PRECISION BOILERS

FPH VERTICAL FIRETUBE WATER BOILER

DESIGN ADVANTAGES

The PRECISION Model FPH Vertical Firetube Hot Water Boiler features the traditional firetube design in the vertical configuration with an underfired power burner. In addition to the simplicity of the 4-piece design, the Model FPH includes many advantages over other vertical configured boilers such as a larger water volume which results in both a low pressure drop thru the unit and reduced cycling, thus improving overall efficiency. The model FPH also features standard "off-the-shelf" burners and the proven firetube reliability.

STANDARD FEATURES AND ACCESSORIES

- ISO Certified Quality System
- UL Listing of Complete Assembly
- ASME Pressure Vessel w/National Board Registration
  - Section IV "H" Code (150 psi / 250°F)
  - Section I "S" Code (units>160 psi / 250°F
- Standard SA178-A Steel Firetubes
- Turbulators for maximum heat transfer
- 16 Gauge Steel Jacket (square jacket standard)
- High Density Insulation
- High efficiency UL Listed Power Flame power gas, light oil or combination burners
- CSD-1 Compliance (units > 400,000 BTU)
- Heat transfer area sized at approximately 4 sq ft per BHP to obtain up to 84% efficiency
- Main & Auxiliary Solenoid Gas / Oil Valves
- Honeywell Combustion Controls
- Main Gas Regulator and Cock and / or Oil Pump
- Air Proving Switch (gas only))
- Flame Inspection Port
- Tank Inspection / Cleanout Openings (2)
- Standard mechanical trim to include:
  - Temperature Control (Off-On)
  - Temperature Limit (Manual Reset)
  - ASME Safety Relief Valve
  - Pressure Gauge with Gauge Cock
  - Temperature Gauge
  - Bottom Blowdown/Drain Valve
  - Manual Reset Probe-type Low Water Cutoff w/ Light

OPTIONAL EQUIPMENT AND ACCESSORIES

- Wide Choice of Burners
- Motorized Gas Valve(s)
- Low-High-Low or Modulating Control
- FM or IRI Compliance
- Fireye Combustion Control
- Outside Air Intake Adapter
- Side or Rear Flue Connection
- Low Temperature Switch/Alarm
- Low Pressure Switch/Alarm
- Auxiliary Float-type Low Water Cutoff
- Flow Switch (Installed)
- Stainless Steel Construction (210°F max)
- Outdoor Reset Control
- Remote Reset of Setpoint
- Audible Alarm w/Silence PB (High Temp & Low Water)
- Low NOx Burner with or without FGR
- Local/Remote Switch

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DIMENSIONAL DATA

LEFT FRONT TOP

NOTE: MINIMUM OF 18" CLEARANCE AROUND BOILER.

PHYSICAL DATA

MODEL NUMBER	NOM BOILER HP	RATED INPUT MBTU	NOM OUTPUT MBTU	VESSEL DIMS (IN.)		WATER VOL (GAL)	OVERALL DIMENSIONS (IN.)			CONNECTION SIZES (NPT)			FLUE SIZE	BURNER BLOWER HP (GAS)
				DIA	HEIGHT		W	L	H	SUPPLY/ RETURN	DRAIN	GAS SUPPLY		
FPH-24-09	9.5	400	330	24	45	72	28	50	82	3"	1"	3/4"	6"	1/4
FPH-24-10	10	420	340	24	48	77	28	50	85	3"	1"	3/4"	6"	1/4
FPH-31-15	15	630	520	31	45	119	35	57	82	3"	1"	1"	6"	1/4
FPH-31-20	20	840	690	31	48	122	35	57	85	3"	1"	1"	8"	1/3
FPH-39-25	25	1050	860	39	45	185	43	65	82	3"	1"	1-1/4"	8"	1/3
FPH-39-30	30	1260	1030	39	48	192	43	65	85	3"	1"	1-1/4"	10"	1/3
FPH-39-35	35	1470	1210	39	54	217	43	65	91	3"	1"	1-1/2"	10"	1/3
FPH-46-40	40	1674	1370	46	48	283	50	76	85	3"	1-1/4"	1-1/2"	12"	1/3
FPH-46-45	45	1870	1530	46	54	320	50	76	91	3"	1-1/4"	1-1/2"	12"	1/3
FPH-58-50	50	2110	1730	58	48	383	62	88	85	4" F*	1-1/2"	1-1/2"	12"	1/3
FPH-58-60	60	2500	2050	58	54	421	62	98	91	4" F	1-1/2"	2"	14"	1
FPH-58-72	72	3000	2460	58	60	454	62	98	97	4" F	1-1/2"	2"	14"	1
FPH-58-84	84	3500	2870	58	70	532	62	98	107	4" F	1-1/2"	2"	16"	1-1/2 †
FPH-62-84	84	3500	2870	62	60	512	66	106	97	4" F	1-1/2"	2"	16"	1-1/2 †
FPH-62-100	100	4200	3440	62	60	464	66	106	97	4" F	1-1/2"	2-1/2"	16"	1-1/2 †
FPH-69-120	120	5000	4100	69	66	706	73	113	103	4" F	1-1/2"	2-1/2"	18"	3 †

* Indicates Flanged Connection (150# w/3" stick-out)

† 3-Phase

HOW TO SELECT A MODEL NUMBER

FPH - 62 - 100 - 150 - P - N

- **FPH** — Vertical Firetube Water Boiler
- **62** — Vessel Diameter
- **100** — Horse Power
- **150** — Pressure
- **P** — Burner
  - B=Beckett
  - P=Power Flame
  - W=Wayne
  - X=Other
- **N** — Fuel
  - N=Natural Gas
  - P=Propane
  - L=Light Oil
  - C=Combonation

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CONVERSIONS/EQUATIONS

$$KW = \frac{GPH \times \Delta T\ (^\circ F)}{410} = \frac{LPH \times \Delta T\ (^\circ C)}{862}$$

$$KW = GPM \times \Delta T\ (^\circ F) \times .146$$

10KW = 1.02 BHP = 34 Lbs Steam/H = 34,120 BTU/H

$$GPH = \frac{KW \times 410}{\Delta T\ (^\circ F)} \qquad \text{Amps (3 phase)} = \frac{KW \times 1000}{\text{Volts} \times 1.732}$$

$$GPH = \frac{BTU/H}{8.33 \times \Delta T\ (^\circ F)} \qquad \text{Amps (1 phase)} = \frac{KW \times 1000}{\text{Volts}}$$

BTU/H = KW x 3412 BTU/H = ΔT x 500 x GPM

1 gal water at 62˚F = 8.34 Lbs 1 cu ft = 7.48 gallons

1 cu ft water at 62˚F = 62.4 Lbs 1 ft water = 0.435 psi

Enthalpy of water = Temp (˚F) -32 BTU/LB

SATURATED STEAM: PRESSURE vs. TEMPERATURE

0 psig = 0 KPa = 212˚F	150 psig = 1034 KPa = 366˚F
8 psig =55 KPa = 235˚F	175 psig = 1207 KPa = 377˚F
15 psig =103 KPa = 250˚F	200 psig = 1379 KPa = 388˚F
30 psig =207 KPa = 274˚F	225 psig = 1551 KPa = 397˚F
50 psig =345 KPa = 298˚F	250 psig = 1724 KPa = 406˚F
80 psig =552 KPa = 324˚F	300 psig = 2068 KPa = 422˚F
100 psig =690 KPa = 338˚F	350 psig = 2413 KPa = 436˚F
125 psig =862 KPa = 353˚F	400 psig = 2758 KPa = 448˚F

BURNER OPTIONS

As with all power-fired boilers, the burner is the heart of the unit. PRECISION has chosen as its standard the Power Flame burner for the majority of applications, and either Wayne or Beckett burners as economical choices for low Hp boilers, with other burners available as options. The Power Flame burner is one of the industry's leading burners and is well suited for this application. The FPH boiler's large combustion chamber and generous heat release area have been carefully matched to the burner size to obtain up to 84% efficiency on natural gas, and up to 86% on light oil. The proven Honeywell combustion control system is provided as standard for gas/oil burners, with other systems available as options.

CONTROL OPTIONS

Off-On control is standard and is quite sufficient for boilers up to 45 Hp. However, boilers rated 50 to 100 Hp may have better operation with either low-high-low burner controls, or a modulating control system.

CONTACT US FOR THESE QUALITY PRODUCTS

- Electric Storage Heaters 125 to 5500 Gallons
- Electrode High Voltage Boilers
- Thermal Storage Systems Space Heating & Domestic or Process Water; Electric, Gas or Steam Fired
- Boiler Feedwater Systems
- Pressure Vessels Water Storage Tanks Flash Tanks Blowdown Tanks
- Unfired Hot Water and Steam Generators
- Deaerators and Surge Tanks
- Steam Superheaters-Electric
- Circulation Heaters-Electric
- Gas or Oil-Fired Vertical Firetube Boilers and Water Heaters
- Gas or Oil-Fired WaterTube Boilers (Flextube Type)
- Chemical Bypass Feeders and Automatic Chemical Feed Systems

NOTE: In pursuing our policy of continuous development of products, PRECISION reserves the right to vary any detail in this bulletin without notice.

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SPECIFICATIONS

Note: Items shown in parentheses () are options

1. GENERAL

Furnish and install as shown on the plans a PRECISION Vertical Firetube Water Boiler Model FPH_____which shall be a complete pretested, packaged unit consisting of a (gas) (oil) power burner with integral vessel, complete with all required operating and safety controls. The Boiler shall include a pressure vessel built to the requirements of ASME Section IV, designed for (125) (150) PSIG, and National Board registered. Units greater than 400,000 BTU shall also comply with CSD-1. A copy of the Manufacturer's Data Report shall be provided to the owner.

2. RATINGS

Boiler(s) shall each be PRECISION Vertical Firetube Model No. FPH rated_____BHp. The Boiler(s) shall be designed for_____ GPM with a discharge temperature of_____° F. Inlet and Outlet connection sizes shall be _____" (NPT) (FLG).

3. POWER BURNER (SELECT ONE)

A. Gas-Fired Burner rated_____ BHp with an input of_____ BTU/H (natural gas) (propane).

B. Oil-Fired Burner rated _____ BHp with an input of _____ GPH / _____ BTU/H (#1) (#2) fuel oil.

C. Gas-Oil Combination Burner rated_____BHP with an input of _____BTU/H (natural gas) (propane) and GPH (#1) (#2) fuel oil.

Burner shall be designed for _____V, _____PH, _____ HZ, electrical supply.

Represented in your area by:

4. CONTROLS AND SAFETY DEVICES

Each Boiler shall be equipped with an ASME pressure relief valve(s), separate pressure and temperature gauges, temperature control, upper temperature limit (auto reset), upper temperature limit (manual reset), low water cutoff (manual reset w/test button and pilot light), and drain valve.

5. BURNER CONTROLS

A. Natural or Propane Gas

120V control power with 24V combustion control, redundant gas valves, flame rod sensor with 4 sec safety shutdown, 30 sec prepurge, combustion air proving switch, direct spark ignition with 7300V ignition, 3200 RPM blower motor. Burner to have primary air adjustment (with) (without) optional outside air intake adapter.

B. Oil

120V control power with 3500 RPM fuel pump, cadmium sulfide cell and relay control, 10,000V constant duty ignition, solenoid oil valve(s). Burner to have primary air adjustment (with) (without) optional outside air intake adapter.

6. ENCLOSURE

The pressure vessel shall be insulated with a minimum of 4 inches of 3/4 pound density fiberglass insulation and shall be enclosed in an enameled 16 gauge sheet steel enclosure.

7. MANUFACTURER

Boiler(s) shall be PRECISION Model FPH-_____ or approved equivalent. Alternate bids shall indicate any deviations from these specifications, and shall state price deductions for substitution of said alternates.

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PRECISION BOILERS

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