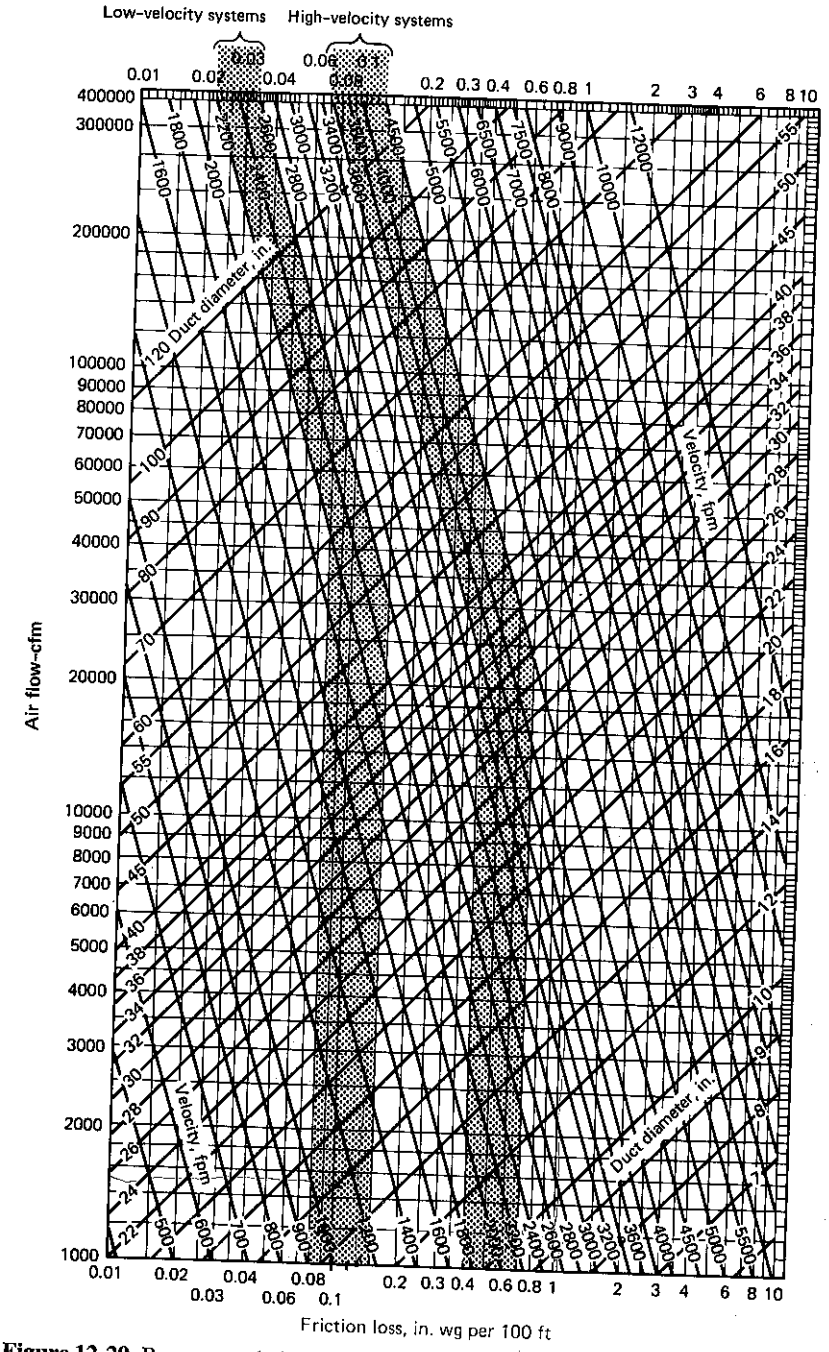

Figure 12-29 Recommended velocity and friction rate design limits. (Reprinted by permission from *ASHRAE Handbook, Fundamentals Volume,* 1985.)

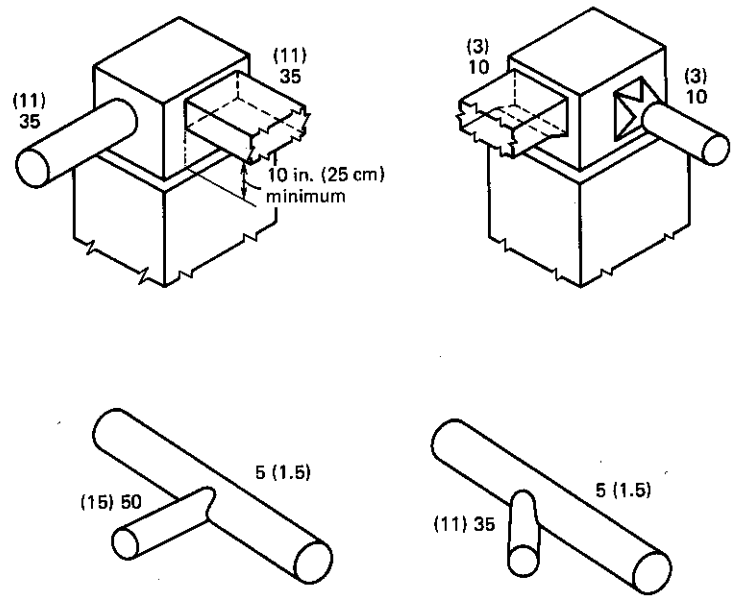

Figure 12-25 Equivalent lengths of some plenum and branch fittings in feet, with meters in parentheses. (Reprinted by permission from *ASHRAE Handbook, Systems and Equipment Volume,* 1992.)

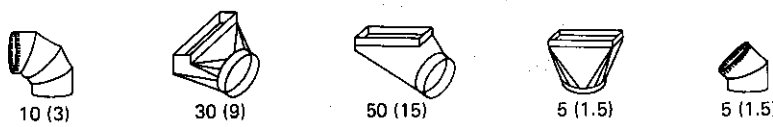

Figure 12-26 Equivalent lengths of common duct fittings in feet, with meters in parentheses. (Reprinted by permission from *ASHRAE Handbook, Systems and Equipment Volume,* 1992.)

plus the equivalent length for the entrance from the plenum of 11 m given in Fig. 12-25. Then

$$L_{1a} = 15 + 11 = 26\,\text{m}$$

From Fig. 12-23 at 0.19 m^3/s and for a pipe diameter of 25 cm, the lost pressure is 0.85 Pa/m of pipe. Then

$$\Delta P_{01a} = (0.85)(26) = 22.1\,\text{Pa}$$

Section a to 3 has an equivalent length equal to the sum of the actual length, and the equivalent length for the 45 degree branch takeoff, one 45 degree elbow, and one 90 degree elbow:

$$L_{a3} = 12 + 11 + 1.5 + 3 = 27.5\,\text{m}$$