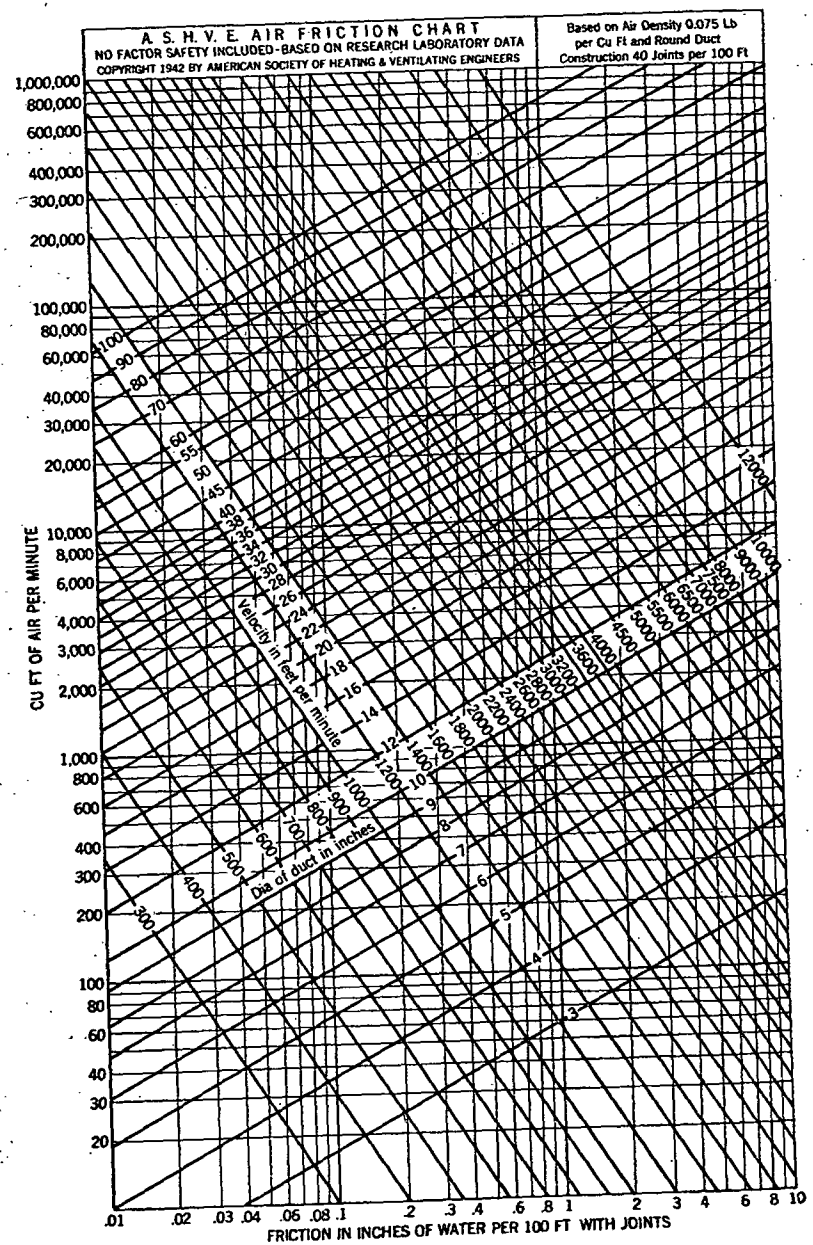

FIG. 2. FRICTION OF AIR IN PIPES

Note: As no safety factor is included in chart due allowance must be made. For field application multiply pressure drop from chart by not less than 1.1.

where

H_s = friction loss, inches of water at standard conditions.
V = velocity of air, feet per minute.
D = diameter of duct, feet.

The chart shown in Fig. 2 was constructed from Equation 4 and therefore applies only for round galvanized iron duct of good construction with 40 joints per 100 ft, and for air at standard conditions. *No factor of safety has been applied.* In view of the many variations that may occur in duct construction and application, *it is recommended that a factor of safety be used* which, in the judgment of the engineer, will make due allowance for these variations. In the Laboratory tests the variation found in pressure loss between the best joints and the worst joints was approximately 10 per cent. This would suggest a *minimum factor of safety of 10 per cent.*

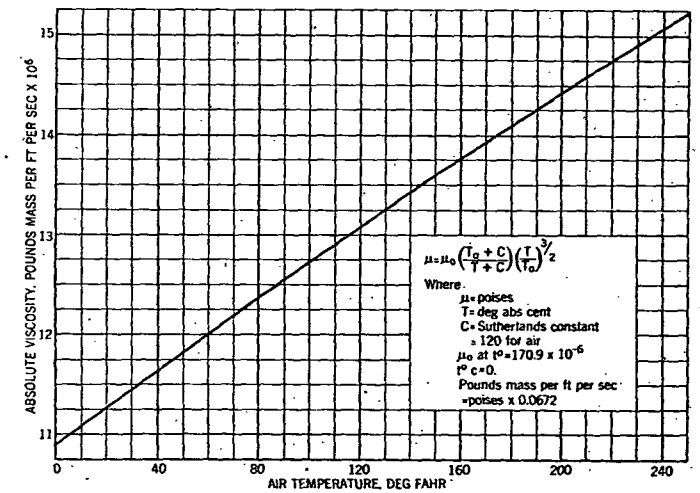

FIG. 3. TEMPERATURE—VISCOSITY CURVE FOR DRY AIR

The friction loss varies with the surface characteristics of a duct and in case a *rough conduit* of tile, brick or concrete is used, a factor of *about 35 per cent* should be added to the friction values obtained from Fig. 2.

Since the friction chart applies only for standard conditions, it is necessary to apply correction factors for other than standard conditions. These corrections are:

$$H_A = H_S \times S \left(\frac{\gamma_A}{\gamma_S}\right)^{0.17} \qquad (5)$$

where

H_A = friction loss, inches of water at actual conditions.
S = ratio of density of air at actual conditions to density of air at standard conditions.
γ_A = kinematic viscosity at actual conditions.
γ_S = kinematic viscosity at standard conditions.

$$\text{Kinematic Viscosity} = \frac{\mu}{\rho}$$