

GENERAL INSTRUCTIONS

Locate the boiler as close as possible to the chimney, taking care to provide ample clearance for access to the piping. It is required that a clearance of 24" be allowed at sides where servicing will occur and 18" allowed at a side where passage is necessary to another side requiring servicing or cleaning. Minimum clearance on remaining sides should be no less than 6". See Page 3 for permissible minimum clearance for alcove installations.

NOTE: Installations must conform with the requirements of local utilities and those of other local authorities having jurisdiction.

CHIMNEY OR FLUE

The masonry chimney or Type A flue to which the boiler is connected must have a cross-sectional area not less than that of the cross-sectional area of the draft hood. The chimney should extend at least two feet above the highest part of the roof so that wind from any direction will not strike the flue or vent from an angle above horizontal and not produce a positive static pressure. Chimney linings should be used when required by national, state or local building codes. Vitreous tile linings with joints which prevent retention of moisture and linings made of non-corrosive materials are advantageous. Advice regarding recommended practice and material for flue connections and chimney linings can usually be obtained from the local gas company and should be given careful consideration. In the event a Type B or Type C vent is used, the instructions relative to size and height contained in the Manual ASA Z21.30-1959, American Standard Installation of Gas Appliances and Gas Piping should be followed. The chimney should be examined before the gas boiler is installed to ascertain that it is properly constructed, clear, and will freely conduct the products of combustion to the outer air. Flue piping should not extend beyond the inside wall of the chimney. Do not place a damper or any other obstruction in the flue pipe. The flue pipe should slope up toward the chimney at least 1/4" per foot and must be the same size as the outlet of the draft hood. Where two or more appliances vent into a common flue, the area of the common flue should be at least equal to the area of the largest flue or vent connector plus 50% of the area of the additional flue or vent connector.

AIR SUPPLY FOR BOILER ROOM

Provisions must be made to supply sufficient clean air to the boiler room at all times. In buildings of conventional frame, brick, or stone construction without enclosed utility rooms, basement storm windows, or tight stair doors, infiltration is normally adequate to provide air for combustion and draft hood dilution. For installations in utility rooms without an outside wall, clean, fresh air ventilation to the rooms should be provided by placing an opening at the top and bottom of the room allowing a minimum of 1 square inch of opening for each 1000 BTU per hour input with not less than a 100 square inch opening in each location. In confined areas without good ventilation, openings to the outside should be provided with a minimum free area of 1 square inch per 4000 BTU per hour of boiler input rating.

IMPORTANT PRECAUTIONS

Proper installation and adjustment of burners and control equipment are important for the successful operation of the gas boiler. The operating instruction plate furnished with the boiler is mounted on the inner jacket panel. Read the instructions very carefully before starting the gas boiler.

BOILER FOUNDATION

A level concrete or brick foundation is strongly recommended and should be from two to a maximum of six inches above floor level if head-room permits.

MINIMUM FOUNDATION DIMENSIONS

Boiler No.	Length (L) Inches	Boiler No.	Length (L) Inches
P-D-3	12	P-D-7	22
P-D-4	14	P-D-8	24
P-D-5	17	P-D-9	27
P-D-6	19	P-D-10	29

These dimensions allow about 1 inch clearance all around the boiler.

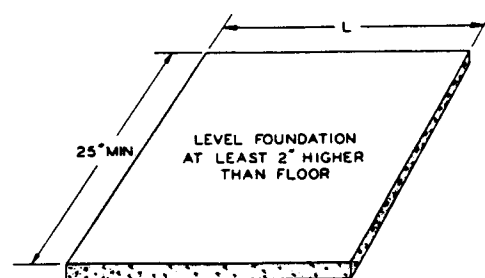


Figure 1

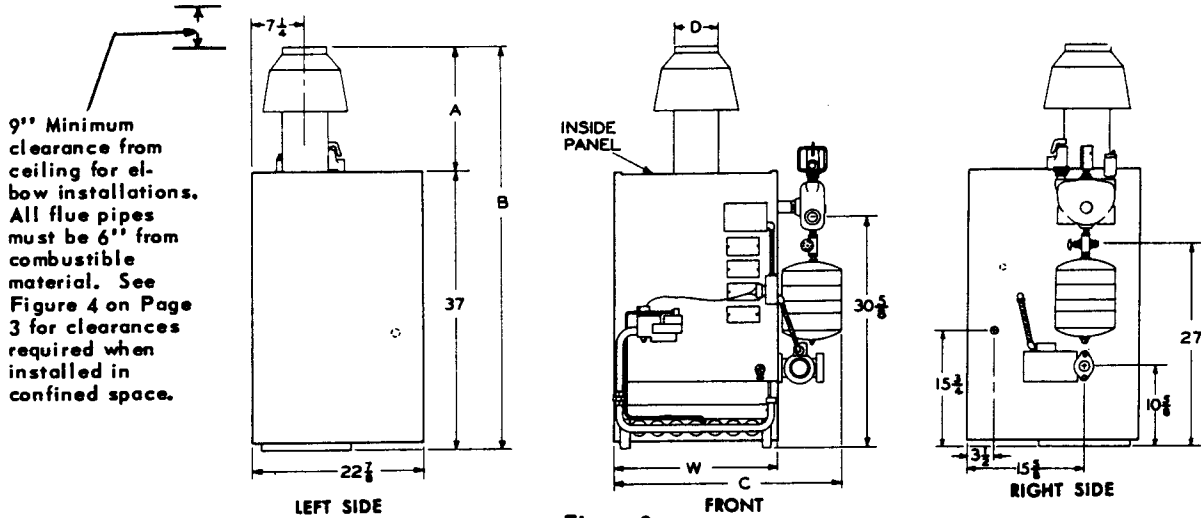


Figure 2

DIMENSIONS

Water Boiler Number	Number and size of		Dimensions - Inches							Gas Connection Size		
	Flows (in Purger-trol)	Return (in Circulator)	A	B	C	D	E	F	W	Nat.	Mixed	Propane
P-D-3	2-1"	1-1"	13-3/8	47-3/8	17 3/4	4	3	6	9 1/4	1/2"	1/2"	1/2"
P-D-4	2-1"	1-1"	13-3/8	47-3/8	20 1/4	4	3	4	11 1/4	1/2"	1/2"	1/2"
P-D-5	2-1"	1-1"	15-3/4	52-3/4	22 1/2	5	4	4	14 1/4	1/2"	1/2"	1/2"
P-D-6	2-1"	1-1"	15-3/4	52-3/4	25 1/4	5	4	3	16 3/4	1/2"	1/2"	1/2"
P-D-7	2-1 1/4"	1-1 1/4"	17-7/8	54-7/8	27 3/4	6	5	3	19 1/4	1/2"	1/2"	1/2"
P-D-8	2-1 1/4"	1-1 1/4"	17-7/8	54-7/8	30 1/4	6	5	2	21 1/4	1/2"	3/4"	1/2"
P-D-9	2-1 1/4"	1-1 1/4"	20-3/4	57-3/4	37 1/4	7	6	2	24 1/4	3/4"	3/4"	3/4"
P-D-10	2-1 1/4"	1-1 1/4"	20-3/4	57-3/4	39 1/4	7	6	2	26 1/4	3/4"	3/4"	3/4"

RATINGS AND DATA

Boiler No.	A.G.A. Input BTU Per Hour	A.G.A. Gross Output BTU Per Hour	Net I.B.R. Ratings * BTU Per Hour	Net Ratings Sq. Ft. @ 150 BTU Emission Per Sq. Ft.	Minimum A.S.M.E. Relief Valve Capacity BTU Per Hour	Flue ** Dia. Inches
P-D-3	50,000	40,000	30,000	200	40,000	4
P-D-4	75,000	60,000	45,000	300	60,000	4
P-D-5	100,000	80,000	60,000	400	80,000	5
P-D-6	125,000	100,000	75,000	500	100,000	5
P-D-7	150,000	120,000	90,000	600	120,000	6
P-D-8	175,000	140,000	105,000	700	140,000	6
P-D-9	200,000	160,000	120,000	800	160,000	7
P-D-10	225,000	180,000	135,000	900	180,000	7

* Net I-B-R ratings are based on net installed radiation of sufficient quantity for the requirements of the building and nothing need be added for normal piping and pick up. Exception: An additional allowance should be made for unusual piping and pick up loads.

** Chimney heights should be 20 feet. In special cases where surrounding conditions permit, chimney height may be reduced to 10 feet.

IMPORTANT - Compression Tank Sizing

No. 109 Extrol furnished for P-D-3 thru P-D-7 - No. 110 Extrol furnished for P-D-8 thru P-D-10.

The expansion volume is suitable for boilers installed in one-story or two-story houses with non-ferrous baseboard systems. Please note the following as a guide to other systems:

1. For systems employing cast iron radiators, an additional #15 Extrol will be required on P-D-4, 5, 6, 7, 8, 9, and 10 boilers.
2. For systems with cast iron baseboard, an additional #15 Extrol will be required on P-D-4 and 5 boilers. For P-D-6, 7, 8, 9 and

10 boilers, an additional #30 Extrol will be required.

3. Converted gravity systems may require additional compression tank capacity.

4. When additional compression tank capacity is required, do not replace the tank furnished on the boiler package with a larger tank. Instead, an additional tank should be connected to a tee in the supply or return line close to the boiler.

NOTE: Where the boiler is to be used with a radiant panel system or other low water temperature applications, a boiler bypass piping arrangement should be used to assure optimum system operation.

If the boiler is to be erected on a combustible floor our heat shield Part No. D-P26-A must be placed under the legs of the boiler base and on the floor to comply with A.G.A. approval. See Figure 3.

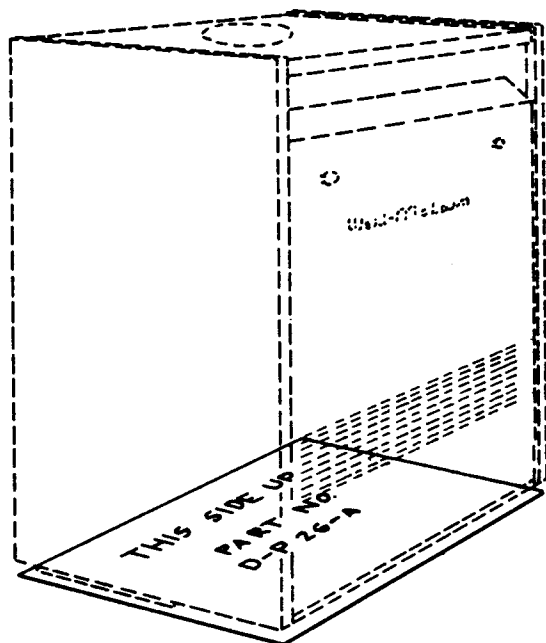


Figure 3

INSTALLING THE BOILER

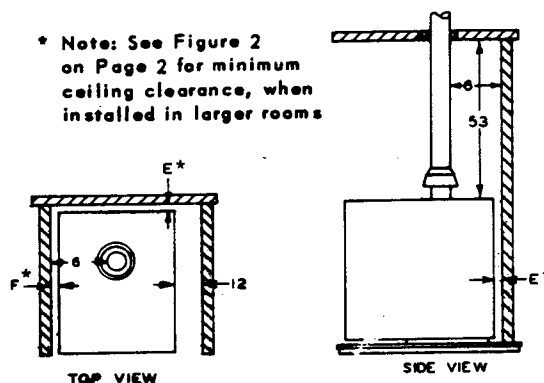
1. Position the boiler near the chimney and on a level concrete foundation. If the boiler is to be located in a confined space clearance should be provided on all sides as shown in Figure 4 for alcove installation. The flue pipe must not be closer than 6" from combustible material.
2. A factory installed air cushion tank and air elimination system is provided with the P-D boiler. The expansion volume is suitable for boilers installed in one-story houses or two-story houses with non-ferrous baseboard systems. When an additional air cushion tank is required, the tank may be connected to a tee in the supply or return line close to the boiler (see Page 2).

PIPING CONNECTION TO THE HEATING SYSTEM

1. The piping to the heating system should be made at this time. Do not bush the flow or return tappings, use reducing fittings when necessary to make the proper connection. The P-D boiler is supplied with a Purger-Trol with two supply tappings. The supply to the system may

MINIMUM CLEARANCE FOR ALCOVE INSTALLATION

* Note: See Figure 2 on Page 2 for minimum ceiling clearance, when installed in larger rooms



APPROVED FOR INSTALLATION ON COMBUSTIBLE FLOORING WHEN PART D-P 26-A IS INSTALLED UNDER THE ENTIRE BOILER

* See Table on Page 2 for Dimensions.

Figure 4

be used from both sides or one side. The unused supply tapping must be plugged with the plug supplied. No flow control device is required on this boiler because the circulator runs continuously until it reaches the circulator control setting.

2. The return line is piped directly to the flange on the circulator.
3. The P-D boiler is supplied with a fill-trol valve. When the cold water supply is connected to the fill-trol valve it will automatically fill the system at a reduced pressure and maintain minimum system pressure. Before connecting the water supply to the fill-trol follow the instructions on the tag attached to the handle of the fill-trol valve.

DRAFT HOOD

1. Install the draft hood to the outlet of the collector hood at the top of the jacket. The draft hood must be installed as it is received without any alterations.

CONNECT THE GAS SUPPLY TO THE BOILER *

Determine whether the gas supply is to be piped to the Right Side or Left Side of the Boiler.

1. If the gas supply is to be piped to the Right Side of the boiler, remove the knockout disc from the Jacket Right Side Panel and proceed to Step 3.
2. If the gas supply is to be piped to the Left Side of the boiler:
 - a. Remove the knockout disc from the Jacket Left Side Panel.
 - b. Remove the thermocouple lead and the pilot tubing from the gas valve.

* See Size of Piping to Gas Boilers on Page 5.

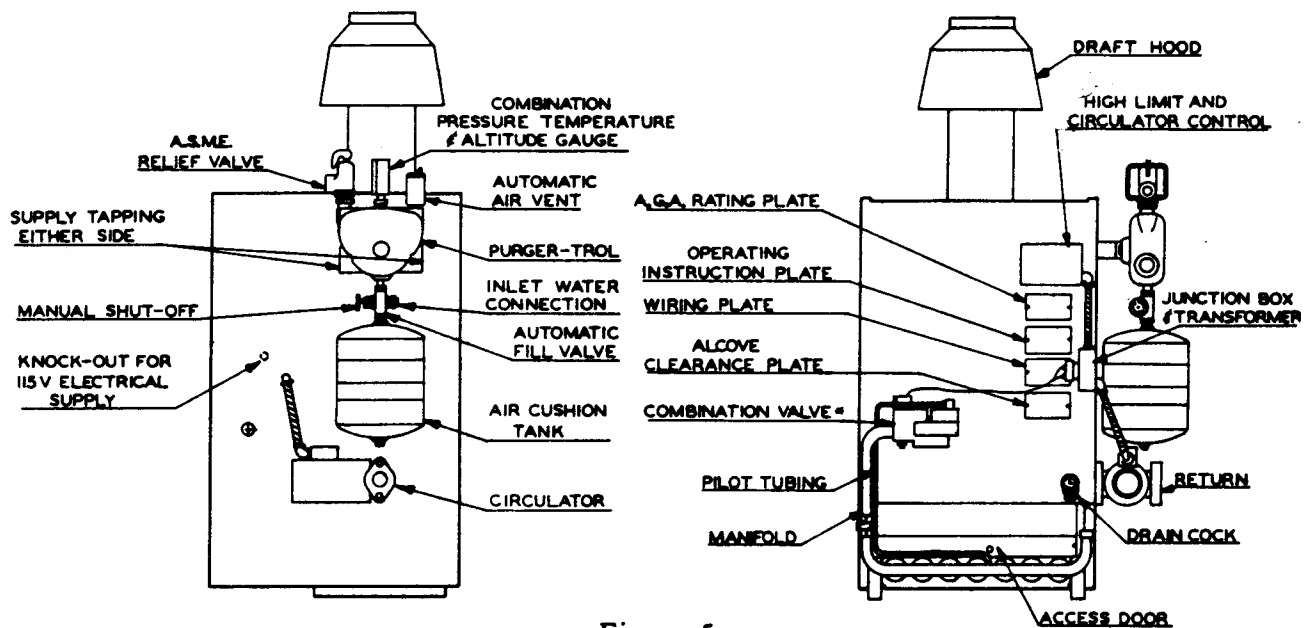


Figure 5

* NOTE: "PD-9" and "PD-10" boilers used with 800-950 BTU gases require the V81E gas valve in place of the combination Gas Valve; a pressure regulator, manual main shut-off valve, pilot cock, and a pilot filter (if required by utility) will be required with the

V81E gas valve. Pilot filter built into combination valve body. For Propane Gas, a combination gas valve and pressure regulator is supplied with a separate manual main shut-off valve, pilot cock, and pilot filter (if required by utility).

- c. Remove the cap at the Right Side of the gas manifold.
 - d. Disconnect the gas control assembly from the Left Side of the gas manifold and secure to the Right Side by means of the union.
 - e. Connect the thermocouple lead to the gas valve. Do not tighten more than 1/4 turn beyond finger tight.
 - f. Connect the pilot tubing to the gas valve. Do not tighten more than one full turn beyond finger tight.
 - g. Replace the cap at the Left Side of the gas manifold and be sure a gas-tight seal is maintained.
3. Connect the gas line to the meter. Install any additional manual main shut-off valve (not supplied) when required by local utility company. A drop leg must be installed at the inlet of the gas connection to the boiler to satisfy A.G.A. requirements.

Where the local utilities require that the drop leg be extended to the floor, place an appropriate length of pipe between the cap and tee. Any piping needed to comply with local codes must be furnished by installer.

4. Check all gas connections for leaks -- use a soapy solution -- do not use a flame. Liability

for damage done through the use of a flame when testing for gas leaks cannot be assumed by the manufacturer.

WIRING AND CONTROL FUNCTION

The boiler is shipped completely wired. The wiring diagram is on a plate located on the inner panel of the jacket. The P-D is supplied with a dual control, for high limit and circulator function. The high limit is set at the factory for 210° but may be changed according to the design temperature of the heating system. The circulator control setting should be set at 140°F.

When the thermostat calls for heat the burner will ignite and continue to operate until the room temperature is satisfied or the boiler water temperature reaches the high limit setting at which time the burner will go out. The circulator will continue to operate until the boiler water temperature reaches the setting of the circulator control.

The pump operates continuously until the water temperature reaches the setting of the circulator control at which time it will stop running. This type of system is fully automatic.

The power supply must be 115 volts which must be connected to the white and black wires in the junction box located on the jacket.

ADJUSTING THE BURNERS

Proper adjustment of the primary air shutters on the burners is essential for correct performance. Avoid a hard flame that burns close to the burners by proceeding as follows with each shutter:

1. Adjust the primary air shutter by closing until yellow tips appear on the flame.
2. Then, open the shutter very slowly until the yellow tips just disappear from the flame.
3. Lock the shutter in this position by tightening the shutter retaining screw securely.

Measure the gas input to the boiler by reading the meter. Be sure all other appliances connected to the same meter are shut off.

$$\frac{\text{Cu. ft. of Gas}}{\text{Minutes (at meter)}} \times 60 \text{ minutes/hr.} \times \text{heating value of gas in BTU/cu. ft.} =$$

BTU/Hr. boiler input as shown on boiler name plate.

If it is within 5%, adjust pressure regulator to obtain the desired flow (stem for adjustment is under the cap on top of the regulator). **TURN STEM CLOCKWISE TO INCREASE AND COUNTER-CLOCKWISE TO DECREASE THE RATE.**

If rate is more than 5% off of rated input, change orifice sizes. Check the burners again and re-adjust the flames if necessary. **NOTE: For proper aspiration the manifold gas pressure should be about 2-1/2 inches of water column for manufactured gas, 3-1/2 inches for natural and 11 inches for propane.**

SIZE OF PIPING TO GAS BOILERS

In determining the size of gas pipe, the following factors should be considered:

- a. Length of pipe and number of fittings.
- b. Maximum gas consumption to be provided for (including possible future expansion).
- c. Allowable loss in pressure from meter outlet to boiler. This is specified as three-tenths of an inch, water column.

The volume to be used (in cubic feet per hour) shall be determined, whenever possible; directly

from the BTU ratings of the boiler which will be installed and the heating value of the gas to be used. To obtain the cubic feet per hour, divide the total BTU input of the boiler by the BTU heating value per cubic foot of gas.

For 604 BTU gas allow 1.7 cubic feet and for natural gas allow .96 cubic feet for each 1000 BTU. See table below for determining the capacity of pipes of various diameters and lengths.

PIPE DELIVERY SCHEDULE

* CAPACITY OF PIPES IN CUBIC FEET OF GAS PER HOUR				ADDITIONAL LENGTH OF PIPE TO BE ADDED FOR EACH ELBOW OR TEE BEND IN THE LINE	
Length of Pipe in Feet	Pipe Size			Pipe Size, Inches	Additional Length, Feet
	1/2"	3/4"	1"		
10	132	278	520	1/2	1.3
20	92	190	350	3/4	1.7
30	73	152	285	1	2.2
40	63	130	245		
50	56	115	215		
75	45	93	175		
100	38	79	150		
150	31	64	120		

* Flow determined by Dr. Pole's Formula -- Specific Gravity:
.60 Pressure Loss: 3/10" water.

STARTING UP SYSTEM FOR ALL GASES

- A. The following prelighting steps are recommended to insure all around safety.
1. Fill system with water. See home owners card for instructions.
 2. Turn off main electric switch.
 3. Purge the air from the main gas line.
 4. Check all piping for gas leaks.

CAUTION - Allow boiler to ventilate for 5 minutes after checking piping for gas leaks. **TO CHECK FOR GAS LEAKS, USE A SOAPY SOLUTION, DO NOT USE A FLAME.** Liability for damage done through the use of a flame when testing for gas leaks cannot be assumed by the manufacturer.

- B. Start up Boiler as indicated in the following steps:

SHUTTING OFF BOILER

1. Turn manual gas cock to the off position.
2. Turn off main boiler electrical switch.

ADDITIONAL INSTRUCTIONS

Important: Before leaving job, make sure unit checks electrically.

1. Set the room thermostat above room temperature so that unit will start.
2. When unit has operated for about 5 to 10 minutes allowing the boiler water temperature to rise to about 120° to 130° F. then turn the high limit control setting below the boiler water temperature. The burners should go out then turn the high limit control up above the boiler water temperature the burner should ignite.

WHEN BOILER IS USED WITH REFRIGERATION SYSTEM

When boiler is used in connection with refrigeration systems, it shall be installed so that the chilled medium is piped in parallel with the heating boiler and with appropriate valve to prevent the chilled medium from entering the heating boiler.

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 shall be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

STARTING UP BOILER

Follow the lighting procedure outlined on the Operating Instruction Plate mounted on the jacket interior panel.

CAUTION: Make sure manual gas cock knob has been in off position for at least 5 minutes before lighting.

THERMOSTAT HEATER SETTING

The Thermostat Heater Setting must be adjusted to match the current requirements of the primary control used. It may be necessary to raise the Thermostat Heater Setting to provide a minimum "on" period of two (2) minutes in mild weather to assure optimum system operation. To lengthen operation, move the Heater Indicator to a higher setting as indicated by the direction of the arrow on the Heater Indicator Scale.

Then, set the high limit control to the desired maximum boiler water temperature.

3. Set the room thermostat to desired room temperature.
4. Make sure that the primary air shutters are tightened in a fixed position so that they will not be subject to an accidental change in position.

For additional information on controls, see control sheets supplied with boiler.

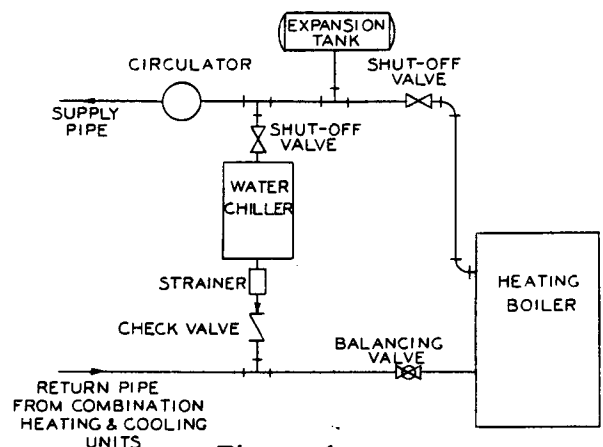


Figure 6

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