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## 50 HP FIRETUBE BOILER

<b>Maximum BTU/hr Input (ie: Rated Input @ High Fire / 100% Input Rating)</b>	<b>50 x 42,000 = 2,100,000 BTU</b>
Cubic Feet of Natural Gas Required	$2,100,000 \div 1,000 = 2,100$ Cu Ft
Cubic Feet of Vaporized Propane Required	$2,100,000 \div 2,500 = 840$ Cu Ft
Gallons of Liquid Propane Required	$2,100,000 \div 91,600 = 22.9$ Gallons
Gallons of #2 Diesel Oil Required	$2,100,000 \div 140,000 = 15$ Gallons
<b>Minimum BTU/hr Input at a 4:1 Turndown Ratio (Low Fire)</b>	<b><math>2,100,000 \div 4 = 525,000</math> BTU</b>
Cubic Feet of Natural Gas Required	$525,000 \div 1,000 = 525$ Cu Ft
Cubic Feet of Vaporized Propane Required	$525,000 \div 2,500 = 210$ Cu Ft
Gallons of Liquid Propane Required	$525,000 \div 91,600 = 5.73$ Gallons
Gallons of #2 Diesel Oil Required	$525,000 \div 140,000 = 3.75$ Gallons
<b>Maximum Steam Production in lbs/hr (High Fire)</b>	<b><math>50 \times 34.5 = 1,725</math> lbs/hr</b>
Maximum Water Evaporation Rate	$50 \times .069 = 3.45$ GPM
Minimum Feedwater Pump Flow (on / off pump strategy)	$3.45 \times 2 = 6.9$ GPM
Minimum Feedwater Pump Flow (modulating pump strategy)	$3.45 \times 1.5 = 5.175$ GPM
Minimum Feedwater Tank Storage Requirement	34.51 Gallons
<b>Steam Temperature at <u>110 psi</u> Saturated</b>	<b>344.22 °F</b>
<b>BTU/hr Output, Based on 80% Efficiency at High Fire</b>	<b><math>2,100,000 \times .80 = 1,680,000</math> BTU</b>
<b>BTU/hr Output, Based on 80% Efficiency at Low Fire</b>	<b><math>525,000 \times .80 = 420,000</math> BTU</b>
<b>Square Feet Heating Surface (sq. ft. HS) at 5 sq. ft. per HP</b>	<b><math>50 \times 5 = 250</math> Sq Ft</b>
<b>Minimum Steam Safety Relief Valve Capacity at Boiler Design</b>	<b><math>1,725 \times 1.10 = 1,897.5</math> lbs/hr</b>
<b>Minimum Water Softener Flow Capacity at High Fire (always based upon 100% input)</b>	<b><math>3.45 \times 2 = 6.9</math> GPM</b>

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