

w/ Bldg Permit # 030999

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

04-1045	Issue Date:	CBL: 374 A023001
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Location of Construction: 184 Auburn St	Owner Name: Shalom House Inc	Owner Address: Po Box 560	Phone:
Business Name:	Contractor Name: Granite Corp	Contractor Address: 18 Hill St Oakland	Shone 2074659229
Lessee/Buyer's Name	Phone:	Permit Type: HVAC	Zone: C-30

Past Use: commercial 5 unit <i>residential</i>	Proposed Use: commercial 5 unit <i>residential</i>	Permit Fee: \$138.00	Cost of Work: \$12,200.00	CEO District: 5	Zone: PRUD
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Proposed Project Description: changing electrical heating system to a gas heating system in bldg.# 4 <i>Entire property use in phase 2: 21 D.U. PRUD</i>	FIRE DEPT: <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied	INSPECTION: Use Group: <i>U</i> Type: <i>Hatting</i>
	Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>

Permit Taken By: dmartin	Date Applied For: 07/27/2004	Zoning Approval
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Special Zone or Reviews <input type="checkbox"/> Shoreland <input type="checkbox"/> Wetland <input type="checkbox"/> Flood Zone <input type="checkbox"/> Subdivision <input type="checkbox"/> Site Plan Maj <input type="checkbox"/> Minor <input type="checkbox"/> MM <input type="checkbox"/> Date: <i>OK 7/27/04</i>	Zoning Appeal <input type="checkbox"/> Variance <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Conditional Use <input type="checkbox"/> Interpretation <input type="checkbox"/> Approved <input type="checkbox"/> Denied Date:	Historic Preservation <input checked="" type="checkbox"/> Not in District or Landmark <input type="checkbox"/> Does Not Require Review <input type="checkbox"/> Requires Review <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied Date: <i>[Signature]</i>
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CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE OF WORK. TITLE		DATE	PHONE



FILL IN AND SIGN WITH INK

APPLICATION FOR PERMIT HEATING OR POWER EQUIPMENT

04 10 45

374 A0²³

To the INSPECTOR OF BUILDINGS, PORTLAND, ME.

The undersigned hereby applies for a permit to install the following heating, cooking or power equipment in accordance with the Laws of Maine, the Building Code of the City of Portland, and the following specifications:

Location / CBL BDC #4 180 Use of Building APARTMENTS Date 2/23/04
 Name and address of owner of appliance SHAWM HOUSING
PORTLAND ME
 Installer's name and address GRANITE CORP
Box 370 ME 04103 Telephone 465-9229

Location of appliance:

- Basement Floor
 Attic Roof

Type of Fuel:

- Gas Oil Solid

Appliance Name: Peerless PSC-00 (2)

U.L. Approved Yes No

Will appliance be installed in accordance with the manufacture's installation instructions? Yes No

IF NO Explain: _____

The Type of License of Installer:

- Master Plumber # _____
 Solid Fuel # _____
 Oil # _____
 Gas # 3466
 Other _____

Type of Chimney:

- Masonry Lined
 Factory built _____

- Metal
 Factory Built U.L. Listing # _____

- Direct Vent
 Type JAILESS Z-UNIT UL# _____

Type of Fuel Tank

- Oil
 Gas NATURAL

Size of Tank _____

Number of Tanks _____

Distance from Tank to Center of Flame _____ feet.

Cost of Work: \$ 12,200

Permit Fee: \$ 131.00

138.00

Approved

Approved with Conditions

Fire: _____

Ele.: _____

Bldg.: _____

See attached letter or requirement

Inspector's Signature

Date Approved

Signature of Installer _____

City of Portland, Maine - Building or Use Permit

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No: 04-0016	Date Applied For: 01/07/2004	CBL 374 A007001
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Location of Construction: 180 Auburn St	Owner Name: Shalom Apartments	Owner Address: Po Box 560	Phone: 207-874-1080
Business Name: n/a	Contractor Name: The Thaxter Company	Contractor Address: 55 Bell Street Portland	Phone (207) 878-5553
Lessee/Buyer's Name n/a	Phone: n/a	Permit Type: Additions • Multi Family	

Proposed Use: Residential Units / Construct three new single story buildings (total of 5,980 sq. Ft.) consisting of 10 new units. Phase 2 of permit # 030999.	Proposed Project Description: Build three new single story buildings for 10 new units. (total of 5,980 sq. Ft.)
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Dept: Zoning **Status:** Approved with Conditions **Reviewer:** Marge Schmuckal **Approval Date:** 01/16/2004
Note: 1/13/04 Kandi has not given me a stamped approved site plan yet. - I am requesting one - This is an R-3 **Ok to Issue:**
 PRUD contract

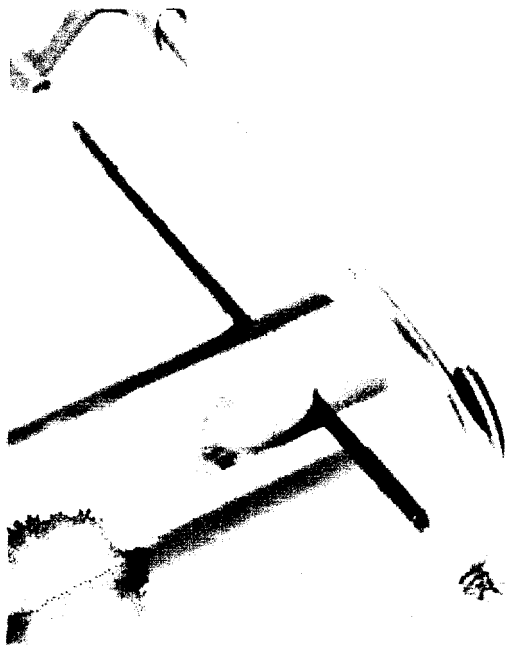
- 1) Per your contract, there shall be no structures erected in the recreation open space other than benches and/or tables or a gazebo.
- 2) Separate permits shall be required for future decks, sheds, pools, and/or garages.
- 3) This property shall remain a twenty-one (21) family dwelling PRUD after the completion of this project. Any change of use shall require a separate permit application for review and approval.
- 4) This permit is being approved on the basis of plans submitted. Any deviations shall require a separate approval before starting that work.

Dept: Building **Status:** Approved **Reviewer:** Mike Nugent **Approval Date:** 04/29/2004
Note: **Ok to Issue:**
 1) Fire separation assembly penetrations must be protected in accordance with Section 7 of the Building Code

Dept: Fire **Status:** Approved with Conditions **Reviewer:** Lt. MacDougal **Approval Date:** 01/20/2004
Note: **Ok to Issue:**
 1) a fire lane shall be maintained to all buildings

Comments:
 2/5/04-gg: Hold draw, waiting for site plan (Kandi Talbot approval). /gg

GAS VENT



*The lengths of pipe may be cut on non-expanded end using aviation snips or a hacksaw (24pi). The cut end must be filed or sanded smooth before joining.

Features:

Gasketed connections

The highest pressure rating in the industry

Fusion welded pipe seams

The only metallic special gas vent that can be cut to length on site

1" clearance to combustibles

Benefits:

No sealant required
- No cure time, no call backs

More than 3 times the industry standard

Provides an air-tight seam, smooth finish and a better fit

Being able to cut the product in the field will save you time and money. Pipe available from 6" thru 10"

Can be installed with minimum clearance to combustibles

Z-Vent is manufactured using AL29-4C[®] advanced ferritic stainless steel** with unmatched corrosion resistance for use with condensing furnaces and boilers. Z-Vent was developed in the early 1980s and has thousands of field installations to date. Z-Vent is now manufactured utilizing a fail-safe gasket connection. **No sealant is required.**

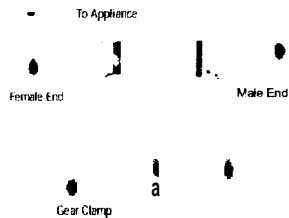
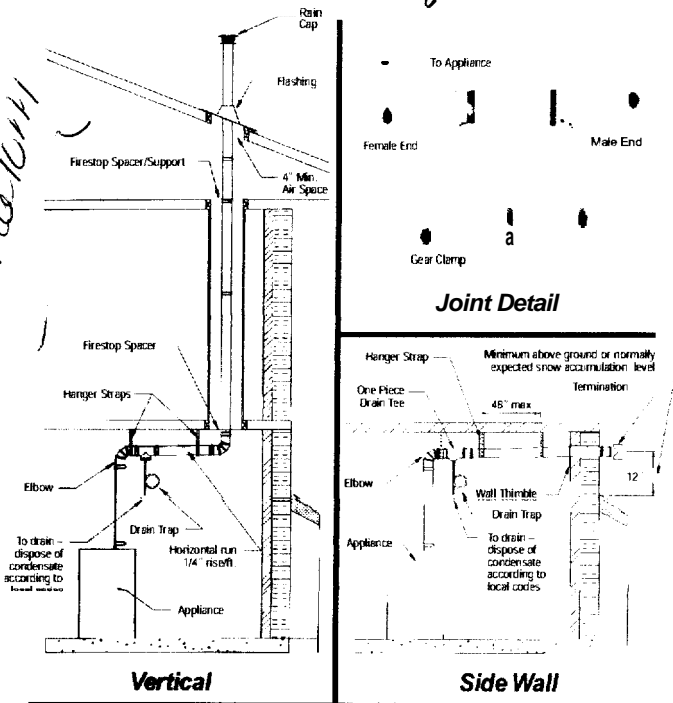
Z-Vent is suitable for use with boilers, high efficiency furnaces, pool heaters, unit heaters and water heaters. see website for list of equipment



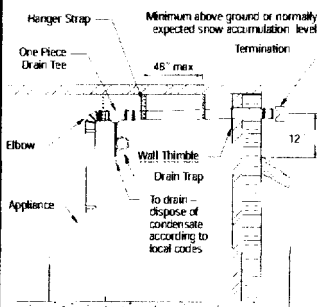
Typical Installations:*

*Through Roof
Single story*

Shallow



Joint Detail



Side Wall

HORIZONTAL DRAINPIPE

PIPE*

Catalogue No.	Size	A	B
2SVEBW6	3"	3"	8.5"
2SVEDWC	4"	4"	10.5"

Catalogue No.	Size	A
2SVEPWC03	3"	3"
2SVEPWC04	4"	4"

45 DEG. ELBOW

90 DEG. ELBOW

Catalogue No.	Size	A	B	C
2SVEEWC0346	3"	3"	8.25"	5.5"
2SVEEWC0445	4"	4"	7"	5.7"

Catalogue No.	Size	A	B
2SVEEWC0390	3"	3"	8.25"
2SVEEWC0490	4"	4"	7"

VERTICAL DRAIN/TEE

TERMINATION

2SVEVWC04	4"	4"	7.5"
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Catalogue No.	Size	A	B	C
2SVSTTX03	3"	3"	6"	6.25"
2SVSTTX04	4"	4"	7"	9.25"

*Pipe lengths available - 6", 1', 2', 3', 4', 5', 8', 10'

Appliance connectors available for most equipment. Please refer to price guide.

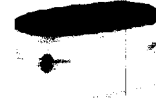
*All drawings are for illustrative purposes only. Please refer to guide for specific U.L. installation instructions. Always defer to local building codes.
**AL29-4C is a registered trademark of Allegheny Ludlum Steel Corporation



Flexible S/S Oval to Round
 Part # 2ZLSSOR ___Dia. ___Lgth.
 Available in 6", 7", 8", 10" Diameters
Note: To be used in those areas that are re-sealable in one application. Oval accessories available.



Flexible S/S Full Oval
 Part # 2ZLSSOX ___Dia ___Lgth
 Available in 6", 7", 8", 10" Diameters
Note: Oval accessories available



Stainless Steel Dripless Type "A" Oval Connector
 Part # 2CNTRA ___Dia.
 Available in 6", 7", 8", 10" Diameters
 Used to join Z-FLEX Oval Liner to Oval T-Section and Oval to Oval Liner or when going through a fireplace adapter.



Stainless Steel Single Oval Base/Teel
 Part # 2ZRBTOX ___Dia
 Available in 6", 7", 8", 10" Diameters

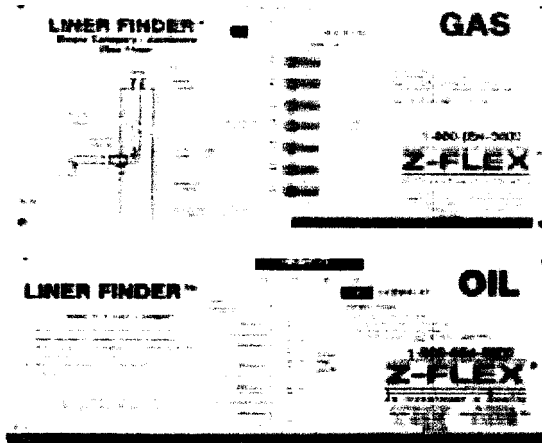


Oval to Round Adapter
 Part # 2ZRORAX ___Dia
 Available in 6", 7", 8", 10" Diameters



Round to Oval Adapter
 Part # 2ZRRORAX ___Dia
 Available in 6", 7", 8", 10" Diameters

The easy-to-apply solution



Apply the right liner every time with LINER FINDER™ from Z-FLEX.

Our Gas and Oil Liner Finders make it fast and easy to match the right Z-FLEX product and size to the liner application. The convenient "slide rule" design is simple to use, portable, and foolproof.

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 20 Commerce Park North,
 Bedford, NH 03110-6911
 Tel (603) 669-5136 1-800-654-5600
 Fax 1-888-889-3539

CANADA
 452 Attwell Drive
 Etobicoke, ON M9W 5C3
 Tel (416) 679-0045
 Fax (416) 679-0051

E-mail sales@7-FLEX.com Website www.7-FLEX.com

09/01

Series PSC

Gas Boilers

Installation, Operation & Maintenance Manual

TO THE INSTALLER:

This manual is the property of the owner and must be affixed near the boiler for future reference.

TO THE OWNER:

This boiler should be inspected annually by a Qualified Service Agency.



HI Division
of gama



ASME



PeerlerrBoilers.com

PB HEAT, LLC

PO BOX 447 • NEW BERLINVILLE, PA 19545-0447

REPAIR PARTS

Table 11

Item No.	Description	(Quantity Length) Stock Code			
		PSC-03	PSC-04	PSC-05	PSC-06
16	Insulation Blanket, 1/2" x 1.50", block to base	(47")50867	(54") 50867	(61")50867	(67")50867
17	Block	91279	91280	91281	91282
18	Flue Baffle	(2)51584	(3)51584	(4)51584	(5)51584
19	Insulation Blanket, 1/2" x .75", flue collector to block	(34")50866	(47")50866	(47")50866	(54")50866
20	Flue Collector	50131	50132	50133	50134
21	Gasket, Orifice Plate	(2) 50135	(2)50135	(2)50135	(2)50135
22	Orifice Plate, normal altitude Natural Gas models only	PSC5002	PSC5002-1	PSC5002-2	PSC5002-3
	Orifice Plate, normal altitude LP Gas models only	PSC5003	PSC5003-1	PSC5003-2	PSC5003-3
23	Fan	50775	50775	50775	50775
24	Fan Adapter	50200	50200	50200	50200
25	Jacket Set	90366	90367	90368	90369
	Gas Valve, SV9501M2700, Natural Gas models only	51682			
	Gas Valve, SV9501M2064, LP Gas models only	51691			
	Pilot Assembly, Q3480B1058, w/Natural Gas Orifice	7794			
	Pilot, Q3480B1058, LP Gas models only	50205			
	Limit Control, L4080B1253 (less well)	50210			
	Pressure Switch, Standard altitude, FS6124A2481	50170			
	Transformer Relay Center, R8285D1026	50567			
	Relay (mounted on jacket), R4222D1005	50223			
	Safety Relief Valve, 30psi, Conbraco 10-408-05	50501			
	Safety Relief Valve, 50psi, Watts #350	99950			
	Temperature-Pressure Gauge	51774			
	Circulator, Taco 007	50736			
	Flange Set, Taco 110-Z53BP , 1 1/4	51042			
	Heat-Fab Vent Adapter 7301 AMTK	50199 (Also Available From Heat-Fab Distributor)			
	Z-Flex Locking Band SVSLBX03	Available from Z-Flex Distributor			
	ProTech Vent Adapter FSA-PSC/DE-3	Available from ProTech Distributor			
	Flex-L Star-34 Vent Adapter SRAPPA3	Available from Flex-L Distributor			
	Wall Thimble Assembly, up to 11 1/2" walls	90249			
	Wall Thimble Assembly, up to 20 walls	90350			
	Heat-Fab vent pipe, elbows	Specify item including pipe length. Also available from Heat-Fab Distr.			
	Z-Flex, ProTech, Flex-L vent pipe, elbows	Available from Vent Manufacturer Distributors			

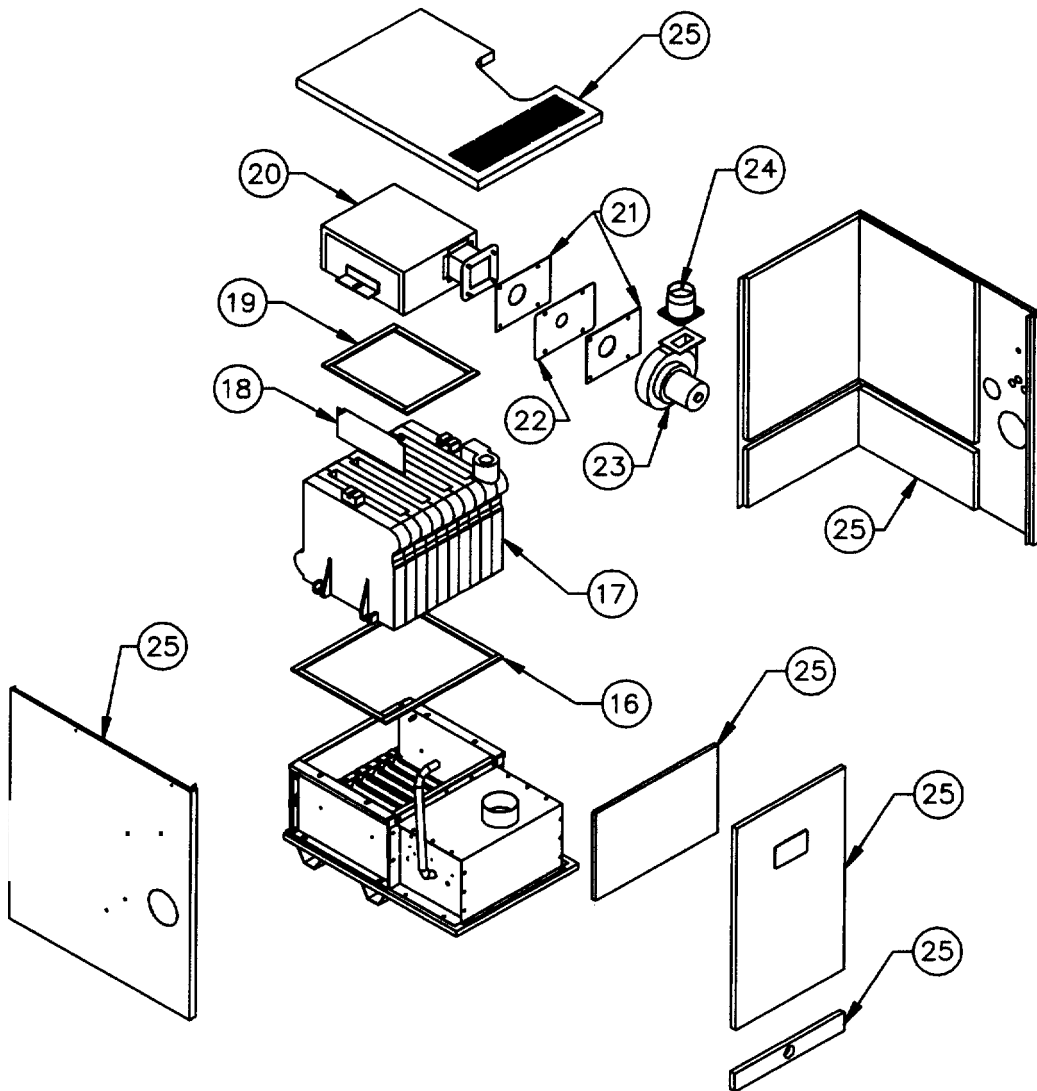


Figure 28

REPAIR PARTS

Table 10

Item No.	Description	(Quantity Length) Stock Code			
		PSC-03	PSC-04	PSC-05	PSC-06
1	Base Assembly	91518	91883	91897	91909
2	Floor Pan	50100	50101	50102	50103
3	Base Rear Panel Assembly	6205	6206	6207	6208
4	Base Observation Port Cover	51771	51771	51771	51771
5	Base/Air box Spacer	(2)50152	(2) 50152	(2) 50152	(2) 50152
6	Air Box Right Side				
7	Air Box Left Side	PSC2023	PSC2023	PSC2023	PSC2023
8	Air Box Top/Front Cover	PSC2024	50144	50145	PSC2024
9	Air Box Diffuser Screen	PSC2025	PSC2025-1	PSC2025-2	PSC2025-3
10	Rope Gasket Seal, Air Box	(56") 50718	(63") 50718	(69") 50718	(76") 50718
12	Flame Rollout Switch Bracket	50119		50119	
	Burner with Pilot Bracket	51539	51539	51539	51539
14	Orifice, #48, normal altitude Natural Gas only	(4) 50894	(6) 50894	(8) 50894	(10) 50894
	Orifice, #56, normal altitude LP Gas only	(4)50899	(6)50899	(8) 50899	(10) 50899
15	Gas Manifold	50121	50122	50123	50124

11. REPAIR PARTS

REPAIR PARTS SERIES PSC GAS BOILER

Repair parts are available from your installer or by contacting PB Heat, LLC, New Berlinville, PA. Use the figures and tables on pages 33-35 to assist in ordering parts.

Note: Remember to include boiler model number and serial number when ordering parts.

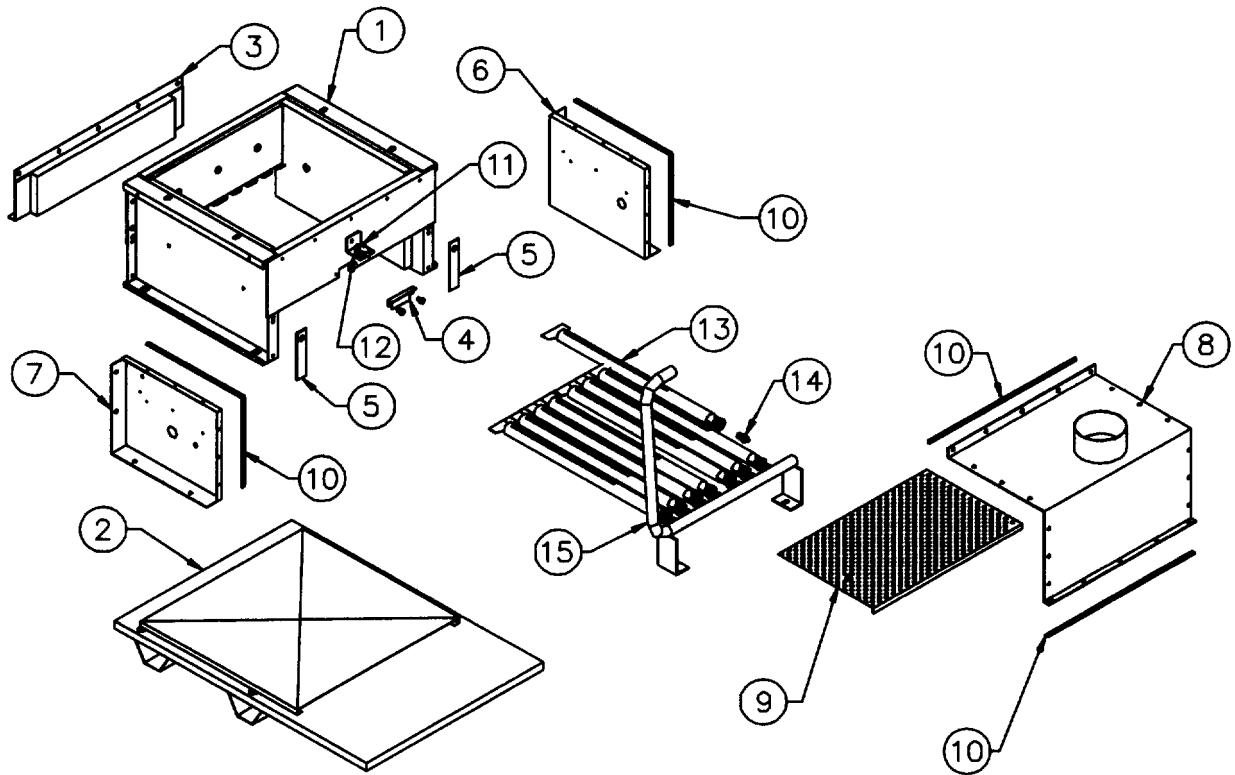


Figure 27

10. BOILER DIMENSIONS & RATINGS

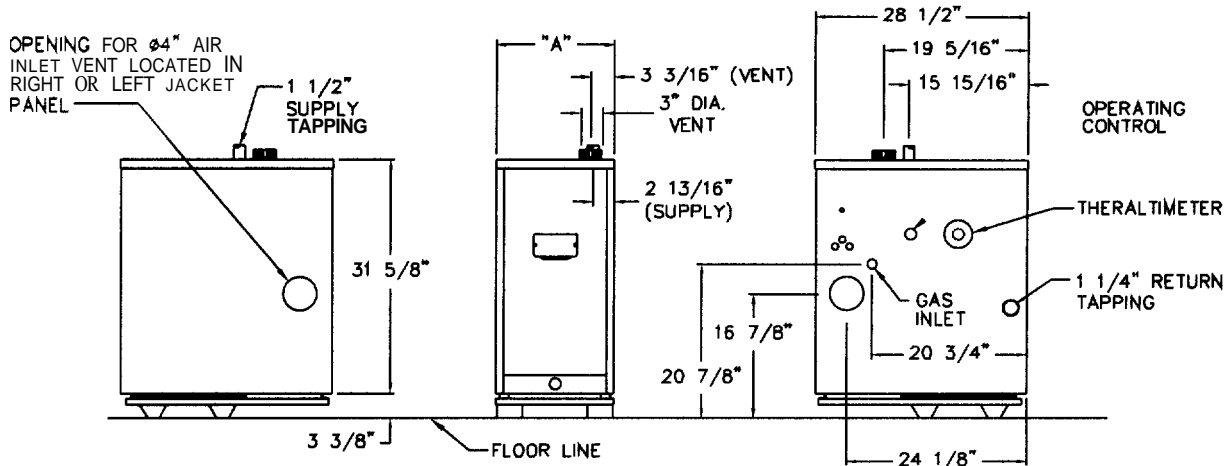


Figure 26: Boiler Views

Table 8: Series PSC Boiler Dimensions

SERIES PSC BOILER DIMENSIONS	
Boiler Model Number	Jacket width "A"
PSC-03	12 1/2"
PSC-04	15 7/8"
PSC-05	19 1/4"
PSC-06	22 3/4"

Table 9: Series PSC Boiler Ratings

SERIES PSC BOILER RATINGS					
Boiler Model Number	CSA Input " MBH	DOE Heating Capacity MBH ³	Net I=B=R Ratings Water MBH ^{1,2}	Seasonal Efficiency (AFUE) % ³	Water Content (Gal.)
PSC-03	70	58	50	83.0	4.72
PSC-04	105	88	77	83.0	6.00
PSC-05	140	117	102	83.0	7.28
PSC-06	175	146	127	83.0	8.56

- 1 Net I=B=R water ratings based on an allowance of 1.15.
- 2 Consult factory before selecting a boiler for installations having unusual piping and pickup requirements, such as intermittent system operation, extensive piping systems, etc.
- 3 Heating Capacity and Annual Fuel Utilization Efficiency (AFUE) ratings are based on U.S. Government test



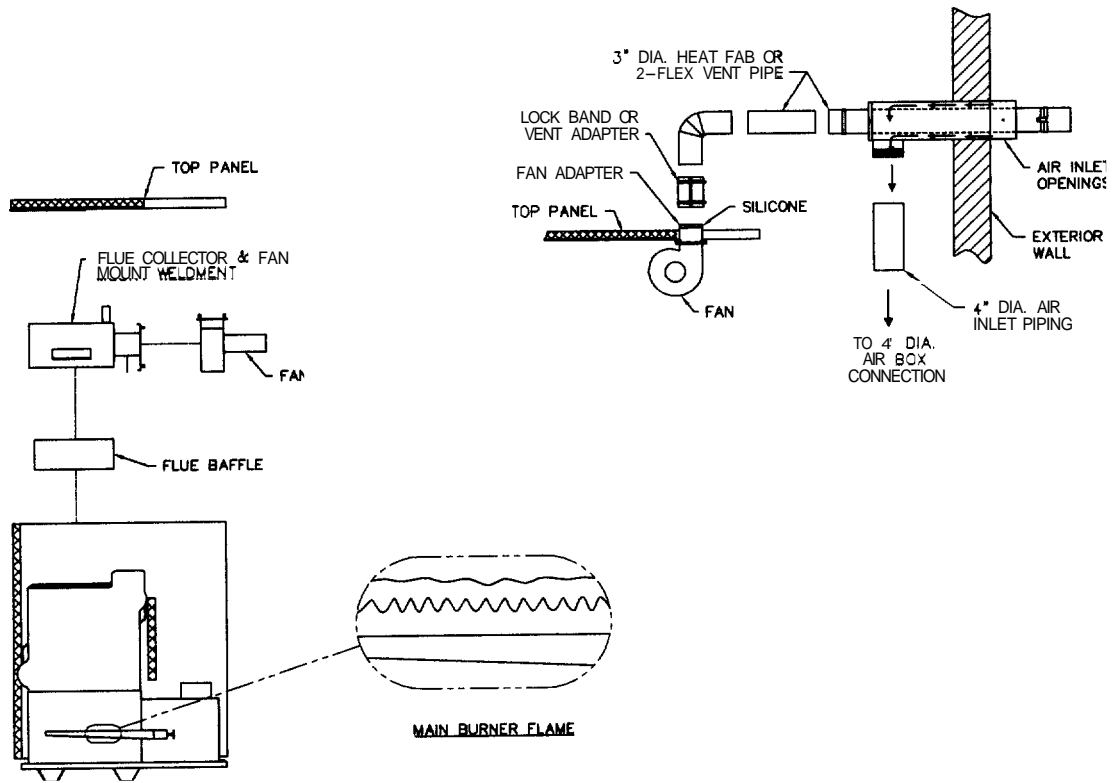


Figure 25: Inspection of Flueways, Burners, and Vent System.

E. ANNUALLY (BEFORE START OF HEATING SEASON)

DANGER

When servicing or replacing components, be absolutely certain that the following conditions are met:

- Water, gas and electricity are off.
- The boiler is at room temperature.
- There is no pressure in the boiler.

1. Inspect flueways, burners and vent system. See Figure 25.
 - a. Refer to the Operating Instructions in Figure 21 to properly turn **off** the gas to the boiler. Turn **off** all electrical power to the boiler.
 - b. Remove jacket removable door, air inlet pipe, air box cover, and air box diffuser screen.
 - d. Remove burner hitch pin clips. Disconnect pilot tubing at compression elbow.
 - e. Disconnect pilot harness at gas valve. Gently pull pilot harness further inside air box to be able to remove burner with attached pilot.
 - f. Remove burners and pilot.
 - g. Brush **gas outlet** ports lightly using a **soft** bristle brush. If extensive corrosion in outlet ports, replace.
 - h. Examine pilot hood and igniter for corrosion, scale, ceramic cracking. Replace if necessary.
 - i. Remove 3" diameter vent pipe from fan adapter.
 - j. Remove top jacket panel, flue collector/fan assembly, and flue baffles.
 - k. Examine **flueways** and flue collector/fan for scale, soot, and **loose rust**.

WARNING

Soot accumulation indicates boiler malfunction. Cause of malfunction must be **determined** and corrected before returning boiler to service.

- l. If necessary, brush flueways with wire brush and remove **scale** and loose **rust** from flue baffles. If corroded, replace baffles.
- m. Reinstall flue **baffles**.
- n. Examine flue collector blanket seal. **Reposition/replace** as necessary to assure air tight seal between flue collector and heat exchanger.
- o. Reinstall flue collector/fan assembly.
- p. Reinstall jacket top panel.

- q. Reinstall pilot, burners, hitch pin clips. Reconnect pilot harness to **gas** valve, gently pulling harness to length required to reach gas valve.
- r. Reinstall air box diffuser.
- s. Examine air box cover seal. **Reposition/replace** as necessary to assure air tight seal.
- t. Reinstall air box cover.
- u. Examine entire vent system for corrosion, support and joint integrity. **Repair** as necessary. Remove any debris inside vent.

WARNING

Leaks in the vent system will cause products of combustion to enter structure (vent system operates under positive pressure).

- v. Reconnect vent pipe to fan adapter. Reseal using high-temp silicones as shown in Section 4, Venting, Ventilation and Air Inlet.
 - w. Refer to Operating Instructions in Figure 25 to properly return the boiler to operation.
2. Check the pilot and main burner flame. See Figure 23. The pilot should provide a steady flame enveloping $3/8"$ to $1/2"$ of the flame sensor. If required, adjust the pilot as stated in the **gas** valve manufacturer's instructions. The main burner flame inner cone should be approximately $1-1/2"$ high and should have a very sharp, blue color characteristic.

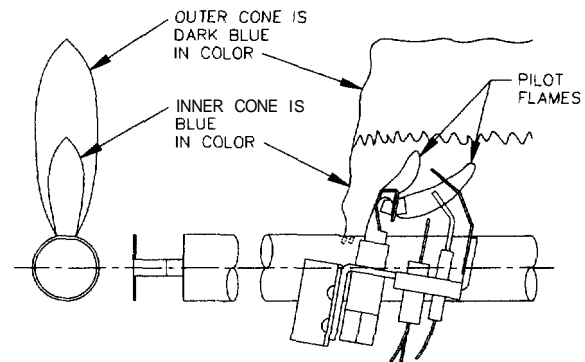


Figure 24: Intermittent Pilot and Main Burner Flame

A. GENERAL

1. Disconnect this boiler from the **gas** supply piping during any pressure testing of the **gas** system.
2. Check pipes adjacent to cold **walls** or in unheated **spaces**. Insulate and tape them if necessary to be sure they can't **freeze** up. Keeping the water moving at all times will reduce the likelihood of freezing. See Section 3 for antifreeze instructions.
3. If there is considerable foreign matter in the boiler water, the boiler should be shut down and allowed to cool, then drained and thoroughly flushed out. **Use** the drain valve at the bottom of the return connection to drain the boiler. Pipe the drain **cock** to a suitable drain or containment device if antifreeze is used. Flush the system to remove remaining matter. If there is evidence that hard scale has formed on the internal **surfaces**, the boiler should be **cleaned** by chemical means as prescribed by a qualified water treatment **specialist**.

B. DAILY (WITH BOILER IN USE)

Daily boiler observation can be **performed** by the **owner**. If any potential problems are found, a qualified installer or service technician/agency must be notified.

1. Remove any combustible materials, gasoline and other flammable liquids and **substances** that generate flammable **vapors** from the area where the boiler is contained. Make certain that the boiler area has ample air for ventilation and that there **are** no obstructions to the free flow of air to and from the **boiler**.
2. Observe general boiler conditions (unusual noises, vibrations, etc.)
3. **Observe** operating temperature and pressure on the combination gauge located on the right side of the boiler. **Boiler pressure** should never be higher than 5 psi below the rating shown on the safety relief valve (25 psig maximum for a **30 psig** rating, 45 psig maximum for a 50 psig rating). The valve rating can be found on the top of the safety relief valve (see Figure 4 for location of the safety relief valve). Boiler temperature should never be higher than **250° E**
4. Check for water leaks in **boiler** and system piping.

5. Smell around the appliance area for **gas**. If you smell **gas**, follow the procedure listed in the Operating Instructions to shut down appliance in Figure 21.

C. WEEKLY (WITH BOILER IN USE)

1. Flush float-type low-water **cut-off** (if used) to remove sediment from the **float** bowl as stated in the manufacturer's instructions.

D. MONTHLY (WITH BOILER IN USE)

1. Check boiler **room** floor drains for proper functioning.
2. Check function of the safety relief valve (monthly unless specified otherwise by manufacturer) by performing the following test:
 - a. Check valve piping to determine that it is properly installed and supported.
 - b. Check boiler operating temperature and pressure.
 - c. **Lift the try** lever on the safety relief valve to the **fill** open position and hold it for at least five seconds or until clean water is discharged.
 - d. Release the try lever and allow the valve to close. If the valve leaks, operate the lever **two** or three times to clear the valve seat of foreign matter. It may take some time to determine if the valve has shut completely.
 - e. If the valve continues to leak, it must be replaced before the boiler is returned to operation.
 - f. Check that operating pressure and temperature have returned to normal.
 - g. Check again to confirm that valve has closed completely and is not leaking.
3. Test low-water cut-off (if used) as described by the manufacturer.
4. Test limit as described in Section 7, 'Check-Out Procedure.'
5. Test function of **gas** safety shut-off features as described by **gas** valve and ignition control manufacturer.

9. MAINTENANCE

WARNING

Product Safety Information Refractory Ceramic Fiber Product

This appliance contains materials made from refractory ceramic fibers (RCF). Airborne RCF, when inhaled, have been classified by the International Agency for Research on Cancer (IARC), as a possible carcinogen to humans. After the RCF materials have been exposed to temperatures above **1800°F**, they can change into crystalline silica, which has been classified by the **IARC** as carcinogenic to humans. If particles become airborne during service or repair, inhalation of these particles may be hazardous to your health.

Avoid Breathing Fiber Particulates and Dust

Suppliers of RCF recommend the following precautions be taken when handling these materials:

Precautionary Measures:

Provide adequate ventilation.

Wear a **NIOSH/MSHA** approved respirator.

Wear long sleeved, loose fitting clothing and gloves to prevent skin contact.

Wear eye goggles.

Minimize airborne dust prior to handling and removal by water misting the material and avoiding unnecessary disturbance of materials.

Wash work clothes separately from others. Rinse washer thoroughly after use.

Discard RCF materials by sealing in an airtight plastic bag.

First Aid Procedures:

Inhalation: If breathing difficulty or irritation occurs, move to a location with fresh clean air. Seek immediate medical attention if symptoms persist.

Skin Contact: Wash affected area gently with a mild soap and warm water. Seek immediate medical attention if irritation persists.

Eye Contact: Flush eyes with water for **15** minutes while holding eyelids apart. Do not rub eyes. Seek immediate medical attention if irritation persists.

Ingestion: Drink 1 to 2 glasses of water. Do not induce vomiting. Seek immediate medical attention.

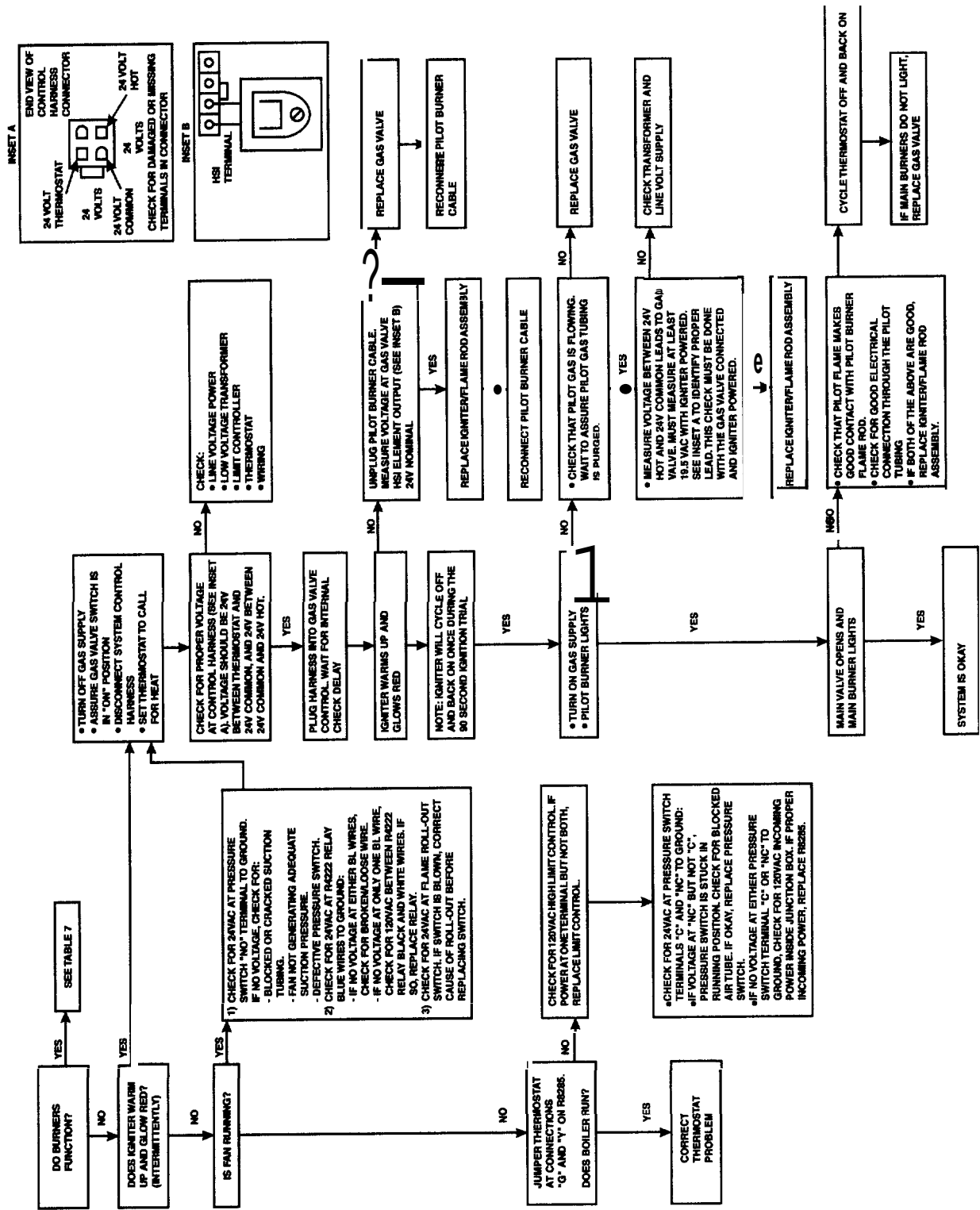


Figure 23: Boiler Troubleshooting Guide (Burners Not Functioning)

TROUBLESHOOTING

Table 7: Boiler Troubleshooting Guide (Burners Functioning)

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTIONS
Burners not functioning.	See Figure 23	See Figure 23
Burners will not shut down.	<ol style="list-style-type: none"> 1. Defective gas valve. 2. Short circuit. 	<ol style="list-style-type: none"> 1. Use Figure 23 to troubleshoot intermittent ignition gas valve. Replace if necessary. 2. Check and correct wiring.
Flashback or burning at orifice spuds.	<ol style="list-style-type: none"> 1. Manifold gas pressure too low. 2. Improperly sized/drilled orifice spuds. 3. Leaking gas valve. 4. Burrs on orifice. 5. Low supply gas pressure. 	<ol style="list-style-type: none"> 1. Adjust to proper pressure. 2. Install correct spuds. 3. Replace valve. 4. Remove burrs. 5. Contact gas supplier if natural gas. Adjust regulator if LP gas.
Delayed ignition.	<ol style="list-style-type: none"> 1. Insufficient pilot flame. 2. Pilot burner/orifice dogged. 3. Overfiring. 4. Misaligned burners or pilot. 	<ol style="list-style-type: none"> 1. Increase pilot gas flow. 2. Clean pilot burner and orifice. 3. Reduce rate to input on rating label. 4. Realign burners or pilot.
Condensation at boiler vent connector/fan.	<ol style="list-style-type: none"> 1. Vent pipe not sloped towards vent terminal. 	<ol style="list-style-type: none"> 1. Install condensate trap per manufadun instructions. 2. Slope vent pipe towards vent terminal.
Boiler not heating properly.	<ol style="list-style-type: none"> 1. Underfiring. 2. Limit set too low. 3. Air in system. 4. Circulator malfunctioning. 5. Circulation system dogged. 6. Incorrect thermostat heat anticipator setting. 	<ol style="list-style-type: none"> 1. Increase rate to input on rating label. 2. Reset limit to higher setting. 3. Vent air from all points in system. 4. Check circulator, replace if necessary. 5. Shut down and cool boiler, drain and flush system. 6. Adjust heat anticipator.
Fumes or gas odors	<ol style="list-style-type: none"> 1. Leaks in gas piping or fittings. 2. Leaks in gas service line or meter. 3. Leaks in venting system. 4. Overfiring. 	<ol style="list-style-type: none"> 1. Locate and repair or replace. 2. Shut down boiler and notify gas provider. 3. Locate and repair or replace. 4. Reduce rate to input on rating label.

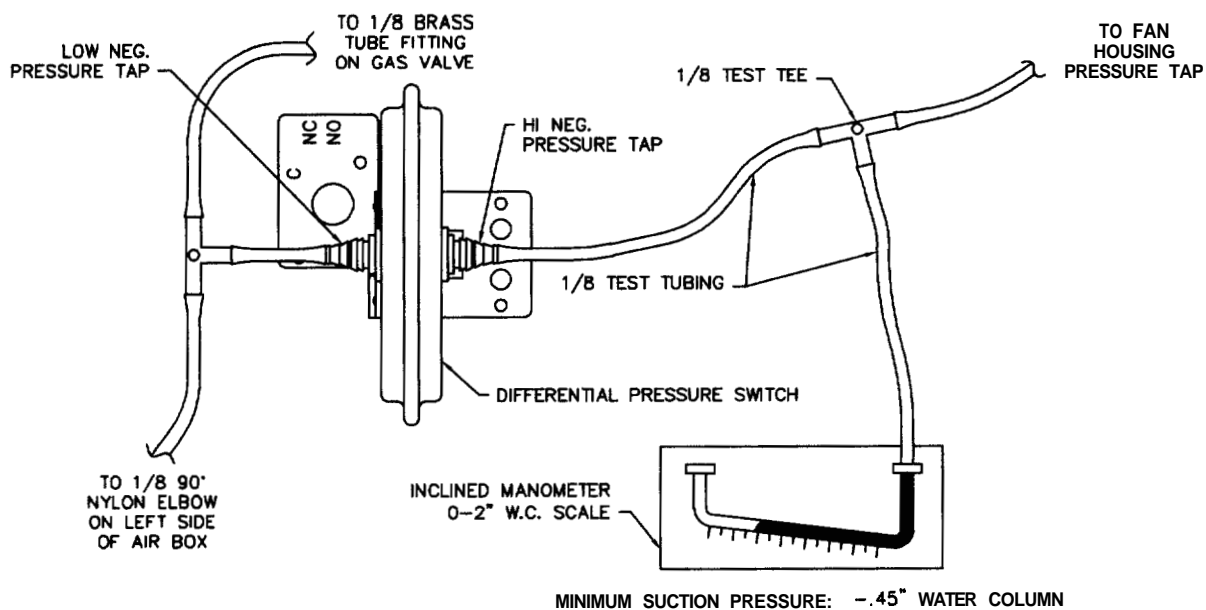


Figure 22: Measuring Fan Suction Pressure

8. TROUBLESHOOTING

A. SHUT-DOWN CAUSED BY PILOT OUTAGE, PRESSURE SWITCH OR FLAME ROLL-OUT SAFETY SHUT-OFF SWITCH

In the event of a shut-down caused by a pilot outage, action of the pressure switch or flame roll-out safety shut-off switch effecting a shut-down of the main burners:

- Refer to the Lighting/Operating Instructions in Figure 21 to properly **turn off** the gas to the boiler.
- Turn off** all electric power to the boiler.
- Call a qualified heating **service** organization or local **gas** company and have the cause of the shut-down investigated and corrected.
- Refer to Operating Instructions to re-start boiler.

B. TROUBLESHOOTING GUIDES

Use Table 7 and Figure 23 to **assist** in determining **causes** and providing corrective actions to boiler problems. **These** guides must be **used** only by qualified service technicians. These individuals **must** follow **all** applicable codes and regulations in repair of any **boiler** problems.

C. MEASURING SUCTION PRESSURE

Pressure switch requires minimum -0.45 W.C. fan suction pressure to energize control circuit. Measure when boiler has **been** operating at least 15 minutes. See Figure 22.

DANGER

When servicing or replacing items that communicate with the boiler water, be certain that:

- There is no pressure on the boiler.
- The boiler is not hot.
- The power is off.

When servicing the gas valve or pilot, be certain that:

- The gas is off.
- The electricity is off.

WARNING

Do not use this appliance if any part has been under water. Improper or dangerous operation may result. Immediately call a qualified service technician to inspect the boiler and to replace any part of the control system and any gas control **which** has been under water.

CAUTION

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous Operation. Verify proper operation after servicing.

CAUTION

Should overheating occur or the gas supply **fail** to shut off, do not **turn** off or disconnect the electrical supply to the **pump**. **This** may aggravate the problem and increase the likelihood of boiler damage. Instead, shut off the gas supply at a location external to the appliance.

Table 6: Meter Conversion - Natural Gas

Burner inputs in Btu/hr for various meter timings and heat values. (Tables based on 2 cubic feet of gas through meter).

Time that meter is read (sec)	Heat Value of Gas (Btu/cubic foot)		
	1000	1025	1050
25	288000	295200	302400
30	240000	246000	252000
35	205714	210857	216000
40	180000	184500	189000
45	160000	164000	168000
50	144000	147600	151200
55	130909	134182	137455
60	120000	123000	126000
65	110769	113538	116308
70	102857	105429	108000
75	96000	98400	100800
80	90000	92250	94500
85	84706	86824	88941
90	80000	82000	84000
95	75789	77684	79579
100	72000	73800	75600
105	68571	70286	72000
110	65455	67091	68727
115	62609	64174	65739
120	60000	61500	63000
125	57600	59040	60480

E. CHECK-OUT PROCEDURE

1. After starting the boiler, be certain all controls **are** working properly. Check to be sure that the limit will shut **off** the boiler in the event of excessive water temperature. **This** can be done by lowering the limit setting until the main burners shut down. **When** proper **limit** function is confirmed, return the dial to its previous setting.
2. To check operation of the ignition **system** safety shut-off features:
 - a. Turn **gas** supply **off**.
 - b. Set thermostat **or** controller above room temperature to **call** for heat. Watch for igniter glow at pilot burner.
 - c. Igniter will continue to glow for 30 seconds, de-energize for 30 seconds, then re-energize and glow for another 30 seconds. It will then de-energize for 5 minutes before restarting the sequence.
 - d. Turn gas supply on.
 - e. Reset the boiler and control by following Operating Instructions.
 - f. Observe boiler operation through one complete cycle.
3. Low Water Cut-Off (if used) - Consult the manufacturer's instructions for the low water cut-off operational check procedure.
4. Check the system to make sure there **are** no leaks or overflowing problems which might cause excessive make-up water to be added. Make-up water causes liming in the boiler and brings in oxygen. Oxygen can cause severe damage to the boiler through oxygen corrosion pitting.
5. Check the expansion tank and automatic fill valve (if used) to confirm that they **are** operating correctly. If either of these components causes high pressure in the system, the boiler relief valve will weep or open, allowing fresh water to enter the system.
6. Do not allow the system controls to subject the boiler to excessively low water temperatures, which would cause condensation of flue **gases** and corrosion of the boiler. Operate the boiler at a temperature above 130°F. Adjust the boiler limit **as** required to maintain boiler temperature above **this** level.
7. Check the general condition of **the** system including piping support, joints, etc. Check cleanliness of the radiators, baseboard units and/or convectors. Clean **them** to the extent possible. If radiators do not heat evenly, vent any remaining air from them.
8. **Review** operation and **User's** Information Manual with end-user.
9. Complete the Warranty **Card** and submit it to **PB** Heat, LLC.
10. Hang the Installation, Operation and Maintenance Manual, **User's** Information Manual, and Vent **Manufacturer's** Information Manual in an accessible position near the boiler.

START-UP PROCEDURES

B. CONTROL DESCRIPTIONS

See Figure 14 in Section 6 (Electrical) for locations of these devices.

FLAME ROLL-OUT SAFETY SHUT-OFF SWITCH (FLAMEROLLOUT SWITCH) - A thermally activated switch located between the first burner from the left and the manifold bracket. The flame roll-out safety shut-off switch will sense excessive temperature caused by continued flame roll-out and shut down main burner gas. This is a non-recycling switch that must be replaced once it has been activated and the cause of the roll-out eliminated.

2. **DIFFERENTIAL PRESSURE SWITCH** - This device senses a negative or suction pressure in the blower housing and air box when the blower is energized. If there is not excessive blockage in the venting system or air inlet vent the switch will close, allowing power to energize the ignition system.
3. **LIMIT** - A thermally activated, manually adjustable switch located on the right side of the boiler. The temperature sensing element is placed in the supply and will shut down main burner gas if the supply water exceeds the preset temperature limit. This is a recycling switch that will automatically reset when the supply water falls below the preset temperature.
4. **LOW WATER CUT-OFF (FOR GRAVITY SYSTEMS OR HOT WATER BOILERS INSTALLED ABOVE RADIATION LEVEL)** - A level-sensing device (float or probe) located in supply piping near the boiler. If water level in the system drops below the control's position, it will shut down main burner gas. The control will automatically reset once the water level rises above its position.

C. ADJUSTMENT OF GAS PRESSURE REGULATOR

1. Using the manometer setup installed in part 7A, set manifold pressure as follows for various gases.
 - a. Natural Gas3.5" Water Column
 - b. LP Gas10.0" Water Column

2. To adjust gas pressure, turn adjusting screw of gas pressure regulator counterclockwise to decrease pressure, clockwise to increase pressure. Refer to Figure 20 for location of gas pressure regulator. Replace the cap screw when adjustment is complete.
3. In no case should the final manifold pressure vary more than ±0.3 inches water column from the above specified pressures. Any necessary major changes in the flow should be made by changing the size of the burner orifice spuds.
4. When adjustment is complete, turn off boiler, gas flow and electricity to boiler. Remove manometer connection from valve and plug tapping with plug provided. Turn utilities back on and resume checkout.

1. Refer to rating label mounted on the jacket top panel to obtain the rated BTU per hour input. In no case shall the input to the boiler exceed the value shown on the rating label.
2. Check input by use of the following formula (PB Heat suggests reading meter for 2 Cu.Ft.):

$$\text{BTU/Hr. Input} = \frac{3600 \times F \times H}{T}$$

- 3600 - Seconds per hour
F - Cubic Feet of Gas Registered on Meter
H - Heat Value of Gas in BTU/Cubic Feet
T - Time in Seconds the Meter is Read
3. As an alternative, use Table 6. Use the heating value provided by gas supplier. Use a stopwatch to record the time it takes for 2 cubic feet of gas to pass through the meter. Read across and down to determine rate.

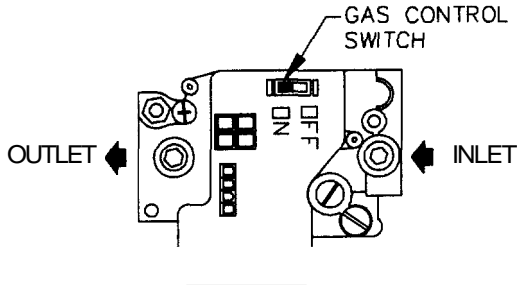
FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury, or loss of life.

- A. This appliance is equipped with an ignition device which automatically lights the pilot. Do **not** try to light the pilot by hand.
 - * If you cannot reach your gas supplier, call the fire department.
 - B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
 - C. Use only your hand to slide the gas control switch. Never use tools. If the switch will not slide by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- WHAT TO DO OF YOU SMELL GAS**
- Do not try to light any appliance.
 - Do not touch any electric switch; do not use any phone in your building.
 - Immediately **call** your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to the lowest setting.
3. Turn off all electric power to the appliance
4. This appliance is equipped with an ignition device which automatically lights the pilot. Do **not** try to light the pilot by hand.
5. If the gas valve is not visible, remove control access panel.
6. If the gas control switch is not in the "OFF" position, slide the switch to "OFF".
7. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above this label. If you don't smell gas, go to the next step.
8. Slide the gas control switch to "ON".
9. Replace control access panel, if applicable.
10. Turn on all electric power to the appliance.
11. Set the thermostat to desired setting.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.



TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. If the gas valve is not visible, remove the control access panel.
4. Slide the gas control switch to "OFF"
5. Replace control access panel, if applicable.

SV9501/SV9601 9318

Figure 21 : Operating Instructions

START-UP PROCEDURES

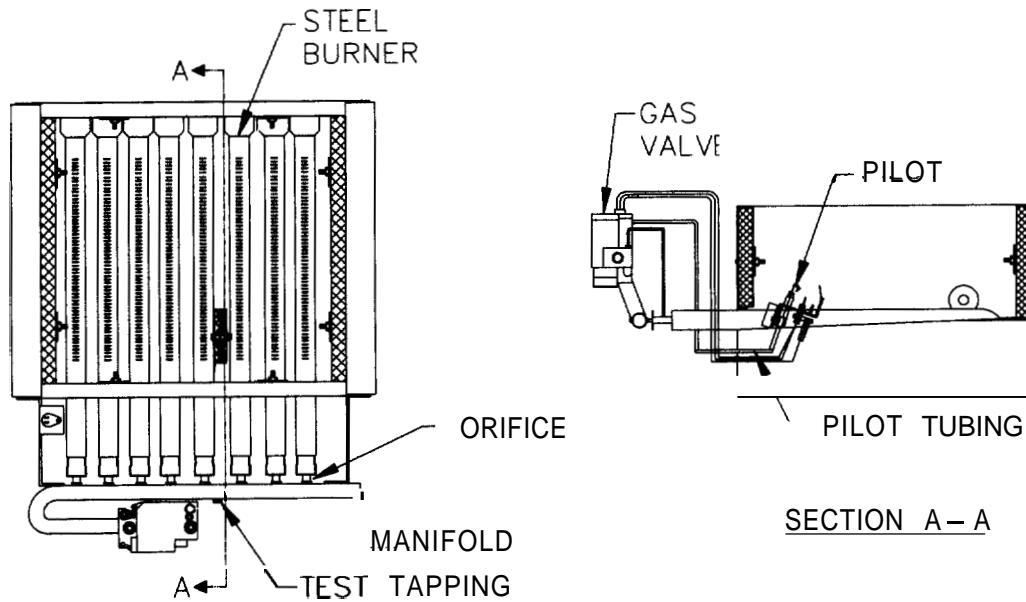


Figure 19: Gas Valve, Manifold and Burner Assembly - Intermittent Ignition

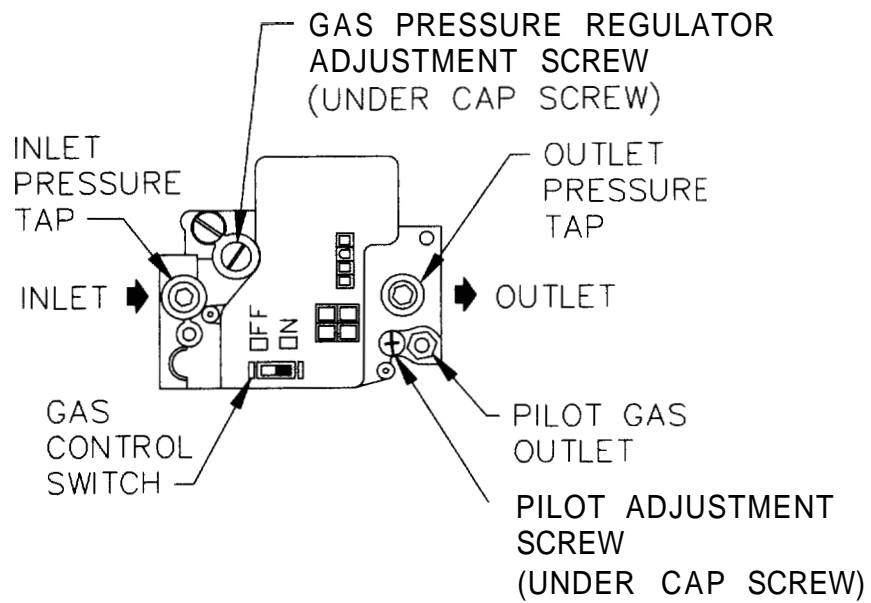


Figure 20: Valve Tapping and Adjustment Screw Locations

7. START-UP PROCEDURES

A. COMPLETING THE INSTALLATION

1. Confirm that **all** water, **gas** and electricity are turned off.
2. **Inspect** the boiler combustion chamber **for** foreign objects and remove **if** present.
3. Check physical condition of burners and pilot. **Make** certain that there **are** no unusual **bends** or perforations in the burners or pilot. Replace components if necessary.
4. **Verify** that water piping, venting, gas piping and electrical wiring and components **are** installed properly. Refer back to previous sections of these instructions **as** well **as** equipment manufacturer's instructions **as** necessary.
5. **Fill** the boiler and system with water, making certain to vent **all** air from **all** points in the system. To check water level in the system, open and **close** each vent in the system. Water should **exit** from each vent when it is opened.
6. The pressure reducing valve on the fill line will typically allow the system to be filled and pressurized to 12 psi. Consult the valve and expansion tank manufacturer for more specific information.
7. **Check** joints and fittings throughout the system for leaks. **If** leaks **are** found, drain the **system** and repair **as** required.
8. Connect a manometer to the 1/8" npt inlet pressure tap on the **gas** valve. See Figure 20.
9. Confirm that the **gas** supply **pressure** to the boiler is above the minimum and **below** the maximum values for the **gas** being used. See the end of Section 5 for these values. If a supply pressure check is required, isolate the boiler and gas valve before performing the pressure check. If the supply pressure is too high or **too low**, contact the **gas** supplier.
10. Turn on electricity and **gas** to boiler.
11. Light the boiler by following the Lighting/Operating Instructions label mounted to the jacket panel. The initial ignition **may** require several **tries** as the piping is purged of air.
12. **Use** the sequence description and Figure 16 in Section 6 (**Electrical**) to follow light-off and shutdown sequences and to assist in diagnosing problems. If the boiler does not function properly, consult Section 8, Troubleshooting.

ELECTRICAL

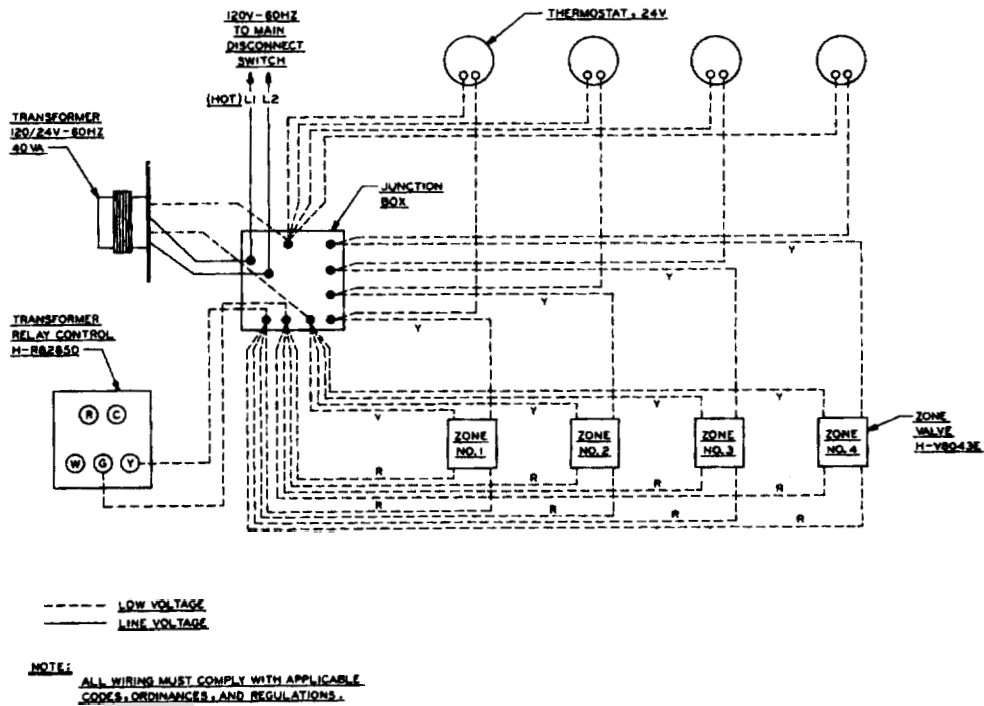


Figure 17: &ne Wiring with Zone Valves

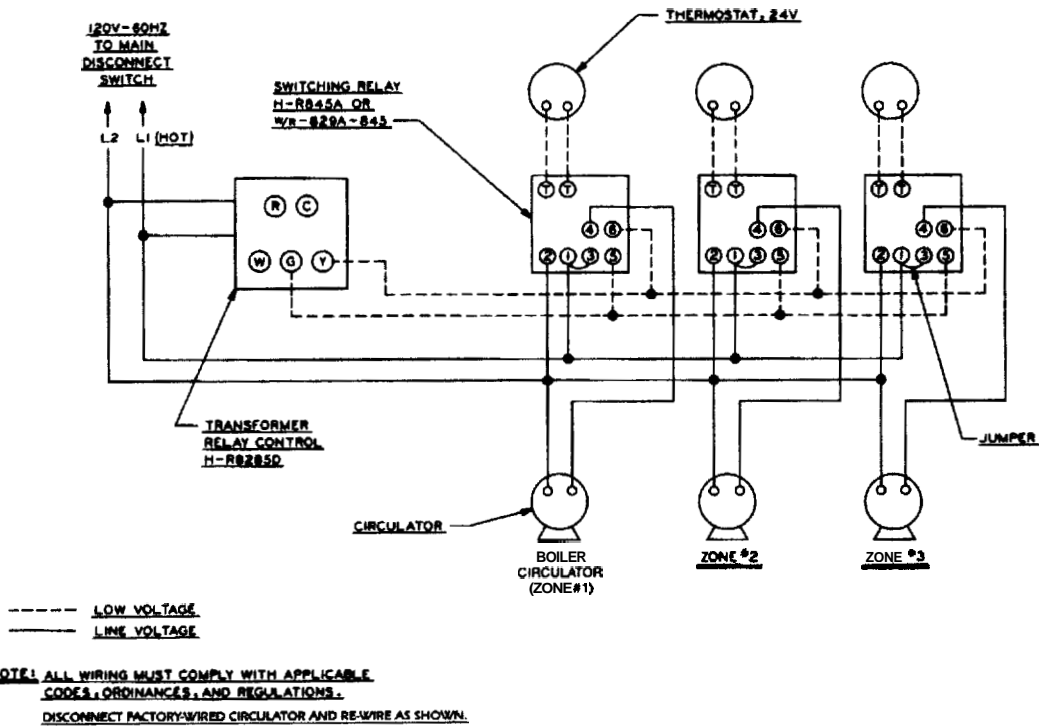


Figure 18: Zone Wiring with Circulators

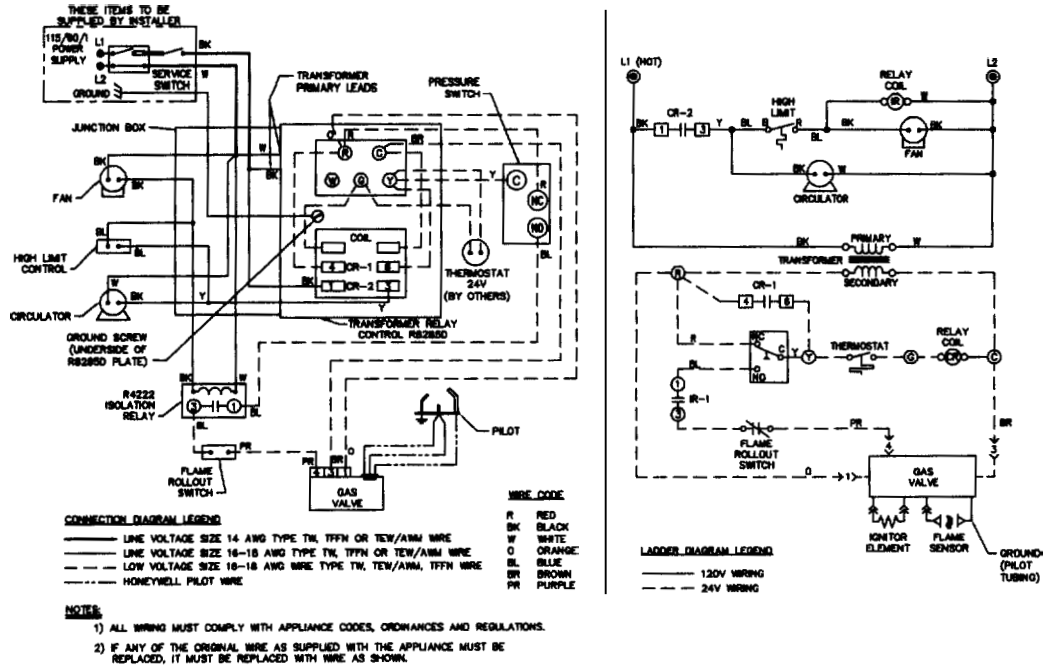


Figure 15: Wiring and Connection Diagram

D. SEQUENCE OF OPERATION

1. Thermostat calls for heat, energizes R8285 Control Relay (CR).
2. R8285 Control Relay (CR) energizes circulator.
3. Limit sensor sees boiler water temperature. Prevents boiler operation until water temperature falls approximately 15°F below the cut-out temperature.
4. Limit energizes Fan and R4222 Isolation Relay (IR).
5. Negative pressure induced by fan switches Pressure Switch, continuing power through closed R4222 contacts (IR-1) and flame roll-out switch.
6. Gas valve energizes.
 - a. Igniter on.
 - b. Pilot gas on, igniting pilot.

7. Pilot flame detected.
 - a. Igniter off.
 - b. Main gas on, igniting main burners.

Note: If pilot flame is not detected within 30 seconds, the igniter is turned off for 30 seconds, and then turned back on for another 30 seconds. If the pilot remains undetected in this second ignition period, the igniter and pilot are turned off for 5 minutes. The sequence then resumes at Step 6a.

8. Call for heat ends.
 - a. Pilot and main gas off, extinguishing pilot and main burners.
 - b. Fan and circulator off.

6. ELECTRICAL

Install all electrical wiring in accordance with the National Electrical Code and local requirements.

⚠ NOTICE

This unit when installed must be electrically grounded in accordance with the requirements of the authority having jurisdiction or, in the absence of such requirements, with the current edition of the **National Electrical Code, ANSI/NFPA 70**.

A. WIRING

1. See Figure 14 for location of wiring and controls. Use Figure 15 to connect the boiler to a power supply and to connect components to the boiler.
2. Connect the boiler by a separate, permanently live electrical supply line with a fused switch.
3. Adjust the thermostat heat anticipator to 0.2 Amp.

B. ZONED SYSTEM WIRING

See Figure 17 for typical wiring with zone valves. See Figure 18 for typical wiring with zone circulators. When wiring a zoned heating system, follow all applicable codes, ordinances and regulations.

C. CONTROLS

1. For proper location of controls and accessories refer to Figure 14.
2. See the attached control sheets for specific details regarding the installation of the various controls.
3. This boiler is supplied with safety devices in addition to the limit. For a description of these devices and how they work to ensure the safe operation of the boiler, see Section 7.
4. If the circulator is mounted in the supply piping, provide longer wiring harness as required.

⚠ NOTICE

Do not power zone valves directly from the boiler transformer. Doing so will greatly reduce the life of the transformer. Use a separate transformer sized to handle the total of all zone valve electrical loads.

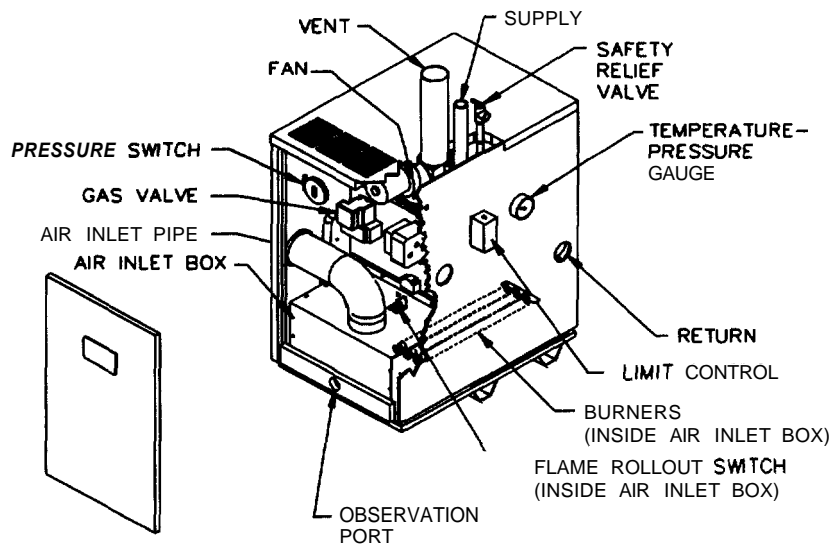


Figure 14: Wiring, Controls and Safety Devices

Table 3: Natural Gas

Model	Input (Cubic Ft/Hr)
PSC-03	70
PSC-04	105
PSC-05	140
PSC-06	175

Based on 1000 Btu/Cubic Ft.

Table 4: LP Gas

Model	Input (Cubic Ft/Hr)
PSC-03	28
PSC-04	42
PSC-05	56
PSC-06	70

Based on 2500 Btu/Cubic Ft.

Table 5: Pipe Capacity

Capacity of pipe of different diameters and lengths in cu. ft. per hour with pressure drop of 0.3 in. and specific gravity of 0.60. No allowance for an ordinary number of fittings is required.

Pipe Length Feet	¾" Pipe	1" Pipe	1¼" Pipe	1½" Pipe
10	278	520	1,050	1,600
20	190	350	730	1,100
30	152	285	590	890
40	130	245	500	760
50	115	215	440	670
60	105	195	400	610

Multipliers to be used with the above table when the specific gravity of the gas is other than 0.60:

Specific Gravity	0.5	0.55	0.60	0.65	0.70
Multiplier.	1.10	1.04	1.00	0.962	0.926

5. GAS PIPING

1. Size and install the gas supply piping properly in order to provide a supply of gas sufficient to meet the maximum demand without undue loss of pressure between the meter and the boiler.
2. Determine the volume of gas to be provided to the boiler in cubic feet per hour. To obtain this value, divide the Btu per hour rating (on the boiler rating plate) by the heating value of the gas in Btu per cubic feet. Obtain the heating value of the gas from the gas supplier. As an alternative, use Table 3 or 4 on the next page to obtain the volume of gas to be provided to the boiler.
3. Use the value obtained above as the basis for piping sizing. Size the gas piping in accordance with Table 5. Consult the *National Fuel Gas Code* for other sizing options.
4. Locate the drop pipe adjacent to, but not in front of the boiler.
5. Install a sediment trap. See Figure 13. Locate a tee in the drop pipe at same elevation as the gas inlet connection to the boiler. Extend the drop pipe to a pipe cap.
6. Install a ground joint union ahead of the gas control assembly to permit servicing of the control. Some local codes require an additional service valve when using the combination gas controls. If your code requires such a valve, a suggested location is shown in Figure 13.

WARNING

Use a pipe joint sealing compound that is resistant to the action of liquefied petroleum gas. A non-resistant compound may lose sealing ability in the presence of this gas, resulting in a gas leak and fire or explosion potential.

7. Check piping for leaks prior to placing the boiler in operation.
Use an approved gas detector, a non-corrosive leak detection fluid or other leak detection method. If leaks are found, turn off all gas flow and repair as necessary.

WARNING

When checking for leaks, do not use matches, candles, open flames or other methods that provide a source of ignition. This can ignite a gas leak, resulting in fire or explosion.

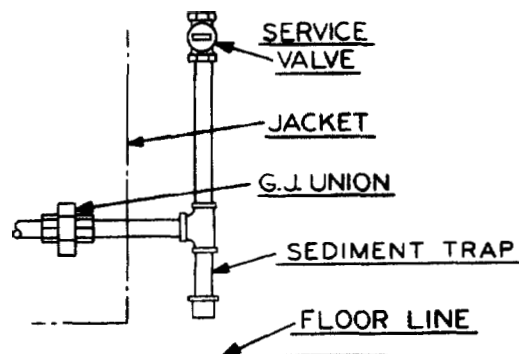


Figure 13: Gas Connection to Boiler

8. Disconnect the boiler and its individual shut-off valve from the gas supply piping system during any pressure testing of that system at test pressure in excess of 1/2 psig (3.5kPa).

CAUTION

Do not subject the gas valve to more than 1/2 psi pressure. Doing so may damage the valve.

Isolate the boiler from the gas supply piping system by dosing its individual service valve during any pressure testing of the gas supply piping system at test pressure equal to or less than 1/2 psig (3.5kPa).

9. Minimum permissible supply pressure for purposes of input adjustment (Inches Water Column):

Natural Gas	5.0"
LP Gas	11.0"

Maximum permissible supply pressure to the boiler (Inches Water Column):

Natural Gas	13.5"
LP Gas	13.5"

VENTING, VENTILATION AND AIR INLET

F. AIR FOR VENTILATION

1. Provide air openings for adequate ventilation in accordance with Air for Combustion and Ventilation Section of the *National Fuel Gas Code, ANSI Z223.1/NFPA 54*, or applicable provisions of the local building codes. Ventilation is required to prevent overheating of the controls which greatly reduces the life of the controls. Air inlet piping provides only combustion air to the boiler. See Section D for Air Inlet Piping requirements.
2. Definition:
Unconfined Space: a space whose volume is not less than fifty (50) cubic feet per 1000 Btu/hr of the total input rating of all appliances installed in that space. Rooms communicating directly with the space in which the appliances are installed, through openings not furnished with doors, are considered part of the unconfined space.
3. **Appliances Located in Unconfined Spaces:**
For installations in unconfined spaces, the supply of air for ventilation can usually be considered adequate.

Appliances Located in Confined Spaces:

Provide two permanent openings communicating directly with an additional room or rooms of sufficient volume so that the combined volume of all spaces meets the criteria for an unconfined space. Use the total input of all gas utilization equipment installed in the combined space in making this determination.

Each opening with a minimum free area of one square inch per 1000 Btu/hr. of the total rating of all gas utilization equipment in the confined space, but not less than 100 square inches. Begin with one opening 12 inches from the top, and begin the other opening within 12 inches of the bottom of the enclosure. See Figure 12. Provide air openings with minimum dimensions not less than three (3) inches.

G. BOILER REMOVAL FROM COMMON

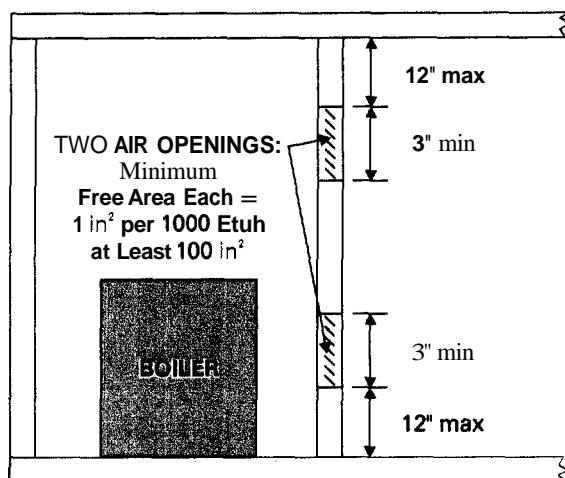


Figure 12: Air Openings

At the time of removal of an existing boiler, follow these steps with each appliance remaining connected to the common venting system placed in operation, while the other appliances remaining connected to the common venting system are not in operation:

- a. Seal any unused openings in the common venting system.
- b. Visually inspect the venting system for proper size and horizontal pitch and determine there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition.
- c. Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. Turn on any clothes dryers and any appliance not connected to common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
- d. Place in operation the appliance being inspected. Follow the lighting instructions. Adjust thermostat so appliance will operate continuously.
- e. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle, or smoke from a cigarette, cigar, or pipe.
- f. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-burning appliance to their previous conditions of use.
- g. Any improper operation of the common venting system should be corrected so that the installation conforms with the *National Fuel Gas Code, ANSI Z223.1/NFPA 54*. When resizing any portion of the common venting system, the common venting system should be resized to approach minimum size as determined using the appropriate tables in the *National Fuel Gas Code, ANSI Z223.1/NFPA 54*.

D. VENT PIPE INSTALLATION

1. For minimum and maximum vent pipe lengths see Table 1.
2. Use only 3" diameter Heat-Fab Saf-T Vent, Z-Flex Z-Vent, ProTech FasNSeal, or Flex-L Star-34 Type AL29-4C stainless steel vent pipe and fittings for venting of flue gases from the boiler.
3. Connect vent pipe to boiler by spreading a 1/4" bead of high-temp GE-106 silicone or Silicones Unlimited 5 Red around the fan up. Attach proper vent adapter to fan adapter (1 1/2" diameter) Z-Flex vent pipe/fitting connects directly fan adapter, secure to fan adapter using Z-Flex lock band. See Figure 11.
4. The remaining pipe and fittings for each manufacturer's vent instructions. Use the silicone recommended by vent pipe manufacturer. Maintain proper clearance to combustible construction - see Section 1, Residential.
5. a. **Std Wall Venting Only** - If lengths of the vent in shall slope **down** at less than 1/4" per foot from the boiler to the vent terminal. If vent pipe does pitch back toward boiler a water drain is as described in 5B and Figure 10.
 b. **Vertical Venting Only** - A horizontal drain tee is required. Slope horizontal pipe **upward** at least 1/4" per foot from the boiler to the vent terminal. Install drain as shown in Figure 10. Use silicone hose clamp as 3" loop trap if a water drain. Pipe to drain per local code.

6. For horizontal lengths of pipe to prevent sagging use of metal hangers or equivalent means. Locate supports at not more than four (4) foot intervals.
7. **Vertical Venting Only** - If there is no solid anchor point in the system below the roof for supporting vertical sections of the vent pipe (i.e. Firestop Support, etc.), a special vent support system will be required. See vent manufacturer's instructions for additional information.

E. AIR INLET PIPE INSTALLATION

1. For maximum air inlet pipe lengths see Table 2.
2. Use only 4" diameter galvanized pipe or 4" diameter flexible aluminum vent for supplying combustion air to boiler inlet air box.
3. Boiler connection can be from either right or left side of boiler jacket. Determine which jacket side air inlet piping is to be routed and remove the 4-1/2" jacket knock-out.
4. Attach a 4" diameter 90 degree elbow to top of air box and connect air inlet piping.
5. Support air inlet piping using the same methods and requirements as shown in the previous section for vent pipe support.
6. Seal all connections using silicone.
7. To prevent condensation from forming on exposed portions of Wall Thimble and 4" diameter air inlet piping, wrap exposed areas with insulation.

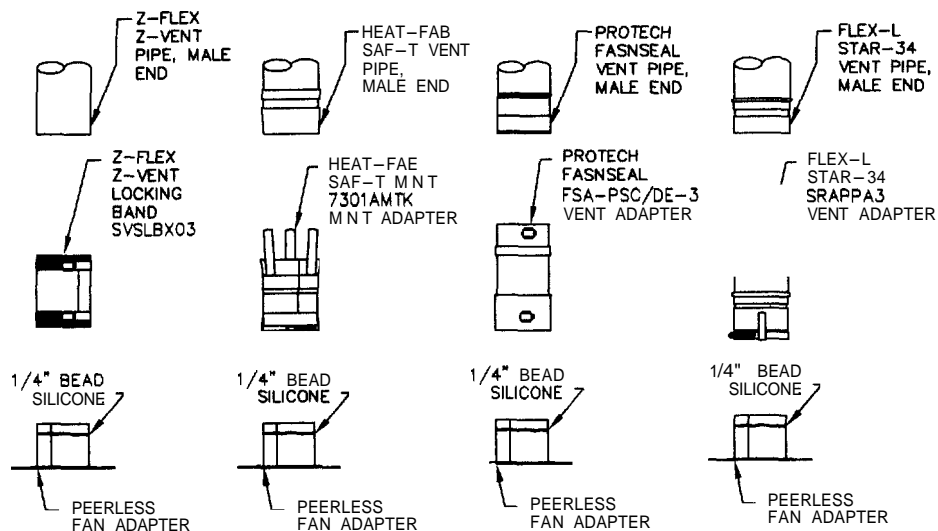


Figure 11: Vent Connection to Boiler

VENTING, VENTILATION AND AIR INLET

C. ROOF TERMINATIONS (VERTICAL VENTING)

1. Vent pipe and air inlet terminations **must** be within the maximum and minimum vent and air intake lengths shown in Tables 1 and 2.
2. Vent pipe and air inlet pipe **must** terminate 12" above expected snow lines. Vent pipe must be a minimum 12" above and 12" horizontally from air inlet pipe. See Figure 10.
3. Attach a vent manufacturer's listed rain cap to both the vent pipe and air inlet pipe.
4. Provide 2" clearance between vent pipe and combustible construction. No clearance is required between air inlet pipe and combustible construction.
5. See vertical venting section in vent manufacturer's instructions for recommendations for penetration through roof.

Table 1:

Boiler Model	*Equivalent Length of 3" Diameter Stainless Steel Vent Pipe	
	Minimum Vent Length	Maximum Vent Length
PSC-03	8 feet	52 feet
PSC-05	8 feet	
	8 feet	

Boiler Model	*Equivalent Length of 4" Diameter Aluminum/Galvanized Air Inlet Pipe	
	Minimum Length	Maximum Length
PSC-03	12 feet	70 feet
PSC-04	12 feet	70 feet
PSC-05	12 feet	63 feet
PSC-06	12 feet	63 feet

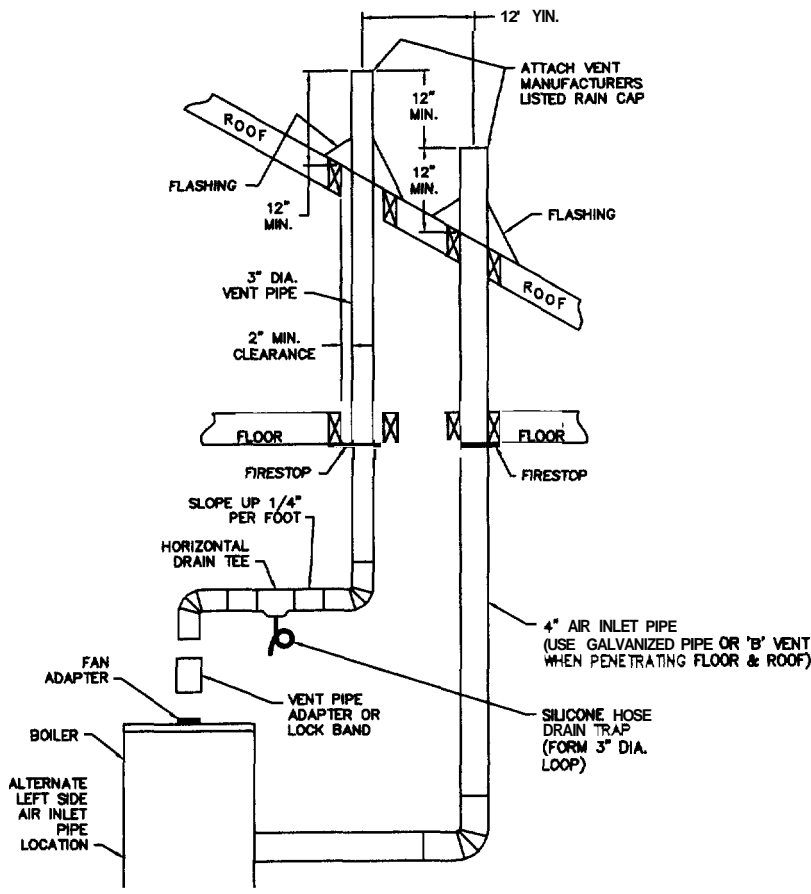


Figure 10: Vertical Venting System

VENTING, VENTILATION AND AIR INLET

4. Use a minimum 2-1/2" foot piece of 3" diameter AL29-4C stainless steel vent pipe for **insertion** through Wall Thimble. See Vent **Pipe** section below for vent pipe requirements.
5. Slide Stainless Steel Collar over vent pipe and slide 3" diameter hose clamp and collar to vent pipe.
6. Insert pipe with collar through Outside Vent Cap and slide 3" diameter hose clamp and collar to vent pipe.
7. Leave at least 2" of vent pipe protruding beyond face of Vent Cap and secure hose clamp and collar to vent pipe.
8. Place Outside Vent Cap over Wall Thimble with air openings in Vent Cap facing down. Secure Cap to Thimble with #10 sheet metal **screws**.
9. Place 3" diameter hose clamp over pipe protruding through inside of Wall Thimble.
10. Place Inside Thimble Cap and Collar onto Wall Thimble. Access hose damp through 4" diameter collar on bottom of Thimble and secure hose clamp over collar and vent pipe **as** per step 7 above.
11. **Secure** Inside Thimble cap to Wall Thimble with #10 **screws**. Seal Thimble Cap perimeter with silicone.
12. Seal all openings between Wall and Thimble and around the 3" diameter **stainless steel** vent pipe that protrudes through inside and outside of Wall Thimble.
13. Add any bracing that may be needed to support **Wall Thimble** on inside of wall **structure**.
14. Secure Outside Vent Cap to exterior wall with four #10 sheet metal screws provided.
15. Attach **Z-Flex** #2SVSTPF03 terminal to protruding vent pipe. Refer to Figure 9. To attach to HEAT-FAB pipe, insert into pipe end and fold over tabs to **secure**. Otherwise, silicone terminal to vent pipe.

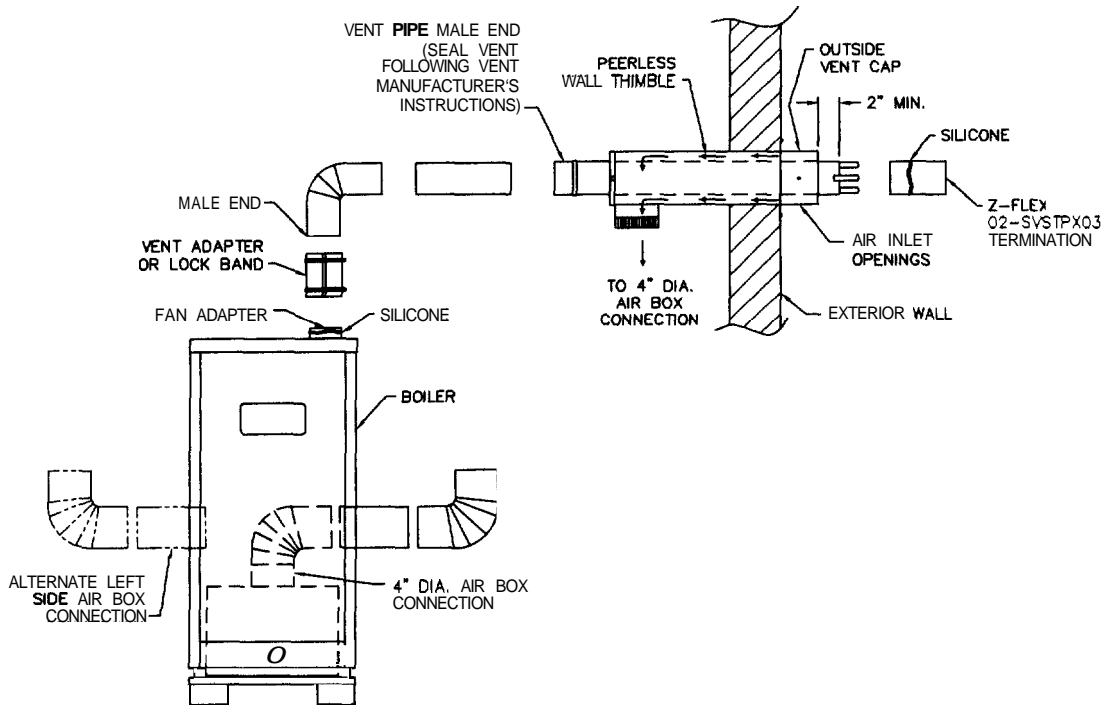


Figure 9: Side Wall Venting System

4. VENTING

A. GENERAL

Install vent system in accordance with Venting of Equipment, ~~part~~ of *National Fuel Gas Code, ANSI Z223.1/NFPA 54* or applicable provisions of the local building codes.

⚠ WARNING

This vent system will operate with a positive pressure in the vent pipe. Do not connect vent connectors serving appliances vented by natural draft into any portion of mechanical draft systems operating under positive pressure.

B. PEERLESS WALL THIMBLE (SIDEWALL

⚠ NOTICE

Flue gases will condense as they exit the vent termination. This condensate can freeze on exterior building surfaces which may cause discoloration of these surfaces.

VENTING ONLY)

1. Determine vent cap (terminal) location.
 - a. Must be within the maximum and minimum vent and air intake lengths shown in Tables 1 and 2.
 - b. Maximum wall thickness for the 19-1/2" long Peerless Wall Thimble (standard) is 11-1/2". Maximum wall thickness for the optional 28" long thimble is 20".
2. Cut a 5-1/8" square hole in sidewall to allow Peerless Wall Thimble to go through.
3. Insert Thimble from inside wall with 4" diameter air inlet connection facing down. Extend Thimble 3-1/2" past outside wall surface. The cut-out opening of thimble is pointed down.
 - c. Provide 2" clearance between vent pipe and combustible construction. No clearance is required between Thimble and combustible construction.
 - d. Provide 3 feet clearance above any forced air inlet within 10 feet.
 - e. Provide 1 foot clearance below, 1 foot beside, or 1 foot above any door, window, or gravity air inlet into any building.
 - f. Provide 1 foot clearance between bottom of vent terminal and ground level and normal snow lines.
 - g. Provide 4 feet horizontal clearance from, and in no case above or below, unless a 4 foot horizontal distance is maintained, from electric meters, gas meters, regulators and relief equipment.
 - h. Do not locate vent terminal over public walkways where condensate could create a nuisance or hazard.
 - i. When adjacent to a public walkway, locate vent terminal at least 7 feet above grade.
 - j. Do not locate directly under roof overhangs to prevent icicles from forming.

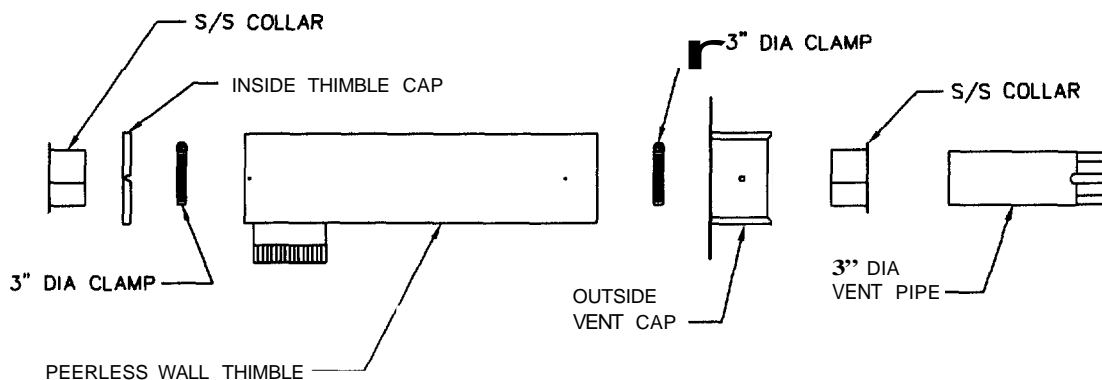


Figure 8: Peerless Wall Thimble

D. EXPANSION TANK

1. Consult the tank manufacturer's instructions for specific information relating to tank installation. Size the expansion tank for the required system volume and capacity. See Table 9 in Section 10 for boiler water capacity.
2. Expansion tanks are available with built-in fill valves and check valves for reducing supply water pressure and maintaining minimum system pressure. Check the design features of the tank and provide valves as necessary.

Refer back to Figure 1 for typical expansion tank piping.

E. INDIRECT-FIRED WATER HEATER

If the boiler is to be used in conjunction with an indirect-fired water heater, refer to Figure 7 for typical piping. Follow the instructions provided by the water heater manufacturer. Pipe the water heater as a separate zone.

F. FREEZE PROTECTION

For new or existing systems that must be freeze-protected

⚠ WARNING

Use only inhibited propylene glycol solutions of up to 50% by volume with water. Ethylene glycol is toxic and can attack gaskets and seals used in hydronic systems.

1. Glycol in hydronic applications is specially formulated for this purpose. It includes inhibitors which prevent the glycol from attacking metallic system components. Make certain that the system fluid is checked for the correct glycol concentration and inhibitor level.
2. The antifreeze solution should be tested at least once a year and as recommended by the antifreeze manufacturer.
3. Antifreeze solutions expand more than water. For example, a 50% by volume solution expands 4.8% in volume for a temperature increase from 32°F to 180°F, while water expands 3% with the same temperature rise. Allowance must be made for this expansion in system design.
4. For more information, consult the PB Heat Water Installation Survey and the antifreeze manufacturer.

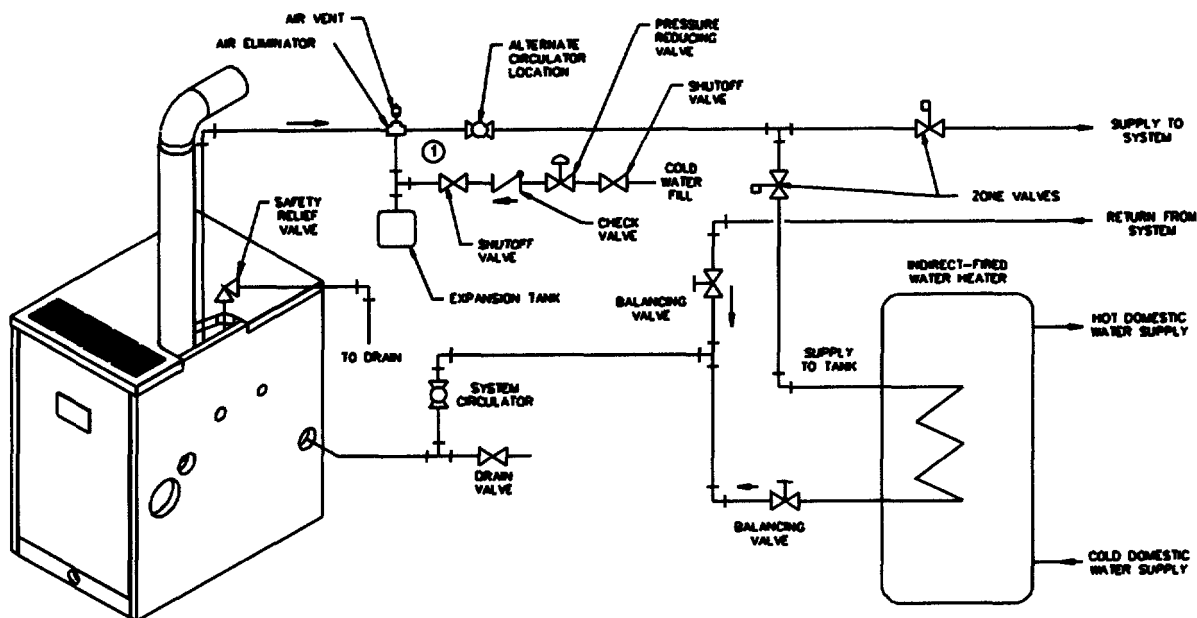


Figure 7: Typical Piping with Indirect-Fired Water Heater

WATER PIPING AND CONTROLS

C. PIPING FOR ZONED SYSTEMS

1. See Figures 5 and 6 for basic zoned system layouts.
2. Run each zone pipe down then up to zone to prevent air accumulation in piping.
3. If required, provide means to isolate and drain each zone separately.

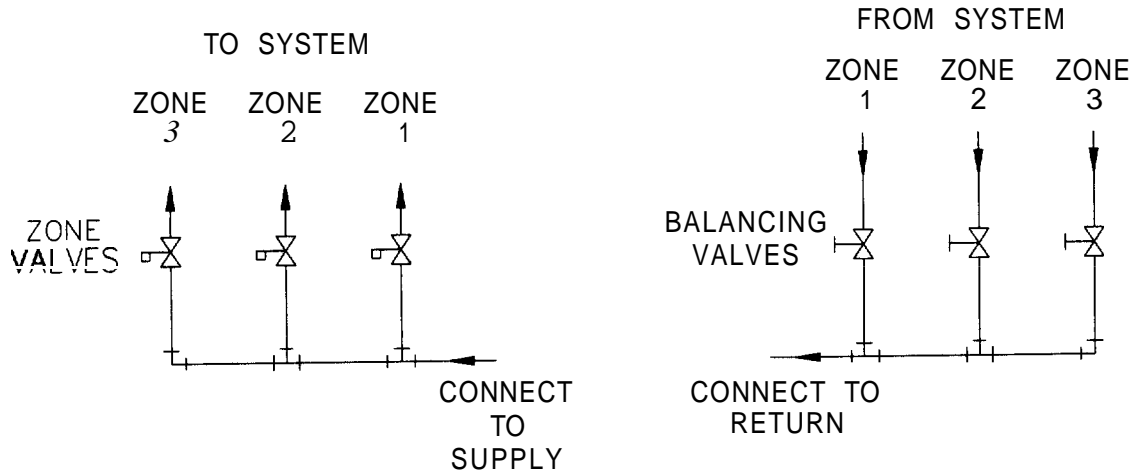


Figure 5: Zone Piping with Zone Valves

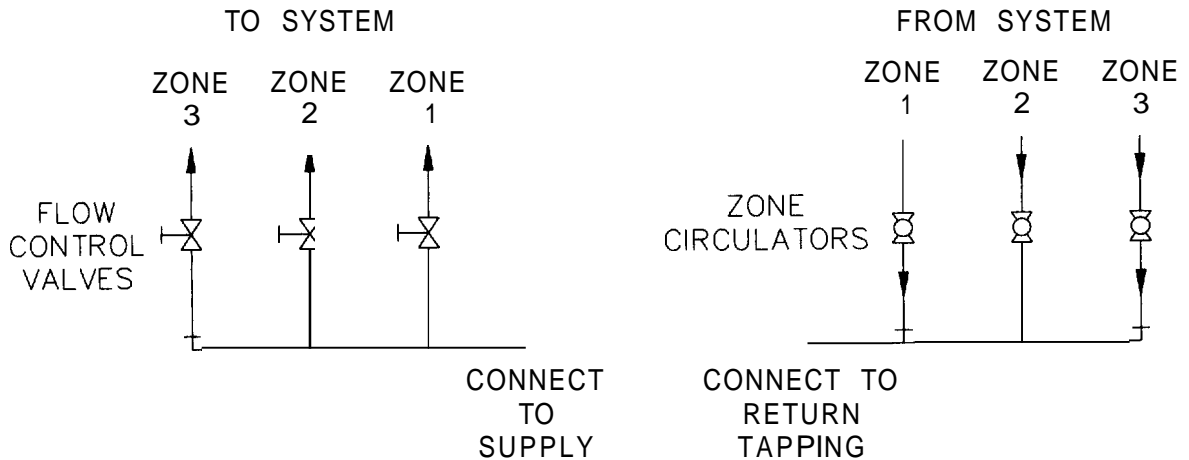


Figure 6: Zone Piping with Circulators

6. Install this boiler so that the **gas ignition system** components **are** protected from water (dripping, spraying, etc.) during appliance operation and service (circulator replacement, condensate trap, control replacements, etc.).
7. If this boiler and distribution system is used in conjunction with a refrigeration system, pipe the chilled medium in parallel with the boiler and install the proper valve to prevent the chilled medium from entering the boiler. A drawing illustrating this hook-up is provided in Figure 2.
8. **When** the boiler is connected to heating **risers** located in air handling units where they may be exposed to refrigerated air circulation, install **flow** control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.
9. If this boiler is installed above radiation level, provide a **low** water cutoff device, either as a part of the boiler or at the time of boiler installation.

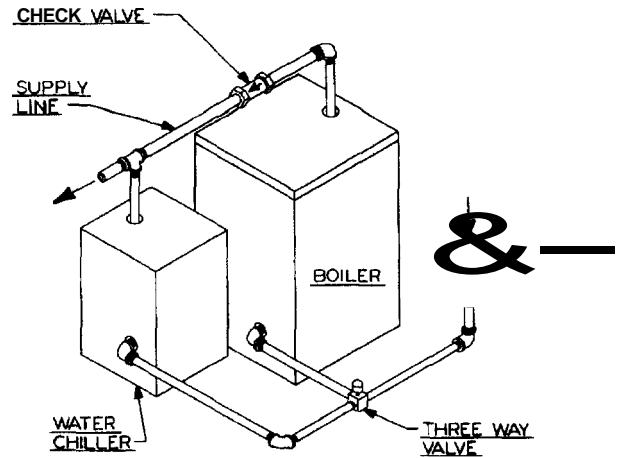


Figure 2: Parallel Hook-up with Water Chiller

B. SAFETY RELIEF VALVE

1. The safety relief valve and fittings in bag only.
2. The safety relief valve is not installed at the safety relief valve tapping, install the piping as shown in Figure 3.
3. In air circulation at the safety relief valve, install valve and piping as shown in Figure 4.

CAUTION

Pipe the discharge of safety relief valve to prevent injury in the event of pressure relief. Pipe the discharge to a drain. Provide piping that is the same size as the safety relief valve outlet.

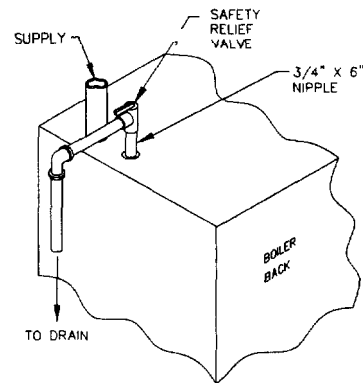


Figure 3: Safety Relief Valve Hook-Up Installation with Air Elimination in System Piping

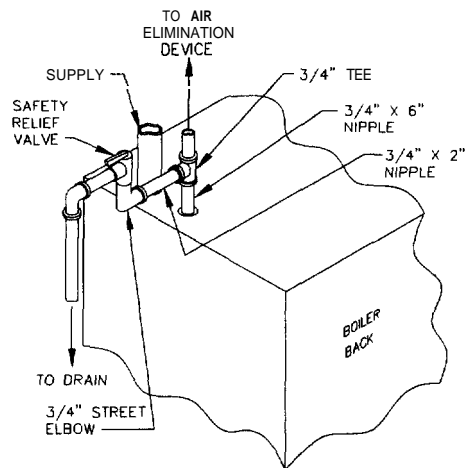


Figure 4: Safety Relief Valve Hook-Up with Air Elimination

3. WATER PIPING AND CONTROLS

A. BOILER SUPPLY AND RETURN

1. Size the supply and return to suit the system. A typical piping arrangement is shown in Figure 1. Refer also to the Hydronics Institute Residential Hydronic Heating Installation Design Guide and the PB Heat Water Survey for additional guidance during water piping installation.
2. Return Piping:
Pipe the outlet connection of the circulator to a tee, provided with a drain valve, at the 1-1/4NPT return tapping near the bottom of the right section. Pipe the return to the inlet connection of the circulator.
3. Supply Piping:
 - a. Pipe the supply to the 1-1/2NPT supply tapping at the top of the boiler.
 - b. Provide clearance to venting system (see Section 4).
4. When system return water temperature will be below 130°F, pipe the boiler with a bypass arrangement to blend the system return and hot supply to obtain at least 130°F entering the boiler. For more information on bypass piping, consult the PB Heat Water Survey.
5. If desired, install the circulator in the alternate location shown in Figure 1. Consult the PB Heat Water Survey for more information on circulator location.

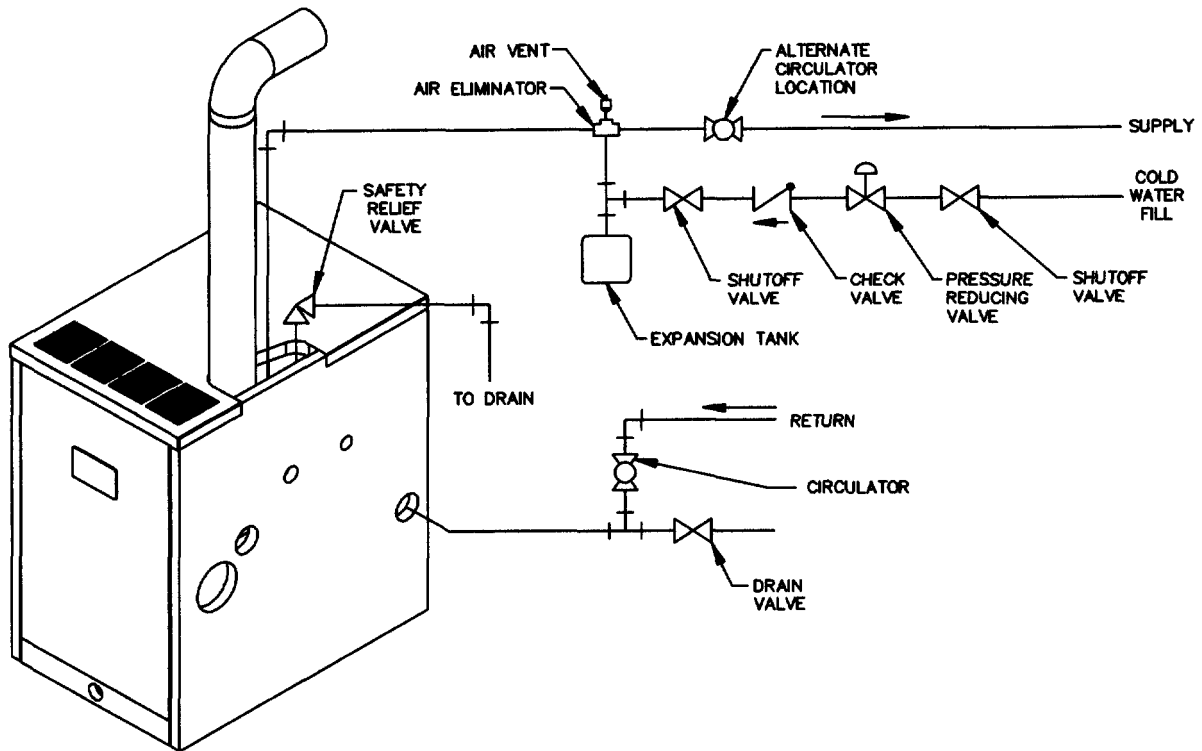


Figure 1: Supply and Return Piping

2. BOILER SET-UP

1. Provide a sound, level foundation. Locate boiler as near to the chimney or outside wall as possible and centralized with respect to the heating system.
2. Locate boiler in front of installation position before removing crate.
4. Separate the wood shipping pallet from the boiler base by removing two (2) hold-down bolts at each end of the boiler base.
5. Move boiler into final position.

1. PREINSTALLATION

Read carefully, study **these** instructions before beginning work.

This boiler must be installed by a qualified contractor.

The boiler warranty *can* be voided if the boiler is not installed, maintained and **serviced** correctly.

NOTICE

The equipment must be installed in accordance with those installation requirements of the authority having jurisdiction or, in the absence of such **requirements**, to the current edition of the National Fuel Gas Code, ANSI **Z223.1/NFPA 54**.

Where required by the authority having jurisdiction, the installation must conform to **American Society of Mechanical Engineers Safety Code for Controls** and **Safety Devices for Automatically Fired Boilers, ANSUSME CSD-1**.

A. ACCESSIBILITY CLEARANCES

Install boiler not less than 24" between the left side, top, and front of the boiler and adjacent wall or other appliance, when **access** is required for servicing.

B. CLEARANCE FROM COMBUSTIBLE CONSTRUCTION

The design of this boiler is certified for closet installation with the following clearances:

1. 6" between right side, front and combustibile construction.
2. 12" between top of jacket and combustibile construction.
3. 1" between left side, rear and combustibile construction.
4. 2" between vent pipe and combustibile construction.
5. 0" between wall thimble and combustibile construction.
6. **This** boiler is design certified for **use** on combustibile flooring.

C. LIQUEFIED PETROLEUM (LP) GAS

The following LP requirements from the *Uniform Mechanical Code*, section 304.6, may be in effect in your geographic area:

"Liquefied petroleum gas-burning appliances shall not be installed in a pit, basement or similar location where heavier-than-air **gas** might collect. Appliances so fueled shall not be installed in an above-grade under-floor **space** or basement unless such location is provided with an approved means for removal of unburned **gas**."

D. INSTALLATION SURVEY

For new and existing installations, a Water Installation Survey is available from PB Heat, LLC. The survey will provide information on how a hot water boiler works with your specific system and will provide an overview of hot water system operation in general.

You can also use this **survey** to locate system problems which will have to be corrected. To obtain copies of the Water Installation Survey, contact your PB Heat representative.

DANGER

Do not install this boiler on carpeting. Boiler installation on carpeting is a **fire** hazard. Install this boiler on non-combustible flooring or use a combustibile floor pan to install this boiler on other non-carpeted flooring.

WARNING

Liquefied Petroleum (LP) is heavier than air and may collect or "pool" in a low area in the event of a leak from defective **equipment**. This gas may then ignite, resulting in a fire or explosion. **See** the instructions **below**.

Prepare sketches and notes of the layout to minimize the possibility of interferences with new or existing equipment, piping, venting and wiring. **Review** limitations on vent pipe, vent terminal, and air inlet pipe locations and ventilation air requirements in Section 4.

USING THIS MANUAL

A. INSTALLATION SEQUENCE

Follow the installation instructions provided in this manual in the **order** shown. The order of these instructions has been **set** in order to provide the installer with a logical sequence of **steps** that will minimize potential interferences and maximize safety during boiler installation.

B. SPECIAL ATTENTION BOXES

Throughout this manual you will see special attention **boxes** intended to supplement the instructions and make special notice of potential hazards. **These** categories mean, in the judgment of PB Heat, **LLC**:

DANGER

Indicates a condition or hazard which will cause severe personal injury, death or major property damage.

1

WARNING

Indicates a condition or hazard which may cause severe personal injury, death or major property damage.

CAUTION

Indicates a condition or hazard which will or can cause minor personal injury or property damage.

NOTICE

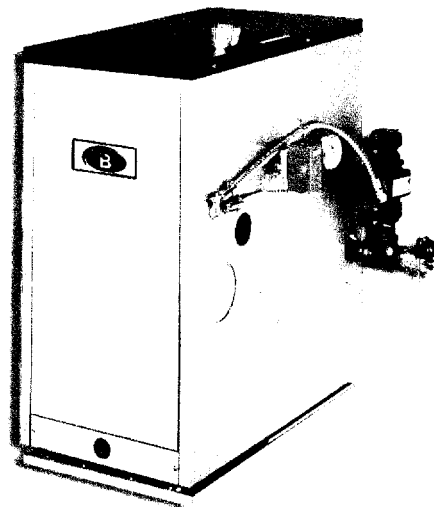
Indicates special attention is needed, but not directly related to potential personal injury or property damage.

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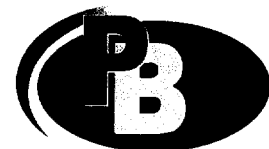
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Series **PSC**

Gas Boilers



Installation, Operation & Maintenance Manual



PeerlessBoilers.com

City of Portland, Maine - Building or Use Permit

389 Congress Street, 04101 Tel: (207) 874-8703, Fax: (207) 874-8716

Permit No: 04-0016	Date Applied For: 01/07/2004	CBL 374 A007001
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Location of Construction: 180 Auburn St	Owner Name: Shalom Apartments	Owner Address: Po Box 560	Phone: 207-874-1080
Business Name: n/a	Contractor Name: The Thaxter Company	Contractor Address: 55 Bell Street Portland	Phone: (207) 878-5553
Lessee/Buyer's Name n/a	Phone: n/a	Permit Type: Additions - Multi Family	

Proposed Use: Residential Units / Construct three new single story buildings (total of 5,980 sq. Ft.) consisting of 10 new units. Phase 2 of permit # 030999.	Proposed Project Description: Build three new single story buildings for 10 new units. (total of 5,980 sq. Ft.)
--	---

Dept: Zoning **Status:** Approved with Conditions **Reviewer:** Marge Schmuckal **Approval Date:** 01/16/2004

Note: 1/13/04 Kandi has not given me a stamped approved site plan yet. - I am requesting one - This is an R-3 **Ok to Issue:**

- 1) Per your contract, there shall be no structures erected in the recreation open space other than benches and/or tables or a gazebo.
- 2) Separate permits shall be required for future decks, sheds, pools, and/or garages.
- 3) This property shall remain a twenty-one (21) family dwelling PRUD after the completion of this project. Any change of use shall require a separate permit application for review and approval.
- 4) This permit is being approved on the basis of plans submitted. Any deviations shall require a separate approval before starting that work.

Dept: Building **Status:** Approved **Reviewer:** Mike Nugent **Approval Date:** 04/29/2004

Note: **Ok to Issue:**

- 1) Fire separation assembly penetrations must be protected in accordance with Section 7 of the Building Code

Dept: Fire **Status:** Approved with Conditions **Reviewer:** Lt. MacDougal **Approval Date:** 01/20/2004

Note: **Ok to Issue:**

- 1) a fire lane shall be maintained to all buildings

Comments:

1/5/04-gg: Hold draw, waiting for site plan (Kandi Talbot approval). /gg