

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK



CITY OF PORTLAND

BUILDING PERMIT

This is to certify that **ONE HUNDRED AND TEN HIGH STREE LLC** Located At **110 HIGH ST**

Job ID: **2012-09-5014-HVAC**

CBL: **039- A-035-001**

has permission to Install a Burnham America Replacement Boiler provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.

A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be

Fire Prevention Officer



Code Enforcement Officer / Plan Reviewer

10/19/2012

**THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY
PENALTY FOR REMOVING THIS CARD**

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**

Final Inspection

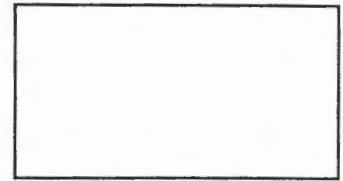
The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.



FILL IN AND SIGN WITH INK

APPLICATION FOR PERMIT HEATING OR POWER EQUIPMENT



2012-05-3014 B-3

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 110 High St. 39-A-35 Use of Building Apts Date 9/19/12
 Name and address of owner of appliance JOIE MANNING ONE HUNDRED AND TEN HIGH ST LLC
1203 Shore Rd CAPE ELIZ PO BOX 424A CAPE 04107
 Installer's name and address Bizlino Grosso INC 980 RIVERSIDE ST
PONT. ME 04103 Telephone 878-2097 EXT 4
671-2318

Location of appliance:
 Basement Floor
 Attic Roof

Type of Fuel:
 Gas Oil Solid

Appliance Name: BURNHAM AMERICAN
 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 # 02415
 Solid Fuel # _____
 Oil # _____
 Gas # PNT 2287
 Other _____

Type of Chimney:
 Masonry Lined
 Factory built Using ext vent no new ext vent
 Metal STAINLESS STEEL
 Factory Built U.L. Listing # _____

Direct Vent
 Type _____ UL# _____

Type of Fuel Tank
 Oil
 Gas

Size of Tank _____

Number of Tanks _____

Distance from Tank to Center of Flame _____ feet.

Cost of Work: \$ 14000
Permit Fee: \$ 160 + 50

RECEIVED
 SEP 21 2012
 Dept of Building Inspections
 City of Portland Maine

Approved
 4.D.Y.

Approved

Approved with Conditions

Fire: _____
 Ele.: _____
 Bldg.: _____

See attached letter or requirement

Signature of Installer Jul Bellini

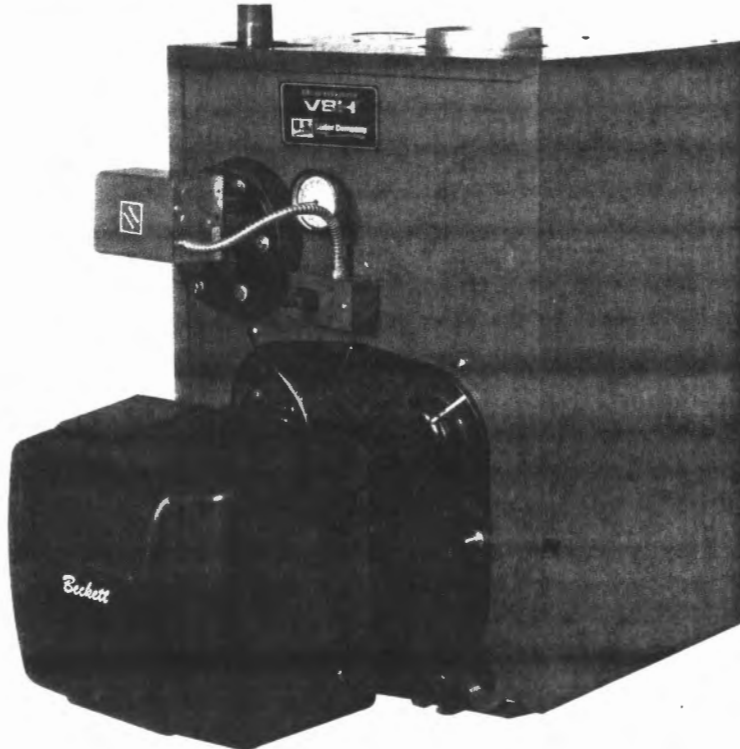
Inspector's Signature _____ Date Approved _____

INSTALLATION, OPERATING AND SERVICE INSTRUCTIONS FOR

V8H™ SERIES OIL - FIRED BOILER



As an ENERGY STAR® Partner, U.S. Boiler Company has determined that the V8H3S, V8H3W, V8H4S, V8H4W, V8H5S, V8H5W, V8H6S, V8H6W and V8H7 meet the ENERGY STAR® guidelines for Energy efficiency established by the United States Environmental Protection Agency (EPA).

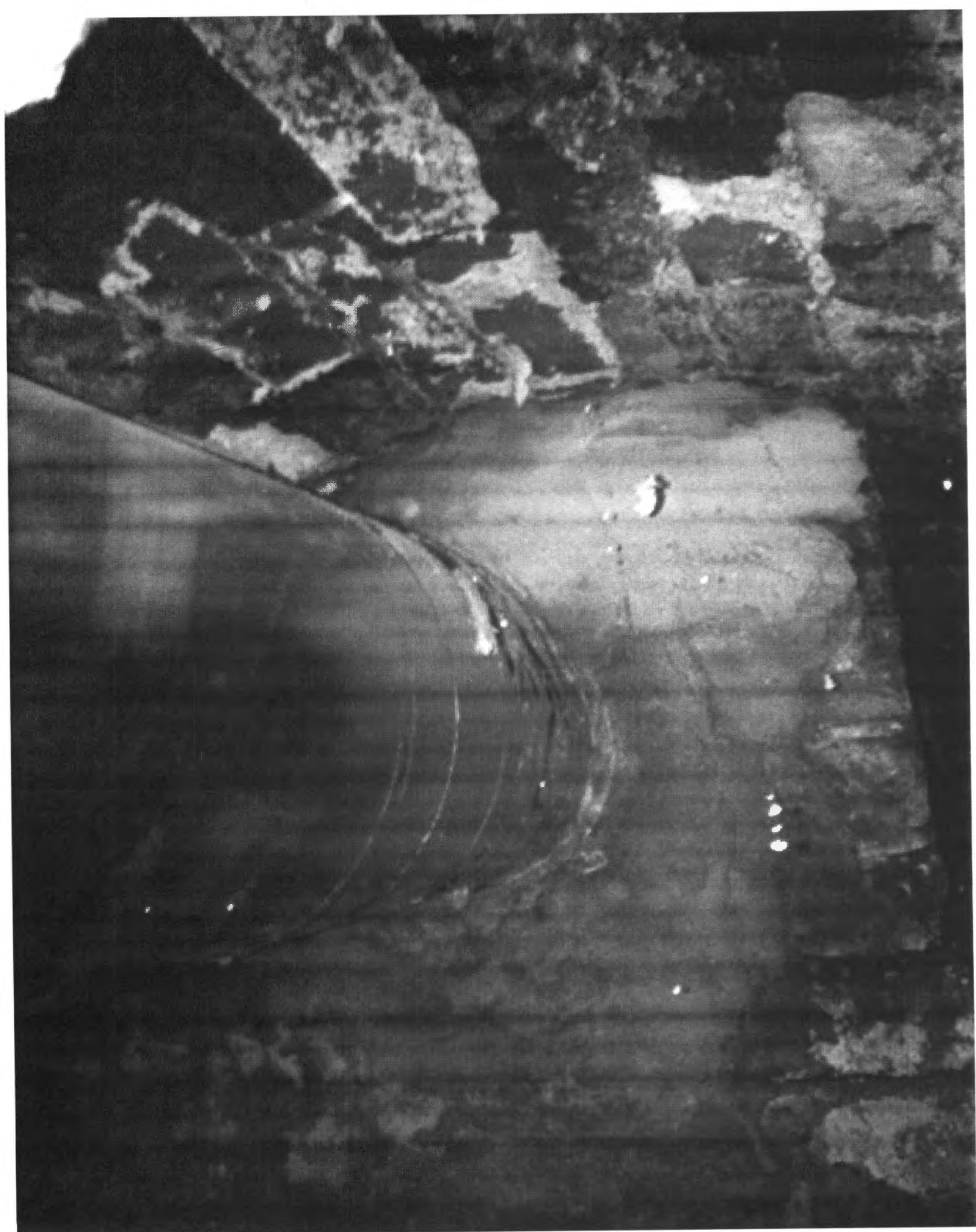


Intertek
9700609

For service or repairs to boiler, call your heating contractor or oil supplier. When seeking information on boiler, provide Boiler Model Number and Serial Number as shown on Rating Label located on top of the boiler.

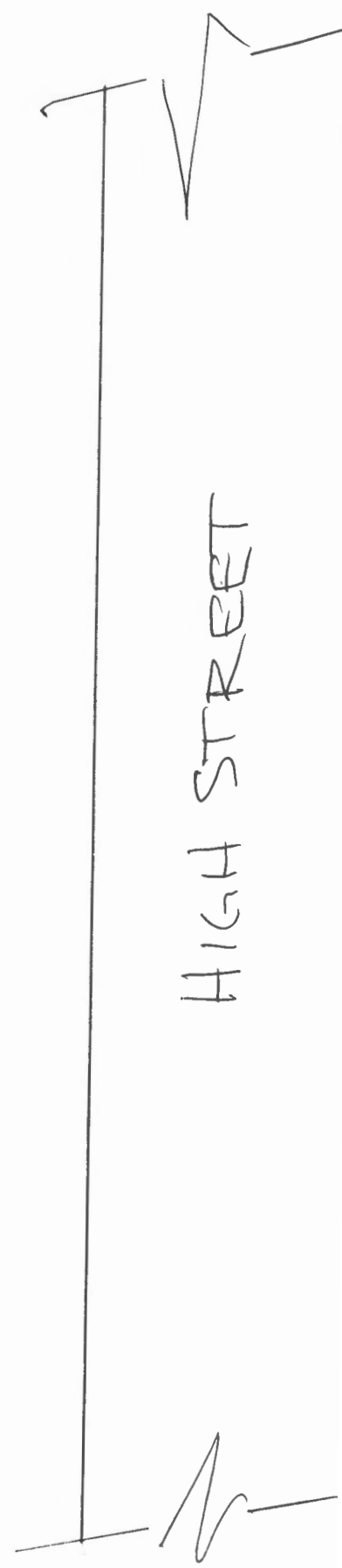
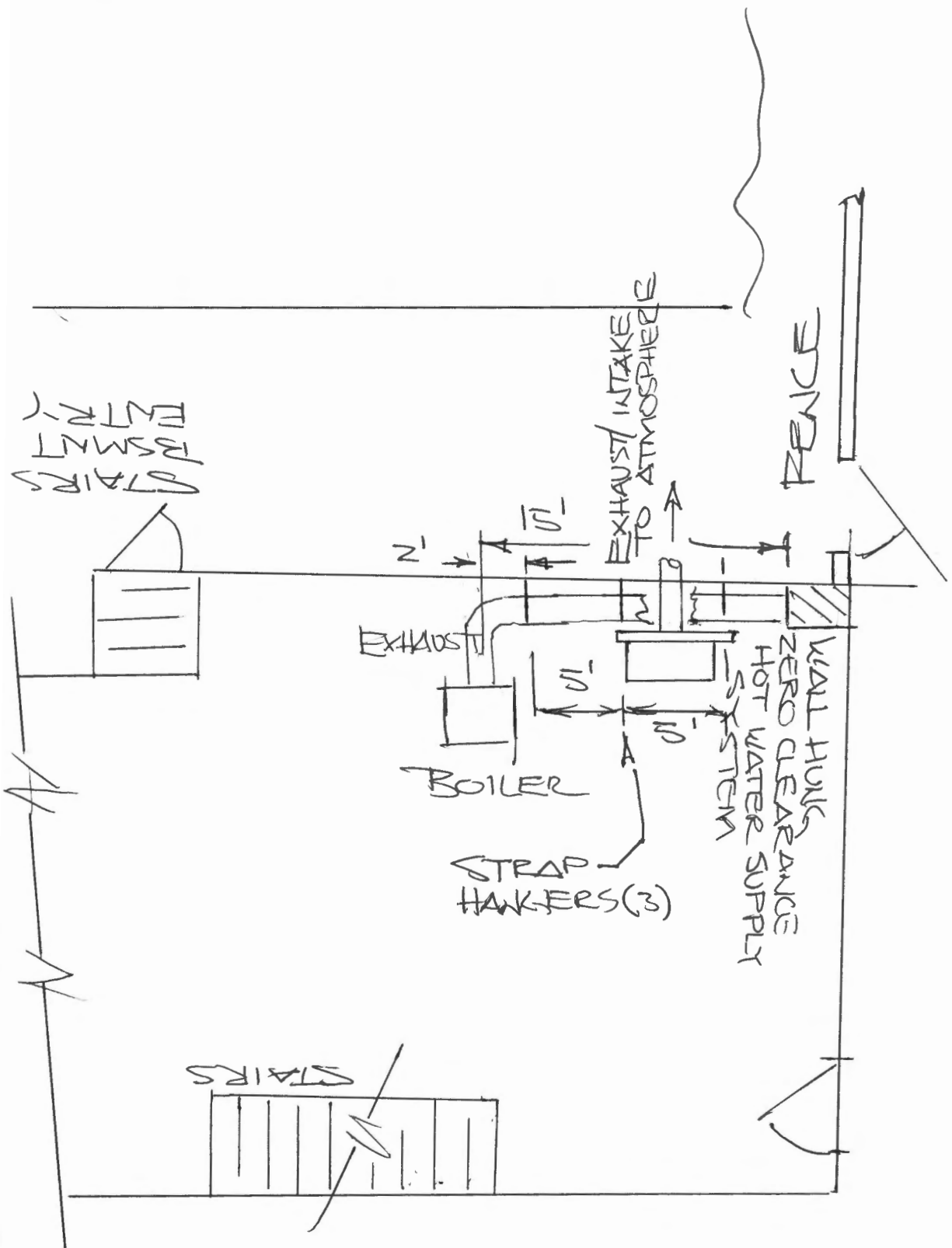
Boiler Model Number V8H	Boiler Serial Number	Installation Date
Heating Contractor		Phone Number
Address		

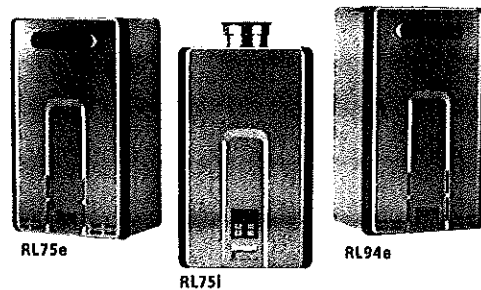




WALL HUNG GAS
HTR (HOT WATER SUPPLY)
EXHAUST







Luxury Series Warranty

Warranty (some restrictions apply): Heat exchanger limited warranty 12 years residential; 3 years when used in certain recirculating systems; 10 years when used with a Rinnai hydronic furnace; 5 years in commercial applications. All other parts: 5 years. *Labor: 5 years residential and 2 years commercial for Luxury/Ultra models when registered within 30 days of installation, 1 year all other applications. For more warranty details, visit www.rinnai.us or call 1-800-621-9419.

Interior Residential/Commercial Models

Models available in Natural Gas or Propane	RL75i	RL94i
Dimensions	14" W x 23" H x 10" D	14" W x 23" H x 10" D
Weight	51 lbs	53 lbs
Maximum/Minimum Gas Rate (Input BTU's)	180,000/9,900 (NG) 180,000/10,300 (LP)	199,000/9,900 (NG) 199,000/10,300 (LP)
Hot Water Capacity Range	0.26 to 7.5 GPM†	0.26 to 9.4 GPM†
Energy Factor (NG and LP)	.82	.82
Temperature Range (Min - Max)		
Residential**	98° F - 140° F	98° F - 140° F
Commercial***	98° F - 160° F	98° F - 185° F
Standard Digital Controller		MC-91-1
Optional Controller		MC-100V-1, BC100V-1, MCC-91-1

Exterior Residential/Commercial Models

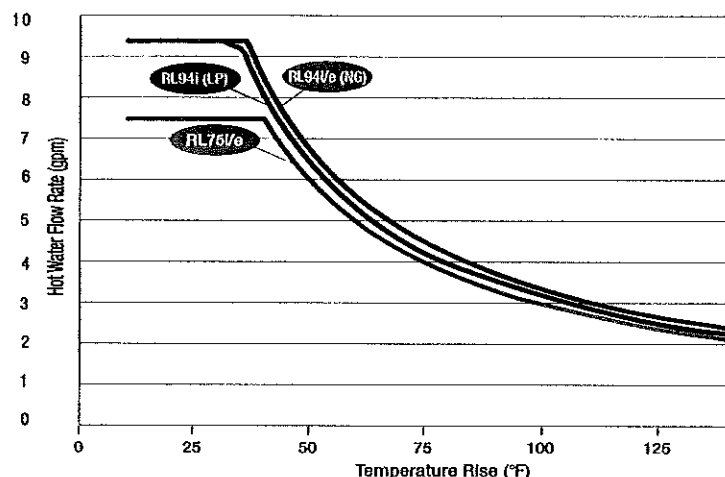
Models available in Natural Gas or Propane	RL75e	RL94e
Dimensions	14" W x 23" H x 10" D	14" W x 23" H x 10" D
Weight	51 lbs	51 lbs
Maximum/Minimum Gas Rate (Input BTU's)	180,000/9,900 (NG) 180,000/10,300 (LP)	199,000/9,900 (NG) 199,000/10,300 (LP)
Hot Water Capacity Range	0.26 to 7.5 GPM†	0.26 to 9.4 GPM†
Energy Factor (NG and LP)	.82	.82
Temperature Range (Min - Max)		
Residential**	98° F - 140° F	98° F - 140° F
Commercial***	98° F - 160° F	98° F - 185° F
Standard Digital Controller		MC-91-1
Optional Controller		MC-100V-1, BC100V-1, MCC-91-1

** Units come with a default maximum temperature of 120° F for increased safety and code compliance. An option to increase the max temp to 140° F is also available.

*** To achieve temperatures over 140° F, an MCC-91 commercial controller must be purchased separately.

† 0.4 GPM activation rate for RL Series

Tankless Water Heater - Maximum Flow Curves



Rinnai is continually updating and improving products; therefore, specifications are subject to change without prior notice. Local, state, provincial and federal codes must be adhered to prior to and upon installation.

HOT WATER FLOW CHART		
MODEL NO.	RL94i/e	RL75i/e
TEMP. RISE (°F)	GPM	GPM
140	2.4	2.1
135	2.5	2.2
130	2.6	2.3
125	2.7	2.4
120	2.8	2.5
115	2.9	2.6
110	3.0	2.7
105	3.2	2.9
100	3.3	3.0
95	3.5	3.2
90	3.7	3.3
85	3.9	3.5
80	4.2	3.8
75	4.4	4.0
70	4.7	4.3
65	5.1	4.6
60	5.5	5.0
55	6.0	5.5
50	6.6	6.0
45	7.4	6.7
40	8.3	7.5
35	9.4	7.5
30	9.4	7.5
25	9.4	7.5
20	9.4	7.5

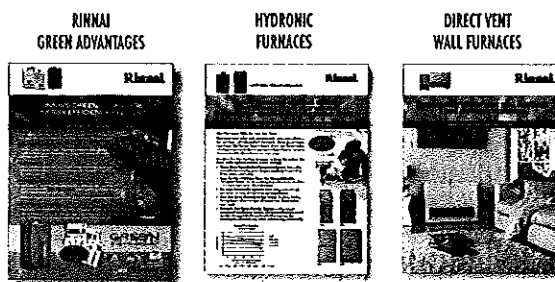
FOR MORE INFORMATION ON RINNAI PRODUCTS

SCAN WITH YOUR SMARTPHONE



RL94i

OTHER RINNAI LITERATURE AVAILABLE



Rinnai America Corporation

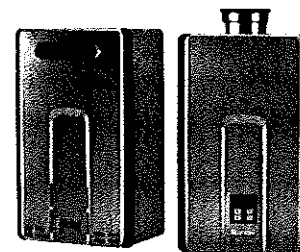
103 International Drive
Peachtree City, GA 30269

Toll Free 1-800-621-9419

Phone: 678-829-1700 • Fax: 678-364-8643

Visit our Website www.rinnai.us

E-mail: marketing@rinnai.us



**THE RINNAI LUXURY SERIES
TANKLESS WATER HEATERS
ENERGY-EFFICIENT HOT WATER NEVER LOOKED SO GOOD**

WHOLE-HOUSE AND COMMERCIAL TANKLESS WATER HEATING SOLUTIONS



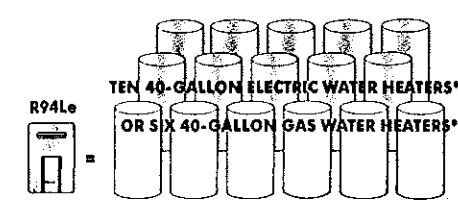
Why Tankless?

at a glance

endless options

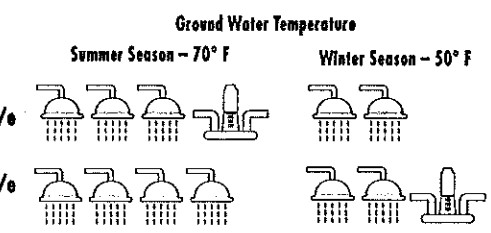
flexibility + control

Unlimited hot water supply maintains consistent, safe temperature. One Rinnai unit delivers 240 gallons or more per hour with no recovery time.



Based on 77' Rise, * Based on a 34,000 BTU Input. ** Based on 4,500 Watt elements.

WHOLE-HOUSE SIMULTANEOUS BATH USE - SIZING CHART



- Customer has the option of using the following appliances instead of a shower: residential grade clothes washing machines or dishwashers.
- Shower heads assumed to be 2.5 GPM mixed flow rate or less. If custom shower fixtures i.e. body sprays, large rain heads, or tubs over 60 gallons in capacity are used, please contact Rinnai.
- Bathroom sink faucets assumed to be 2 GPM mixed flow rate or less.
- Assumed mixed temperature on shower heads and bathroom sink faucets to be 104°F.
- Assumed Rinnai set point to be 120°F.
- Assumed 50 psi - 80 psi inlet water pressure for maximum flow.

ESTIMATED ANNUAL ENERGY COST COMPARISON

Costs less to operate on an annual basis.

Rinnai RL94i	\$223
40-Gallon Gas Tank**	\$281
40-Gallon Electric Tank**	\$492

* Based Upon DOE Average Energy Costs for 2008 (www.doe.gov)
** Source: AHRI Consumers Directory of Certified Efficiency Ratings

TANKLESS VS. TANK COMPARISON

Significant space savings over conventional tank water heaters.

Dimensions:
14" W x 26" H x 10" D vs approx. 20" Dia. x 47" H

Space Savings:
Avg. 12-16 sq. ft. Wall mounted vs 40-gallon tank

Weight Savings:
50 lbs. vs approx. 320 lbs. or more during use



Heat Water Only When You Need It!

Tankless water heating is the wave of the future – available to you today. You'll enjoy more than 40 percent energy savings¹, continuous hot water, and significant space savings² – plus a typical life span of 20 years or more in residential applications. And this "green" technology produces less CO₂ and NO_x than conventional gas or electric tank water heaters.

You see, Rinnai Tankless Water Heaters use natural gas or propane gas to heat water only when needed. When water flow is detected, the Rinnai begins heating water as it passes through its copper heat exchanger. The design of the unit allows it to capture up to 84 percent of the heat energy, making it highly efficient and cost effective.

When the demand for water ceases, the tankless unit shuts down and uses no electricity – a revolutionary advantage over inefficient tank-style heaters. More efficient when it's on, and off when it's off, the Rinnai Tankless Water Heater is the ultimate choice in today's world of high energy costs and environmental preservation.

Additionally, your Rinnai is supported by the most extensive group of professionals in the business. Our nationwide network of more than 20,000 trained and registered installers ensures a trouble-free installation and reliable after-the-sale support.

Never Run Out of Hot Water

Tankless water heating is one of the few energy-saving technologies that actually improves the quality of your life. You'll delight in continuous hot water – for bathing, cooking, dishes, laundry, and all the other countless ways hot water enriches your life. Plus, our digital controllers give you precise control of the output water temperature for the ultimate in comfort and safety.

Save Space

Traditional tank water heaters can take up to 16 square feet of valuable floor space. But your Rinnai unit – only about the size of a carry-on suitcase – can be installed on virtually any wall inside or outside your home or building, so you can strategically locate the unit for maximum performance and energy efficiency.

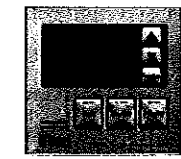
	Rinnai	Limited
Direct-Vent Sealed Combustion	✓	Limited
Free Air Space Requirement (cu. ft.)	3.1	Up to 9,990
Zero-Clearance Venting	✓	Limited
Concentric Vent (One Penetration)	✓	Limited
12-Year Heat Exchanger Warranty**	✓	Limited
24/7/365 Technical Support	✓	Limited

	Rinnai	40 gallons
Hot Water Capacity	Unlimited	40 gallons
Digital Control for:		
• Set Temperature	✓	No
• Consistent Temperature	✓	No
• Self-Diagnostics	✓	No
Interior/Exterior Install Options	✓	Interior Only
Warranty/Avg. Service Life (Years)	12**/20	6/12

** Residential: 12 years on heat exchanger, 5 years on all other parts, 5 years labor. Commercial: 5 years on heat exchanger and all other parts, 2 years labor. See warranty information on back cover for more details.



MC-91-1-S Digital Controller Integrated in Internal Unit; Standard Digital Controller for Exterior Unit



MC-100V-1-S Deluxe Digital Controller



BC-100V-1US-S Bath-Fill Digital Controller

Accessories

Rinnai's line of digital controllers allows you to set water temperature precisely for multiple locations in your home, analyze and troubleshoot the water heater, and even automatically fill your bath to a pre-set temperature and volume. (Note: the MC-91 controller is integrated on the front panel of the RL Series interior units and comes standard with all RL Series exterior units.)

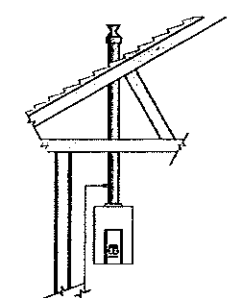
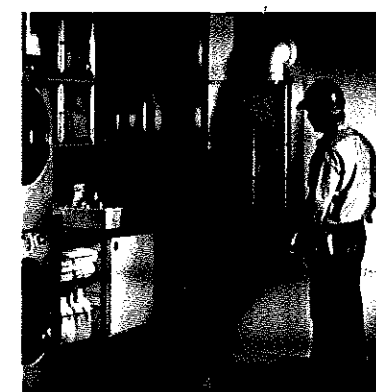
Flexible Installation

For interior installation, Rinnai units use a *concentric venting system* – a single vent assembly featuring an inner, metal vent for exhaust gases and an outer PVC or metal tube for bringing combustion air from outdoors. The result: a direct-vent, sealed-combustion system that offers optimum safety, performance and ease of installation.

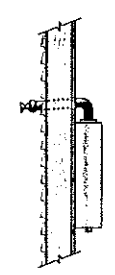
Exterior units can be installed in a recessed enclosure, which can be painted or textured to match your home's panel or brick siding.

Multiple Units

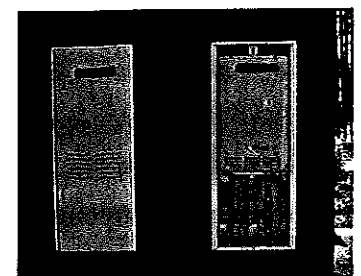
If you need more than one unit for your larger home, spa or body spray shower, Rinnai's EZConnect® feature allows you to link two units with a simple cord. For even larger applications, your installer can place up to 25 units in parallel.



INTERIOR ROOF OR WALL VENTING
The Rinnai can be vented vertically or horizontally.



EXTERIOR WALL-MOUNT
installations require no additional venting accessories.



CUSTOM INSTALLATIONS to blend in with the interior (shown at left with optional pipe cover) or to be recessed on an exterior wall of the home.

More Than 30 Million Installations Worldwide Make Rinnai #1!

At Rinnai, we've sold more tankless water heaters worldwide than anyone else. Our complete commitment to safety, quality, support and the environment has also made us #1 in the U.S. market.

Tomorrow's Innovation Today

As the leading manufacturer of gas heating products worldwide, Rinnai continues innovating to ensure a greener environment. Rinnai's superior heating and hot water technologies deliver greater efficiency and reliability, so everyone benefits – with environmental preservation and energy conservation that results in a better planet for us all.



Industry and Building Associations



WARNING

This boiler contains very hot water under high pressure. Do not unscrew any pipe fittings nor attempt to disconnect any components of this boiler without positively assuring the water is cool and has no pressure. Always wear protective clothing and equipment when installing, starting up or servicing this boiler to prevent scald injuries. Do not rely on the pressure and temperature gauges to determine the temperature and pressure of the boiler. This boiler contains components which become very hot when the boiler is operating. Do not touch any components unless they are cool.

High water temperatures increase the risk of scalding injury. If this boiler is equipped with a tankless heater for domestic water supply, a flow regulator and automatic mixing valve must be installed properly in tankless heater piping. See Piping and Trim Sections of this manual for details.

This boiler must be properly vented and connected to an approved vent system in good condition. Do not operate boiler with the absence of an approved vent system.

This boiler needs fresh air for safe operation and must be installed so there are provisions for adequate combustion and ventilation air.

A clean and unobstructed chimney flue is necessary to allow noxious fumes that could cause injury or loss of life to vent safely and will contribute toward maintaining the boiler's efficiency.

This boiler is supplied with controls which may cause the boiler to shut down and not re-start without service. If damage due to frozen pipes is a possibility, the heating system should not be left unattended in cold weather; or appropriate safeguards and alarms should be installed on the heating system to prevent damage if the boiler is inoperative.

This boiler is designed to burn No. 2 fuel oil only. Do not use gasoline, crankcase drainings, or any oil containing gasoline. Never burn garbage or paper in this boiler. Do not convert to any solid fuel (i.e. wood, coal). Do not convert to any gaseous fuel (i.e. natural gas, LP). All flammable debris, rags, paper, wood scraps, etc., should be kept clear of the boiler at all times. Keep the boiler area clean and free of fire hazards.

All boilers equipped with burner swing door have a potential hazard which if ignored can cause severe property damage, personal injury or loss of life. Before opening swing door, turn off service switch to boiler to prevent accidental firing of burner outside the combustion chamber. Be sure to tighten swing door fastener completely when service is completed.

TABLE OF CONTENTS

<p>I. Pre-Installation10</p> <p>II. Knockdown Boiler Assembly12</p> <p>III. Packaged Boiler Assembly25</p> <p>IV. Water Boiler Piping & Trim29</p> <p>V. Steam Boiler Piping & Trim34</p> <p>VI. Tankless & Indirect Water Heater Piping..36</p> <p>VII. Venting & Air Intake Piping39</p> <p>VIII. Electrical42</p> <p>IX. Oil Piping58</p>	<p>X. System Start-Up60</p> <p>XI. Maintenance & Service Instructions69</p> <p>XII. Boiler Cleaning73</p> <p>XIII. Trouble Shooting75</p> <p>XIV. Repair Parts.....77</p> <p>Appendix A - Low Water Cut Off93</p> <p>Appendix B - Figures94</p> <p>Appendix C - Tables96</p>
--	--

TABLE 1A: DIMENSIONAL DATA (SEE FIGURES 1A THRU 1D)

Boiler Model No.	Dimensions See Figures 1A - 1D			Water Content - Gallons		Heat Transfer Surface Area - Sq. Ft.	Approximate Shipping Weight (LB.)
	"A"	"B"	"C"	Steam Boiler	Water Boiler	Steam Boiler	
V8H2	12-1/8"	6-5/8"	5"		10.0		450
V8H3	17-1/8"	9-1/8"	6"	10.3	12.8	15.88	542
V8H4	22-1/8"	11-5/8"	6"	12.4	15.7	22.92	634
V8H5	27-1/8"	14-1/8"	7"	14.6	18.5	29.96	726
V8H6	32-1/8"	16-5/8"	7"	16.7	21.4	37.00	818
V8H7	37-1/8"	19-1/8"	8"	18.8	24.2	44.04	910
V8H8	42-1/8"	21-5/8"	8"	20.9	27.1	51.08	1002
V8H9	47-1/8"	24-1/8"	8"	23.0	30.0	58.12	1094

NOTE: 1 The V8H2 Boiler is available as a packaged water boiler only.

2 Maximum working Pressure: Steam: 15 PSI; Water: 30 PSI Shipped From Factory (Std.), 40 PSI Optional, 50 PSI Optional

TABLE 1B: RATING DATA

Boiler Model No. *	Burner Capacity			I=B=R NET Ratings			Minimum Chimney Requirements			AFUE %	
	GPH	MBH	DOE Heating Capacity MBH	Water MBH	Steam MBH	Steam Sq. Ft.	Round In. Dia.	Rectangle In. x In.	Height Ft.	Steam	Water
V8H2W	0.60	84	70	61			6	8 x 8	15		82.1
V8H3W	1.05	147	125	109			6	8 x 8	15		85.0
V8H3S	0.75	105	91		68	283	6	8 x 8	15	85.1	
V8H4W	1.35	189	162	141			7	8 x 8	15		85.3
V8H4S	1.05	147	127		95	396	6	8 x 8	15	85.3	
V8H5W	1.65	231	198	172			7	8 x 8	15		85.3
V8H5S	1.35	189	164		123	512	7	8 x 8	15	85.4	
V8H6W	1.90	266	228	198			8	8 x 8	15		85.3
V8H6S	1.65	231	201		151	629	7	8 x 8	15	85.7	
V8H7S V8H7W	2.10	294	252	219	189	787	8	8 x 8	15	84.7	85.0
V8H8S	2.35	329	266		200	833	8	8 x 12	15		
V8H8W	2.35	329	275	239			8	8 x 12	15		
V8H9S	2.60	364	298		224	933	9	8 x 12	15		
V8H9W	2.60	364	299	260			9	8 x 12	15		

* Boiler Model Suffix: S=Steam, W=Water

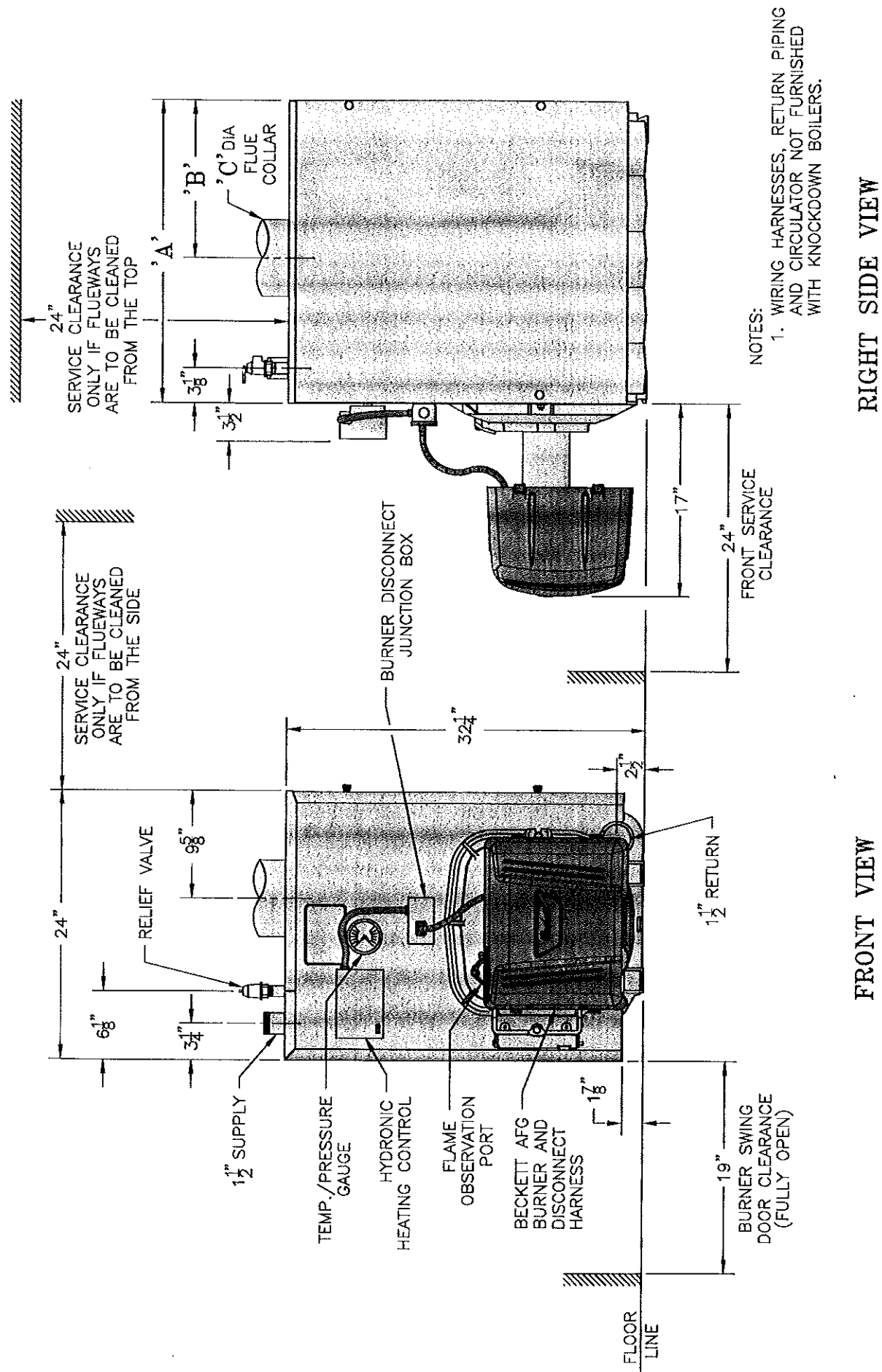


Figure 1A: V8H2 thru V8H9 Water Boiler without Tankless Heater

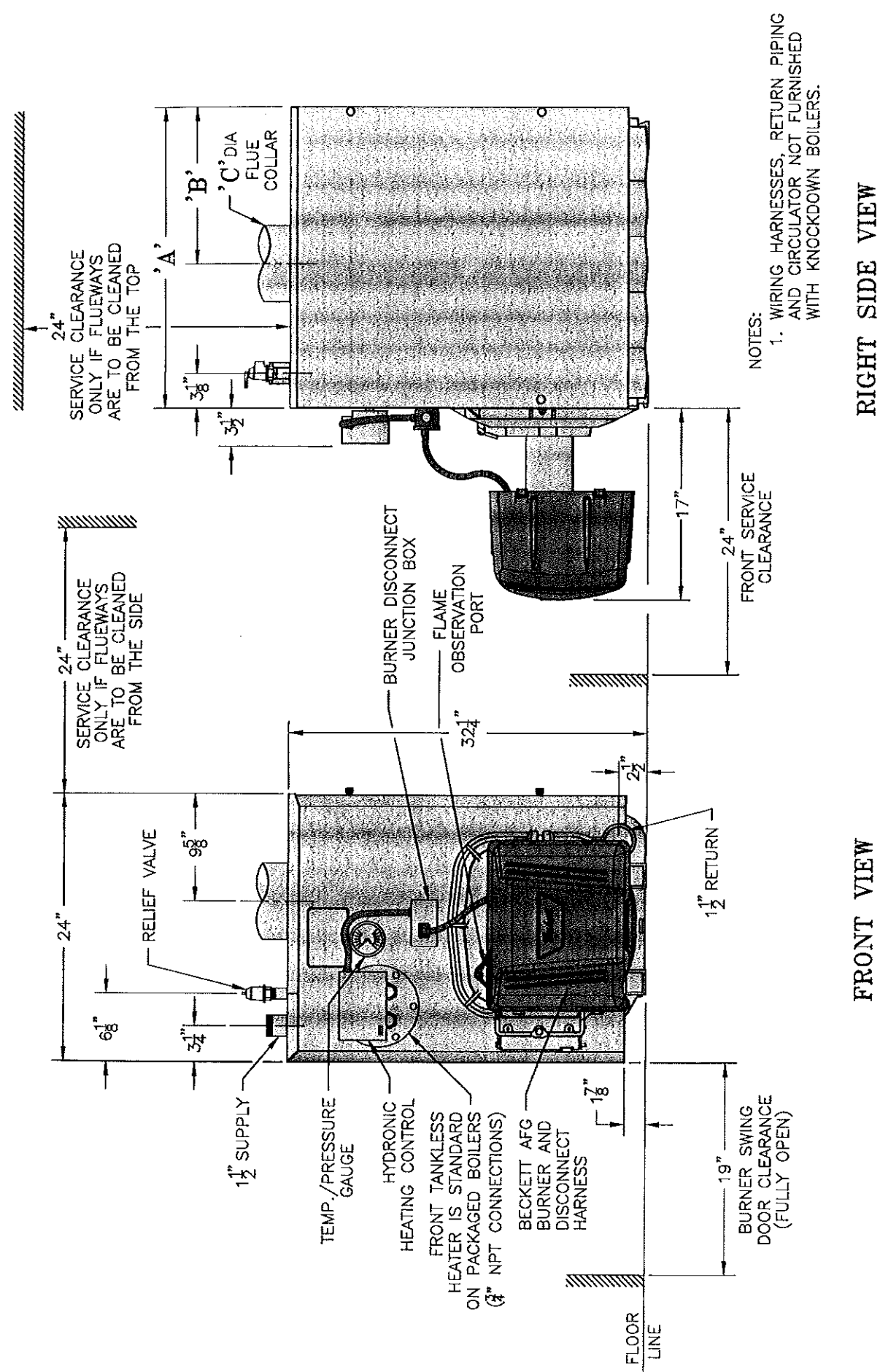


Figure 1B: V8H3 thru V8H9 Water Boiler with Front Tankless Heater

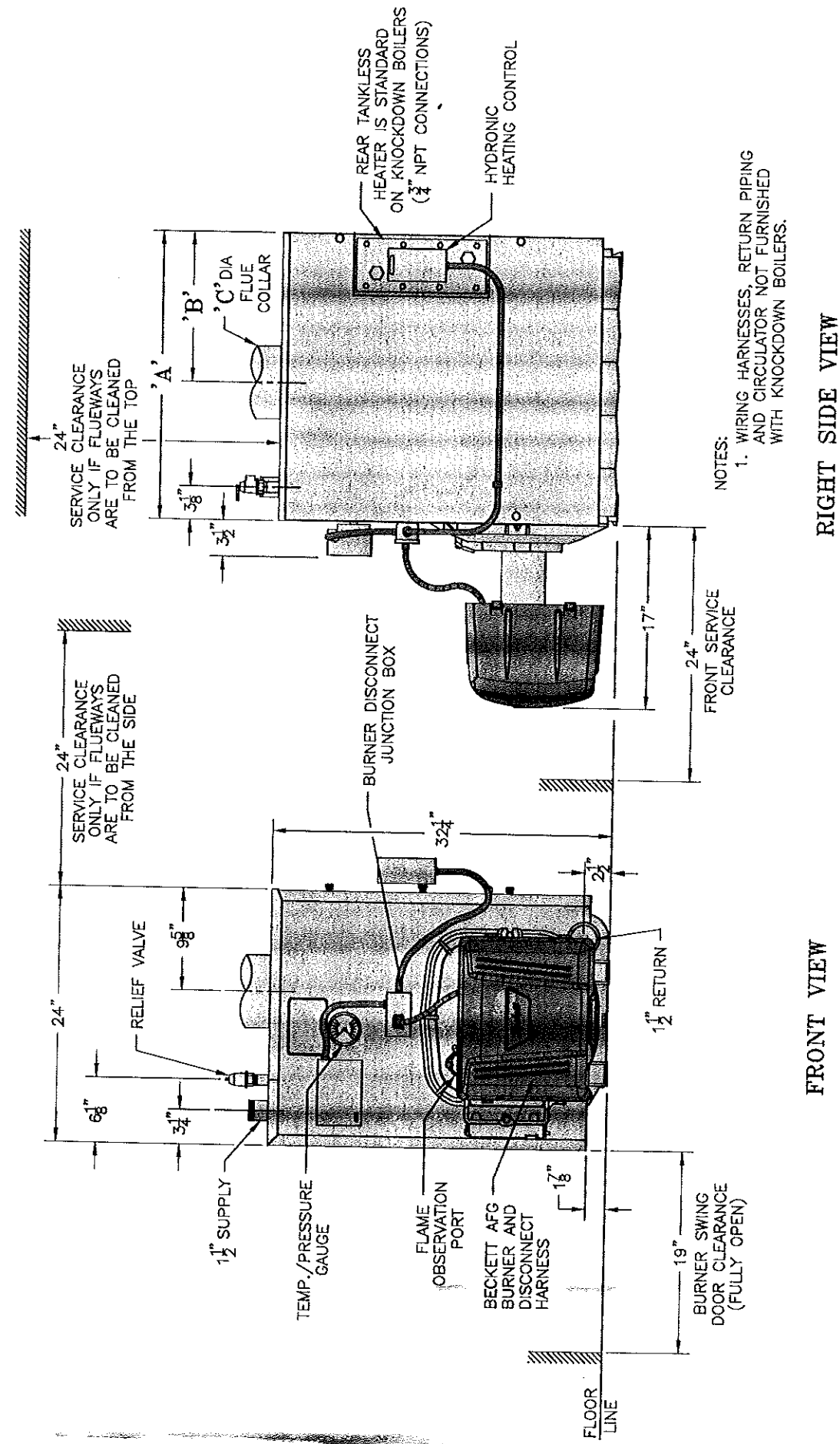


Figure 1C: V8H3 thru V8H9 Water Boiler with Rear Tankless Heater

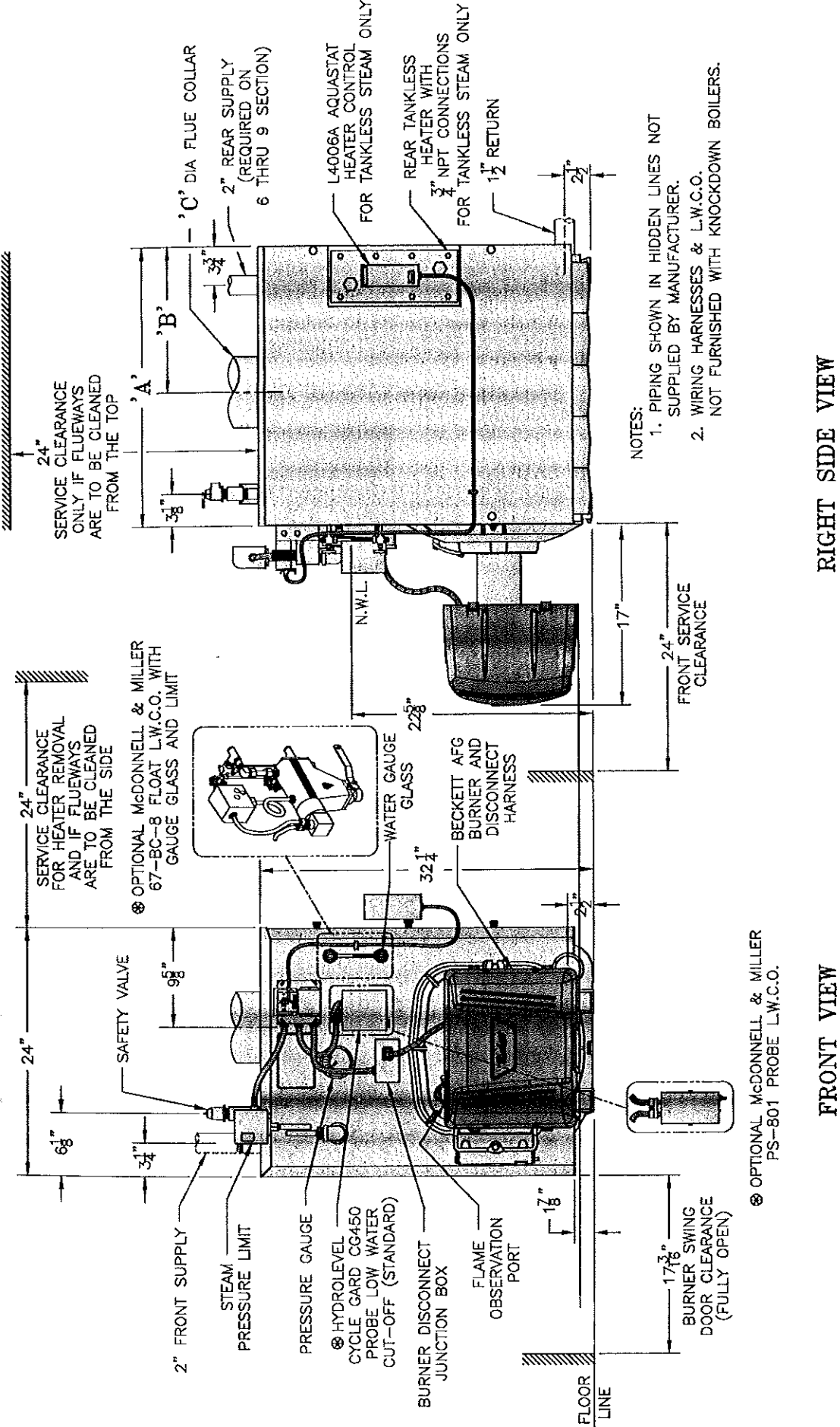


Figure 1D: V8H3 thru V8H9 Steam Boiler with or without Tankless Heater

SECTION I: PRE-INSTALLATION

A. INSPECT SHIPMENT

carefully for any signs of damage.

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

B. LOCATE BOILER

in front of final position before removing crate. See Figures 1A thru 1D.

1. LOCATE so that vent pipe connection to chimney will be short and direct.
2. BOILER IS SUITABLE FOR INSTALLATION ON COMBUSTIBLE FLOOR. Boiler cannot be installed on carpeting.
3. FOR BASEMENT INSTALLATION, provide a solid elevated base, such as concrete, if floor is

not level, or if water may be encountered on floor around boiler.

4. PROVIDE SERVICE CLEARANCE of at least 24" clearance from front jacket panel for servicing and removal of front tankless heater (increase to 30" for #A54 heater). If boiler is equipped with a rear tankless heater, provide at least 24" service clearance on the right side of the boiler. Boiler flueways may be cleaned either from the top or from the right side. Provide at least 24" clearance from either the right side of the boiler or the top of the boiler for cleaning flueways.

5. For minimum clearances to combustible materials. See Figure 2.

NOTICE

Clearance to venting is for single wall vent pipe. If Type L vent is used, clearance may be reduced to the minimum required by the vent pipe manufacturer.

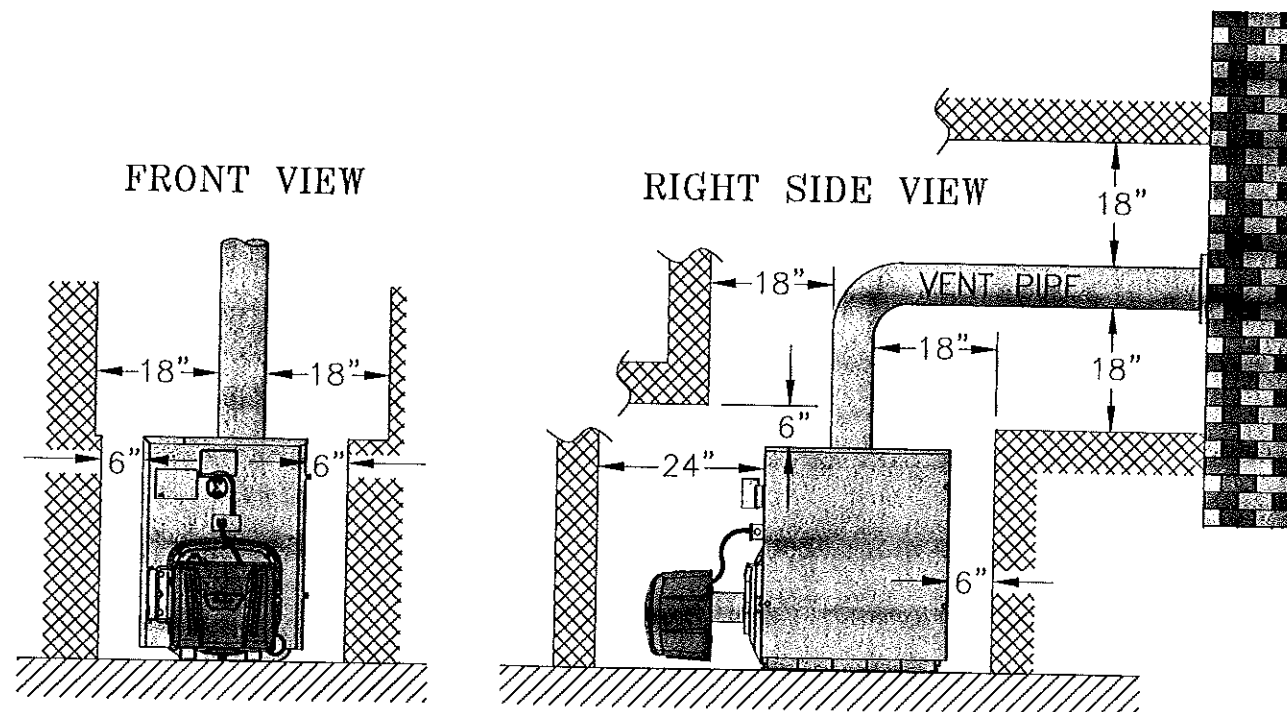


Figure 2: Minimum Installation Clearances To Combustible Materials (Inches)

NOTES:

1. Listed clearances comply with American National Standard ANSI/NFPA 31, Installation of Oil Burning Equipment.
2. V8H Series boilers can be installed in rooms with clearances from combustible material as listed

above. Listed clearances cannot be reduced for alcove or closet installations.

3. For reduced clearances to combustible material, protection must be provided as described in the above ANSI/NFPA 31 standard.

SECTION I: PRE-INSTALLATION (continued)

C. PROVIDE COMBUSTION AND VENTILATION AIR.

Local and National Codes may apply and should be referenced.

WARNING

Adequate combustion and ventilation air must be provided to assure proper combustion and to maintain safe ambient air temperatures.

Do not install boiler where gasoline or other flammable vapors or liquids, or sources of hydrocarbons (i.e. bleaches, fabric softeners, etc.) are used or stored.

1. Determine volume of space (boiler room). Rooms communicating directly with the space in which the appliances are installed, through openings not furnished with doors, are considered a part of the space.

$$\text{Volume}(\text{ft}^3) = \text{Length}(\text{ft}) \times \text{Width}(\text{ft}) \times \text{Height}(\text{ft})$$
2. Determine total input of all appliances in the space. Add inputs of all appliances in the space and round the result to the nearest 1000 BTU per hour.
3. Determine type of space. Divide Volume by total input of all appliances in space. If the result is greater than or equal to 50 ft³/1000 BTU per hour, then it is considered an *unconfined space*. If the result is less than 50 ft³/1000 BTU per hour then the space is considered a *confined space*.
4. For boiler located in an *unconfined space* of a *conventionally constructed building*, the fresh air infiltration through cracks around windows and doors normally provides adequate air for combustion and ventilation.
5. For boiler located in a *confined space* or an *unconfined space* in a building of *unusually tight construction*, provide outdoor air.
 - a. Outdoor air for combustion may be provided with an optional U.S. Boiler Company V8H™ Fresh Air Accessory Kit (**ONLY AVAILABLE WITH BECKETT BURNER**). Metal cover applications, P/N 611280031. Plastic cover applications, P/N 102119-01. Refer to Fresh Air Accessory Kit Instructions for installation and air intake piping details.

or

- b. Outdoor air may be provided with the use of two permanent openings which communicate directly or by duct with the outdoors or spaces (crawl or attic) freely communicating with the outdoors. Locate one opening within 12 inches of top of space. Locate remaining opening within 12 inches of bottom of space. Minimum dimension of air opening is 3 inches. Size each opening per following:

- i. **Direct communication with outdoors.** Minimum free area of 1 square inch per 4,000 BTU per hour input of all equipment in space.
- ii. **Vertical ducts.** Minimum free area of 1 square inch per 4,000 BTU per hour input of all equipment in space. Duct cross-sectional area shall be same as opening free area.
- iii. **Horizontal ducts.** Minimum free area of 1 square inch per 2,000 BTU per hour input of all equipment in space. Duct cross-sectional area shall be same as opening free area.
Alternate method for boiler located within confined space. Use indoor air if two permanent openings communicate directly with additional space(s) of sufficient volume such that combined volume of all spaces meet criteria for unconfined space. Size each opening for minimum free area of 1 square inch per 1,000 BTU per hour input of all equipment in spaces, but not less than 100 square inches.

6. Louvers and Grilles of Ventilation Ducts

- a. All outside openings should be screened and louvered. Screens used should not be smaller than 1/4 inch mesh. Louvers will prevent the entrance of rain and snow.
- b. Free area requirements need to consider the blocking effect of louvers, grilles, or screens protecting the openings. If the free area of the louver or grille is not known, assume wood louvers have 20-25 percent free area and metal louvers and grilles have 60-75 percent free area.
- c. Louvers and grilles must be fixed in the open position, or interlocked with the equipment to open automatically during equipment operation.

SECTION VII: VENTING AND AIR INTAKE PIPING (continued)

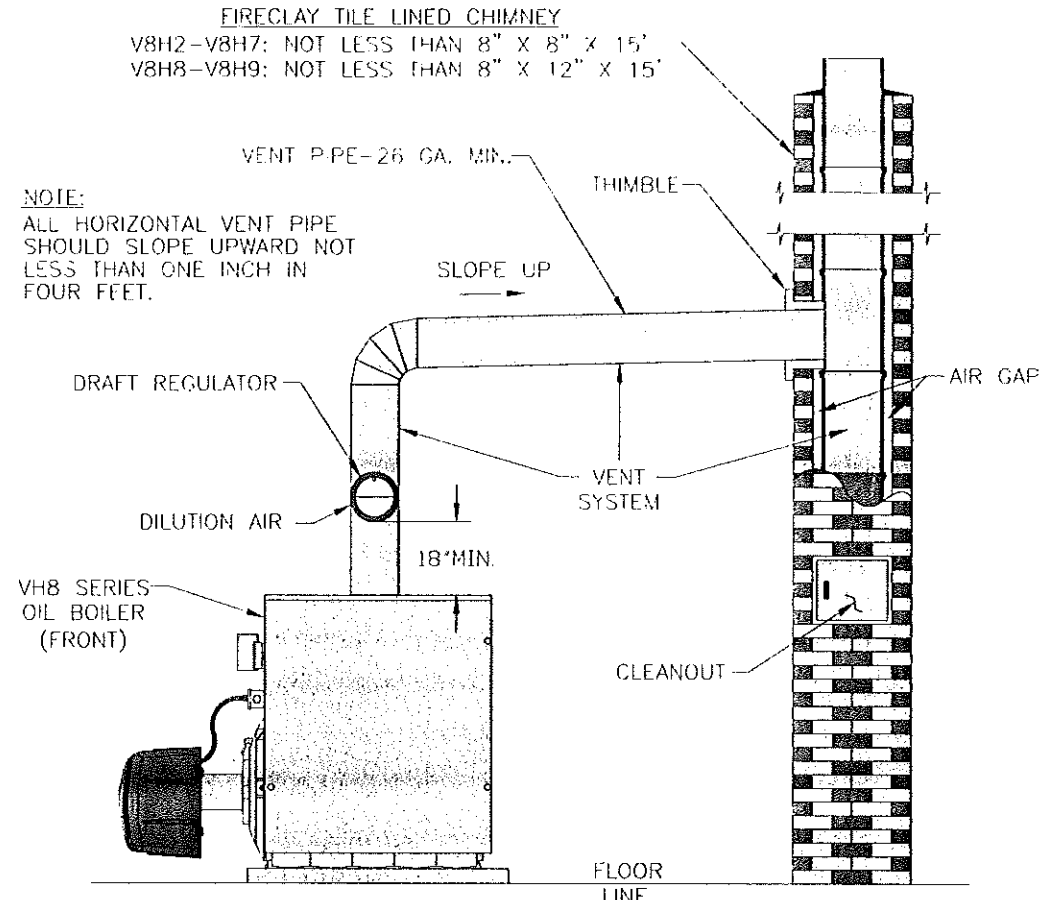


Figure 17: Recommended Vent Pipe Arrangement and Chimney Requirements

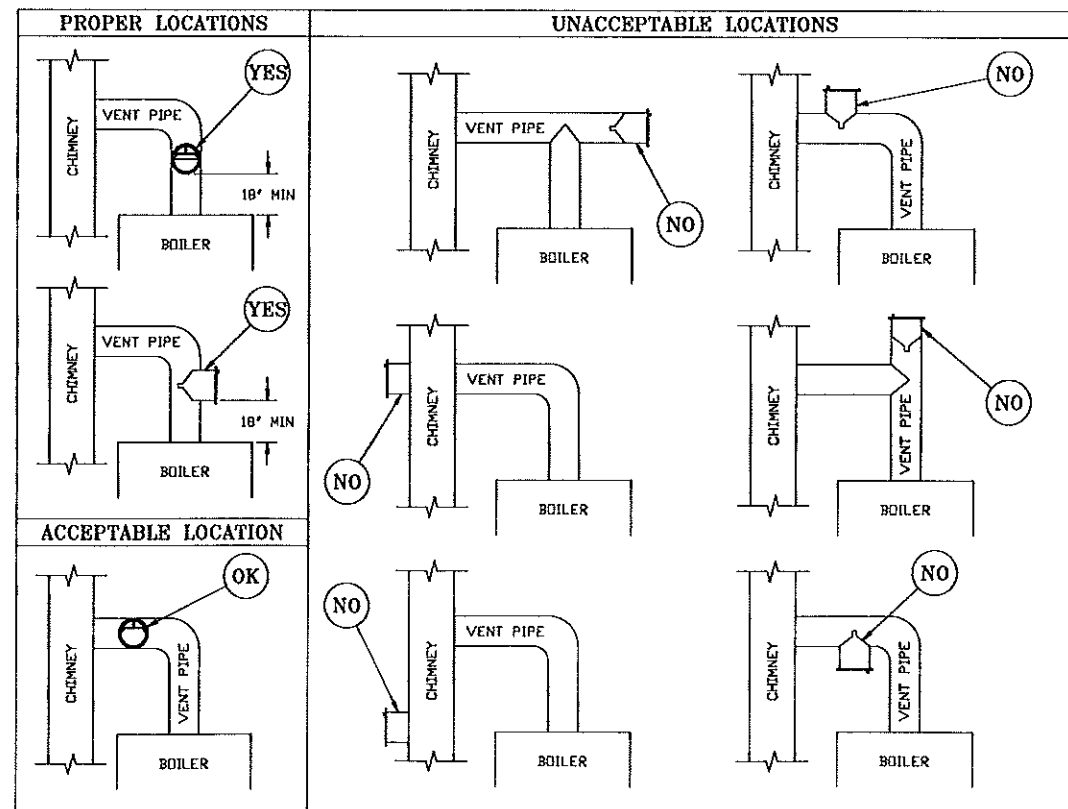


Figure 18: Proper and Improper Locations of Draft Regulator

SECTION VII: VENTING AND AIR INTAKE PIPING (continued)

- d. Seal all joints gas-tight, using silicone caulk or self-adhesive aluminum tape.
2. After determining location, cut a hole in the wall to accept 4 inch air intake pipe. See Figure 19.
3. Remove the metal knockout in right side of burner cover. Install U.S. Boiler Company Inlet Air Accessory Kit, P/N 611280031.
4. Mount the Vacuum Relief Valve Tee Assembly (P/N 8116268 included with Kit) or 90° elbow into the burner inlet ring. See Figure 19.
 - a. Secure with at least three (3) sheet metal screws evenly spaced around the burner inlet ring.
 - b. Assembly the vacuum relief valve balance weight onto the gate. Refer to the vacuum relief valve manufacturer's instructions.
 - c. Mount the vacuum relief valve into the tee and fasten with a screw and nut in collar tabs. To ensure proper operation, the gate must be level across the pivot point and plumb. Refer to vacuum relief valve manufacturer's instructions.

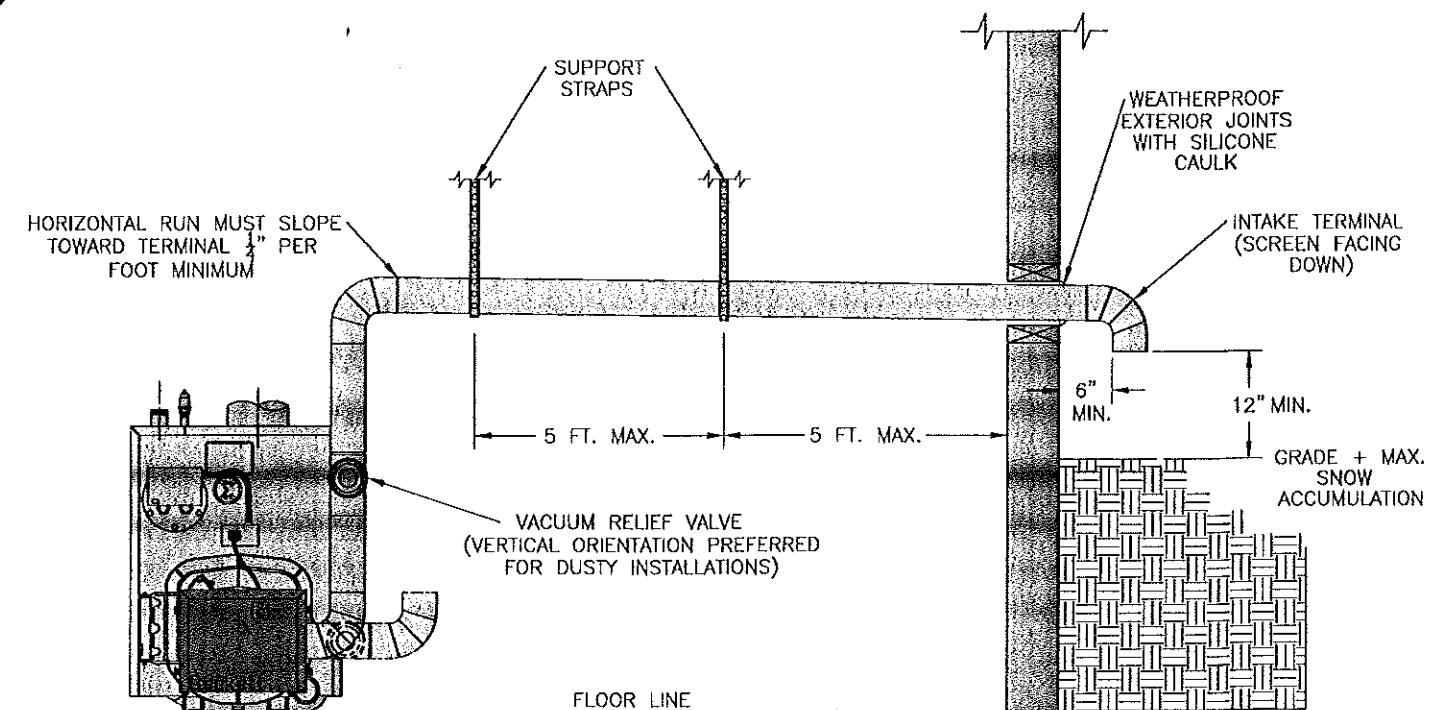
5. Install remainder of air intake, securing each joint with at least three (3) sheet metal screws evenly spaced.
6. Install air intake terminal. See Figure 19.

NOTICE

Intake terminal must be at least 12 inches above grade plus snow accumulation.

WARNING

Do not locate air intake where petroleum distillates, CFC's, detergents, volatile vapors or any other chemicals are present. Severe boiler corrosion and failure will result.



FRONT VIEW

Figure 19: Optional Air Intake Piping Installation - Only Available with Beckett Burner