INSTALLATION AND OPERATING INSTRUCTIONS

FOR

PF-3 FORCED DRAFT BOILER - BURNER UNITS

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NOTE: For optimum performance and serviceability from this unit adhere to the following recommendations:

- 1-Clean Flueways at least once a year-preferably at the end of heating season to remove soot and scale. Inside of Firebox should also be cleaned at the same time.
- 2-Have Oil Burner and Controls checked at least once a year or as may be necessitated.
- 3-Retain your contractor or a competent serviceman to assure that the unit is properly adjusted and main-,tained.

IMPORTANT: BEFORE STARTING TO INSTALL THIS OIL HEATING UNIT, READ THESE INSTRUCTIONS CAREFULLY. KEEP INSTRUCTIONS NEAR OIL HEATING UNIT FOR REFERENCE BY OWNER AND SERVICEMAN.

For service and repairs to the heating plant, call your Heating Contractor. When seeking information on the boiler, provide series and size designation shown on rating plate.

| Boiler Number | Type H | 'iringType Sys | item |
|--------------------|-----------|----------------|------|
| Heating Contractor | | | |
| Address | | Phone No | ٥ |
| | BURNHAM C | ORPORATION | |

HYDRONICS DIVISION

Lancaster, Pennsylvania 17604

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FRONT VIEW FLUSH JACKET

SIDE VIEW EXTENDED JACKET

REAR VIEW

12% m ¥ À 3" ЗИРРLYø y 2<mark>-</mark>4 "LC" BURNER | |2 | FLANGE INSULATION

|] | | | | | | |
|--------------------------------|-------|-------|-------|--------|--------------------|--------------|
| °, | 401/2 | 581/4 | 365/8 | 34 1/3 | ۷ | PF-37 |
| . 8 | 341⁄2 | 521/4 | 305⁄8 | 281⁄/2 | 9 | PF-36 |
| .8 | 281⁄2 | 461/4 | 245% | 221/2 | 5 | PF-35 |
| 8" | 221⁄2 | 401/4 | 185% | 161/2 | 4 | PF-34 |
| I=B=R VENT SIZE DIAM. | 5 | Ш | ш | ¥ | NO. OF SECTIONS | MODEL NO. |

SECTION THRU BOILER WITH FLUSH JACKET

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Dimensional Data Figure 1

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SECTION I

GENERAL INFORMATION

INSPECT SHIPMENT carefully for any signs of damage. All equipment is carefully manufactured, inspected and packed by experienced workmen. Our responsibility ceases upon delivery of boiler to the carrier in good condition. Any claims for damage in shipment must be filed immediately against the carrier by the consignee. No claims for variances from, or shortage in orders, will be allowed by the manufacturer, unless presented within sixty (60) days after receipt of goods.

ULOCATE BOILER so that smoke pipe connection to chimney is short and direct. Floor construction should have adequate load bearing characteristics to bear the weight of the boiler filled with water. See table below.

| BOILER NO. | ASSEMBLED SECTION WEIGHT (LBS.) | WATER CONTENT FULL (LBS.) | TOTAL WEIGHT (LBS.) |
|---------------|--|------------------------------------|---------------------------|
| PF-34 | 800 | 276 | 1076 |
| PF-35 | 1000 | 335 | 1335 |
| PF-36 | 1200 | 402 | 1602 |
| PF-37 | 1400 | 465 | 1865 |

Table ''A''

A boiler foundation similar to the one shown in Figure 2 is recommended if the boiler room floor is not perfectly level, weak, uneven or if a water condition exists. If the boiler is set on a combustible floor, a 1" thick layer of foil-faced insulation or equivalent should be placed beneath the boiler foil side up.



Figure 2 SUGGESTED BOILER FOUNDATION

2 PROVIDE CLEARANCE of at least 24" on the right side and back of the unit for cleaning of flues. Provide a minimum of 20" clearance in front for servicing of equipment, 30" if boiler is equipped with jacket extension. If boiler is equipped with tankless heater, additional allowance may have to be made for installation and servicing of heater, see table below:

| HEATER NO. | HEATER CLEARANCE INCHES |
|---------------|-------------------------------|
| 226 | 23 |
| 232 | 29 |
| 445 | 35 |

Table "B"

Distances are measured from front of flush jacket.

3) CHIMNEY OR VENT. The PF-3 series boiler is designed for forced-draft firing and may be used with a conventional natural draft stack or a stub vent (see Figure 3). See Fig. 1 for the proper vent size. Draft controls are not normally required, although they may be used on installations where a natural draft stack is used or on multiple boiler installations with a common stack. The boiler is provided with a breeching damper which should be secured in the open position unless high breeching draft makes burner adjustment difficult.

4 AIR FOR COMBUSTION AND VENTILATION must be provided. If natural ventilation is inadequate, provide a screened opening from the boiler room to the outside, which is based on one square inch free area per 3000 btuh input. If other air consuming appliances are near the boiler the air inlet should be larger. Consult respective manufacturers.



Figure 3 ARRANGEMENT FOR STUB VENT

NUMBER OF

SECTIONS

SECTION II

INSTALLATION INSTRUCTIONS

U Place boiler assembly on foundation provided. Shim if necessary. The tie rod nuts should then be loosened until finger tight.

"INSTALLATION OF BUILT-IN HEATERS AND HEATER OPENING COVER PLATES"

(2) INSTALLATION OF BUILT-IN DOMESTIC WA-TER HEATER if furnished.

- a. Slip Rubber Gasket over Heater Coil and place against Heater Mounting Plate so that holes in Gasket are in line with holes in Heater Mounting Plate.
- b. Install Built-in Heater Coil through opening in Front Section into the upper nipple port for water boilers or the lower nipple port for steam boilers. (See Fig. 4).
- c. Secure the Heater Mounting Plate with 3/8" Hex Head Cap Screws and Flat Washers (if furnished). Snug all screws before final tightening.
- d. Attach the Tapped Heater Cover Plate with Rubber Gasket to the remaining opening in the Front Section. Secure with 3/8" Hex Hd. Cap Screws and Flat Washers (if furnished). Snug all screws before tightening.

(3) INSTALLMENT OF HEATER OPENING COVER PLATES if Built-in Domestic Water Heater is not furnished. (Steam and Water Boilers). See Figure 1.

a. Attach Blank Heater Cover Plate with Rubber Gas-

ket to the lower nipple port in Front Section using 3/8" Hex Hd. Cap Screws and Flat Washers (if furnished). Snug all screws before final tightening.

b. Attach the Tapped Heater Cover Plate with Rubber Gasket to the upper nipple port in Front Section using 3/8" Hex Hd. Cap Screws and Flat Washers (if furnished). Snug all screws before final tighting.

4 TEST BOILER FOR LEAKS before installing controls, trim, and jacket, and before connecting to heating system.

- a. Install Pressure Gauge (at least 30 P.S.I. capacity), a hose to the City Water and a valve in one of the supply tappings. Plug remainder of tappings.
- b. Fill Boiler with water and apply a pressure of at least 10 pounds but no more than 50 pounds gauge pressure.
- c. Examine Boiler carefully inside and outside for leaks or damage due to shipment or handling.

5 DRAIN WATER FROM BOILER. Remove gauge, valve and plugs from those tappings to be used. Leave other tappings plugged or bushed according to Figure 4.

(6) INSPECT JOINTS BETWEEN SECTIONS. All joints are factory sealed. If there are any spaces due to shipment or handling, seal them with silastic sealant.

| LOCATION | SIZE R (INCHES) | WATER CONTROL USED | STEAM CONTROL USED | |
|----------|--------------------|---|--|--|
| A | 1 | SAFETY RELIEF USED | SAFETY VALVE | |
| В | 3/4 | LIMIT CONTROL OR COMBINATION HIGH LIMIT AND CIRCULATOR CONTROL (FOR INSTALLATIONS WITHOUT TANKLESS WATER HEATER) | BUSH TO 1/4" - PRESSURETROL- OR OPTIONAL CONTROLS | |
| с | 3/4 | COMBINATION HIGH LIMIT, LOW LIMIT AND CIRCULATOR CONTROL (FOR INSTALLATIONS WITH TANKLESS HEATER) | | |
| D | 1/4 | COMBINATION PRESSURE AND TEMPERATURE GAUGE | STEAM PRESSURE GAUGE | |
| E | 3/4 | AUXILIARY LIMIT CONTROL (WHEN MEEDED_REQUIRES ADDITIONAL TAPPED HEATER OPENING COVER PLATE FOR INSTALLATIONS WITHOUT TANKLESS HEATER) | OPERATING CONTROL (FOR INSTAL- LATIONS WITH TANKLESS HEATER) OR OPTIONAL CONTROLS (REQUIRES ADDITIONAL TAPPEO HEATER OPEN- ING COVER PLATE FOR INSTALLA- TIONS WITHOUT TANKLESS HEATER) | |
| F | 1 1/2 | NOT USED | BLOWOFF | |
| G | 1/2 | NOT USED | GAUGE GLASS AND LOW WATER CUT-OFF | |
| н | 3/4 | AUXILIARY TAPPING | AUXILIARY TAPPING-BELOW NORMAL WATER LINE | |





WATER BOILER

Fig. 4

() INSTALL CAST IRON CLEANOUT COVERS to the boiler with $\frac{1}{4}$ " x $2\frac{1}{4}$ " long bolts provided. The bolts should be anchored to the slots in the cleanout openings of the sections with the head of the bolt and a washer inside and a washer and nut outside. See Figure 5. The covers are placed on the bolts and secured with washers and nuts.



TOP VIEW CLEANOUT COVER ASSEMBLY

Fig. 5

(8) FLUE COLLAR should be assembled next. Clean the ground surface on the flue collar and the mating ground surface on the back section with a wire brush. Then using a cartridge of silastic sealant provided, apply a smooth $\frac{1}{4}$ " diameter bead of sealant to the ground surface on the back section. Place the collar on the back section and position the damper bracket on the collar as shown in Figure 1. Secure the collar with the $\frac{5}{16}$ " bolts provided.

(9) INSTALL BURNER PLATE as follows: Clean the ground surface on the burner plate and the mating surface on the front section with a wire brush. Then using a cartridge of sealant provided, apply a smooth $\frac{1}{4}$ " diameter bead of sealant to the ground surface of the front section. Secure the burner plate to the front section with the $\frac{5}{16}$ " x 1" long bolts provided. Draw-up the bolts until the burner plate makes contact with the front section.

IMPORTANT—THIS BOILER DOES NOT REQUIRE A COMBUSTION CHAMBER OR SEPARATE SMOKE-HOOD.

(10) CONNECT SUPPLY AND RETURN PIPING TO HEATING SYSTEM.

NOTE—If jacket extension (special order only) is to be installed now or in the future, return piping connected to front section must pass thru opening provided in extension, see Fig. 1. In addition, fittings used to connect circulator in this return (water boiler) must be selected so that circulator does not extend beyond sides of flush jacket.

- a. If boiler is equipped with tankless heater, hot and cold water lines must be routed thru opening provided in Jacket Extension Top Panel. Refer to FIG. 18 for Tankless Heater Piping.
- b. All Piping must be installed so as to provide clearance for running the Smokepipe as direct as possible between the Boiler and Chimney.
- c. With Forced Circulation HOT WATER HEATING, consult I-B-R Installation and Piping Guide No. 200. NOTE: When Hot Water Heating Boilers are connected to Heating Coils located in Air Handling Units where they may be exposed to refrigerated air circulation, the Boiler Piping System must be equipped with Flow Control Valve or other automatic means to prevent gravity circulation of the Boiler Water during Cooling Cycle.
- d. With STEAM HEATING, see Figures 7 and 8. Consult I-B-R Piping Guide No. 200.
- e. With COMBINATION HEATING AND COOLING (REFRIGERATION) SYSTEMS having the same Distributing Units, Piping and Circulator, see Figure 6. NOTE: Valves must be installed in each Supply and Return Branch to the Heating Boiler and Water Chiller so as to prevent circulation of Chilled Water through the Boiler or Heated Water through the Chiller.

"ABB" ARE CLOSED IN WINTER AND OPEN IN SUMMER



RECOMMENDED PIPING FOR COMBINATION HEATING & COOLING (REFRIGERATION) SYSTEMS

Fig. 6





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Fig. 8 Minimum Piping Recommendations 6 and 7 Section Steam Boilers

1) INSTALL FLUSH JACKET in accordance with Fig. 9. Refer to Figure 4 for knockouts to be removed. 0

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Fig.

(12) INSTALLATION OF TRIM AND CONTROLS FOR WATER BOILERS. (See Figure 4 for Control Locations.)

- a. Screw COMBINATION ALTITUDE GAUGE AND THERMOMETER into ¹/₄" tapping. Tighten by wrench applied to square shank back of gauge. DO NOT APPLY PRESSURE ON GAUGE CASE since this may destroy calibration of gauge.
- b. RELIEF VALVE—Install in 1" Tapping next to 3" Supply Tapping in Front Section using fittings provided.

CAUTION: Safety Relief Valve should be piped to and open drain—full size of discharge outlet on Relief Valve and without any provision of "shut-off" between the Relief Valve and discharge into drain.

c. Install Hydronic Controls in their designated tappings.

(13) INSTALLATION OF TRIM AND CONTROLS FOR STEAM BOILERS. (See Figure 4 for control locations.)

- a. Screw Combination Pressure Vacuum Gauge into designated ¹/₄" tapping. Tighten by wrench applied to square shank on back of gauge. Do not apply pressure on gauge case since this may destroy calibration of gauge.
- b. SAFETY VALVE. Install in 1" Tapping next to 3" Supply Tapping in Front Section. CAUTION: Safety Valve should be piped to an open drain—full size of discharge outlet on Safety Valve and without any provision of "shut-off" between the Safety Valve and discharge into drain.
- c. Install Pressure Limit Control with $\frac{1}{4}$ " Pig Tail Syphon into Heater Cover Plate Tapping bushed $\frac{3}{4}$ " to $\frac{1}{4}$ ".
- d. Install Operating Control (supplied with Tankless Heater equipped boilers only) in designated tapping.
- e. Install Gauge Glass and Low Water Cut-off (if furnished) in $\frac{1}{2}$ " tappings on left side of Front Section.

U INSTALL SMOKEPIPE so that connection to Chimney or vent is short and direct.

- a. Install in accordance with LOCAL FIRE ORI-NANCES.
- b. Smokepipe must not be smaller than the 8" dia. flue collar. See Fig. 1.
 - For Stub Vent installation see Fig. 3, if connected to chimney.
- c. Do not connect into same leg of Chimney serving an open fireplace.
- d. Inspect Chimney for obstructions or restrictions which should be removed. Clean Chimney if necessary.
- e. Smokepipe should slope upward from Boiler to Chimney not less than one inch in four feet. Smokepipe must be securely supported so as to maintainproper clearances from combustible materials and to prevent separation of joints.
- f. Insert Smokepipe into but not beyond inside wall of Chimney Flue Lining. Pipe should be installed above the extreme bottom of Chimney so as to prevent stoppage.
- g. Seal between Smokepipe and Chimney connection to prevent draft leakage.

(15) INSTALL ROOM THERMOSTAT on an inside wall about four feet above floor. Never install Thermostat on an outside wall or where it will be influenced by drafts, hot or cold water pipes, lighting fixtures, television, rays of the sun, or near a fireplace. Keep large furniture away from Thermostat so there will be free movement of room air around this Control.

(16) OIL BURNER INSTALLATION. Bolt burner to mounting plate with nuts and washers packed in boiler parts carton. REFER TO BURNER INSTALLATION and SERVICE MANUAL form No. 52004.

17) _P

BOILER with JACKET EXTENSION refer to Figure 10 for assembly instructions.

(18) INSTALL ELECTRIC WIRING in accordance with NATIONAL ELECTRICAL CODE and Local Regulations.

a. A separate ELECTRICAL CIRCUIT should be run from Meter with a Fused Disconnect Switch in this Circuit.

See Figures 11 thru 17 for appropriate wiring diagram.



Jacket Extension Assembly Fig. 10



SEQUENCE OF OPERATION

When the thermostat calls for heat, it energizes the cad cell protectorelay, bringing on the burner. The burner will operate until the thermostat is satisfied or the limit setting on the high limit is reached. When the high limit control restores the circuit on a drop in pressure, the burner will start if the thermostat is still calling for heat. The low water cut-off will stop the burner if the water level in the boiler drops too low.

On burner start, if the cad cell does not see flame within approximately 45 seconds, protectorelay will lock out on safety and must be reset before burner can be restarted.





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On burner start, if the cad cell does not see flame within approximately 45 seconds, protectorelay will lock out on safety and must be reset before burner can be restarted.

When there is no demand for heat, the operating control will maintain the boiler water temperature at the selected setting for the proper operation of the domestic water heater.

No. 2 Wiring Diagram for Steam Boilers with Tankless Heater



SEQUENCE OF OPERATION

A call for heat by the thermostat energizes the R8184 control to bring on the burner. If burner ignites within approximately 45 seconds (safety switch timing), cad cell sees flame and burner continues to operate until call for heat is satisfied.

Circulator will run as long as boiler water temperature is up to the low limit setting of the L4081B controller. (terminals R-W).

If boiler water temperature reaches setting of the high limit control (part of the L4081B controller) burner operation will be discontinued but circulator will continue to operate as long as boiler water temperature is up to the setting of the low limit side of the L4081B controller. When the high limit side of the L4081B restores the circuit (terminals R-W) on a drop in boiler water temperature the burner will resume operation if the thermostat is still calling for heat.





SEQUENCE OF OPERATION

A call for heat by the thermostat energizes the L8124C Control which in turn energizes the R8184 control to turn on the burner. If burner ignites within approximately 45 seconds and the cad cell sees flame the burner will continue to operate until the call for heat is satisfied. The circulator will also operate when the thermostat calls for heat if the boiler water temperature is up to the setting of the low limit in the L8124C control. If boiler water temperature is below the low limit setting the burner will operate but the circulator will not, giving preference to the domestic hot water demand. On call for heat by the thermostat the burner will continue to operate until the thermostat is satisfied or the setting of the horner will continue to operate until the thermostat is satisfied or the setting of the high limit is reached. If the thermostat is not satisfied when the high limit is reached the burner will stop but the circulator will continue to operate until the thermostat the burner will stop but the circulator will continue to operate until the thermostat is not satisfied.

Any time the boiler water temperature drops below the setting of the low limit the burner will be energized in order to maintain domestic water temperature.

No. 5 Wiring Diagram for Forced Hot Water Boilers with Tankless Heater



SEQUENCE OF OPERATION

A call for heat by the thermostat for Zone #1 connected to the L8124C control energizes the L8124C control which in turn energizes the R8184 control to turn on the burner. If burner ignites within approximately 45 seconds and the cad cell sees flame the burner will continue to operate until the call for heat is satisfied. The circulator will also operate when the thermostat calls for heat if the boiler water temperature is up to the setting of the low limit in the L8124C control. If boiler water temperature is below the low limit setting the burner will operate but the circulator will not, giving preference to the domestic hot water demand.

On call for heat by the thermostat the burner will continue to operate until the thermostat is satisfied or the setting of the high limit is reached. If the thermostat is not satisfied when the high limit is reached the burner will stop but the circulator will continue to operate until the thermostat is satisfied.

Any time the boiler water temperature drops below the setting of the low limit the burner will be energized in order to maintain domestic water temperature.

For any of the "add on" zones the operation is basically the same as Control Set #5 except for the fact that the thermostat for the add on zones energizes the R845A switching relay which then energizes the burner through the L8124C controller and the R8184 control. Since the power to the K845A switching relays is supplied by the L8124C low limit switch none of the "add on" zone circulators can be energized unless the boiler water temperature is up to the low limit setting again giving preference to the domestic water demand.

5Z Wiring Diagram for "Add-On" Zone Control Set



SET NO.6 BOILER WITH CIRCULATOR AND STORAGE TANK DOMESTIC HOT WATER

No. 6 Wiring Diagram for Forced Hot Water Boilers with Storage Tank Heater



Fig. 17

No. 7 Wiring Diagram for Forced Hot Water Boilers with Tankless Heater

SECTION III OPERATING and SERVICE INSTRUCTIONS

U INSPECT INSTALLATION BEFORE STARTING BURNER.

SET NO. 7

- a. WITH HOT WATER BOILER, fill entire Heating System with water and vent air from System.
- b. WITH STEAM BOILER, fill Boiler to Normal Water Level. (See Figure 1).
- c. CHECK CONTROLS, WIRING AND BURNER to be sure that all connections are tight and burner is rigid, that all electrical connections have been made and fuses installed, and that oil tank is filled and oil lines have been tested.
- d. LUBRICATE MOTORS on Oil Burner and Circulator (Hot Water Boilers), also bearing on Circulator, according to instructions on Circulator.

2) SET CONTROLS with Burner service switch turn-

- a. SET ROOM THERMOSTAT about 10°F above room temperature.
- b. Press reset button on PROTECTORELAY.
- c. On STEAM BOILERS, set cut-in pressure for three (3) pounds and differential pressure for two (2) pounds. These pressures may be varied to suit individual requirements of installation.

- d. On WATER BOILERS WITHOUT DOMESTIC WATER HEATERS, set water temperature High Limit Control at 210°F. This temperature may be varied to suit requirements of installation.
- e. On WATER BOILERS WITH DOMESTIC WATER HEATERS, set Operating Control at 190°F and High Limit Control at 210°F (at least 20°F higher than setting of Operating Control).
- f. On STEAM BOILERS WITH TANKLESS DOMESTIC WATER HEATERS, set boiler water temperature Operating Control at 200°F.

3 START OIL BURNER. Refer to oil burner installation and operation manual FORM NO. 52004 for startup, adjustments & servicing.

4) TEST CONTROLS.

WARNING — Before installation of the boiler is considered complete, the operation of the boiler controls should be checked, particularly the low water cut-off (if applicable) and the high limit control. 5 CLEAN STEAM HEATING SYSTEM for trouble free operation. Oil, greases and sediments which accumulate in a new boiler and piping must be removed from the system in order to prevent an unsteady water line and carry over of water into the Supply Main above boiler.

a. Operate the boiler with steam in the entire system for a few days allowing the condensate to return to the boiler. If the condensate can temporarily be wasted, operate boiler only for the length of time it takes for condensate to run clear. If the latter cannot be achieved or if the condensate is returned to the boiler, boilout the boiler using the SUR-FACE BLOWOFF connection, see Figure 4.

1). Drain boiler until water is just visible in gauge glass. Run temporary $1\frac{1}{2}$ pipe line from the Surface Blowoff Connection to an open drain or some other location where hot water may be discharged safely. Do not install value in this line.

2). Drain about 5 gallons of hot water from boiler into a container and dissolve into it 1 pound of caustic soda and 1 pound of trisodium phosphate for each 50 gallons of boiler water. See table below. Remove safety valve and add solution to boiler water thru exposed tapping.

| Boiler No. | Water Capacity to Water Line | Caustic Soda | Trisodium Phosphate |
|---------------|---------------------------------|-----------------|------------------------|
| | gals. | lbs. | lbs. |
| PF-34 | 27 | 0.5 | 0.5 |
| PF-35 | 33 | 0.7 | 0.7 |
| PF-36 | 40 | 0.8 | 0.8 |
| PF-37 | 46 | 0.9 | 0.9 |

(Caution: Use extreme care in handling these chemicals. Caustic Soda is harmful to skin, clothing, and eyes. Do not permit the dry material or the concentrated solution to come into contact with skin or clothing.)

3). Start burner and operate sufficiently to boil the water without producing steam pressure. Boil for about 5 hours. Open boiler feed pipe sufficiently to permit a steady trickle of water from the surface blowoff. Continue this slow boiling and trickle of overflow for several hours until the water coming from the overflow is clear.

4). Stop burner and drain boiler in a manner and to a location that hot water can be discharged with safety.

5). Refill boiler to normal water line. If water in gage glass does not appear to be clear, repeat steps 1) thru 3) and boil out the boiler for a long time.

6). Remove temporary surface blowoff piping, plug tapping and reinstall safety valve. Boil or bring water temperature to 180°F promptly in order to drive off the dissolved gases in the fresh water.

If unsteady water line, foaming or priming persist, install gate valve in Hartford Loop and drain valves in return main and at boiler as shown in Figures 7 and 8 and proceed as follows:

7). Connect hoses from Drain Cocks to floor drain. Close Gate Valve in Hartford Loop and open Drain Cock in Return Main. Fill Boiler to normal water level, turn on Oil Burner and operate Boiler at this water level for at least 30 minutes after the condensate begins to run hot, then turn off Burner.

8). Close all Radiator Valves. Remove all Supply Main Air Valves and plug the openings in Supply Main.

9). Draw about 5 gallons of Hot Water from Boiler into a container and dissolve into it the quantities of caustic soda and trisodium phosphate shown in 2.) above. Remove Safety Valve from Boiler and pour this solution into Boiler, then reinstall Safety Valve.

10). Turn on Oil Burner and keep operating while feeding water to Boiler slowly. This will raise water level in Boiler slowly so that Water will be boiling hot and will rise slowly into Supply Main and back through Return Main, flowing from drain hose at about 180°F. Continue until water runs clear from drain hose for at least 30 minutes.

11). Stop feeding water to Boiler but continue operating Oil Burner until excess water in Boiler flows out through Supply Main and water lowers (by steaming) until it reaches normal level in Boiler. Turn off Oil Burner. Drain Boiler. Open all Radiator Valves. Reinstall all Supply Main Air Valves. Open Gate Valve in Hartford Loop.

12). When Boiler has cooled down sufficiently (crownsheet of Sections are not too hot to touch), close the Drain Cocks at Boiler and in Return Main and feed water slowly up to normal level in Boiler. Turn on Oil Burner and allow Boiler to steam for 10 minutes, then turn off Burner. Draw off one quart of water from bottom Gauge Glass Fitting and discard. Draw off another quart sample and if this is clear, the Boiler is ready for service. If this sample is not clear, repeat the cycle of draining the Boiler and Return Main and refilling the Boiler until sample is clear.

13). If the Boiler water becomes dirty again at a later date due to additional sediment loosened up in the piping, close Gate Valve in Hartford Loop, open Drain Cock in Return Main, turn on Oil Burner and allow Condensate to flow to drain until it has run clear for at least 30 minutes while feeding water to Boiler so as to maintain normal water level. Turn off Oil Burner, drain Boiler, open Gate Valve in Hartford Loop, then repeat step 12 above. ATTENTION TO BOILER WHILE IN OPERATION.

- a. On steam boilers at the start of each heating season and once or twice during the season try SAFETY VALVE to be sure it is in working condition. A try lever test should be performed as follows: with the boiler under a minimum of 5 psi pressure, lift the try lever on the safety valve to the wide open position and allow steam to be discharged for 5 to 10 sec. release the try lever and allow the spring to snap the disk to the closed position. If valve leaks operate lever two or three times to seat disk properly. If valve continues to simmer it must be replaced or repaired. It is advisable to have a chain or wire attached to lever of valve so test can be conducted in a safe manner.
- b. On a water system at the start of each heating season and once or twice during the season try safety relief valve to be sure it is in working condition. A try lever test should be performed as follows:

1) Lift the try lever to the open position and hold it open for at least 5 sec or until clear water is discharged.

2) Release the lever and allow the spring to snap the disk to the closed position. If the valve leaks, operate the try lever two or three times to clear the seat of any

TANKLESS HEATER PERFORMANCE

Tankless water heater ratings for PF-3 boilers (steam and water) are given in gallons per minute continuous draw of water heated from 40°F to 140°F with 200°F boiler water.

| | Tan | kless W | ⁷ ater | |
|--------------|-------------|-------------|-------------------|------------|
| Boiler Model | Heat | ter Nu | mber | Pressure |
| Number | 226 | 2 32 | 445 | Drop (psi) |
| PF-34 | 6.0 | | | 23 |
| PF-35 | 6.0 | 7.5 | | 36 |
| PF-36 | 6. 0 | 7.5 | 9.0 | 37 |
| PF-37 | 6.0 | 7.5 | 9.0 | 37 |

FLOW REGULATION—If flow through the heater is greater than its rating, the supply of adequate hot water may not be able to keep up with the demand. For this reason a FLOW REGULATOR matching the heater rating should be installed in the cold water line to the heater. The flow regulator should preferably be located below the inlet to the heater and a minimum of 3' away from the inlet so that the regulator is not subjected to excess temperatures that may occur during "off" periods when it is possible for heat to be conducted back through the supply line. The flow regulator also limits the flow of supply water regardless of inlet press variations in the range of 20 to 125 psi.

(2) TEMPERING OF HOT WATER — Installation of a tempering or mixing valve will lengthen the delivery of the available hot water by mixing some cold water with the hot. This prevents excessive and possibly scalding hot water at the fixtures. In addition, savings of hot water will be achieved since the user will not waste as much hot water while seeking water temperatures to his liking. Higher temperature hot water required by dishwashers and automatic washers is possible by piping the hot water from the heater prior to entering the mixing valve. The mixing valve should be "trapped" by installing it below the cold water inlet to heater to prevent lime formation in the valve. object that is preventing proper seating. As safety relief valves are normally piped to the floor or near a floor drain, it may take some time to determine if the valve has shut completely.

3) If the safety relief valve continues to leak it shall be replaced with a new valve, returned to the manufacturer for repair or field repaired by the manufacturer.

ATTENTION TO BOILER WHILE NOT IN OPERATION. — The boiler and steam system should be inspected at least once each year by a competent serviceman to insure continued reliable, safe operation.

Clean Boiler as follows at the end of each heating season.

- a. Remove upper right hand jacket panel by removing screws, lifting and swinging out bottom of panel using two finger holes.
- b. Access to boiler flue ways may be gained by removing nuts and washers securing cast iron cleanout covers. Refer to Figure 5..
- c. Thoroughly clean flue ways using a flue brush.
- d. Remove and clean smokepipe where feasible.
- e. Replace smokepipe and cleanout covers.
- f. Replace upper right hand jacket panel.

3 FLUSHING OF HEATER — All water contains some sediment which settles on the inside of the coil. Consequently, the heater should be periodically backwashed. This is accomplished by installing hose bibs as illustrated and allowing water at city pressure to run into hosebib A, through the heater, and out hosebib B until the discharge is clear. The tees in which the hose bibs are located should be the same size as heater connections to minimize pressure drop.

4 HARD WATER — This is applicable to some city water and particularly to well water. This should not be a deterent but precautions are necessary. A water analysis is necessary and an appropriate water softener installed. This is not only beneficial to the heater but to piping and fixtures plus the many other benefits derived from soft water.



LIMITED WARRANTY

Burnham Corporation warrants to the original owner at the original installation site that products manufactured by the Hydronics Division comply at the time of manufacture with recognized Hydronic industry regulatory agency standards and requirements then in effect and will be free from defects in materials and workmanship for a period of 12 months after the date of the installation.

THE REMEDY FOR BREACH OF THIS WARRANTY IS EXPRESSLY LIMITED TO THE REPAIR OR REPLACEMENT OF ANY PART FOUND TO BE DEFECTIVE UNDER CONDITIONS OF NORMAL USE AND DOES NOT EXTEND TO LIABILITY FOR INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES OR LOSSES SUCH AS LOSS OF THE USE OF THE MATERIALS, INCONVENIENCE OR LOSS OF TIME. THIS WARRANTY IS IN LIEU OF ALL OTHERS AND ANY IMPLIED WARRANTIES (INCLUDING WARRANTY OF MERCHANTABIL-ITY OR FITNESS FOR A PARTICULAR PURPOSE) ARE EXPRESSLY LIMITED IN DURATION TO THE PERIOD OF 12 MONTHS AFTER THE DATE OF INSTALLATION.

Warranty service can be obtained by contacting the original installer of the equipment and providing him with a detailed description of any apparent defect. If this procedure fails to result in satisfactory warranty service, the owner should notify the Burnham Corporation, Hydronics Division, P.O. Box 3079, Lancaster, Pa. 17604. Transportation to a factory or other designated facility for repairs of any materials or items alleged defective shall in all events be the responsibility and at the cost of the owner. Failures resulting from misuse, improper installation or lack of maintenance are not covered by this warranty. In no event shall the Burnham Corporation's liability hereunder exceed the selling price of the product found to be defective.

Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.



BURNHAM CORPORATION

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