

3.8.4—Height and Exposure Factor K_z

The height and exposure factor K_z shall be determined either from Table 3.8.4-1 or calculated using Eq. C3.8.4-1 in the commentary.

C3.8.4

K_z is a height and exposure factor that varies with height above the ground depending on the local exposure conditions and may be conservatively set to 1.0 for heights less than 10 m (33 ft). The variation is caused by the frictional drag offered by various types of terrain. ASCE 7 defines acceptable wind design procedures using different terrain exposure conditions. For a specified set of conditions, the wind pressures associated with the different exposures increase as the exposure conditions progress from B to D, with exposure B resulting in the least pressure and exposure D resulting in the greatest pressure. Exposure C has been adopted for use in these Specifications as it should provide an accurate or conservative approach for the design of structural supports. It represents open terrain with scattered obstructions.

Once the terrain exposure conditions are established, the height and exposure factor, K_z , is calculated using the following relationship that is presented in ASCE 7:

$$K_z = 2.01 \left(\frac{z}{z_g} \right)^{\frac{2}{\alpha}} \tag{C3.8.4-1}$$

where z is height above the ground at which the pressure is calculated or 5 m (16 ft), whichever is greater, and z_g and α are constants that vary with the exposure condition. Based on information presented in ASCE 7, α should be taken to be 9.5 and z_g should be taken to be 274.3 m (900 ft) for exposure C. These values are for 3-s gust wind speeds and are different from similar constants that have been used for fastest-mile wind speeds. Table 3.8.4-1 presents the variation of the height and exposure factor, K_z , as a function of height based on the above relation.

Table 3.8.4-1—Height and Exposure Factors, K_z ^a

Height, m (ft)	K_z ^a
5.0 (16.4) or less	0.87
7.5 (24.6)	0.94
10.0 (32.8)	1.00
12.5 (41.0)	1.05
15.0 (49.2)	1.09
17.5 (57.4)	1.13
20.0 (65.6)	1.16
22.5 (73.8)	1.19
25.0 (82.0)	1.21
27.5 (90.2)	1.24
30.0 (98.4)	1.26
35.0 (114.8)	1.30
40.0 (131.2)	1.34
45.0 (147.6)	1.37
50.0 (164.0)	1.40
55.0 (180.5)	1.43
60.0 (196.9)	1.46
70.0 (229.7)	1.51
80.0 (262.5)	1.55
90.0 (295.3)	1.59
100.0 (328.1)	1.63

^a See Eq. C3.8.4-1 for calculation of K_z .