**Manufacturer of Boilers, Thermal Oil Heaters, Heat Exchangers**
**Pressure Vessels, Storage Tanks & Industrial Water Treatment Equipment ,...**

PACKMAN

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# Firebox Boiler

## PHW-FB

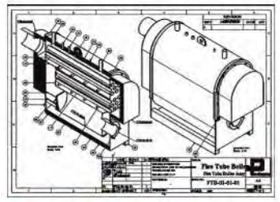
**Hot water three pass boiler**

www.packmangroup.com

Today's process and heating applications continue to be powered by steam and hot water. The mainstay technology for generating heating or process energy is the packaged firetube boiler. The packaged firetube boiler has proven to be highly efficient and cost effective in generating energy for process and heating applications.
Efficient F.P.B three-pass design, available in 150 Kw to 1200 Kw models. Our Firebox boilers are fitted with a forced draft flame retention burner that results in an efficiency of over 85%. This boiler-burner combination gives reliable operation with minimum maintenance.

## Standard features

All unit and factory packaged with operating controls, relief valves, burner and fuel train. Installation is made simple in that only service connections are need to place in operation. Flexible burner systems are available for firing natural gas & oil or combination. High density 2" mineral wool insulation assures lower radiant heat loss.



## Efficiency

Conventional atmospheric burners operate at high excess air levels, up to 300%, which decrease flame temperature. Variation of adiabataic flame temperature by excess air is illustrated in fig. 1. It is obvious that excess air has substantial effect on flame temperature and consequently on the rate of heat transfer and efficiency. Influence of excess air on thermal efficiency at different stack temperature is illustrated in fig. 2. Forced draft burners which are used in our boilers operate at lower excess air, about 10-30 percent.

By accounting appropriate heat transfer area, stack temperature decreased to 130-150 oC which jail energy inside boiler. These cases provide acceptable efficiency of 84-85% which lessen operation costs.
The initial cost of a boiler is the lowest portion of your boiler investment. Fuel costs and maintenance costs represent the largest portion of your boiler equipment investment. Some basic design differences can reveal variations in expected efficiency performance levels. Evaluating these design differences can provide insight into what efficiency value and resulting operating costs you can expect.

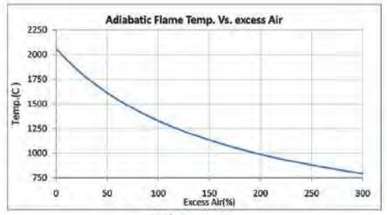



Figure 1

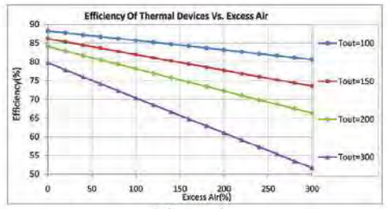
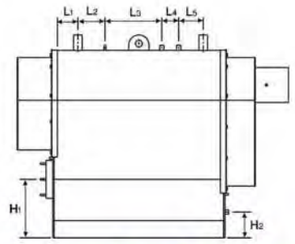
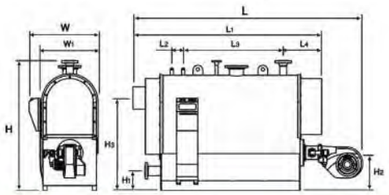



Figure 2




## Type 1

| Boiler model | | PHW FB150 | PHW FB200 | PHW FB250 | PHW FB300 | PHW FB400 |
|---|---|---|---|---|---|---|
| Input | KW | 150 | 200 | 250 | 300 | 400 |
| | Kcal/h | 129000 | 172000 | 215000 | 258000 | 344000 |
| Fuel consumption | M3/h | 15 | 20 | 25 | 30 | 40 |
| Supply & return nozzle size | in | 2 | 2 | 2 | 3 | 3 |
| Safety relief size | in | 1/2 | 1/2 | 1/2 | 1 | 1 |
| Drain size | in | 1 | 1 | 1 | 2 | 2 |
| Total length | mm | 1610 | 1770 | 1930 | 1960 | 2180 |
| Tota height | mm | 1180 | 1180 | 1180 | 1440 | 1440 |
| Total width | mm | 580 | 580 | 580 | 660 | 660 |
| Dimension L1 | mm | 140 | 160 | 180 | 180 | 200 |
| Dimension L2 | mm | 160 | 210 | 220 | 355 | 390 |
| Dimension L3 | mm | 335 | 375 | 420 | 120 | 180 |
| Dimension L4 | mm | 100 | 105 | 130 | 120 | 140 |
| Dimension L5 | mm | 145 | 160 | 190 | 345 | 390 |
| Dimension H1 | mm | 340 | 340 | 340 | 410 | 410 |
| Dimension H2 | mm | 150 | 150 | 150 | 160 | 160 |
| Operating weight | kg | 760 | 850 | 940 | 1370 | 1540 |
| Transport weight | kg | 500 | 550 | 600 | 900 | 1000 |
| Pressure vessel volume | M3 | 0.26 | 0.3 | 0.34 | 0.47 | 0.54 |




## Type 2

| Boiler model | | PHW FB250 | PHW FB325 | PHW FB400 | PHW FB500 | PHW FB600 | PHW FB700 | PHW FB800 | PHW FB1000 | PHW FB1200 |
|---|---|---|---|---|---|---|---|---|---|---|
| Input | KW | 250 | 325 | 400 | 500 | 600 | 700 | 800 | 1000 | 1200 |
| | Kcal/h | 215000 | 279500 | 344000 | 430000 | 516000 | 602000 | 688000 | 860000 | 1032000 |
| Fuel consumption | M3/h | 25 | 32.5 | 40 | 50 | 60 | 70 | 80 | 100 | 120 |
| Supply & return nozzle size | in | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 |
| Safety relief size | in | 1 | 1 | 1 | 1-1/2 | 1-1/2 | 1-1/2 | 1-1/2 | 1 1/2 | 1 1/2 |
| Drain size | in | 1 | 1 | 1 | 1-1/4 | 1-1/4 | 1-1/4 | 1-1/4 | 1 1/2 | 1 1/2 |
| Hand hole size | in | 6 | 6 | 6 | 8 | 8 | 8 | 8 | 10 | 10 |
| Total length | mm | 2400 | 2600 | 2800 | 2900 | 3100 | 3300 | 3500 | 3860 | 4080 |
| Tota height | mm | 1550 | 1550 | 1550 | 1900 | 1900 | 1900 | 1900 | 2100 | 2100 |
| Total width | mm | 830 | 830 | 830 | 1090 | 1090 | 1090 | 1090 | 1190 | 1190 |
| Dimension L1 | mm | 1900 | 2100 | 2300 | 2400 | 2600 | 2800 | 3000 | 3310 | 3524 |
| Dimension L2 | mm | 110 | 120 | 140 | 140 | 140 | 160 | 160 | 230 | 250 |
| Dimension L3 | mm | 1000 | 1100 | 1200 | 1230 | 1420 | 1500 | 1610 | 840 | 950 |
| Dimension L4 | mm | 440 | 440 | 470 | 485 | 495 | 540 | 595 | 1040 | 1080 |
| Dimension H1 | mm | 200 | 200 | 200 | 250 | 250 | 250 | 250 | 250 | 250 |
| Dimension H2 | mm | 420 | 420 | 420 | 535 | 535 | 535 | 535 | 560 | 560 |
| Dimension H3 | mm | 1180 | 1180 | 1180 | 1430 | 1430 | 1430 | 1430 | 1500 | 1500 |
| Dimension W1 | mm | 760 | 760 | 760 | 920 | 920 | 920 | 920 | 1000 | 1000 |
| Operating weight | kg | 1960 | 2120 | 2340 | 3470 | 3740 | 4030 | 4340 | 4830 | 5040 |
| Transport weight | kg | 1220 | 1310 | 1400 | 2300 | 2460 | 2620 | 2790 | 3000 | 3300 |
| Pressure vessel volume | M3 | 0.74 | 0.81 | 0.94 | 1.17 | 1.29 | 1.42 | 1.56 | 1.83 | 2.06 |

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