



MODEL: PFTA 1600-4

4-Pass Hot Water Packaged Firetube Boiler

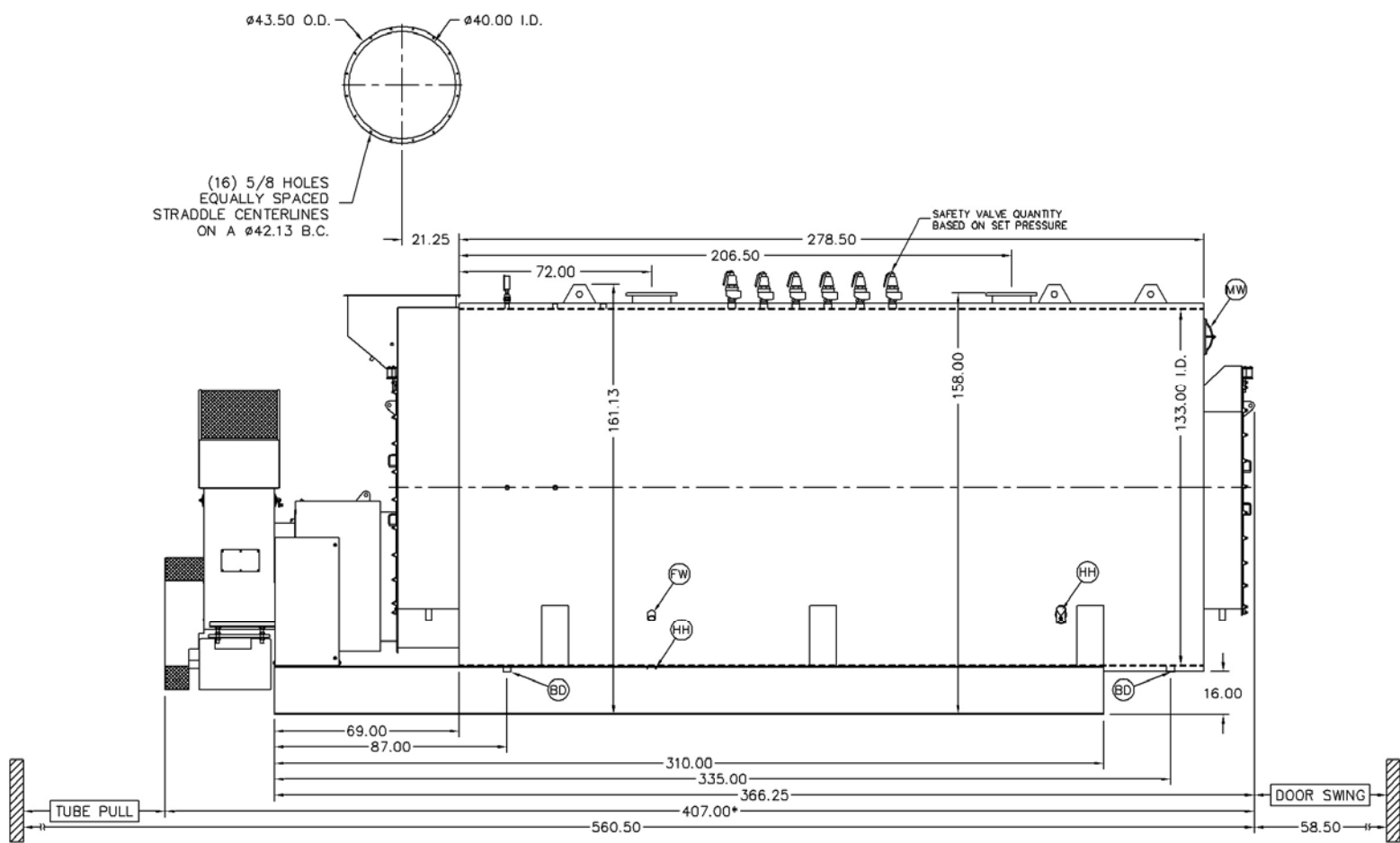
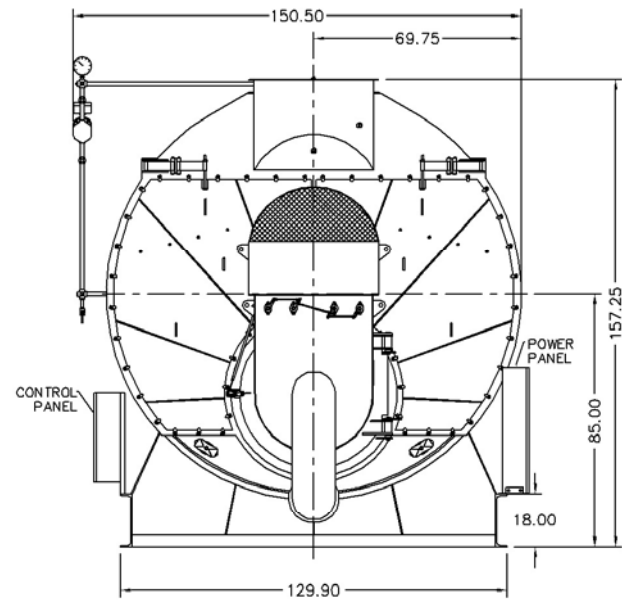


Ratings & Performance Data

Horsepower 1600		Natural Gas Flow, SCFH (1,000 Btu/ft ³)**		61,670		
Total Heating Surface, ft ²	8,088	Combustion Air (15% Excess), SCFM***		11,285		
Furnace Outside Diameter, in	53.5	Flue Gas Flow Rate, lb/hr***		53,779		
Furnace Heat Release Rate, Btu/ft ³ hr**	208,000	Stack Flue Gas Velocity, ft/min***		1,818		
Total Combustion Volume, ft ³	410.1	#2 Oil Flow, gal/hr (140,000 Btu/gal)**		424.7		
Total Heat Release Rate, Btu/ft ³ hr**	150,000	#6 Oil Flow, gal/hr (150,000 Btu/gal)**		392.5		
Water Content Flooded, gal	10,206	Flue Gas Side Pressure Drop, in. H ₂ O		11.3		
Approx. Dry Weight 30#, lb	94,400	Approx. Operating Weight 30#, lb		179,500		
Approx. Dry Weight 60#, lb	94,700	Approx. Operating Weight 60#, lb		179,800		
Approx. Dry Weight 125#, lb	98,000	Approx. Operating Weight 125#, lb		183,100		
Performance Data						
Operating Temperature (F)	Natural Gas		#2 Oil		#6 Oil	
	Stack Temp (F)	%Eff	Stack Temp	%Eff	Stack Temp (F)	%Eff
180	203	87.3	209	90.6	216	91.3
200	223	86.9	229	90.1	236	91.0
220	243	86.4	249	89.6	256	90.3
240	263	85.9	269	89.1	276	89.8
*Based on 20°F difference in supply/return, ** Values calculated at 200°F operating temperature, ***Calculated Firing Natural Gas						

Drawings - 4-Pass Hot Water Packaged Firetube Boiler

Connection & Opening Schedule			
Conn.	Description	Type	Qty
FW	Feedwater Inlet	2.00 FNPT	2
WS	Water Supply	14.00 150#RF	1
WR	Water Return	14.00 150#RF	1
DO	Drain Outlet	2.00 FNPT	2
MW	Manway	12 X 16	1
HH	Hand Hole	4 X 6	7
Supply and return outlets ASME flanged drilling			



Notes:

30# Hot Water design shown, all dimensions given in inches.

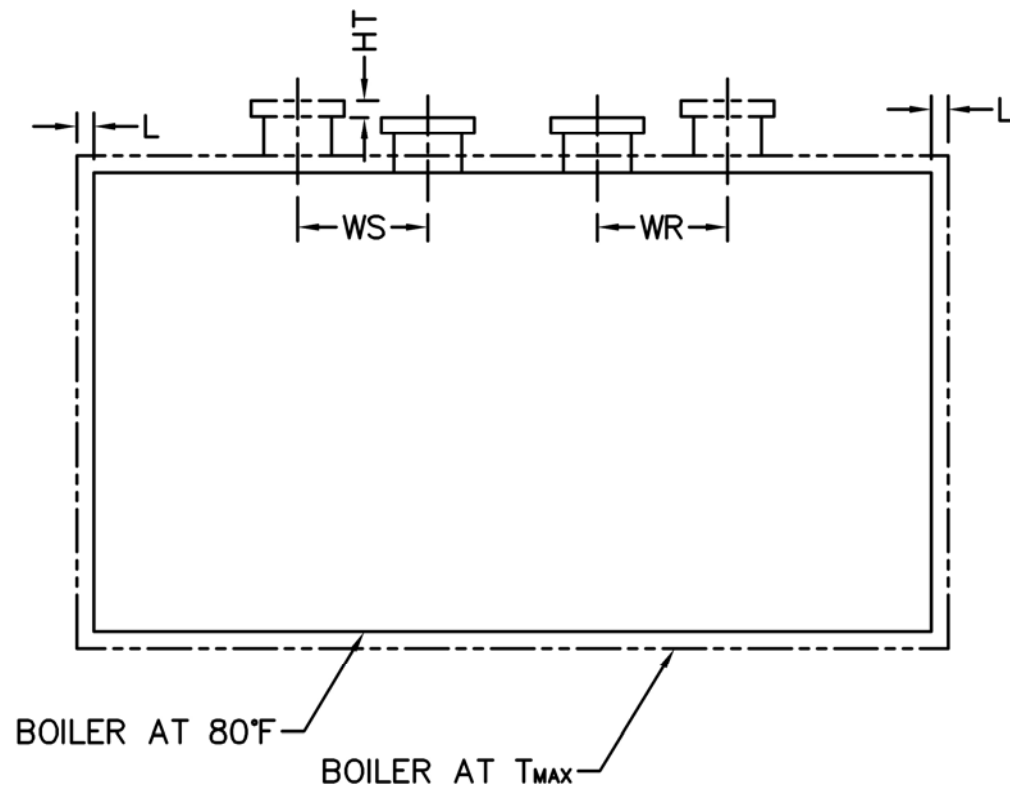
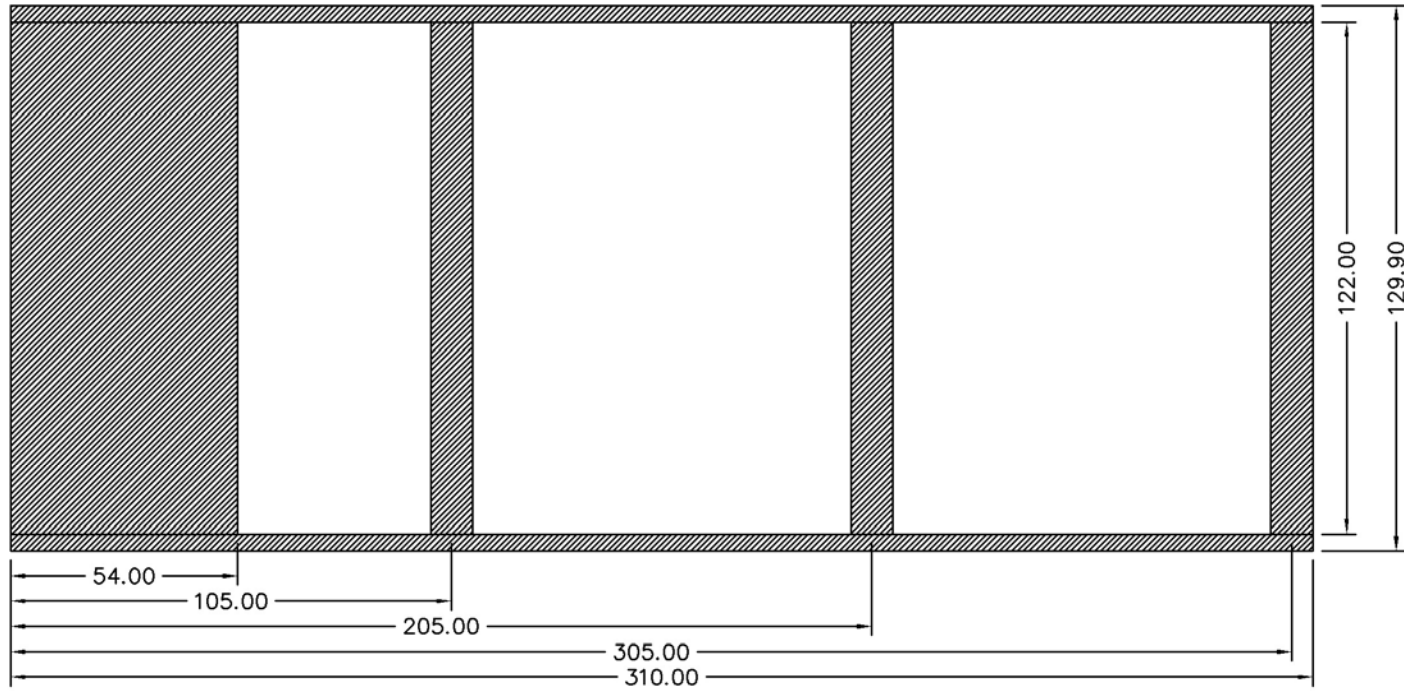
Fuel piping and/or optional boiler trim may increase overall width.

Specifications subject to change to incorporate engineering advances.

*May vary on low-NO_x designs.

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Base Diagram

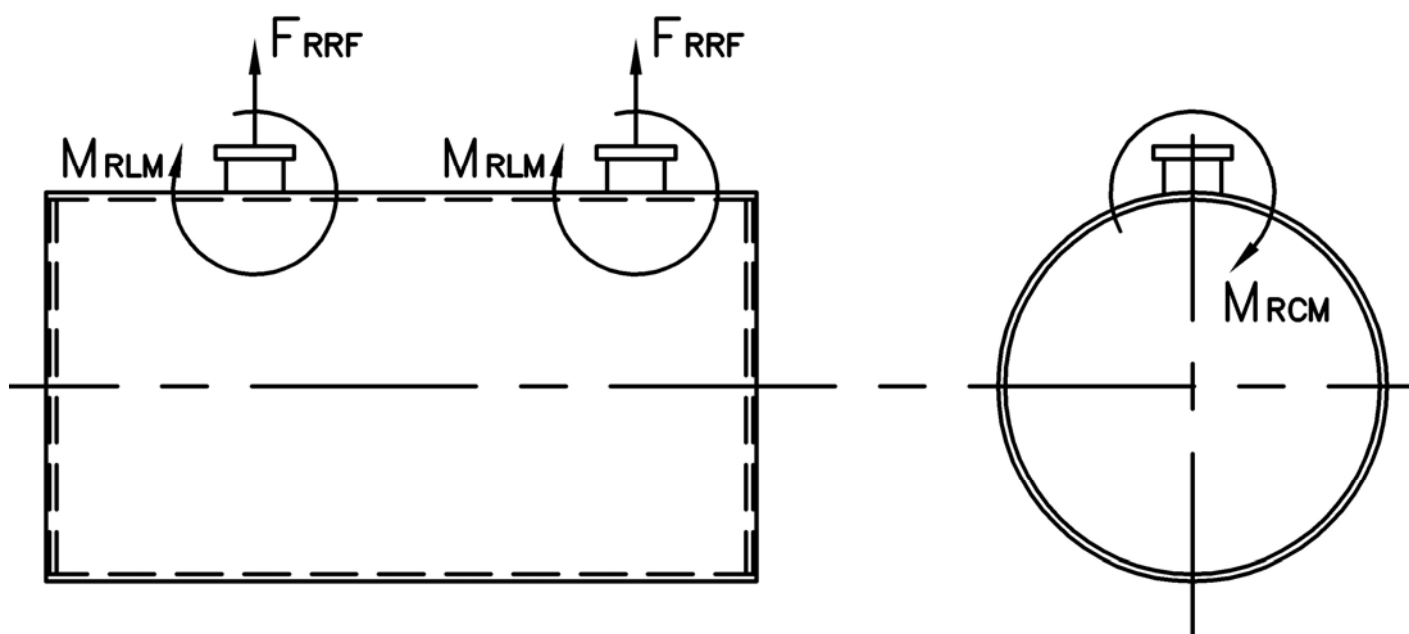


Thermal Expansion				
Metal T_{MAX} (F)	180	200	220	240
L (in)	0.081	0.097	0.113	0.129
WS (in)	0.030	0.036	0.042	0.048
WR (in)	0.057	0.069	0.080	0.092
HT (in)	0.080	0.096	0.112	0.128

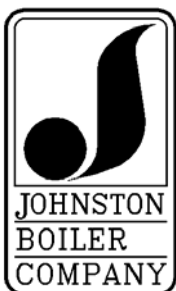
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Nozzle Loadings

Maximum Allowable Load on Outlet & Return Nozzles				
	30# Design	60# Design	125# Design	160# Design
F_{RRF} , lb	5,675	4,055	7,120	10,155
M_{RCM} , in-lb	67,535	67,535	123,845	208,520
M_{RLM} , in-lb	96,035	68,680	102,560	162,545



Distributed By:



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Stack Emissions-Natural Gas (1,000 Btu/CF)				
	PPMv (Corr to 3% O ₂)	lb/MBtu	lb/hr @ Full Rate	Ton/Yr @ Full Rate
NO _x *	110	0.131	8.076	35.372
	30	0.036	2.202	9.647
	9	0.011	0.661	2.894
CO	50	0.037	2.27	9.923
CO ₂	2.55 lb/lb fuel	119.76	7,386	32,349
H ₂ O	2.03 lb/lb fuel	106.16	6,547	28,675
Stack Emissions-#2 Oil** (140,000 Btu/gal)				
NO _x	128	0.174	10.352	45.342
CO	50	0.037	2.184	9.567
CO ₂	3.20 lb/lb fuel	168.53	10,021	43,890
H ₂ O	1.12 lb/lb fuel	71.20	4,233	18,542

* 110 ppm "A" Burner, 30 ppm A-FGR Burner, 9 ppm FIR Burner
**0.02% fuel bound Nitrogen