# HYDRONIC CAST IRON HEAT OIL, GAS OR COMBINATION



## PF-5 SERIES & ®

Heating Capacities: 620 to 3430 MBH



# PF-5 SERIES HOT WATER OR STEAM BOILER

Maximum Water Working Pressure: 70 PSI-Water; 15 PSI-Steam

# The finest in large cast iron boiler design.

Utilizing a completely sealed, forced draft wet base design, the Burnham® PF-5 Series requires no separate base or combustion chamber. The sealed, forced draft design provides optimum draft for controlled combustion, eliminating the need for high chimneys or mechanical equipment to artificially induce proper draft.

The sectional construction of the PF-5 Series makes it ideal for use in installations where the boiler room is not easily accessible due to structural limitations. In addition to being shipped as individual sections the boiler is available with factory-assembled sections or as a completely packaged unit. The packaged unit is fastened to a steel skid to facilitate lifting with a fork truck or crane. The skid can serve as the boiler foundation, replacing the need for a concrete pad. A factory fire-test is available on all packaged units.

Available in eighteen sizes starting at Gross Outputs of 620 MBH, the PF-5 Series fires gas, oil or gas/oil combination and can be equipped with either steam or water trim and controls.

The product is energy efficient with a combustion efficiency of up to 82%. All sizes exceed the efficiency requirements of ASHRAE 90.1.

#### Quality breeds Security

Each PF-5 boiler section is hydrostatically tested at two and one half times rated working pressure to make sure that the section is flawless. Factory-assembled sections are tested at one and one half times the rated working pressure. The sections are surface ground to insure smooth surface mating, and sealed gas-tight with an elastic sealing compound. This sealant is used on all section joints to guarantee a completely sealed and gastight assembly required for forced draft operation. The sealant is easily applied and takes less time than applying conventional gasket materials and lasts many times longer.

Each section is then joined with quality cast iron nipples which will

increase the longevity of the boiler by resisting petroleum based chemicals, including antifreeze

which can deteriorate the gaskets used in some competitor's boilers. Time-proven cast iron nipples last the life of the boiler. They expand and contract along with the sections they join ensuring the integrity of the entire section assembly.

#### Thermal Pump— Making Waves

Incorporated into the wet base design is a "thermal pump" action that greatly improves circulation in both water and steam versions of the PF-5 Series. This thermal pump insures good steam quality as well as maximum tankless heater capacity. The thermal pumping action is created by causing greater heat transfer on one side of the boiler than on the other. An upward flow of water occurs on the side where heat transfer is greatest, and a downward water flow results on the side where heat transfer is lowest. Continuous water circulation is assured.

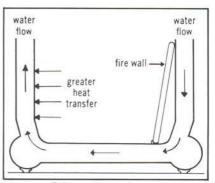


Diagram of thermal pump action

Added safety and system longevity are achieved with the addition of a pressure relief door as standard equipment. This will reduce potential damage to the breeching or heat exchanger in the event of an inadvertent delayed ignition of the burner.

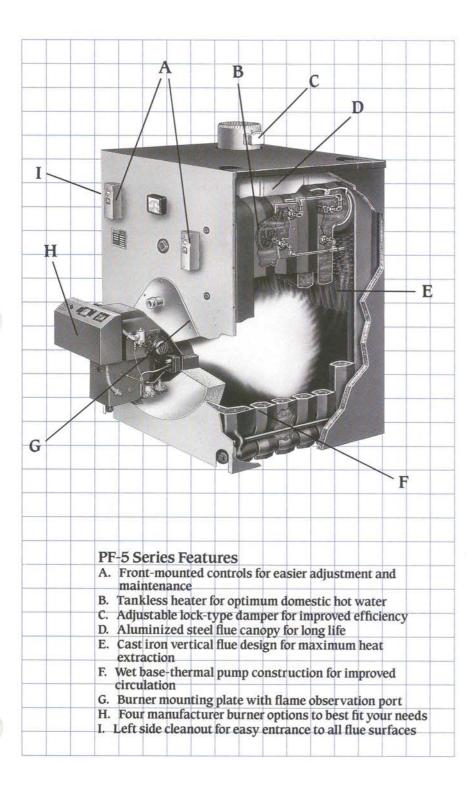
#### The "Smart" Choice

Specifying a heating system in CSI (Construction Specifications Institute) format is made easy with Burnham's Smartspec computer software program. Use the program menu to specify atmospheric or forced draft; steam or hot water; gas, oil, or combination fuels; single or lead-lag; knockdown or packaged; and output ratings in gross, net or square feet of steam. Optional equipment menu and built-in editing features let you create a customized CSI specification. Consult your local Burnham sales representative for details.

#### Burnham— The name for quality

Burnham has earned a reputation for quality and dependability going back to 1856. To ensure quality and availability, castings for the PF-5 and all other boilers are produced at its inhouse modern foundry, a claim no other boiler manufacturer can make. Look to Burnham, the name in quality boilers.

# PF-5 FEATURES AND STANDARD EQUIPMENT



#### Standard equipment.

ALL BOILERS—Sections unassembled Flush insulated jacket
 Burner mounting plate (priced separately) • Pressure relief door • Fire wall plates Flue damper assembly
 Flue canopy • Trim • Miscellaneous plugs. bushings and fittings. STEAM TRIM-ASME Safety valve • PA-404A Pressuretrol • Gauge glass assembly . Boiler drain cock . Pressure vacuum gauge. WATER TRIM-ASME Safety relief valve • L-4006A High limit • Pressure temperature gauge · Boiler drain cock. OIL BOILERS-Flange mounted flame retention oil burner furnished with 2 stage fuel unit, primary control and dual oil valve. GAS BOILERS-Flange mounted gas burner with standard controls meeting the latest UL requirements . Dual gas valves • gas-electric ignition with proven gas pilot • ultra-violet flame detector . Electronic programming controls and components are factory wired in a burner mounted control cabinet. GAS/OIL BOILERS-Flange mounted combination gas/oil burner with standard controls meeting latest UL requirements . Manually operated fuel transfer switch for dual fuel changeover . Dual gas valves and oil valves • Electric ignition with proven gas pilot on the gas side; direct spark ignition on the oil side • Ultra-violet flame detector . Electronic programming controls and

Optional equipment

Assembled sections • Completely packaged • Packaged and fire-tested • Tankless heaters • 30 PSI and 70 PSI ASME safety relief valves • Combustion and hydronic controls to meet special applications including F.M., I.R.I. and ASME CSD-1.

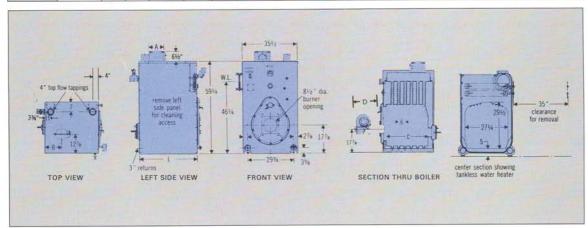
components are factory wired in a

burner mounted control cabinet (includes high limit with manual reset

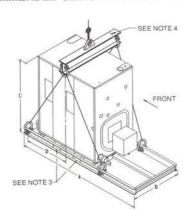
and a probe low water cutoff).

# **DIMENSIONS** (in inches)

							В	urner Dimer	ision D				Assembled	Approximate
Boiler Number	Number of Sections	A	В	С	Gas	owerflar Oil	ne-C Gas/Oil	Beckett	Carlin	G&P R	Webster JB	Flush Jacket	Section Weight Lbs.	Shipping Weight Lbs.
PF-504	4	10	12	19½	29	29	34	12	17	26	25	25¾	1650	1975
PF-505	5	10	12	25½	29	29	34	23	22	26	25	31¾	2000	2330
PF-506	6	10	12	31½	29	29	34	23	22	26	25	37¾	2300	2705
PF-507	7	10	12	37½	34	34	34	23	22	26	25	43¾	2650	3050
PF-508	8	10	12	43½	34	34	34	24	22	26	25	49¾	2950	3430
PF-509	9	14	12	49½	34	34	34	24	22	26	25	55¾	3300	3775
PF-510	10	14	12	55½	34	34	34	24	22	26	25	61¾	3650	4175
PF-511	11	14	12	61½	34	34	34	24	22	29	25	67¾	3950	4610
PF-512	12	14	27	67½	34	34	34	24	22	29	25	73¾	4300	4985
PF-513	13	14	33	73½	34	34	34	25	22	29	25	79¾	4600	5330
PF-514	14	14	39	79½	34	34	34	25	29	29	29	85¾	4950	5720
PF-515	15	14	45	85½	34	34	34	25	29	29	29	91¾	5300	6055
PF-516	16	18	51	91½	39	39	39	25	29	29	29	97¾	5600	6405
PF-517	17	18	57	97½	39	39	39	26	30	29	29	103¾	5950	6745
PF-518	18	18	63	103½	39	39	39	26	30	29	29	109¾	6300	7110
PF-519	19	18	69	109½	39	39	39	26	30	29	29	115¾	6600	7420
PF-520	20	18	75	115½	39	39	39	_	30	29	29	121¾	6950	7880
PF-521	21	18	81	121½	39	39	39	_	30	29	29	127¾	7300	8235



#### RECOMMENDED SLING ARRANGEMENT



- NOTES:

  1. This boiler can be lifted by fork truck. Do not truck from front.

  2. When lifting from rear, forks must extend beyond center of gravity and second skid gross bar.

  3. When lifting from side, forks must extend to opposite skid rail and straddle center of gravity.

  4. Cable spreader is to prevent jacket damage. Spreader should be B (width of skid) + 12°. Adjust cable lengths to lift at approx. center of gravity per chart.

#### **DIMENSIONS**

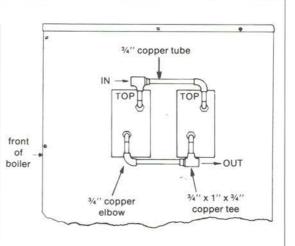
Boiler Model	Number of Sections	Length A	Width B	Height C	Approximate Center of Gravity D*	Approx. Shipping Wt. (lbs)
PF-504	4	70	44	651/4	211/2	2322
PF-505	5	76	44	651/4	241/2	2694
PF-506	6	82	44	651/4	271/2	3087
PF-507	7	88	44	651/4	311/2	3450
PF-508	8	94	44	651/4	341/2	3879
PF-509	9	100	44	651/4	371/2	4242
PF-510	10	112	44	651/4	401/2	4709
PF-511	11	118	44	651/4	431/2	5171
PF-512	12	124	44	651/4	461/2	5586
PF-513	13	130	44	651/4	491/2	5982
PF-514	14	136	44	651/4	521/2	6392
PF-515	15	142	44	651/4	551/2	6748
PF-516	16	148	441/2	671/4	581/2	7178
PF-517	17	154	441/2	671/4	611/2	7539
PF-518	18	160	441/2	671/4	651/2	7974
PF-519	19	166	441/2	671/4	681/2	8305
PF-520	20	172	441/2	671/4	711/2	8785
PF-521	21	178	441/2	671/4	741/2	9161

Varies slightly with burner and gas train configura

#### TANKLESS HEATER RATINGS\* (Water and Steam)

Boiler			Number of	#548 Tank	less Heater	rs Installed		
Number	1	2	3	4	5	6	7	8
PF-504	8.0							
PF-505	8.0	16.0						
PF-506	8.0	16.0						
PF-507	8.0	16.0	24.0					
PF-508	8.0	16.0	24.0					
PF-509	8.0	16.0	24.0	32.0				
PF-510	8.0	16.0	24.0	32.0				
PF-511	8.0	16.0	24.0	32.0				
PF-512	8.0	16.0	24.0	32.0	40.0			
PF-513	8.0	16.0	24.0	32.0	40.0			
PF-514	8.0	16.0	24.0	32.0	40.0			
PF-515	8.0	16.0	24.0	32.0	40.0	48.0		
PF-516	8.0	16.0	24.0	32.0	40.0	48.0		
PF-517	8.0	16.0	24.0	32.0	40.0	48.0		
PF-518	8.0	16.0	24.0	32.0	40.0	48.0	56.0	
PF-519	8.0	16.0	24.0	32.0	40.0	48.0	56.0	
PF-520	8.0	16.0	24.0	32.0	40.0	48.0	56.0	64.0
PF-521	8.0	16.0	24.0	32.0	40.0	48.0	56.0	64.0

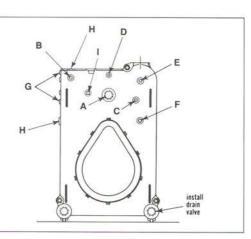
\*Ratings are given in gallons per minute continuous draw of water heated from 40°F to 140°F with 200°F boiler water.



#### **CONTROL TAPPINGS**

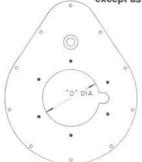
Location	Size of Tappings	Steam	Water
A	3	Low water cut-off	Not used
В	3/4	Pressure limit control	Temperature limit control
C	3/4	Operating cont. Tankless heater	Operating cont. Tankless heater
D	1/2	Pressure gauge	Pressure Temperature Gauge
E	3/4	Not used	Not used
F	3/4	Not used	Reverse acting control
G	1/2	Gauge glass	Not used
Н	1	Water Feeder, LWCO. Water Column	Not used
-1	3/4	Probe Type Low Water Cutoff	Not Used

 ${\bf NOTE-3}"\ blow-off\ on\ back\ section\ safety\ or\ relief\ valve\ piped\ in\ connection\ with\ blow-off.$ 



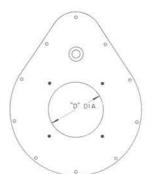
#### **BURNER MOUNTING PLATES**

(81/2" diameter mounting plate is standard except as shown below.)



#### **GORDON & PIATT**

Boiler Number	D
PF-507-512	81/2"
PF-513-521	101/2"



#### CARLIN

Boiler Number	D
PF-514-516	87/8"
PF-517-521	101/8"

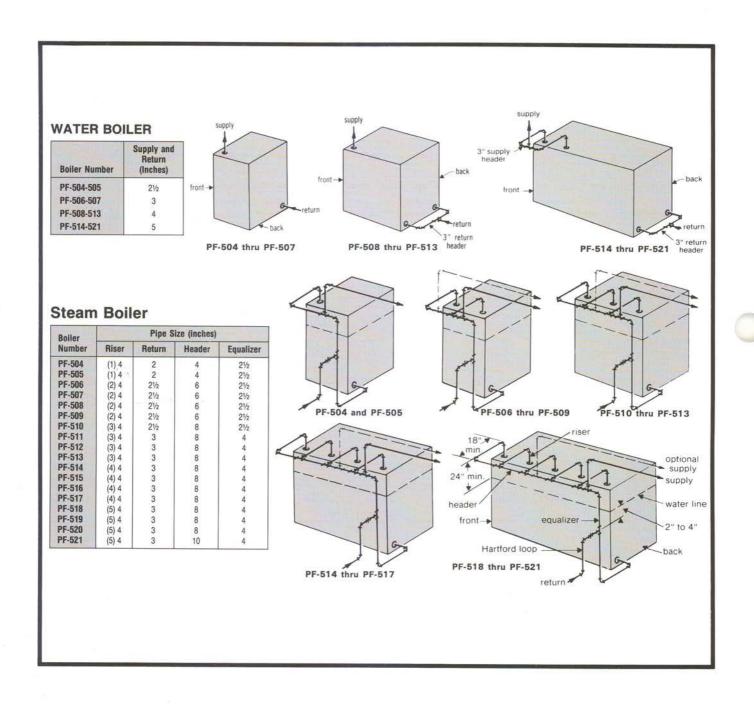
#### POWER FLAME

Boiler Number	D
PF-507-515	9"
PF-516-521	103/8"

#### WEBSTER

Boiler Number	D
PF-504-513	7%*
PF-514-521	9%*

# MINIMUM PIPING RECOMMENDATIONS



# **BURNER SCHEDULES**

#### **OIL BURNERS**

	:	Beckett		Carlin	Gor	don-Platt	Pov	ver-Flame	W	ebster
Boiler	Burner	Standard	Burner	Standard	Burner	Standard	Burner	Standard	Burner	Standard
Number	Number	Motor Voltage	Number	Motor Voltage	Number	Motor Voltage	Number	Motor Voltage	Number	Voltage
PF-504	CF800	120/60/1	301CRD	120/60/1	R6.2-0	120/60/1	C1-0S	120/60/1	JB10-03	120/60/1
PF-505	CF1400	120/60/1	701CRD	120/60/1	R6.2-0	120/60/1	C1-0S	120/60/1	JB10-03	120/60/1
PF-506	CF1400	120/60/1	701CRD	120/60/1	R6.2-0	120/60/1	C1-0S	120/60/1	JB10-03	120/60/1
PF-507	CF1400	120/60/1	701CRD	120/60/1	R8-0	120/60/1	C2-OAS	240/60/1	JB10-03	120/60/1
PF-508	CF2300	120/60/1	701CRD	120/60/1	R8-0	120/60/1	C2-OAS	240/60/1	JB10-03	120/60/1
PF-509	CF2300	120/60/1	801CRD	230/60/1	R8-0	120/60/1	C2-OAS	240/60/1	JB10-07	120/60/1
PF-510	CF2300	120/60/1	801CRD	230/60/1	R8.1-0	240/60/1	C2-OBS	240/60/1	JB10-07	120/60/1
PF-511	CF2300	120/60/1	801CRD	230/60/1	R8.2-0	240/60/1	C2-OBS	240/60/1	JB10-07	120/60/1
PF-512	CF2300	120/60/1	801CRD	230/60/1	R8.3-0	240/60/3	C2-OBS	240/60/1	JB10-07	120/60/1
PF-513	CF2500	230/60/1	801CRD	230/60/1	R10.9-0	240/60/3	C2-OBS	240/60/1	JB10-07	120/60/1
PF-514	CF2500	230/60/1	1050FFD	230/60/3	R10.9-0	240/60/3	C2-OBS	240/60/3	JB20-10	240/60/3
PF-515	CF2500	230/60/1	1050FFD	230/60/3	R10.9-0	240/60/3	C2-OBS	240/60/3	JB20-10	240/60/3
PF-516	CF2500	230/60/1	1050FFD	230/60/3	R10-0	240/60/3	C3-0	240/60/3	JB20-10	240/60/3
PF-517	CF3500	230/60/1	1150FFD	230/60/3	R10-0	240/60/3	C3-0	240/60/3	JB20-10	240/60/3
PF-518	CF3500	230/60/1	1150FFD	230/60/3	R10.1-0	240/60/3	C3-0	240/60/3	JB20-10	240/60/3
PF-519	CF3500	230/60/1	1150FFD	230/60/3	R10.1-0	240/60/3	C3-0	240/60/3	JB20-10	240/60/3
PF-520	CF3500	230/60/1	1150FFD	230/60/3	R10.1-0	240/60/3	C3-0	240/60/3	JB20-20	240/60/3
PF-521	CF3500	230/60/1	1150FFD	230/60/3	R10.1-0	240/60/3	C3-0	240/60/3	JB20-20	240/60/3

#### **GAS BURNERS\***

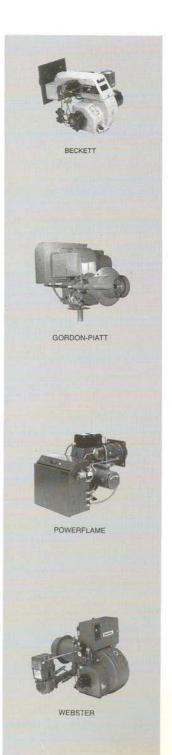
		Gordon-Piatt			Power Flame			Webster	
Boiler Number	Burner Number	Min. Gas Press. Req'd. In. W.C.	Standard Motor Voltage	Burner Number	Min. Gas Press. Req'd. In. W.C.	Standard Motor Voltage	Burner Number	Min. Gas Press. Reg'd. In. W.C.	Standard Voltage
PF-504	R6.2-G	6.7	120/60/1	C1-G-12	5.0	120/60/1	JB1G-03	4.0	120/60/1
PF-505	R6.2-G	5.9	120/60/1	C1-G-12	5.9	120/60/1	JB1G-03	6.1	120/60/1
PF-506	R6.2-G	6.3	120/60/1	C1-G-12	6.8	120/60/1	JB1G-03	5.0	120/60/1
PF-507	R8-G	6.4	120/60/2	C2-G-15	8.1	120/60/1	JB1G-03	6.8	120/60/1
PF-508	R8-G	6.1	120/60/2	C2-G-15	7.3	120/60/1	JB1G-03	6.9	120/60/1
PF-509	R8-G	6.4	120/60/2	C2-G-15	7.6	120/60/1	JB1G-07	6.6	120/60/1
PF-510	R8.1-G	6.7	240/60/1	C2-G-20A	5.5	240/60/1	JB1G-07	4.1	120/60/1
PF-511	R8.2-G	6.6	240/60/1	C2-G-20A	6.5	240/60/1	JB1G-07	4.7	120/60/1
PF-512	R8.3-G	4.9	240/60/3	C2-G-20A	6.6	240/60/1	JB1G-07	5.7	120/60/1
PF-513	R10.9-G	5.9	240/60/3	C2-G-20B	4.9	240/60/1	JB1G-07	6.6	120/60/1
PF-514	R10.9-G	5.5	240/60/3	C2-G-20B	4.7	240/60/1	JB2G-10	4.6	240/60/3
PF-515	R10.9-G	5.3	240/60/3	C2-G-20B	5.1	240/60/1	JB2G-10	5.5	240/60/3
PF-516	R10-G	7.5	240/60/3	C3-G-20	5.8	240/60/3	JB2G-10	6.3	240/60/3
PF-517	R10-G	6.8	240/60/3	C3-G-20	6.5	240/60/3	JB2G-10	5.9	240/60/3
PF-518	R10.1-G	6.4	240/60/3	C3-G-20	7.2	240/60/3	JB2G-10	5.6	240/60/3
PF-519	R10.1-G	7.1	240/60/3	C3-G-25	5.9	240/60/3	JB2G-10	5.9	240/60/3
PF-520	R10.1-G	7.0	240/60/3	C3-G-25	6.4	240/60/3	JB2G-10	6.4	240/60/3
PF-521	R10.1-G	7.7	240/60/3	C3-G-25	7.0	240/60/3	JB2G-20	6.8	240/60/3

<sup>\*</sup>For gas connection size see Gas/Oil Burner chart.

#### **GAS/LIGHT OIL BURNERS\***

		Gordon-Piat	t		Power Flame		Webster			
Boiler Number	Burner Number	Inlet Gas Connection Inches	Standard Motor Voltage	Burner Number	Inlet Gas Connection Inches	Standard Motor Voltage	Burner Number	Inlet Gas Connection Inches	Standard Voltage	
PF-504	R6.2-G0	1	120/60/1	C1-G0-12	1 1 1	120/60/1	JB1C-03	13/4	120/60/1	
PF-505	R6.2-G0	1½	120/60/1	C1-G0-12		120/60/1	JB1C-03	13/4	120/60/1	
PF-506	R6.2-G0	1¼	120/60/1	C1-G0-12		120/60/1	JB1C-03	13/4	120/60/1	
PF-507	R8-G0	11/4	240/60/1	C2-G0-15	1	240/60/1	JB1C-03	1½	120/60/1	
PF-508	R8-G0	11/2	240/60/1	C2-G0-15	1¼	240/60/1	JB1C-03	1½	120/60/1	
PF-509	R8-G0	11/2	240/60/1	C2-G0-15	1¼	240/60/1	JB1C-07	1½	120/60/1	
PF-510	R8.1-G0	1½	240/60/1	C2-G0-20A	11/4	240/60/1	JB1C-07	2	120/60/1	
PF-511	R8.2-G0	1½	240/60/1	C2-G0-20A	11/4	240/60/1	JB1C-07	2	120/60/1	
PF-512	R8.3-G0	2	240/60/3	C2-G0-20A	11/2	240/60/1	JB1C-07	2	120/60/1	
PF-513	R10.9-G0	2	240/60/3	C2-G0-20B	2	240/60/1	JB1C-07	2	120/60/1	
PF-514	R10.9-G0	2	240/60/3	C2-G0-20B	2	240/60/1	JB2C-10	2	240/60/3	
PF-515	R10.9-G0	2	240/60/3	C2-G0-20B	2	240/60/1	JB2C-10	2	240/60/3	
PF-516	R10-G0	2	240/60/3	C3-G0-20	2	240/60/3	JB2C-10	2	240/60/3	
PF-517	R10-G0	2	240/60/3	C3-G0-20	2	240/60/3	JB2C-10	2½	240/60/3	
PF-518	R10.1-G10	2½	240/60/3	C3-G0-20	2	240/60/3	JB2C-10	2½	240/60/3	
PF-519 PF-520 PF-521	R10.1-G0 R10.1-G0 R10.1-G0	2½ 2½ 2½ 2½	240/60/3 240/60/3 240/60/3	C3-G0-25 C3-G0-25 C3-G0-25	2 2 2	240/60/3 240/60/3 240/60/3	JB2C-10 JB2C-20 JB2C-20	2½ 2½ 2½ 2½	240/60/3 240/60/3 240/60/3	

<sup>\*</sup>For minimum gas pressure requirements see Gas Burner chart.



## **SPECIFICATIONS**



### PF-5 RATINGS



Boiler Number (1)			Net I = B = R Rating (2)			I = B = R Burner Capacity		Net	Pressure In Firebox	Heating Surface Ft. <sup>2</sup>		Water Content Gal.	
	Boiler H.P.		Steam Sq. Ft.	Steam MBH	Water MBH (3)	Light Oil GPH (4)	Gas MBH	Firebox Volume Ft.3	(Inches Water Column) (5)	Steam	Water	Gal.	Water
PF-504	18.5	620	1938	465	539	5.5	790	8.5	.244	57.45	66.12	69	70
PF-505	23.4	785	2454	589	683	6.9	997	11.1	.244	73.44	85.00		84
PF-506	28.4	951	2971	713	827	8.3	1204	13.7	.245	89.43	103.88		98
PF-507	33.3	1116	3488	837	970	9.8	1412	16.3	.245	105.42	122.76	104	112
PF-508	38.2	1281	4013	963	1114	11.2	1619	18.9	.246	121.41	141.64		127
PF-509	43.2	1446	4583	1100	1257	12.6	1826	21.4	.246	137.40	160.52		141
PF-510	48.2	1612	5158	1238	1402	14.0	2033	24.1	.247	153.39	179.40	138	156
PF-511	53.1	1777	5725	1374	1545	15.6	2240	26.8	.247	169.38	198.28		170
PF-512	58.1	1942	6283	1508	1689	17.0	2448	29.4	.248	185.37	217.16		184
PF-513	63.0	2108	6821	1637	1833	18.4	2655	32.0	.248	201.36	236.04	172	198
PF-514	67.9	2273	7354	1765	1977	19.8	2862	34.6	.249	217.35	254.92		212
PF-515	72.9	2438	7888	1893	2120	21.5	3069	37.2	.249	233.34	273.80		226
PF-516	77.8	2604	8425	2022	2264	22.5	3276	39.8	.250	249.33	292.68	195	240
PF-517	82.7	2769	8958	2150	2408	24.0	3484	42.4	.250	265.32	311.56	207	255
PF-518	87.7	2934	9492	2278	2551	25.5	3691	45.0	.251	281.31	330.44	218	270
PF-519	92.6	3099	10025	2406	2695	27.0	3898	47.6	.251	297.30	349.32	230	280
PF-520	97.4	3265	10563	2535	2839	28.5	4105	50.2	.252	313.29	368.20	241	298
PF-521	102.5	3430	11096	2663	2983	30.0	4312	52.8	.252	329.28	387.08	253	312

- Suffix "S" indicates steam boiler, "W" indicates water boiler. Suffix "G" indicates gas-fired, "O" oil fired and "GO" for combination gas-oil fired.
- I=B=R net ratings shown are based on piping and pick up allowances which vary from 1.333 to 1.288 for steam and 1.15 for water.
- Net ratings for water, square feet, are based on 170°F average water temperature in system.
  - For higher water temperatures, select boiler on basis of I=B=R Net Ratings, MBH.
- The I=B=R burner capacity in GPH is based on oil having a heat value of 140,000 BTU per gallon.

NOTE: Water Working Pressure — Steam 15 PSI W.P.
Water 50 PSI W.P.
Water (Optional) 70 PSI W.P.
(Optional) 30 PSI W.P.

- 5. Boiler ratings are based on 12½%  $CO^{2},\ +.10^{\prime\prime}$  water column pressure at boiler flue outlet.
  - $I\!=\!B\!=\!R$  vent diameter for Boiler No. PF-504 thru PF-508 is 10", for PF-509 PF-515 is 14" and for PF-516 PF-521 is 18".

Consult manufacturer for installations having unusual piping and pick up requirements, such as intermittent system operation, extensive piping systems, etc.

Ratings shown above apply at altitudes up to 1000 feet on oil and 2000 feet on gas. For altitudes above those indicated, the ratings should be reduced at the rate of 4% for each 1000 feet above sea level.

