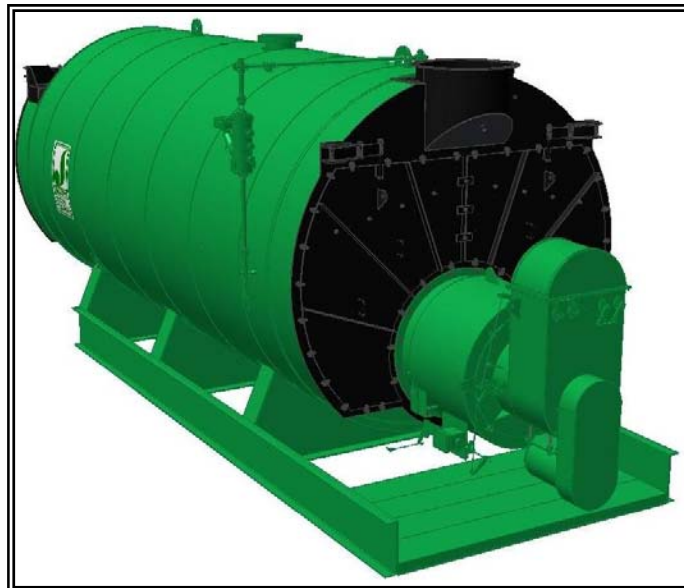




## MODEL: PFTA 200-4

### 4-Pass Steam Packaged Firetube Boiler



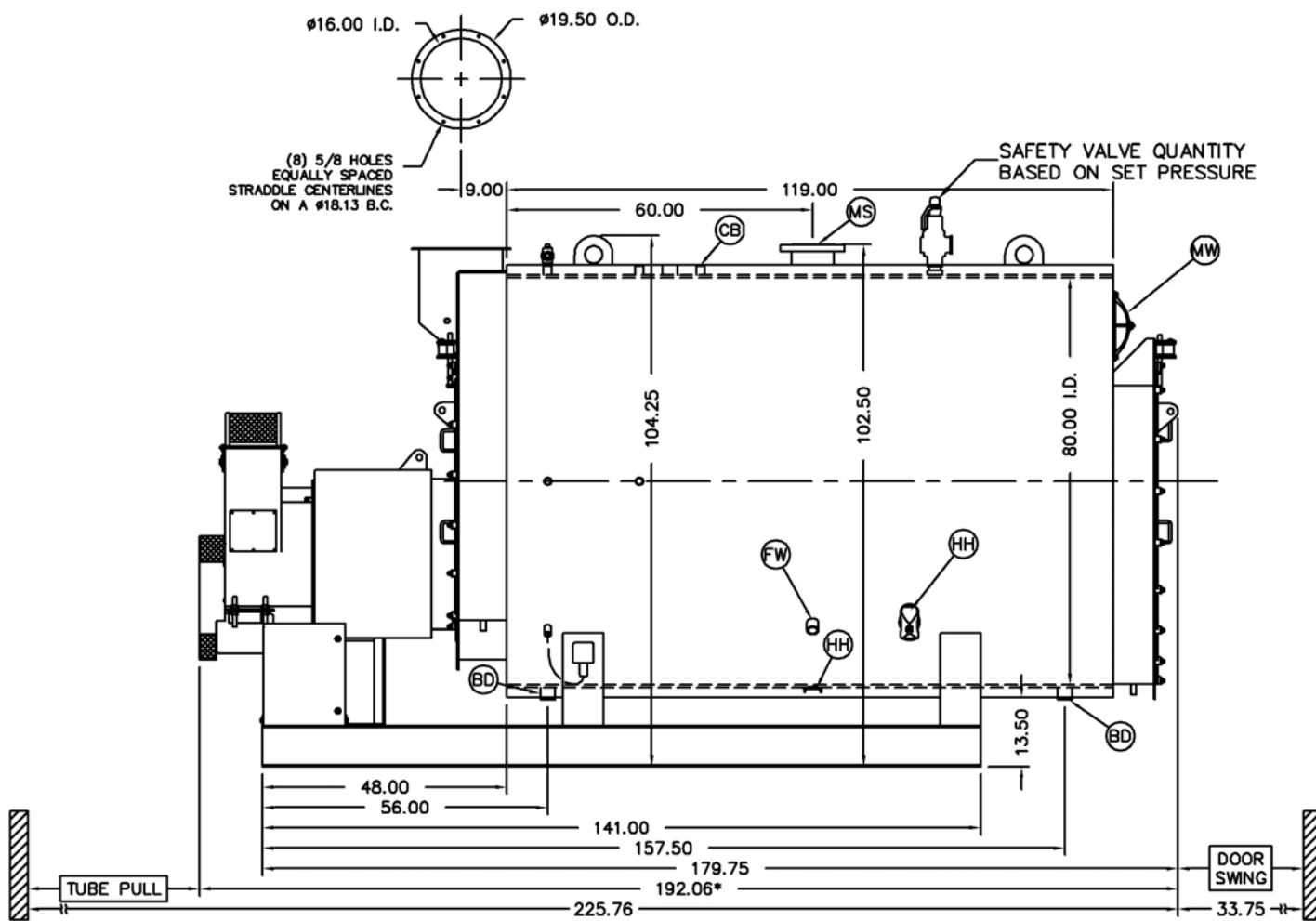
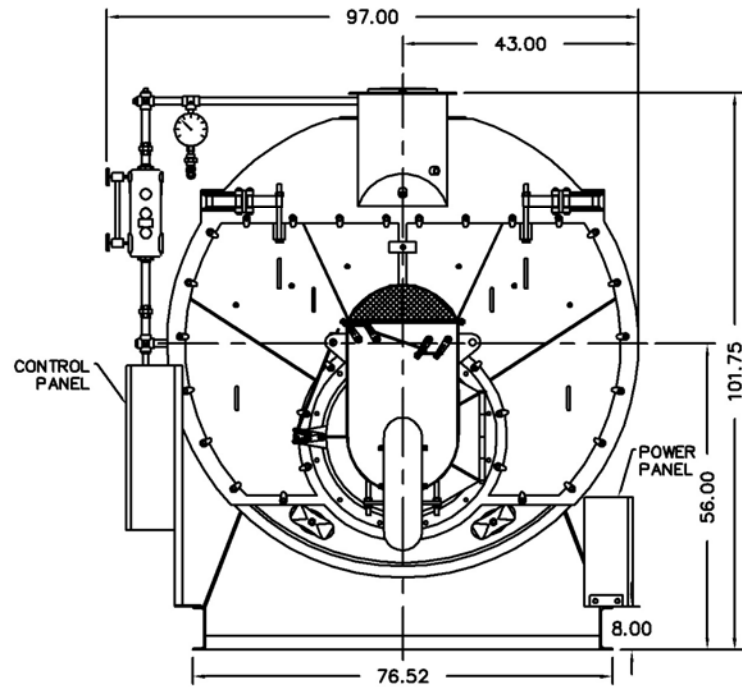
### Ratings & Performance Data

Horsepower 200							
Steam Storage, ft <sup>3</sup>	44.3	Natural Gas Flow, SCFH (1,000 Btu/ft <sup>3</sup> )**	8,172				
Steam Disengaging Area, ft <sup>2</sup>	50.8	Combustion Air (15% Excess), SCFM***	1,495				
Total Heating Surface, ft <sup>2</sup>	1,035	Flue Gas Flow Rate, lb/hr***	7,126				
Furnace Outside Diameter, in	36.0	Stack Flue Gas Velocity, ft/min***	1,918				
Furnace Heat Release Rate, Btu/ft <sup>3</sup> hr**	167,000	#2 Oil Flow, gal/hr (140,000 BTU/gal)**	56.3				
Total Combustion Volume, ft <sup>3</sup>	77.3	#6 Oil Flow, gal/hr (150,000 BTU/gal)**	52.1				
Total Heat Release Rate, Btu/ft <sup>3</sup> hr**	106,000	Flue Gas Side Pressure Drop, in. H <sub>2</sub> O	3.1				
Water Content N.W.L., gal	1,290	Water Content Flooded, gal.	1,622				
Approx. Dry Weight 15#, lb	16,900	Approx. Operating Weight 15#, lb.	28,000				
Approx. Dry Weight 150#, lb	17,800	Approx. Operating Weight 150#, lb.	28,900				
Approx. Dry Weight 200#, lb	18,400	Approx. Operating Weight 200#, lb.	29,500				
Approx. Dry Weight 250#, lb	19,500	Approx. Operating Weight 250#, lb.	30,600				
Approx. Dry Weight 300#, lb	21,100	Approx. Operating Weight 300#, lb.	32,200				
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	6,946	313	84.4	326	87.5	334	88.2
50	6,811	370	83.0	383	86.0	393	86.7
100	6,738	410	81.9	422	85.0	434	85.6
150	6,697	438	81.2	450	84.2	462	84.9
200	6,672	460	80.6	472	83.7	485	84.3
250	6,656	478	80.2	491	83.2	504	83.8
300	6,646	494	79.8	506	82.8	520	83.4
*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

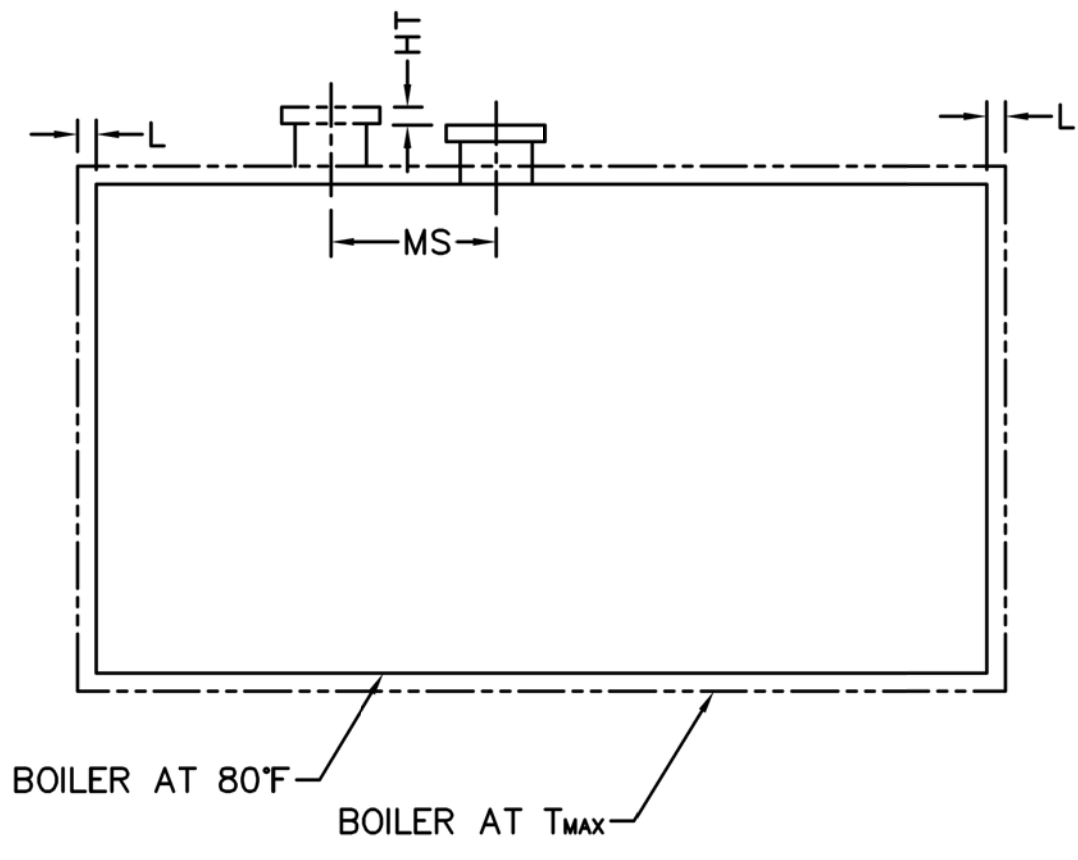
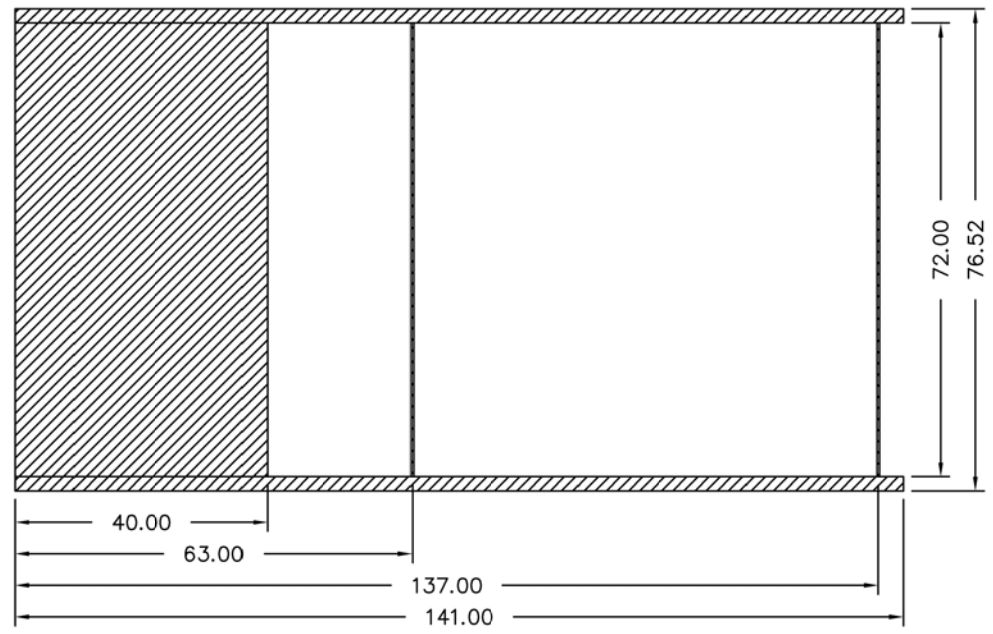
Connection & Opening Schedule			
Conn.	Description	Type	Qty
FW	Feedwater Inlet	1.50 FNPT	2
MS*	Main Steam	6.00 300# RF	1
CB	Continuous Blowoff	1.00 FNPT	1
BD	Blowdown Outlet	2.00 FNPT	2
MW	Manway	12 X 16	1
HH	Hand Hole	4 X 6	6

\*10.00 150#RF Flange on 15 psig Design



# MODEL: PFTA 200-4

## Base Diagram

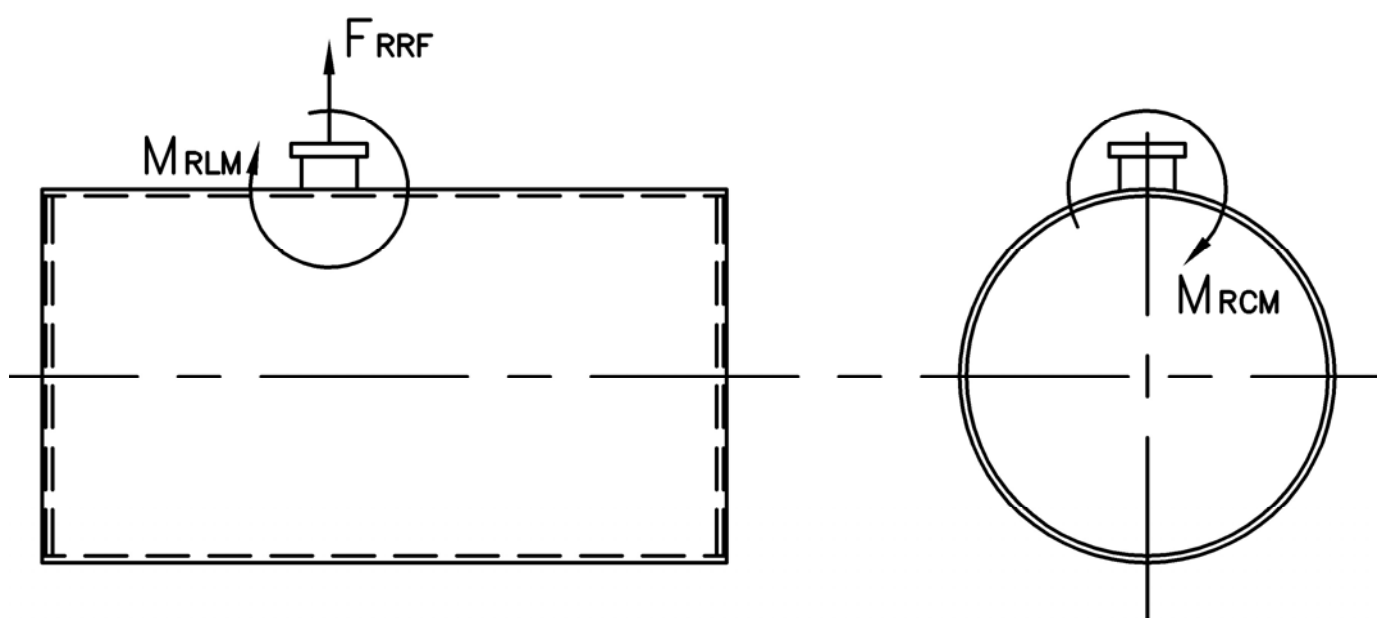


Thermal Expansion					
psig	15	150	200	250	300
Metal $T_{MAX}$ (F)	240	366	388	406	421
L (in)	0.061	0.102	0.110	0.116	0.122
MS (in)	0.001	0.001	0.001	0.001	0.001
HT (in)	0.082	0.138	0.149	0.158	0.166

# MODEL: PFTA 200-4

## Nozzle Loadings

Maximum Allowable Load on Boiler Steam Nozzle					
	15# Design	150# Design	200# Design	250# Design	300# Design
$F_{RRF}$ , lb	7,160	2,785	2,785	3,675	5,005
$M_{RCM}$ , in-lb	43,535	29,615	29,615	39,610	59,600
$M_{RLM}$ , in-lb	76,995	22,640	22,640	33,395	47,460



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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	1.070	4.687
	30	0.036	0.292	1.278
	9	0.011	0.088	0.383
CO	50	0.037	0.30	1.315
CO <sub>2</sub>	2.55 lb/lb fuel	119.76	979	4,286
H <sub>2</sub> O	2.03 lb/lb fuel	106.16	867	3,800
Stack Emissions-#2 Oil** (140,000 Btu/gal)				
NO <sub>x</sub>	128	0.174	1.372	6.009
CO	50	0.037	0.289	1.268
CO <sub>2</sub>	3.20 lb/lb fuel	168.53	1,328	5,817
H <sub>2</sub> O	1.12 lb/lb fuel	71.20	561	2,457

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