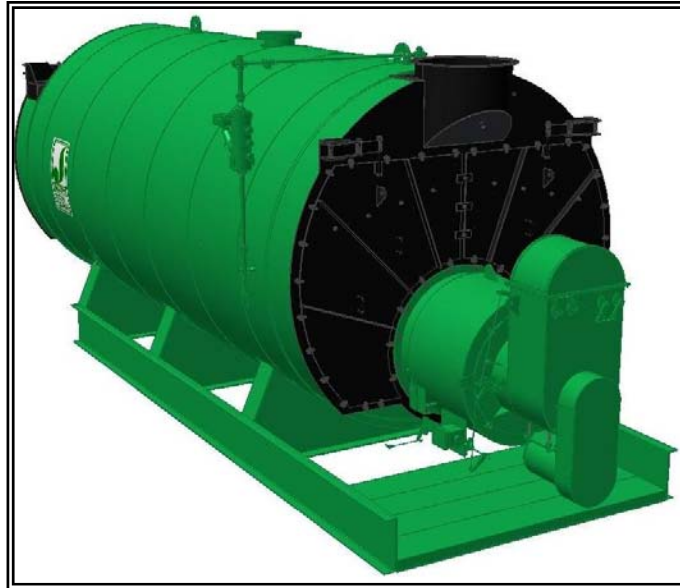




# MODEL: PFTA 1600-4

## 4-Pass Steam Packaged Firetube Boiler

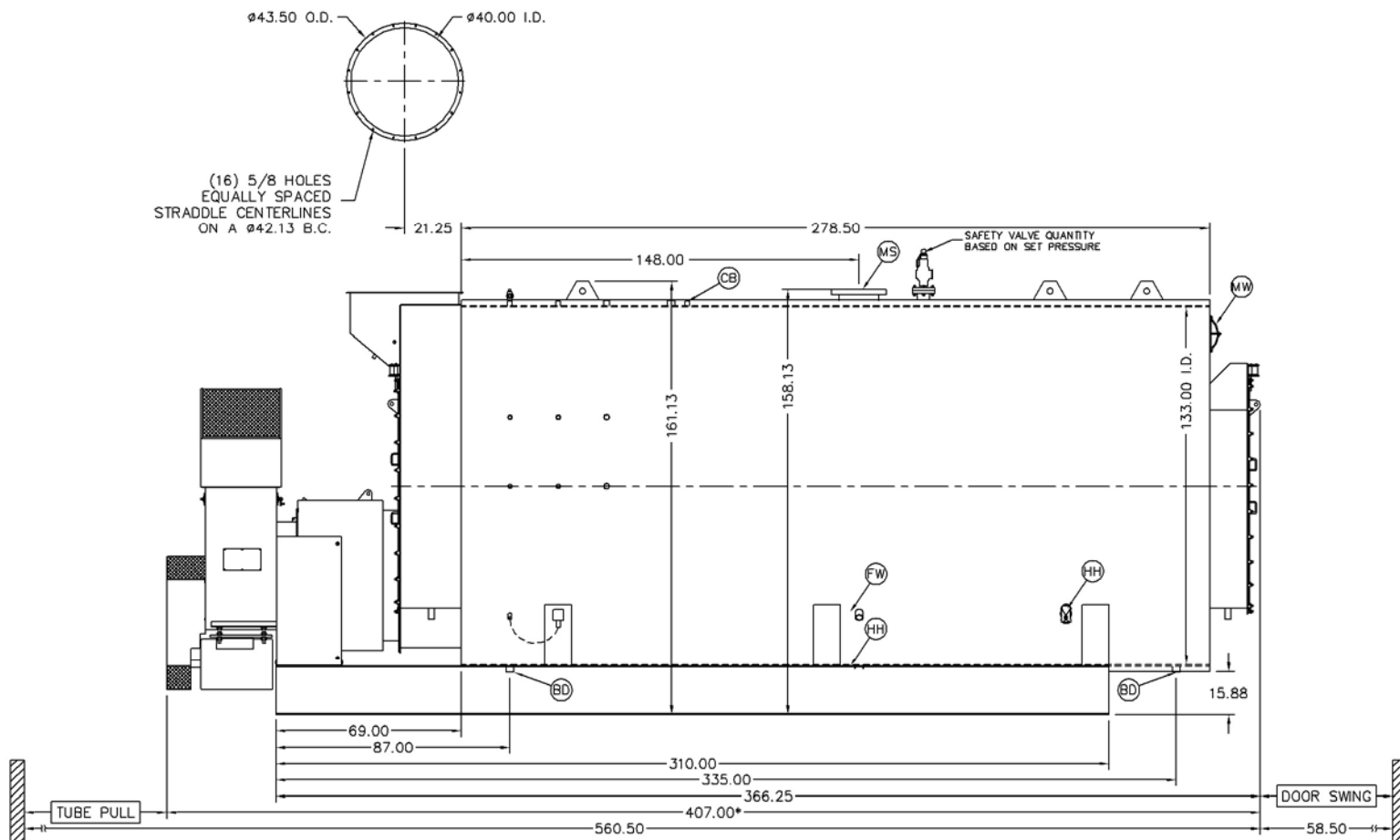
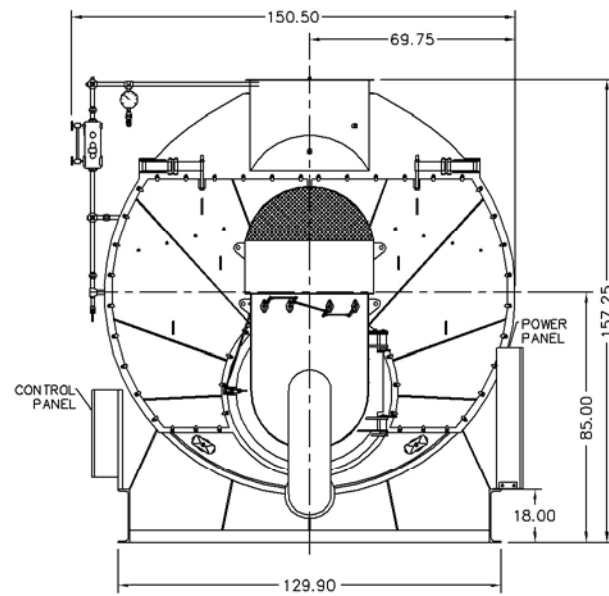


### Ratings & Performance Data

Horsepower 1600							
Steam Storage, ft <sup>3</sup>	281.6	Natural Gas Flow, SCFH (1,000 Btu/ft <sup>3</sup> )**	64,144				
Steam Disengaging Area, ft <sup>2</sup>	198.2	Combustion Air (15% Excess), SCFM***	11,737				
Total Heating Surface, ft <sup>2</sup>	8,088	Flue Gas Flow Rate, lb/hr***	55,937				
Furnace Outside Diameter, in	53.5	Stack Flue Gas Velocity, ft/min***	2,270				
Furnace Heat Release Rate, Btu/ft <sup>3</sup> hr**	216,000	#2 Oil Flow, gal/hr (140,000 BTU/gal)**	441.3				
Total Combustion Volume, ft <sup>3</sup>	410.1	#6 Oil Flow, gal/hr (150,000 BTU/gal)**	408.4				
Total Heat Release Rate, Btu/ft <sup>3</sup> hr**	156,000	Flue Gas Side Pressure Drop, in. H <sub>2</sub> O	11.3				
Water Content N.W.L., gal	8,100	Water Content Flooded, gal.	10,206				
Approx. Dry Weight 15#, lb	94,400	Approx. Operating Weight 15#, lb.	161,900				
Approx. Dry Weight 150#, lb	100,200	Approx. Operating Weight 150#, lb.	167,700				
Approx. Dry Weight 200#, lb	106,300	Approx. Operating Weight 200#, lb.	173,800				
Approx. Dry Weight 250#, lb	113,400	Approx. Operating Weight 250#, lb.	180,900				
Approx. Dry Weight 300#, lb	120,500	Approx. Operating Weight 300#, lb.	188,000				
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	55,565	262	85.9	268	89.1	275	89.8
50	54,488	320	84.5	326	87.7	334	88.4
100	53,905	360	83.5	366	86.7	374	87.4
150	53,580	388	82.8	394	86.0	402	86.7
200	53,378	410	82.3	416	85.5	425	86.2
250	53,248	429	81.8	435	85.0	443	85.7
300	53,165	445	81.4	451	84.6	459	85.3
*Based on 228°F feedwater and 3% O <sub>2</sub> , ** 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	2.00 FNPT	2
MS*	Main Steam	12.00 300# 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
*16.00 150#RF Flange on 15 psig Design			



### Notes:

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

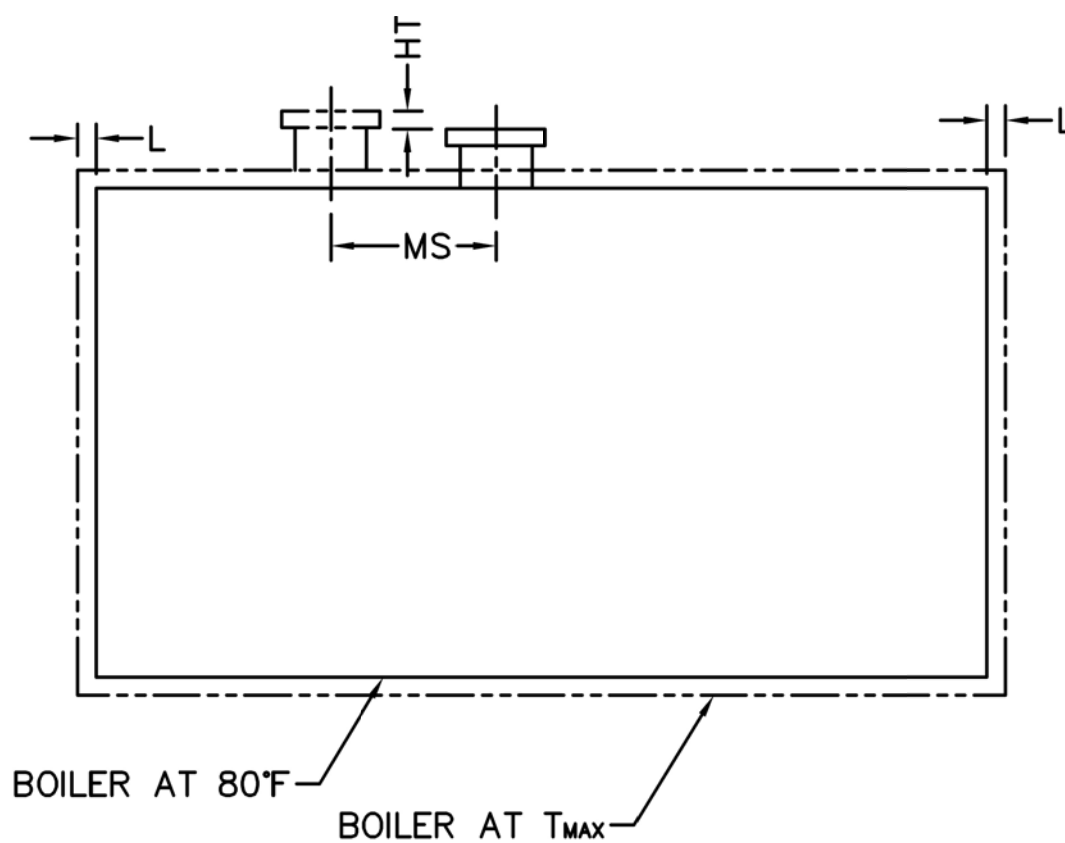
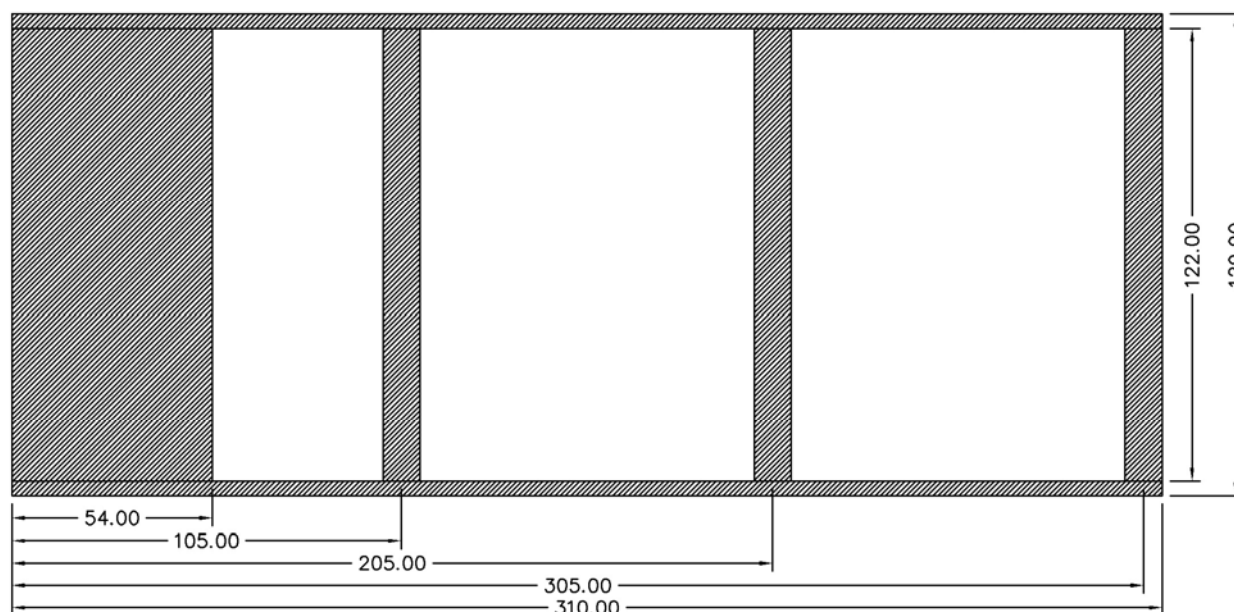
Fuel piping and/or optional boiler trim may increase overall width.

Specifications subject to change to incorporate engineering advances.

\*May vary on low-NO<sub>x</sub> designs

# MODEL: PFTA 1600-4

## Base Diagram

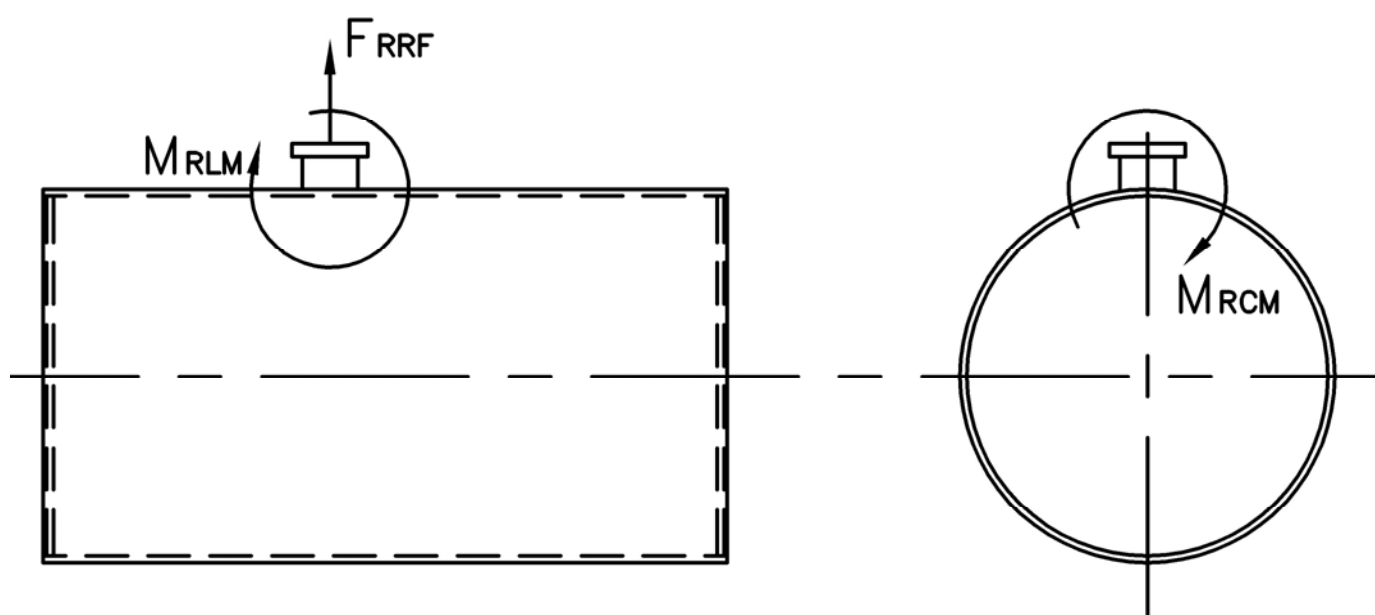


Thermal Expansion					
psig	15	150	200	250	300
Metal T <sub>MAX</sub> (F)	240	366	388	406	421
L (in)	0.137	0.230	0.248	0.263	0.275
MS (in)	0.010	0.017	0.018	0.019	0.020
HT (in)	0.136	0.229	0.247	0.262	0.275

# MODEL: PFTA 1600-4

## Nozzle Loadings

Maximum Allowable Load on Boiler Steam Nozzle					
	15# Design	150# Design	200# Design	250# Design	300# Design
$F_{RRF}$ , lb	7,130	5,185	6,630	9,895	18,450
$M_{RCM}$ , in-lb	71,285	91,165	102,360	192,230	314,810
$M_{RLM}$ , in-lb	103,725	70,780	94,550	158,170	238,145



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Stack Emissions-Natural Gas (1,000 Btu/CF)				
	PPMv (Corr to 3% O <sub>2</sub> )	lb/MBtu	lb/hr @ Full Rate	Ton/Yr @ Full Rate
NO <sub>x</sub> *	110	0.131	8.400	36.791
	30	0.036	2.291	10.034
	9	0.011	0.687	3.010
CO	50	0.037	2.36	10.321
CO <sub>2</sub>	2.55 lb/lb fuel	119.76	7,682	33,647
H <sub>2</sub> O	2.03 lb/lb fuel	106.16	6,809	29,826
Stack Emissions-#2 Oil** (140,000 Btu/gal)				
NO <sub>x</sub>	128	0.174	10.756	47.109
CO	50	0.037	2.270	9.940
CO <sub>2</sub>	3.20 lb/lb fuel	168.53	10,411	45,601
H <sub>2</sub> O	1.12 lb/lb fuel	71.20	4,398	19,265

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