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500 HP FIRETUBE BOILER

Maximum BTU/hr Input (ie: Rated Input @ High Fire / 100% Input Rating)	$500 \times 42,000 = 21,000,000 \text{ BTU}$
Cubic Feet of Natural Gas Required	$21,000,000 \div 1,000 = 21,000 \text{ Cu Ft}$
Cubic Feet of Vaporized Propane Required	$21,000,000 \div 2,500 = 8,400 \text{ Cu Ft}$
Gallons of Liquid Propane Required	$21,000,000 \div 91,600 = 229.25 \text{ Gallons}$
Gallons of #2 Diesel Oil Required	$21,000,000 \div 140,000 = 150 \text{ Gallons}$
Minimum BTU/hr Input at a 4:1 Turndown Ratio (Low Fire)	$21,000,000 \div 4 = 5,250,000 \text{ BTU}$
Cubic Feet of Natural Gas Required	$5,250,000 \div 1,000 = 5,250 \text{ Cu Ft}$
Cubic Feet of Vaporized Propane Required	$5,250,000 \div 2,500 = 2,100 \text{ Cu Ft}$
Gallons of Liquid Propane Required	$5,250,000 \div 91,600 = 57.3 \text{ Gallons}$
Gallons of #2 Diesel Oil Required	$5,250,000 \div 140,000 = 37.5 \text{ Gallons}$
Maximum Steam Production in lbs/hr (High Fire)	$500 \times 34.5 = 17,250 \text{ lbs/hr}$
Maximum Water Evaporation Rate	$500 \times .069 = 34.5 \text{ GPM}$
Minimum Feedwater Pump Flow (on / off pump strategy)	$34.5 \times 2 = 69 \text{ GPM}$
Minimum Feedwater Pump Flow (modulating pump strategy)	$34.5 \times 1.5 = 51.75 \text{ GPM}$
Minimum Feedwater Tank Storage Requirement	345 Gallons
Steam Temperature at 100 psi Saturated	337.9 °F
BTU/hr Output, Based on 80% Efficiency at High Fire	$21,000,000 \times .80 = 16,800,000 \text{ BTU}$
BTU/hr Output, Based on 80% Efficiency at Low Fire	$5,250,000 \times .80 = 4,200,000 \text{ BTU}$
Square Feet Heating Surface (sq. ft. HS) at 5 sq. ft. per HP	$500 \times 5 = 2,500 \text{ Sq Ft}$
Minimum Steam Safety Relief Valve Capacity at Boiler Design	$17,250 \times 1.10 = 18,975 \text{ lbs/hr}$
Minimum Water Softener Flow Capacity at High Fire (always based upon 100% input)	$34.5 \times 2 = 69 \text{ GPM}$

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