea level pressure of 29.92 in. of mercury (101.325 kPa), and dimensions associated with wind speed in mi/h (m/s). The constant is obtained as follows:

$$\begin{aligned}\text{constant} &= 1/2[(0.0765\ \text{lb/ft}^3)/(32.2\ \text{ft/s}^2)] \\ &\quad \times [(\text{mi/h})(5{,}280\ \text{ft/mi}) \times (1\ \text{h}/3{,}600\ \text{s})]^2 \\ &= 0.00256 \\ \text{constant} &= 1/2[(1.225\ \text{kg/m}^3)/(9.81\ \text{m/s}^2)] \\ &\quad \times [(\text{m/s})]^2\ [9.81\ \text{N/kg}] = 0.613\end{aligned}$$

The numerical constant of 0.00256 should be used except where sufficient weather data are available to justify a different value of this constant for a specific design application. The mass density of air will vary as a function of altitude, latitude, temperature, weather, and season. Average and extreme values of air density are given in Table C27.3-2.

Loads on Main Wind-Force Resisting Systems:

C27.4.1 Enclosed and Partially Enclosed Rigid Buildings

In Eqs. 27.4-1 and 27.4-2, a velocity pressure term q_i appears that is defined as the "velocity pressure for internal pressure determination." The positive internal pressure is dictated by the positive exterior pressure on the windward face at the point where there is an opening. The positive exterior pressure at the opening is governed by the value of q at the level of the opening, not q_h. For positive internal pressure evaluation, q_i may conservatively be evaluated at height h ($q_i = q_h$). For low buildings this does not make much difference, but for the example of a 300-ft-tall building in Exposure B with a highest opening at 60 ft, the difference between q_{300} and q_{60} represents a 59 percent increase in internal pressure. This difference is unrealistic and represents an unnecessary degree of conservatism. Accordingly, $q_i = q_z$ for positive internal pressure evaluation in partially enclosed buildings where height z is defined as the level of the highest opening in the building that could affect the positive internal pressure. For buildings sited in wind-borne debris regions, with glazing that is not impact resistant or protected with an impact protective system, q_i should be treated on the assumption there will be an opening.

Figure 27.4-1. The pressure coefficients for MWFRSs are separated into two categories:

1. Directional Procedure for buildings of all heights (Fig. 27.4-1) as specified in Chapter 27 for buildings meeting the requirements specified therein.
2. Envelope Procedure for low-rise buildings having a height less than or equal to 60 ft (18 m) (Fig. 28.4-1) as specified in Chapter 28 for buildings meeting the requirements specified therein.

In generating these coefficients, two distinctly different approaches were used. For the pressure coefficients given in Fig. 27.4-1, the more traditional approach was followed and the pressure coefficients reflect the actual loading on each surface of the building as a function of wind direction; namely, winds perpendicular or parallel to the ridge line.

Observations in wind tunnel tests show that areas of very low negative pressure and even slightly