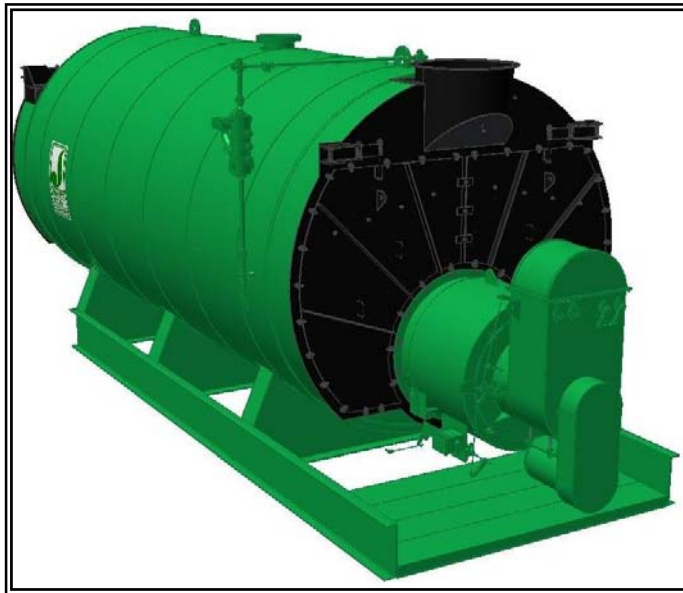




MODEL: PFTA 150-4

4-Pass Steam Packaged Firetube Boiler

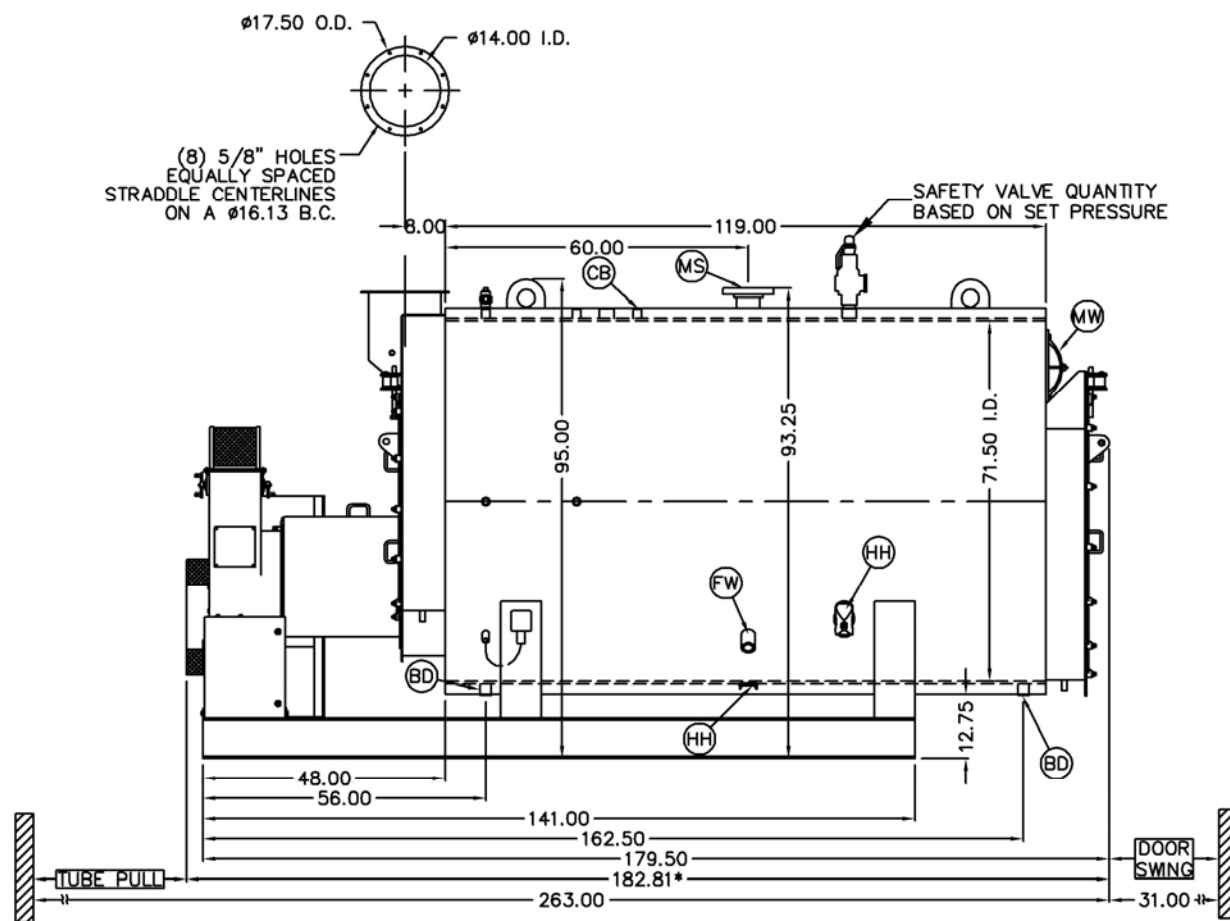
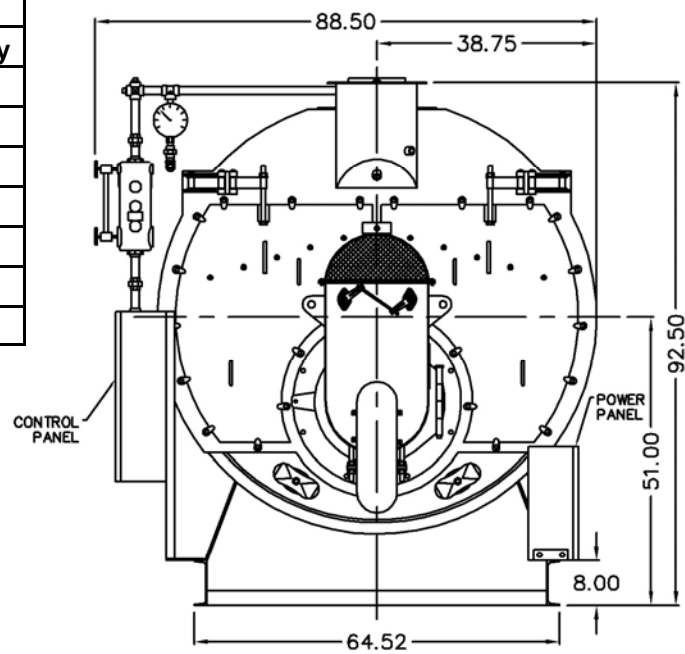


Ratings & Performance Data

Horsepower 150							
Steam Storage, ft ³	33.8	Natural Gas Flow, SCFH (1,000 Btu/ft ³)**	6,112				
Steam Disengaging Area, ft ²	44.9	Combustion Air (15% Excess), SCFM***	1,118				
Total Heating Surface, ft ²	778	Flue Gas Flow Rate, lb/hr***	5,330				
Furnace Outside Diameter, in	31.5	Stack Flue Gas Velocity, ft/min***	1,850				
Furnace Heat Release Rate, Btu/ft ³ hr**	162,000	#2 Oil Flow, gal/hr (140,000 BTU/gal)**	42.1				
Total Combustion Volume, ft ³	59.9	#6 Oil Flow, gal/hr (150,000 BTU/gal)**	38.9				
Total Heat Release Rate, Btu/ft ³ hr**	102,000	Flue Gas Side Pressure Drop, in. H ₂ O	3.2				
Water Content N.W.L., gal	1,077	Water Content Flooded, gal.	1,330				
Approx. Dry Weight 15#, lb	14,500	Approx. Operating Weight 15#, lb.	23,400				
Approx. Dry Weight 150#, lb	15,400	Approx. Operating Weight 150#, lb.	24,300				
Approx. Dry Weight 200#, lb	16,600	Approx. Operating Weight 200#, lb.	25,500				
Approx. Dry Weight 250#, lb	17,900	Approx. Operating Weight 250#, lb.	26,800				
Approx. Dry Weight 300#, lb	19,100	Approx. Operating Weight 300#, lb.	28,000				
Performance Data							
Operating Pressure (psig)	Steam Rate (lb/hr)	Natural Gas		#2 Oil		#6 Oil	
		Stack Temp (F)	%Eff	Stack Temp (F)	%Eff	Stack Temp (F)	%Eff
10	5,209	303	84.7	314	87.7	313	88.7
50	5,108	359	83.2	370	86.3	371	87.2
100	5,054	399	82.2	409	85.2	411	86.1
150	5,023	426	81.5	437	84.5	440	85.4
200	5,004	448	80.9	458	83.9	462	84.8
250	4,992	466	80.4	476	83.5	481	84.3
300	4,984	482	80.0	492	83.1	497	83.9
*Based on 228°F feedwater and 3% O ₂ , ** Values calculated at 100 psi operating pressure, ***Calculated Firing Natural Gas							

Drawings - 4-Pass Steam Packaged Firetube Boiler

Connection & Opening Schedule			
Conn.	Description	Type	Qty
FW	Feedwater Inlet	1.50 FNPT	2
MS*	Main Steam	4.00 300# RF	1
CB	Continuous Blowoff	1.00 FNPT	1
BD	Blowdown Outlet	1.50 FNPT	2
MW	Manway	12 X 16	1
HH	Hand Hole	4 X 6	6
*8.00 150#RF Flange on 15 psig Design			



Notes:

150# Steam design shown, all dimensions given in inches.

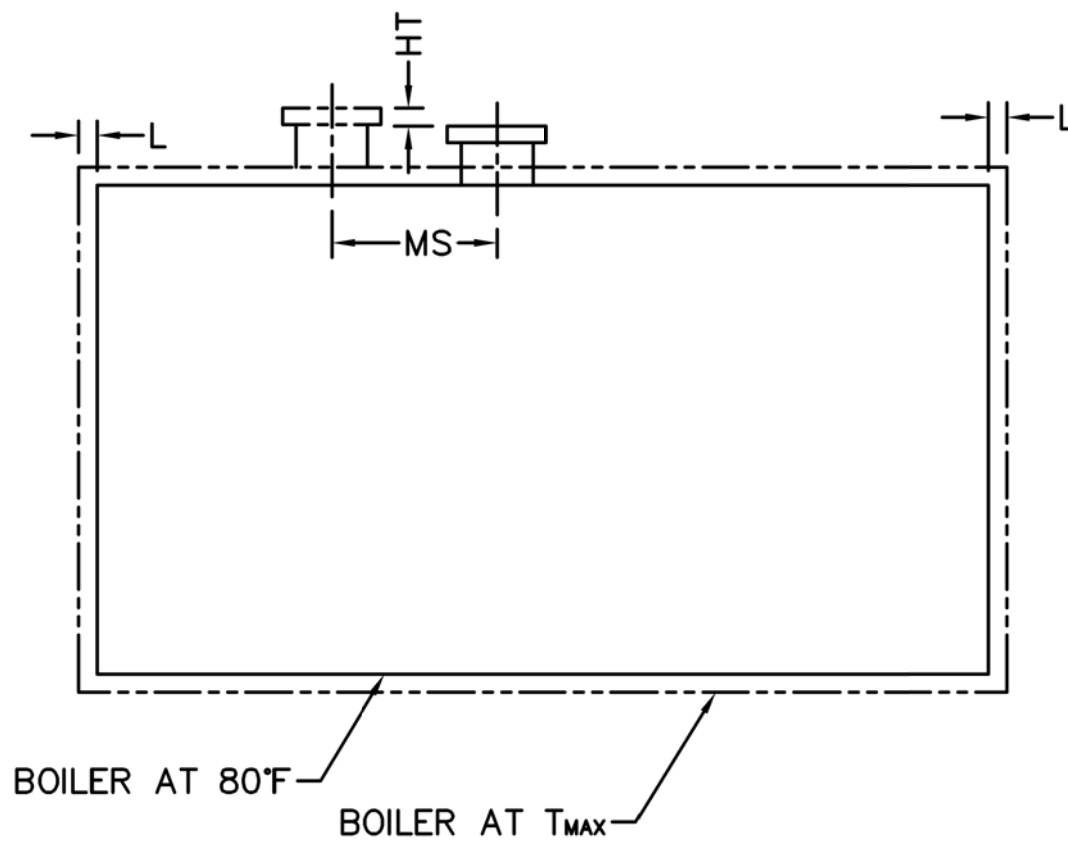
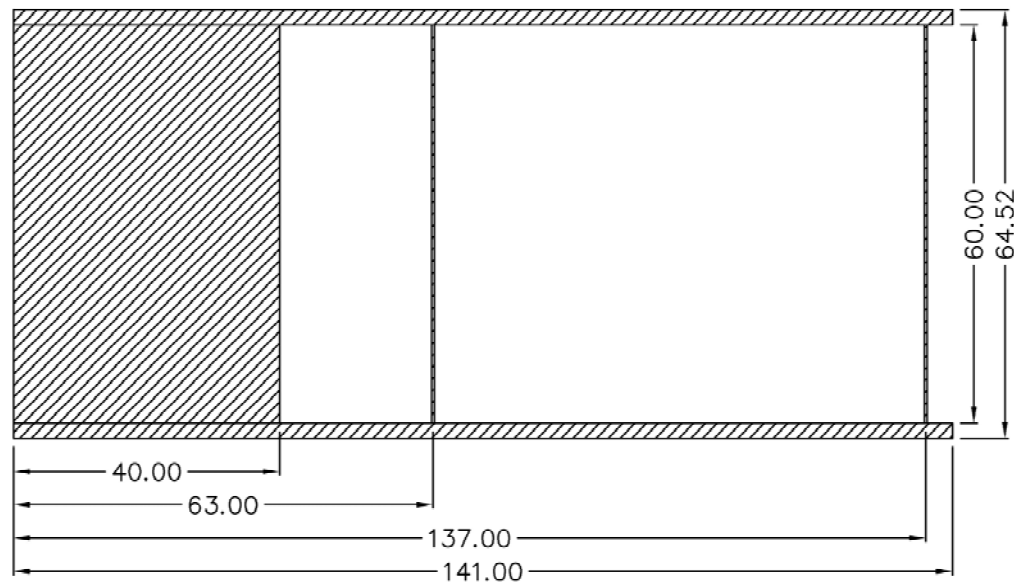
Fuel piping and/or optional boiler trim may increase overall width.

Specifications subject to change to incorporate engineering advances.

*May vary on low-NO_x designs

MODEL: PFTA 150-4

Base Diagram

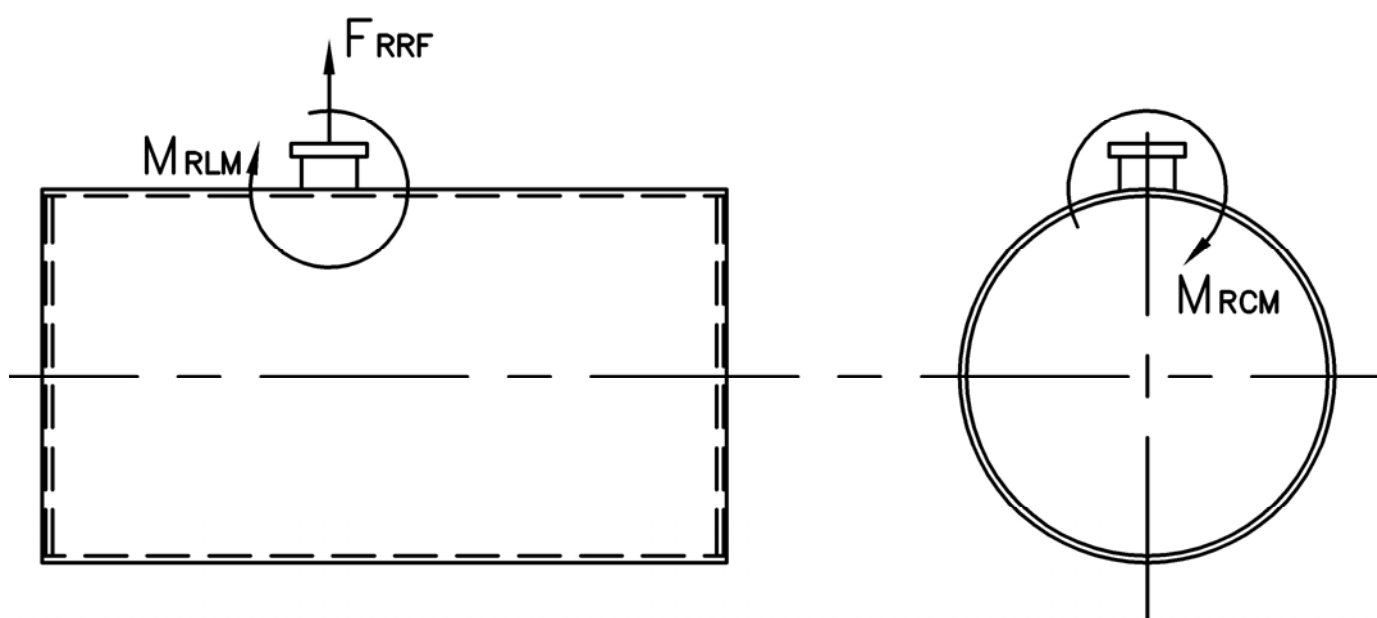


Thermal Expansion					
psig	15	150	200	250	300
Metal T_{MAX} (F)	240	366	388	406	421
L (in)	0.061	0.102	0.110	0.116	0.122
MS (in)	0.001	0.001	0.001	0.001	0.001
HT (in)	0.073	0.123	0.133	0.141	0.148

MODEL: PFTA 150-4

Nozzle Loadings

Maximum Allowable Load on Boiler Steam Nozzle					
	15# Design	150# Design	200# Design	250# Design	300# Design
F_{RRF} , lb	3,820	1,220	2,320	2,320	2,795
M_{RCM} , in-lb	19,275	8,715	16,400	16,400	18,810
M_{RLM} , in-lb	30,760	6,405	12,530	12,530	13,980



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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	0.800	3.505
	30	0.036	0.218	0.956
	9	0.011	0.065	0.287
CO	100	0.073	0.45	1.967
CO ₂	2.55 lb/lb fuel	119.76	732	3,206
H ₂ O	2.03 lb/lb fuel	106.16	649	2,842
Stack Emissions-#2 Oil** (140,000 Btu/gal)				
NO _x	128	0.174	1.026	4.492
CO	100	0.040	0.236	1.032
CO ₂	3.20 lb/lb fuel	168.53	993	4,348
H ₂ O	1.12 lb/lb fuel	71.20	419	1,837

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