

chart, locate the diagonal curve giving the diameter of the round duct. The width and height of an equivalent rectangular or square duct may then be read as the abscissa and the ordinate of any point of the curve.

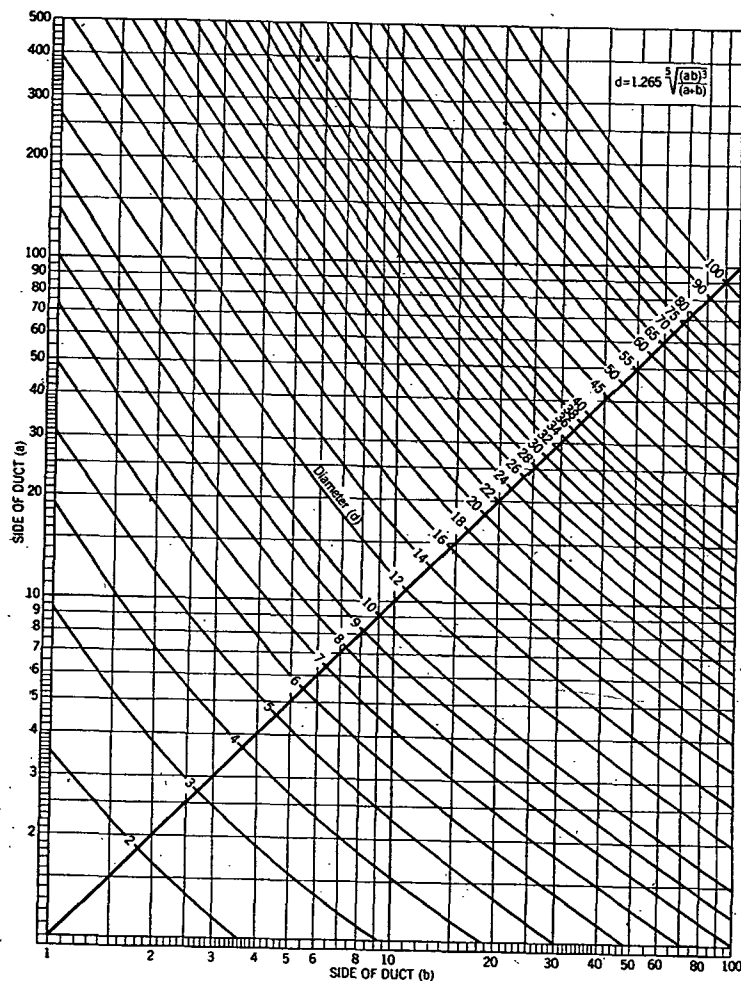


FIG. 4. RECTANGULAR EQUIVALENTS OF ROUND DUCTS

Multiplying or dividing the length of each side of a pipe by a constant is the same as multiplying or dividing the equivalent round size by the same constant. Thus, if the circular equivalent of an 80 x 24-in. duct is required, it will be twice that of a 40 x 12-in. duct, or $2 \times 23.3 = 46.6$ in.

Elbow Friction Losses

It is customary to express the dynamic and friction losses in elbows as equal to a number of diameters of round pipe, or a number of widths of rectangular pipe, or equivalent length of duct³. The curves in Fig. 5 are arranged to read the number of diameters or widths for determining the lineal feet of pipe having a frictional resistance equivalent to the pressure drop in the elbows. Curves B and C are based on tests of round and square elbows⁴ of ordinary good sheet metal construction.

Values obtained from Curve A should be used when there is any doubt as to quality of duct construction. It is suggested that this curve be used

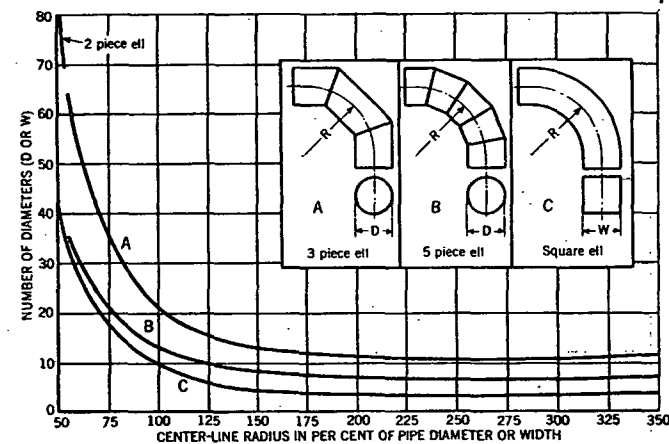


FIG. 5. LOSS OF PRESSURE IN ELBOWS

for rectangular elbows and five piece elbows as it will thus allow an additional factor of safety without seriously affecting the design.

As indicated on the chart, long radius elbows will offer much less resistance to the flow of air than short radius elbows. Experience has

TABLE 1. CIRCULAR EQUIVALENTS OF RECTANGULAR DUCTS FOR EQUAL FRICTION

SIDE RECTANGULAR DUCT	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15	15.5	16
3	5.2	5.4	5.5	5.7	5.8	5.9	6.0	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1
3.5	5.7	5.9	6.0	6.2	6.3	6.5	6.6	6.7	6.9	7.0	7.1	7.3	7.4	7.5	7.6	7.7	7.8
4	6.1	6.3	6.5	6.7	6.8	7.0	7.1	7.2	7.4	7.5	7.7	7.8	7.9	8.1	8.2	8.3	8.4
4.5	6.5	6.7	6.9	7.1	7.2	7.4	7.6	7.7	7.9	8.0	8.2	8.4	8.5	8.6	8.7	8.9	9.0
5	6.9	7.1	7.3	7.5	7.7	7.8	8.0	8.2	8.3	8.5	8.7	8.8	8.9	9.1	9.2	9.4	9.5
5.5	7.3	7.5	7.7	7.8	8.1	8.3	8.5	8.6	8.8	9.0	9.2	9.4	9.5	9.6	9.8	9.9	10.1

³A.S.H.V.E. RESEARCH REPORT No. 1211—Pressure Loss Caused by Elbows in 8-Inch Round Ventilating Duct, by M. C. Stuart, C. F. Warner and W. C. Roberts (A.S.H.V.E. TRANSACTIONS, Vol. 48, 1942, p. 335).

⁴Loss of Pressure Due to Elbows in the Transmission of Air Through Pipes or Ducts, by F. L. Buséy (A.S.H.V.E. TRANSACTIONS, Vol. 10, 1913, p. 366).