

### **Steam Conversion Formulas**

Boiler Horsepower (BHP) \* 34.5 = Lb of Steam/Water per hour(lb/hr)  
 Boiler Horsepower \* 0.069 = Gallons of Water Per Minute (GPM)  
 Sq Ft of EDR \* 0.000637 = Gallons of Water Per Minute (GPM)  
 Boiler Horsepower \* 33,479 = BTU  
 Boiler Horsepower \* 108 = Equivalent Direct Radiation (EDR)  
 Lbs per Sq In \* 2.31 = Feet of Water  
 Lbs per Sq In \* 2.036 = Inches of Mercury  
 Feet of Water (Head) \* 0.4335 = Pounds per Sq In  
 Inches of Mercury \* 13.6 = Inches of Water Column  
 Gallons of Water \* 8.34 = Pounds of Water  
 Cubic Feet of Water \* 7.48 = Gallons of Water  
 Cubic Feet per Minute \* 62.43 Pounds of Water per Minutes  
 Cubic Feet per mInute \* 448.8 = Gallons per Hour  
 Pounds of Condensate x 4 = Sq Ft EDR  
 EDR/ 1000 \* 0.5 = Evaporation Rate Gallons per minute (GPM)  
 Pounds of Steam/hr / 500 = Evaporation Rate Gallons per minute (GPM)

### **Boiler Feed Unit Sizing**

Evaporation Rate \* 1.85 = Pump GPM Required  
 Evaporation Rate \* 20 = Receiver Tank Size (Gallon Storage at 20 Minutes)  
 Example; 4,500,000 BTU Output / 33.479 = 134.5 BHP  
 134.5 BHP \* .069 = 9.28 GPM  
 9.28 GPM \* 1.85 = 17.1 Pump GPM Required  
 17.1 \* 20 = 342 Gallons Storage

### **Condensate Pump Sizing**

Evaporation Rate \* 3 = Pump GPM Required  
 Pump GPM \* 1 = Receiver Tank Size (Gallons Storage)  
 Example ; 4,500,000 Output boiler / 240 = 18,750  
 18,750 EDR / 1000 x .5 = 9.37  
 9.37 GPM \* 3 = 28 GPM Pump Capacity  
 Pump GPM \* 1 = 28 Gallon Tank

### **What is A Boiler Feed Tank**

The boiler feed unit is larger and holds more water than a condensate pump and does not work off of a float. The boiler feed tank will get a signal from a boiler pump controller to start and stop the pump. The boiler only gets water when it is needed. The boiler does not overflow. If the near boiler piping is correct we get drier steam. The other difference is the make-up water for the boiler is fed into the tank not the boiler. The feed water is controlled by a float. The benefit of this is as the boiler feed tank is hot due to returning condensate it helps remove the damaging oxygen before getting to the boiler. It also give a place for dissolved solids to drop out before getting to the boiler.

### **What is A Condensate Pump**

Operation of a condensate pump is like a sump pump. It works off of a float mechanism. When the condensate tanks gets enough water in it to lift the float it makes a switch. This turns the pump on and pumps water back into the boiler. The problem is the boiler may not need water at that time and it overfills the boiler. This will create wet steam. Wet steam moves slower and turns back into condensate long before it should. You lose the heating capability of steam and must run the boiler to make more steam.