

Hydronic Equations

$$Q = 500 \times \text{gpm} \times \Delta t$$

gpm = Gallons per minute

$$\Delta P_2 / \Delta P_{t1} = (\text{gpm}_2 / \text{gpm}_1)^2$$

Q = Heat flow (Btu/hr)

Δt = Temperature diff. (°F)

$$\Delta P = (\text{gpm} / C_v)^2$$

ΔP = Pressure diff. (psi)

$$\text{gpm} = C_v \sqrt{\Delta P}$$

C_v = Valve constant (dimensionless)

$$\text{whp} = (\text{gpm} \times H \times \text{Sp. Gr.}) / (3960)$$

whp = water horsepower

gpm = gallons per minute

$$\begin{aligned} \text{bhp} &= (\text{gpm} \times H \times \text{Sp. Gr.}) / (3960 \times E_p) \\ &= \text{whp} / E_p \end{aligned}$$

bhp = brake horsepower

H = head (ft. w.g.)

$$E_p = (\text{whp} \times 100) / \text{bhp} \text{ (in percent)}$$

Sp. Gr. = Specific gravity (use 1.0 for water)

$$1 \text{ hp} = 746 \text{ watts} = 2545 \text{ Btu/hr}$$

E_p = Efficiency of pump
