

MODEL: PFTA 350-4

4-Pass Steam Packaged Firetube Boiler

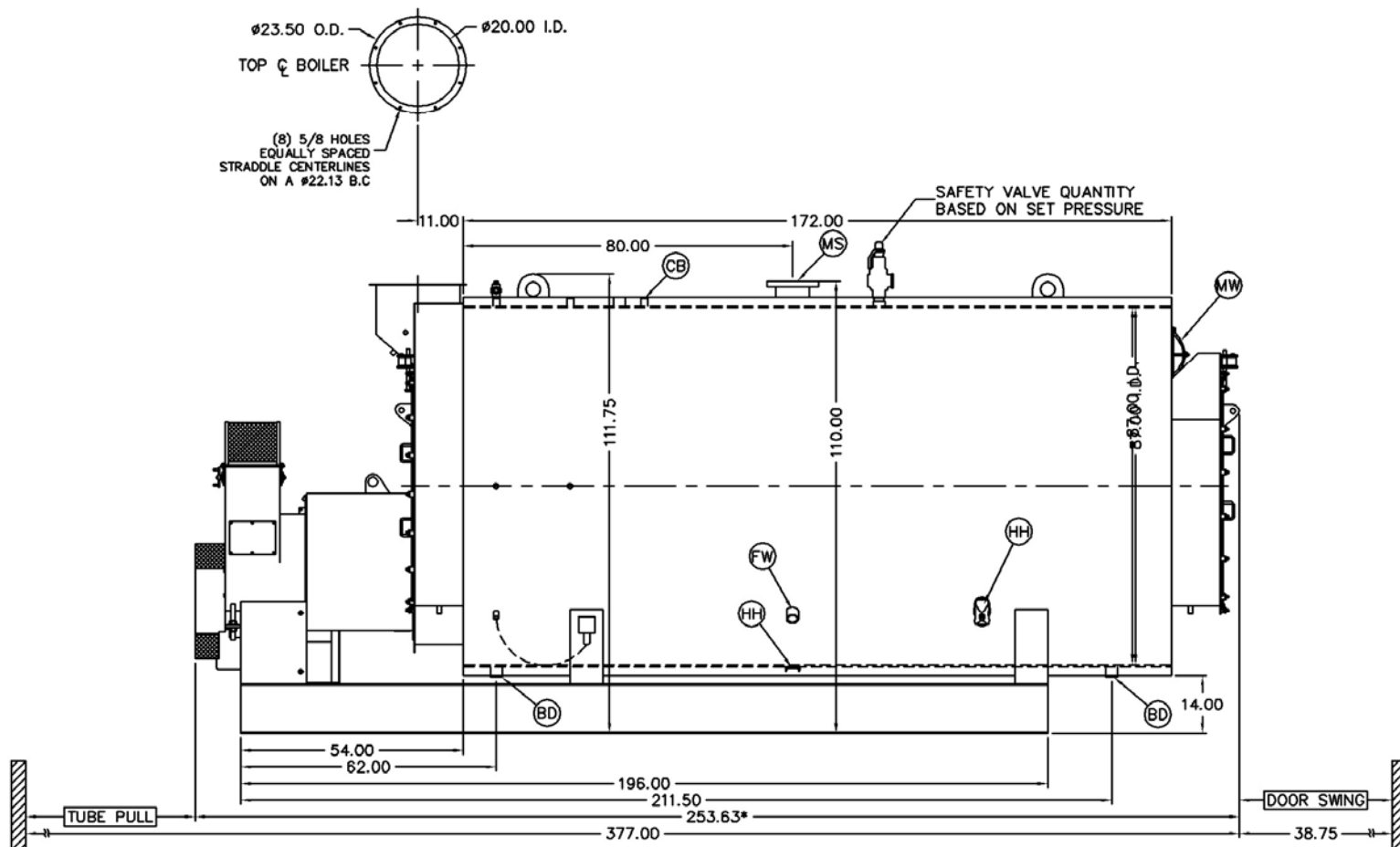
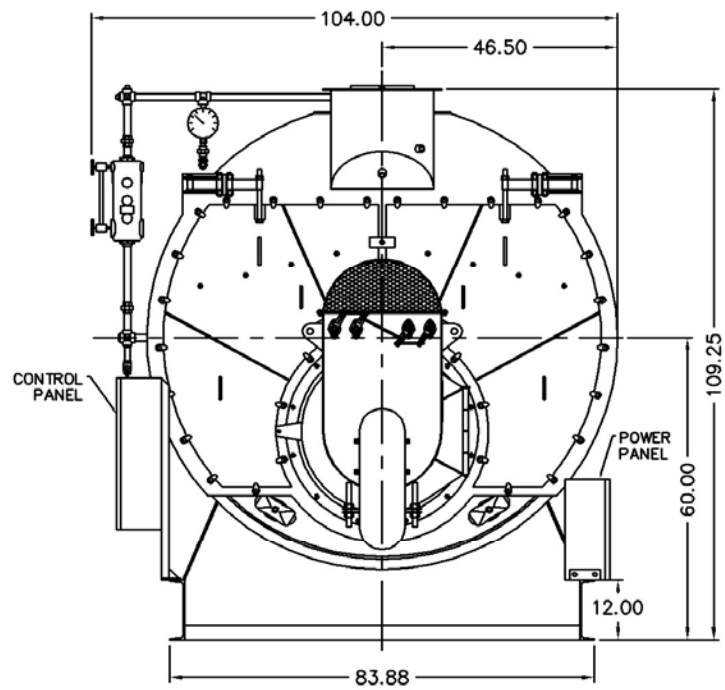


Ratings & Performance Data

Horsepower 350							
Steam Storage, ft ³	59.4	Natural Gas Flow, SCFH (1,000 Btu/ft ³)**	14,233				
Steam Disengaging Area, ft ²	75.0	Combustion Air (15% Excess), SCFM***	2,604				
Total Heating Surface, ft ²	1,756	Flue Gas Flow Rate, lb/hr***	12,412				
Furnace Outside Diameter, in	40.0	Stack Flue Gas Velocity, ft/min***	2,109				
Furnace Heat Release Rate, Btu/ft ³ hr**	153,000	#2 Oil Flow, gal/hr (140,000 BTU/gal)**	98.0				
Total Combustion Volume, ft ³	134.3	#6 Oil Flow, gal/hr (150,000 BTU/gal)**	90.8				
Total Heat Release Rate, Btu/ft ³ hr**	106,000	Flue Gas Side Pressure Drop, in. H ₂ O	3.9				
Water Content N.W.L., gal	2,193	Water Content Flooded, gal.	2,637				
Approx. Dry Weight 15#, lb	24,200	Approx. Operating Weight 15#, lb.	43,000				
Approx. Dry Weight 150#, lb	27,300	Approx. Operating Weight 150#, lb.	46,100				
Approx. Dry Weight 200#, lb	30,500	Approx. Operating Weight 200#, lb.	49,300				
Approx. Dry Weight 250#, lb	34,600	Approx. Operating Weight 250#, lb.	53,400				
Approx. Dry Weight 300#, lb	38,200	Approx. Operating Weight 300#, lb.	57,000				
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	12,155	301	84.8	312	87.9	321	88.6
50	11,919	358	83.3	370	86.4	380	87.1
100	11,792	398	82.3	410	85.4	421	86.0
150	11,721	426	81.6	438	84.7	450	85.3
200	11,676	448	81.0	460	84.1	473	84.7
250	11,648	467	80.6	478	83.6	492	84.2
300	11,630	483	80.2	494	83.2	509	83.8
*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	6.00 300# RF	1
CB	Continuous Blowoff	1.00 FNPT	1
BD	Blowdown Outlet	2.00 FNPT	2
MW	Manway	12 X 16	1
HH	Hand Hole	4 X 6	7
*10.00 150#RF Flange on 15 psig Design			



Notes:

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

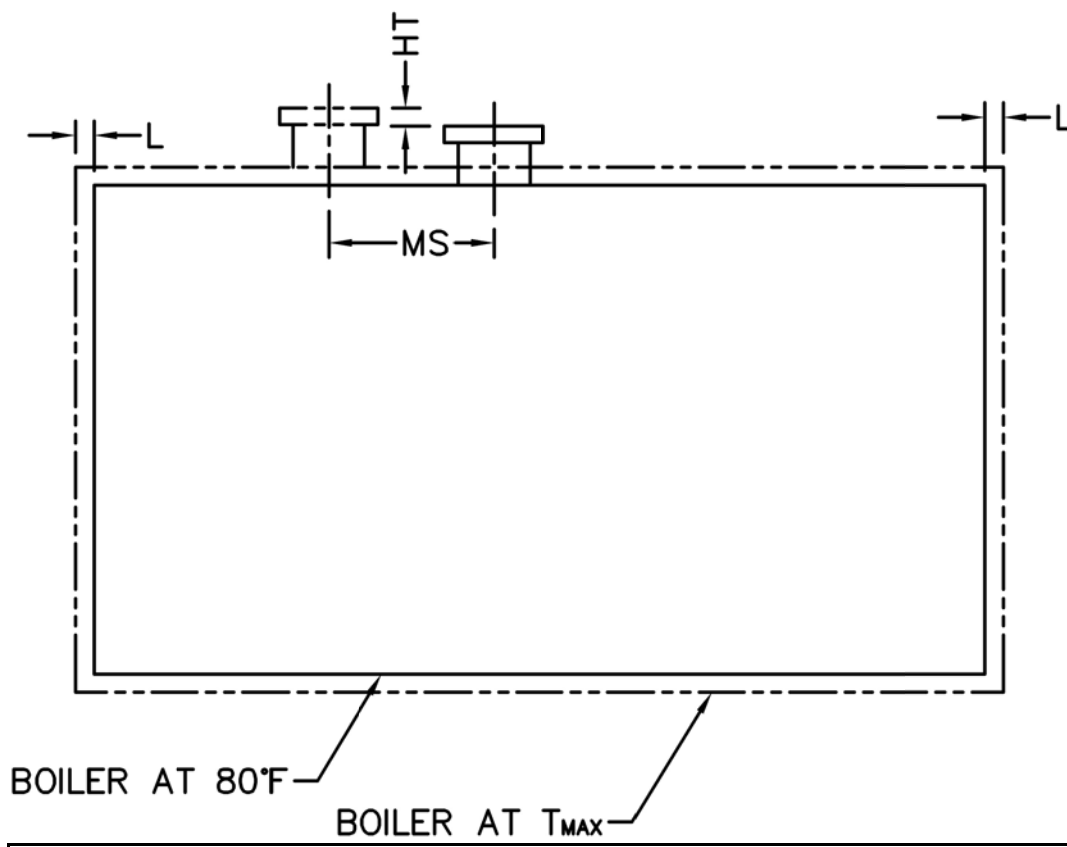
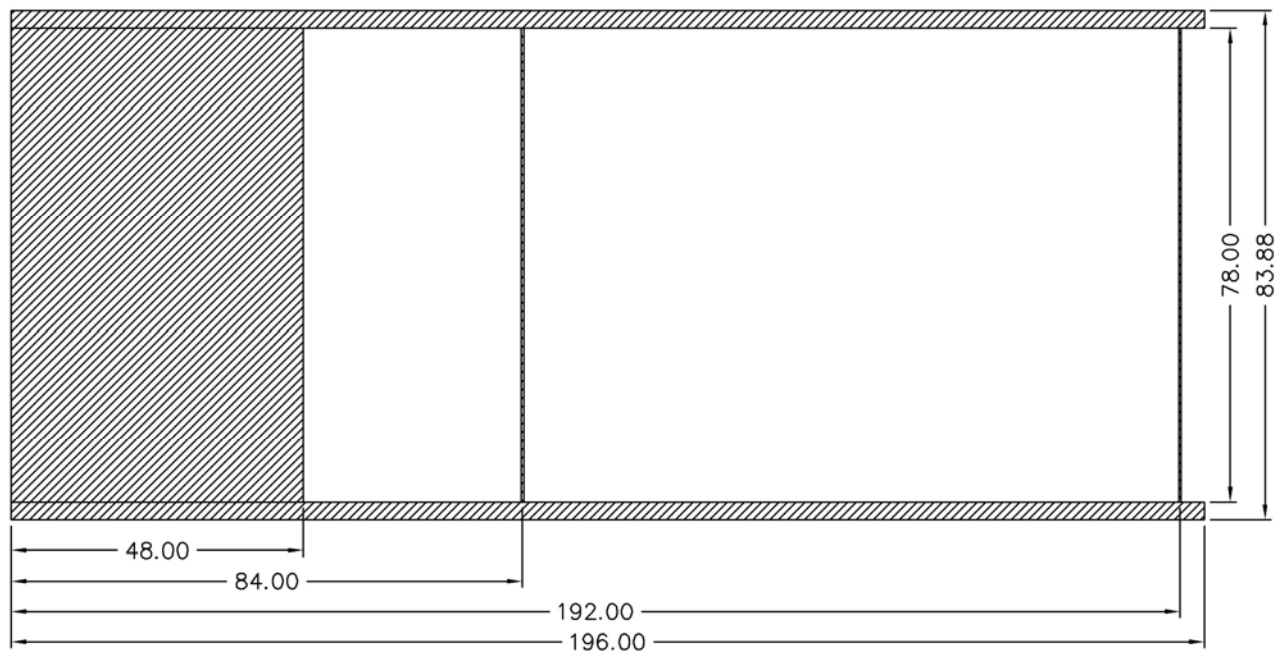
Fuel piping and/or optional boiler trim may increase overall width.

Specifications subject to change to incorporate engineering advances.

*May vary on low-NO_x designs

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Base Diagram

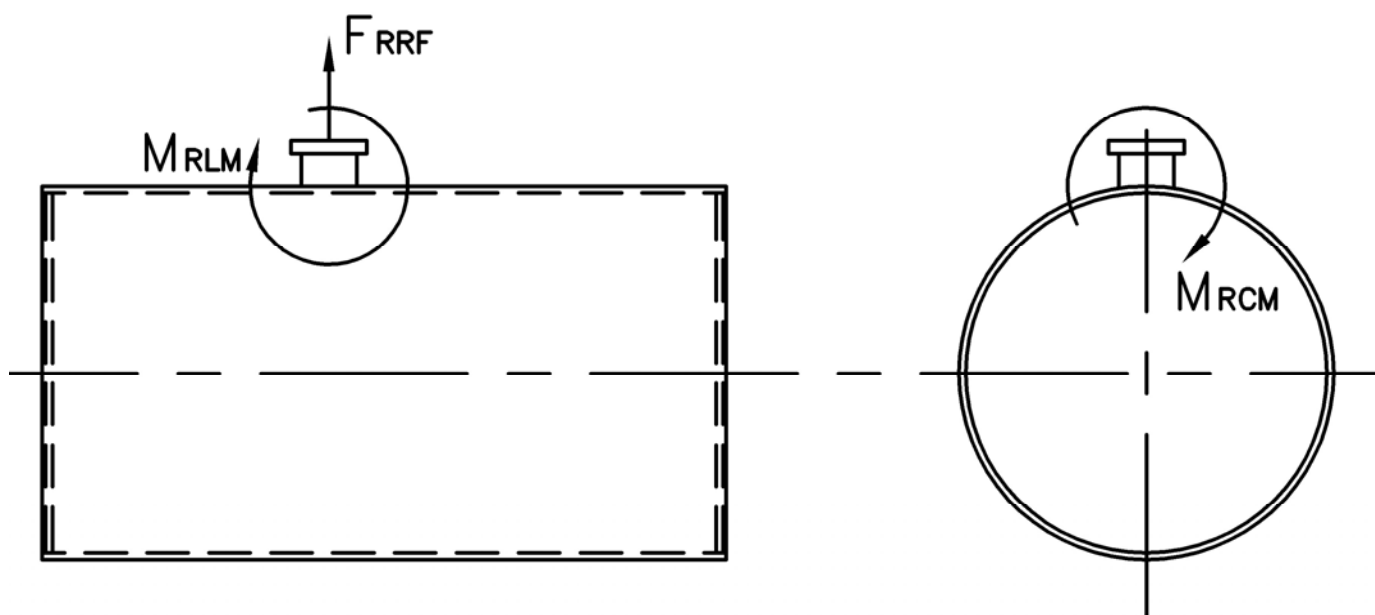


Thermal Expansion					
psig	15	150	200	250	300
Metal T_{MAX} (F)	240	366	388	406	421
L (in)	0.088	0.147	0.159	0.168	0.176
MS (in)	0.006	0.010	0.011	0.012	0.012
HT (in)	0.089	0.150	0.162	0.171	0.180

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Nozzle Loadings

Maximum Allowable Load on Boiler Steam Nozzle					
	15# Design	150# Design	200# Design	250# Design	300# Design
F_{RRF} , lb	7,260	3,165	4,340	4,125	4,245
M_{RCM} , in-lb	43,065	28,560	47,580	41,280	50,270
M_{RLM} , in-lb	78,070	23,460	37,255	37,255	42,035



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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	1.864	8.163
	30	0.036	0.508	2.226
	9	0.011	0.152	0.668
CO	50	0.037	0.52	2.290
CO ₂	2.55 lb/lb fuel	119.76	1,704	7,466
H ₂ O	2.03 lb/lb fuel	106.16	1,511	6,618
Stack Emissions-#2 Oil** (140,000 Btu/gal)				
NO _x	128	0.174	2.389	10.465
CO	50	0.037	0.504	2.208
CO ₂	3.20 lb/lb fuel	168.53	2,313	10,129
H ₂ O	1.12 lb/lb fuel	71.20	977	4,279

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