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300 HP FIRETUBE BOILER

Maximum BTU/hr Input (ie: Rated Input @ High Fire / 100% Input Rating)	$300 \times 42,000 = 12,600,000 \text{ BTU}$
Cubic Feet of Natural Gas Required	$12,600,000 \div 1,000 = 12,600 \text{ Cu Ft}$
Cubic Feet of Vaporized Propane Required	$12,600,000 \div 2,500 = 5,040 \text{ Cu Ft}$
Gallons of Liquid Propane Required	$12,600,000 \div 91,600 = 138.46 \text{ Gallons}$
Gallons of #2 Diesel Oil Required	$12,600,000 \div 140,000 = 90 \text{ Gallons}$
Minimum BTU/hr Input at a 4:1 Turndown Ratio (Low Fire)	$12,600,000 \div 4 = 3,150,000 \text{ BTU}$
Cubic Feet of Natural Gas Required	$3,150,000 \div 1,000 = 3,150 \text{ Cu Ft}$
Cubic Feet of Vaporized Propane Required	$3,150,000 \div 2,500 = 1,260 \text{ Cu Ft}$
Gallons of Liquid Propane Required	$3,150,000 \div 91,600 = 34.39 \text{ Gallons}$
Gallons of #2 Diesel Oil Required	$3,150,000 \div 140,000 = 22.5 \text{ Gallons}$
Maximum Steam Production in lbs/hr (High Fire)	$300 \times 34.5 = 10,350 \text{ lbs/hr}$
Maximum Water Evaporation Rate	$300 \times .069 = 20.7 \text{ GPM}$
Minimum Feedwater Pump Flow (on / off pump strategy)	$20.7 \times 2 = 41.4 \text{ GPM}$
Minimum Feedwater Pump Flow (modulating pump strategy)	$20.7 \times 1.5 = 30.05 \text{ GPM}$
Minimum Feedwater Tank Storage Requirement	207 Gallons
Steam Temperature at <u>150 psi</u> Saturated	366 °F
BTU/hr Output, Based on 80% Efficiency at High Fire	$12,600,000 \times .80 = 10,080,000 \text{ BTU}$
BTU/hr Output, Based on 80% Efficiency at Low Fire	$3,150,000 \times .80 = 2,520,000 \text{ BTU}$
Square Feet Heating Surface (sq. ft. HS) at 5 sq. ft. per HP	$300 \times 5 = 1,500 \text{ Sq Ft}$
Minimum Steam Safety Relief Valve Capacity at Boiler Design	$10,350 \times 1.10 = 11,385 \text{ lbs/hr}$
Minimum Water Softener Flow Capacity at High Fire (always based upon 100% input)	$20.7 \times 2 = 41.4 \text{ GPM}$

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