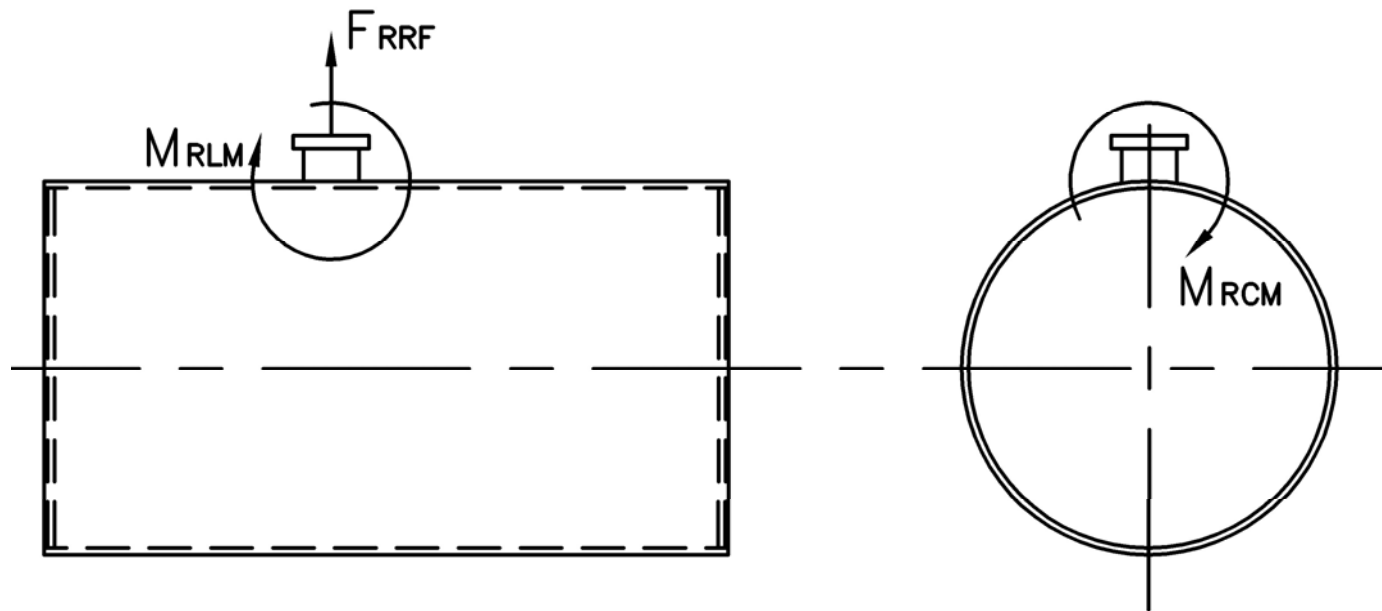


# MODEL: PFTA 400-4

## Nozzle Loadings

| Maximum Allowable Load on Boiler Steam Nozzle |            |             |             |             |             |
|---|------------|-------------|-------------|-------------|-------------|
|   | 15# Design | 150# Design | 200# Design | 250# Design | 300# Design |
| $F_{RRF}$ , lb                                | 8,980      | 2,775       | 4,335       | 5,495       | 4,920       |
| $M_{RCM}$ , in-lb                             | 60,810     | 28,745      | 46,625      | 61,140      | 56,770      |
| $M_{RLM}$ , in-lb                             | 117,350    | 24,765      | 36,950      | 46,030      | 47,465      |



Distributed By:

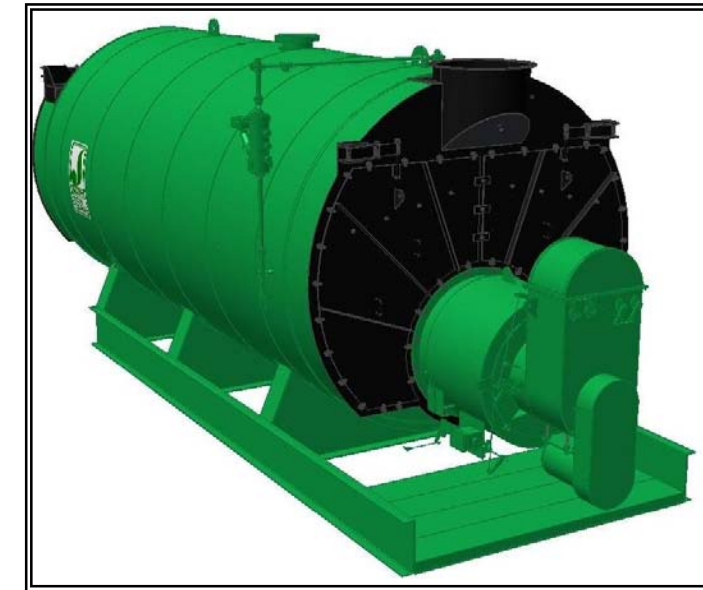
| Stack Emissions-Natural Gas (1,000 Btu/CF) |                                      |         |                      |                       |
|--|--------------------------------------|---------|----------------------|-----------------------|
|  | PPMv<br>(Corr to 3% O <sub>2</sub> ) | lb/MBtu | lb/hr @<br>Full Rate | Ton/Yr @<br>Full Rate |
| NO <sub>x</sub> *                          | 110                                  | 0.131   | 2.135                | 9.352                 |
|  | 30                                   | 0.036   | 0.582                | 2.551                 |
|  | 9                                    | 0.011   | 0.175                | 0.765                 |
| CO   | 50                                   | 0.037   | 0.60                 | 2.624                 |
| CO <sub>2</sub>                            | 2.55 lb/lb fuel                      | 119.76  | 1,953                | 8,553                 |
| H <sub>2</sub> O                           | 2.03 lb/lb fuel                      | 106.16  | 1,731                | 7,582                 |
| Stack Emissions-#2 Oil** (140,000 Btu/gal) |                                      |         |                      |                       |
| NO <sub>x</sub>                            | 128                                  | 0.174   | 2.738                | 11.992                |
| CO   | 50                                   | 0.037   | 0.578                | 2.530                 |
| CO <sub>2</sub>                            | 3.20 lb/lb fuel                      | 168.53  | 2,650                | 11,608                |
| H <sub>2</sub> O                           | 1.12 lb/lb fuel                      | 71.20   | 1,120                | 4,904                 |

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



# MODEL: PFTA 400-4

## 4-Pass Steam Packaged Firetube Boiler



## Ratings & Performance Data

| Horsepower 400                                      |                    |   |        |                |      |                |      |
|---|--------------------|---|--------|----------------|------|----------------|------|
| Steam Storage, ft <sup>3</sup>                      | 74.8               | Natural Gas Flow, SCFH (1,000 Btu/ft <sup>3</sup> )** | 16,305 |                |      |                |      |
| Steam Disengaging Area, ft <sup>2</sup>             | 82.2               | Combustion Air (15% Excess), SCFM***                  | 2,984  |                |      |                |      |
| Total Heating Surface, ft <sup>2</sup>              | 2,026              | Flue Gas Flow Rate, lb/hr***                          | 14,219 |                |      |                |      |
| Furnace Outside Diameter, in                        | 42.0               | Stack Flue Gas Velocity, ft/min***                    | 2,017  |                |      |                |      |
| Furnace Heat Release Rate, Btu/ft <sup>3</sup> hr** | 161,000            | #2 Oil Flow, gal/hr (140,000 BTU/gal)**               | 112.3  |                |      |                |      |
| Total Combustion Volume, ft <sup>3</sup>            | 148.0              | #6 Oil Flow, gal/hr (150,000 BTU/gal)**               | 104.2  |                |      |                |      |
| Total Heat Release Rate, Btu/ft <sup>3</sup> hr**   | 110,000            | Flue Gas Side Pressure Drop, in. H <sub>2</sub> O     | 3.9    |                |      |                |      |
| Water Content N.W.L., gal                           | 2,435              | Water Content Flooded, gal.                           | 2,995  |                |      |                |      |
| Approx. Dry Weight 15#, lb                          | 27,400             | Approx. Operating Weight 15#, lb.                     | 48,000 |                |      |                |      |
| Approx. Dry Weight 150#, lb                         | 31,400             | Approx. Operating Weight 150#, lb.                    | 52,000 |                |      |                |      |
| Approx. Dry Weight 200#, lb                         | 35,100             | Approx. Operating Weight 200#, lb.                    | 55,700 |                |      |                |      |
| Approx. Dry Weight 250#, lb                         | 39,600             | Approx. Operating Weight 250#, lb.                    | 60,200 |                |      |                |      |
| Approx. Dry Weight 300#, lb                         | 44,200             | Approx. Operating Weight 300#, lb.                    | 64,800 |                |      |                |      |
| 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  | 13,891             | 308   | 84.6   | 320            | 87.7 | 335            | 88.2 |
| 50  | 13,622             | 366   | 83.2   | 379            | 86.2 | 394            | 86.7 |
| 100   | 13,476             | 407   | 82.1   | 419            | 85.2 | 436            | 85.7 |
| 150   | 13,395             | 435   | 81.4   | 448            | 84.4 | 466            | 84.9 |
| 200   | 13,344             | 458   | 80.8   | 470            | 83.8 | 489            | 84.3 |
| 250   | 13,312             | 476   | 80.4   | 489            | 83.4 | 508            | 83.8 |
| 300   | 13,291             | 492   | 79.9   | 505            | 82.9 | 525            | 83.4 |

\*Based on 228°F feedwater and 3% O<sub>2</sub>, \*\* Values calculated at 100 psi operating pressure, \*\*\*Calculated Firing Natural Gas



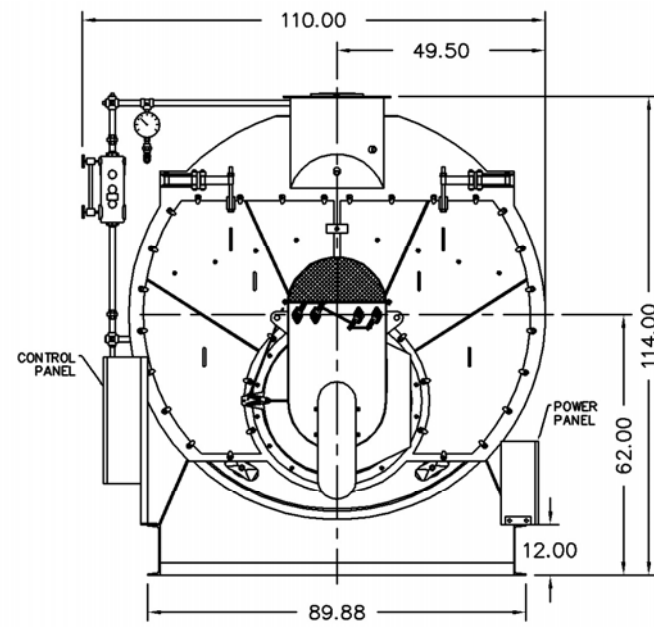
300 Pine Street  
 P.O. Box 300  
 Ferrysburg, MI 49409-0300  
 Telephone: (616) 842-5050  
 Net: www.johnstonboiler.com

# Drawings - 4-Pass Steam Packaged Firetube Boiler

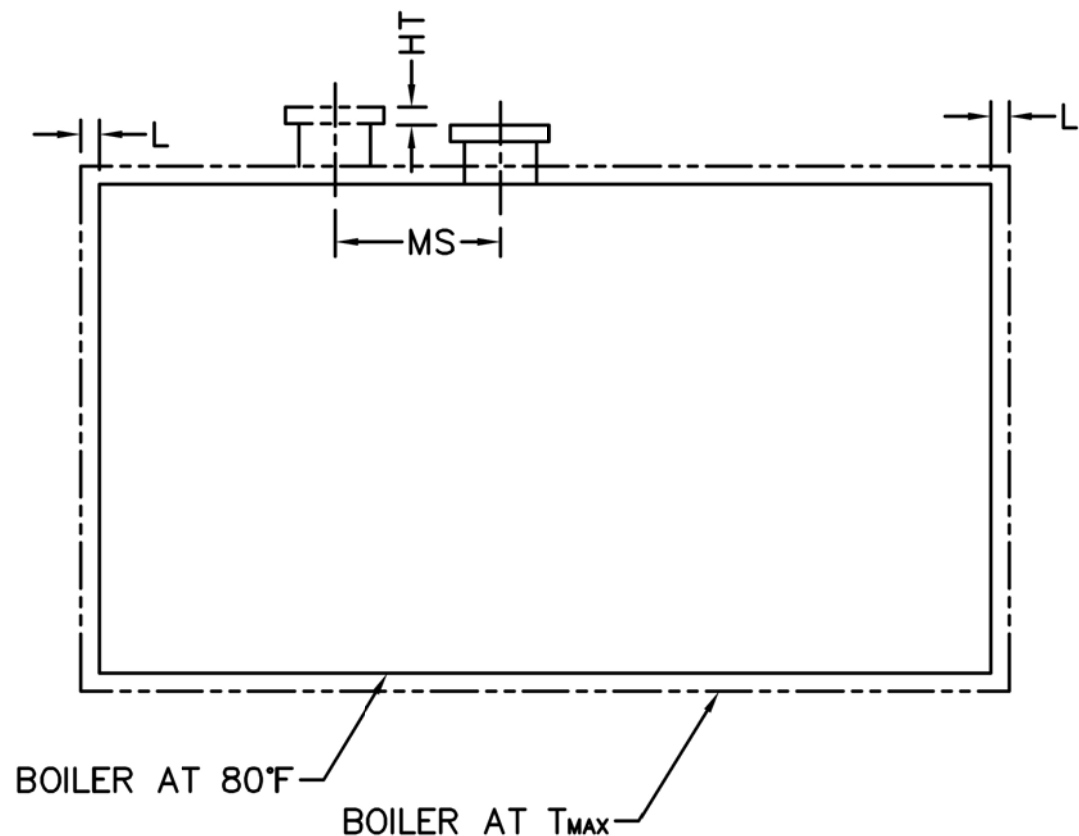
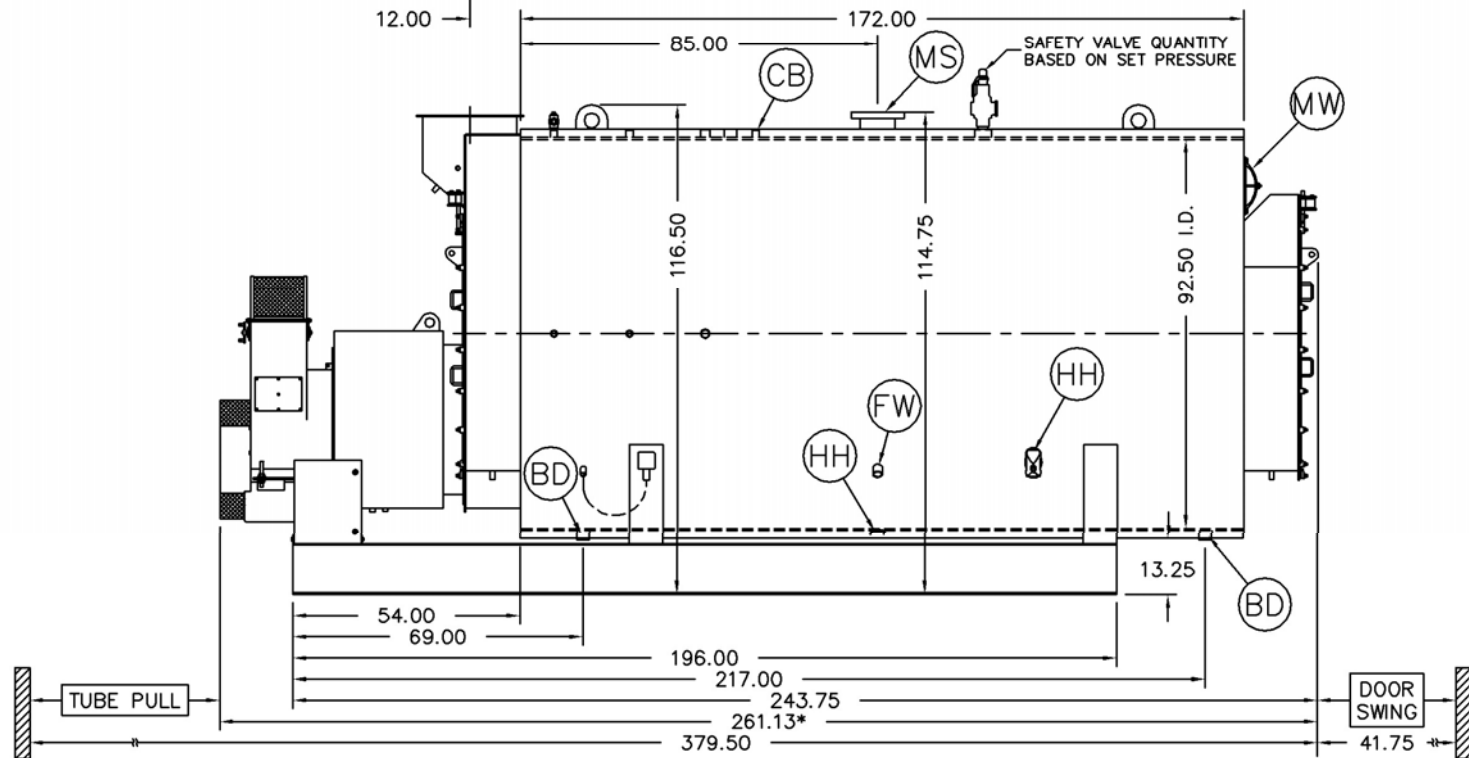
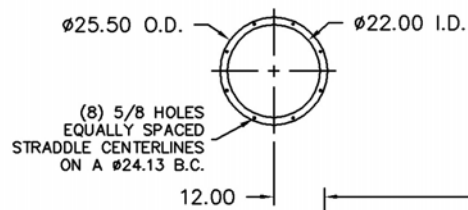
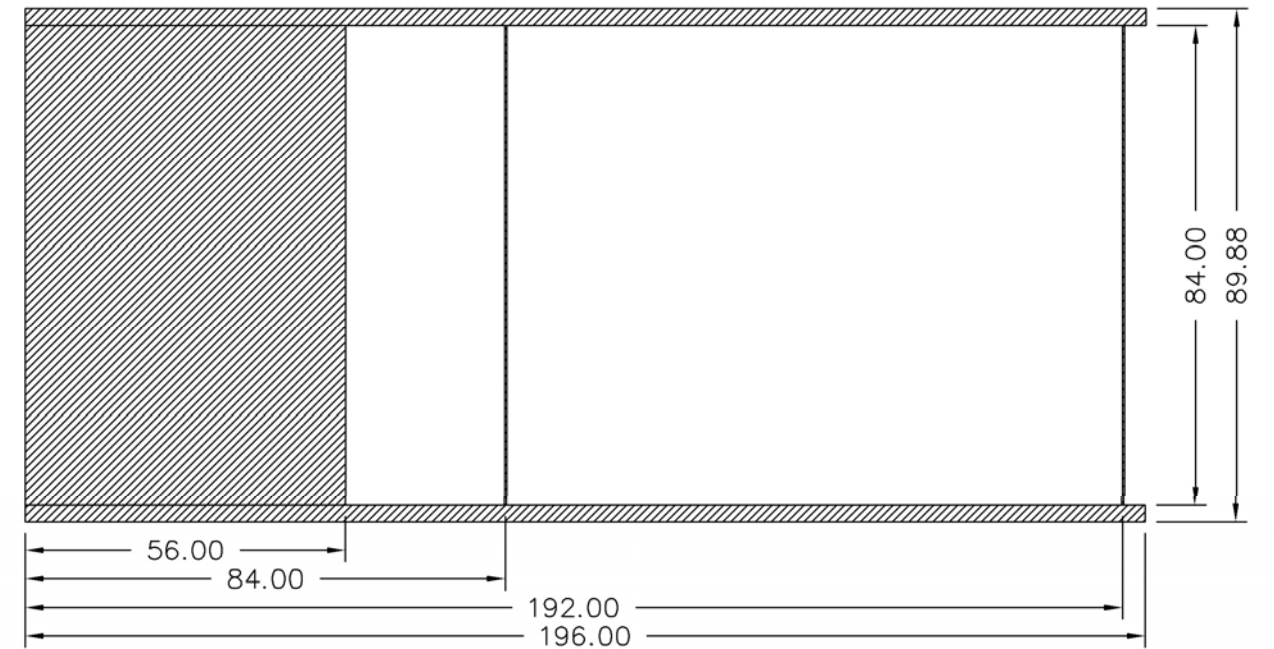
**MODEL: PFTA 400-4**

| Connection & Opening Schedule |                    |              |     |
|-------------------------------|--------------------|--------------|-----|
| Conn.                         | Description        | Type         | Qty |
| FW                            | Feedwater Inlet    | 2.00 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



**Base Diagram**



**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

| Thermal Expansion          |       |       |       |       |       |
|----------------------------|-------|-------|-------|-------|-------|
| psig                       | 15    | 150   | 200   | 250   | 300   |
| Metal T <sub>MAX</sub> (F) | 240   | 366   | 388   | 406   | 421   |
| L (in)                     | 0.088 | 0.147 | 0.159 | 0.168 | 0.176 |
| MS (in)                    | 0.001 | 0.002 | 0.002 | 0.002 | 0.002 |
| HT (in)                    | 0.095 | 0.160 | 0.172 | 0.182 | 0.191 |