

CONVERSION FACTORS

Density, ρ

$$\begin{aligned} 1 \text{ kg/m}^3 &= 1 \times 10^{-3} \text{ g/cm}^3 = 1 \text{ g/l} \\ &= 62.428 \times 10^{-3} \text{ lb/ft}^3 \\ &= 1.0011 \times 10^{-3} \text{ S.G. } 60^\circ/60^\circ\text{F} \end{aligned}$$

Note: $^\circ\text{API} = \frac{141.5}{\text{S.G. } 60^\circ/60^\circ\text{F}} - 131.5$, e.g. a density of 800 kg/m^3 is 45.181°API .

Enthalpy, i

$$\begin{aligned} 1 \text{ kJ/kg} &= 1 \text{ J/g} \\ &= 238.85 \times 10^{-3} \text{ cal/g} \\ &= 429.92 \times 10^{-3} \text{ Btu/lb.} \end{aligned}$$

Heat Flux, Φ

$$1 \text{ W/m}^2 = 317.00 \times 10^{-3} \text{ Btu/ft}^2\text{h.}$$

Length, z

$$\begin{aligned} 1 \text{ m} &= 39.370 \text{ in} \\ &= 3.2808 \text{ ft} \\ &= 621.37 \times 10^{-6} \text{ miles.} \end{aligned}$$

Mass Flow Velocity, G

$$\begin{aligned} 1 \text{ kg/s m}^2 &= 100 \times 10^{-3} \text{ g/s cm}^2 \\ &= 737.34 \text{ lb/h ft}^2. \end{aligned}$$

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Pressure, p

$$\begin{aligned}
 1 \text{ N/m}^2 (\text{Pa}) &= 10.197 \times 10^{-6} \text{ kgf/cm}^2 \\
 &= 10 \text{ dyn/cm}^2 \\
 &= 7.5006 \times 10^{-3} \text{ mm Hg} \\
 &= 9.8692 \times 10^{-6} \text{ atm (standard atmosphere)} \\
 &= 145.04 \times 10^{-6} \text{ lbf/in}^2 \text{ or psia.}
 \end{aligned}$$

Note: psia = psig + local atmospheric pressure in psia, *e.g.* a pressure of 100 psig at ISA sea level atmospheric pressure is 114.696 psia.

Temperature, T

If T_K , T_C , T_F and T_R represent a temperature expressed in K, °C, °F and R respectively, they are related by

$$T_K = T_C + 273.15 = (T_F - 32) \frac{5}{9} + 273.15 = \frac{5}{9} T_R .$$

Viscosity, Dynamic, μ

$$\begin{aligned}
 1 \text{ N s/m}^2 &= 10 \text{ poise} \\
 &= 671.97 \times 10^{-3} \text{ lb/ft s} \\
 &= 20.885 \times 10^{-3} \text{ lbf s/ft}^2 \\
 &= 145.04 \times 10^{-6} \text{ lbf s/in}^2 (\text{reyn}).
 \end{aligned}$$

Note: if viscosity information is available in terms of kinematic viscosity, for example, in centistokes, values must be multiplied by the density in appropriate units to obtain dynamic viscosity. The SI unit of kinematic viscosity is the m^2/s which is 1×10^4 stokes. Data may also be available in “arbitrary” measures of kinematic viscosity, either Saybolt Universal seconds or Redwood No. 1 seconds relating to discharge from a viscometer. ESDU 68036 provides conversion factors for such units.