Flame Safeguard Conversion Factors

Simplified method of determining combustion air required to completely burn a given amount of fuel.

$$\text{Cf/h Air} = \frac{\text{Btu/hr input}}{100}$$

M18318

Normally useful for determining standard cubic feet of fuel consumed when metering pressure is other than standard; e.g., gas passing through a volumetric gas meter at 5 psig. (The heating value of fuel gases is based on Btu/cf at standard gas conditions.)

To correct gas volume from one set of conditions to another.

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

P = Absolute pressure.
= 14.7 + gauge psi.
T = Absolute temperature in -R = 460.
V = Volume in any consistent terms.

Turndown ratio of fixed area burner.

$$\text{T.D.} = \sqrt{\frac{\text{Maximum Pressure Drop across Burner}}{\text{Minimum Pressure Drop across Burner}}} = \frac{\text{Maximum Firing Rate}}{\text{Minimum Firing Rate}}$$

M18319

Where pressure drops are expressed in the same units.

Relationship between flow capacity at a specified pressure drop and Cv factor.

Cv = Flow Factor. Defined as the amount of water at 60 F in gallons per minute which will flow through a valve in the open position with a pressure drop through the valve of 1 pound per square inch.

For capacity conversion to gases the following may be used for pressure ratios less than critical ratios.

$$Q = 1360\ Cv \sqrt{\frac{(P_1 - P_2)\ P_2}{GT}}$$

Q = Standard cubic feet per hour at 14.7 psia and 60 F.
P1 = Inlet pressure, psia.
P2 = Outlet pressure, psia.
T = Absolute temperature in -R = -F+460.
G = Specific gravity of the gas.