PARKER BOILER GENERAL ENGINEERING DATA
USEFUL FORMULAS FOR HEATING & BOILER CALCULATIONS

WATER DATA FORMULAS:

GPM $= \frac{\text{BTUH OUTPUT}}{(8.33 \text{ Lbs/Gal X } 60 \text{ Min/Hr X } \Delta T \text{ °F})} = \frac{\text{BTUH}}{500 \text{ X } \Delta T}$

BTUH = GPM x 500 x ΔT°F

ΔT $= \frac{\text{BTUH}}{500 \text{ X GPM}}$

BTUH/Output = GPH x 8.33 Lbs./Gal. x ΔT

BTUH/Input $= \frac{\text{GPH x 8.33 x } \Delta T}{\text{\% Efficiency}}$

Gal/Per/Hr. $= \frac{\text{BTUH/Hr. Input x \% Eff.}}{\Delta T \text{ x } 8.33}$

Rise (ºF) $= \frac{\text{BTUH/Hr. Input x \% Eff.}}{\text{GPH x } 8.33}$

ELECTRICAL DATA:

1 KW = 3413 BTU

1 KW = 1,000 Watts

10 KW = 1 B.H.P.

Watts = BTU x 0.293

POWER & HEAT:

1 Phase : Volts x Amps = Watts
3 Phase : Volts x Amps x 1.73 = Watts

1 Boiler H.P. = 33,500 BTUH Output (@212ºF)
1 B.H.P. = 34.5 lbs/stm per hour.

AIR DATA:

BTUH = CFM x 1.08 x ΔT°F - Formula to determine BTU Based on Air Temperature Change, Valid for (40° to 110°F Air)

STEAM ORIFICE FORMULA - (See Table 7):

For Orifice Discharging to Atmosphere:

W $= \frac{PA}{70}$

W = Lbs/Steam per Second
P = Absolute Pressure = Gage Pressure + 14.7 PSI
A = Area in Square Inches

FLUE GAS DATA CORRECTIONS:

NOx or CO @ 3% Oxygen Basis

NOx or CO @ 3% O_2 = NOx or CO measured x CF

CF $= \frac{17.9}{20.9 - (\text{Measure } O_2)}$

CO Air Free Correction

COaf = CO measured x $\frac{(\ 12\ )}{(CO_2 \text{ measured})}$

THERMAL FLUID HT HEATERS:

GPM $= \frac{\text{BTUH Output}}{8.33 \text{ x } 60 \text{ x S.H. X S.G. X } \Delta T}$

Thermal Fluid Tube Velocity should exceed 8 FPS

For most Thermal Fluids at Temperature: Specific Heat = .5 (usually)
Specific Gravity = .8 (usually)