



OSB

Series 3 Oil-Fired Steam Boilers

Boiler Manual

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Homeowner —

Read and follow all information on pages 1 through 6 ONLY.

Service technician —

Read and follow ALL information in the entire manual.

WARNING Failure to follow all instructions in proper order can cause severe personal injury, death or substantial property damage.

WARNING At the beginning of each heating season, contact your qualified service technician to inspect, clean and start-up the boiler per the Boiler Manual. Failure to comply could result in boiler failure, leading to potential severe personal injury, death or substantial property damage.

Hazard definitions

DANGER Hazards that **will cause severe** personal injury, death or substantial property damage.

CAUTION Hazards that **will or can cause minor** personal injury or property damage.

WARNING Hazards that **can cause severe** personal injury, death or substantial property damage.

NOTICE Special instructions on installation, operation or maintenance that are important but not related to personal injury or property damage.

WARNING **INSTALLER** — Read all instructions before installing. **Read page 2 first.** Follow all instructions in proper order to prevent personal injury or death.

- Consider piping and installation when determining boiler location.
- Any claims for damage or shortage in shipment must be filed immediately against the transportation company by the consignee.

WARNING **USER** — Please read the following. Failure to comply could result in severe personal injury, death or substantial property damage.

- **This manual is for use only by your qualified heating installer/service technician.**
- Have the boiler serviced by a qualified service technician.

WARNING This manual must only be used by a **qualified heating installer/service technician.** Boiler and burner must be installed and serviced only by a qualified heating installer/service technician. Failure to comply could result in severe personal injury, death or substantial property damage.

NOTICE When calling or writing about the boiler— Please have: • boiler model number from the boiler rating label and • Consumer Protection (CP) number from the boiler jacket. You may list the CP number in the space provided on the “Installation and service certificate” found on page 20.

Read this first!

WARNING Failure to adhere to the guidelines below can result in severe personal injury, death or substantial property damage.

Homeowner —

- For homeowner or person responsible for simple start-up and routine maintenance of the system.

Instructions on pages 1 through 5 must be followed to assure proper operation of your boiler. See page 5 for lists common problems and possible corrections. In addition, it is your responsibility to:

- Have boiler and burner installed by a qualified installer.
- Have boiler and burner serviced annually by a qualified service technician.
- Review and understand start-up and routine maintenance procedures with qualified service technician.

Perform routine maintenance as described on page 3.

Service technician —

- For a qualified service technician who has the necessary equipment to check the boiler and system performance, and is responsible for start-up and service of boiler and system.
- All instructions in this manual must be followed to assure proper operation of this boiler.
- Annually service boiler and burner to assure proper operation. See page 21 for service record.
- Review and explain start-up and routine maintenance procedures with homeowner.

WARNING Follow instructions below to prevent severe personal injury, death or substantial property damage:

- To avoid electric shock, disconnect electrical supply to burner service switch and additional external switches before performing service.
- To avoid severe burns, allow boiler to cool before performing service.
- Do not block flow of combustion or ventilation air to boiler.
- Boiler must be connected to a flue with sufficient draft at all times to assure proper operation.

Do not use this boiler if any part has been under water. Electrical and mechanical failures may cause electric shock and fire risks. Immediately call a qualified service technician to inspect chimney or vent, boiler and burner. Have the boiler flue ways cleaned and have the following replaced:

- all electrical and mechanical controls
- electrical wiring
- oil burner and controls
- insulation and chamber lining

When servicing boiler —

1. To avoid electric shock, disconnect electrical supply before performing maintenance.
2. To avoid severe burns, allow boiler to cool before performing maintenance.

Boiler operation —

1. Do not block flow of combustion or ventilation air to boiler.
2. Should overheating occur, turn off or disconnect electrical supply to boiler **and** shut off the oil supply at a location external to the appliance, if possible.

Boiler water —

- Continual fresh makeup water will reduce boiler life. Mineral buildup in sections reduces heat transfer, overheats cast iron, and causes section failure. Addition of oxygen and other gases can cause internal corrosion. Leaks in boiler or piping must be

repaired at once to prevent makeup water.

CAUTION Failure to maintain recommended pH and repair leaks can cause section iron corrosion, leading to section failure and leaks. Do not use petroleum-based sealing or stop-leak compounds in boiler systems. Damage to system components can result, causing property damage.

- Boiler water pH 7.0 to 8.5 is recommended. For pH conditions outside 7.0 to 8.5 range or unusually hard water areas (above 7 grains hardness), consult local water treatment company.

When using antifreeze:

- Use antifreeze especially made for hydronic systems. Inhibited propylene glycol is recommended.

WARNING Do not use automotive, ethylene glycol, undiluted or petroleum-based antifreeze. Severe personal injury, death or substantial property damage can result.

- 50% solution provides protection to about -30°F.
- Local codes may require back-flow preventer or actual disconnect from city water supply.
- Determine quantity according to system water content. Boiler water content is listed on Rating page.
- Percent of solution will affect sizing of heat distribution units, circulator and expansion tank.
- Follow antifreeze manufacturer's instructions.
- Do not add cold water to hot boiler. Thermal shock can cause sections to crack.

WARNING DO NOT use petroleum-based cleaning or sealing compounds in boiler system. Water seal deterioration will occur, causing leakage between boiler sections, circulator flanges, diaphragm tanks or other system components. This can result in substantial property damage.

- DO NOT use "homemade cures" or "boiler patent medicines". Serious damage to boiler, personnel and/or property may result.
- Do not add cold water to hot boiler. Thermal shock can cause sections to crack.

Saltwater Damage — The exposure of boiler components to saltwater can have both immediate and long-term effects. While the immediate effects of saltwater damage are similar to those of freshwater (shorting out of electrical components, washing out of critical lubricants, etc.), the salt and other contaminants left behind can lead to longer term issues after the water is gone due to the conductive and corrosive nature of the salt residue. Therefore, Williamson -Thermoflo boiler equipment contaminated with saltwater or polluted water will no longer be covered under warranty and should be replaced.

Electrical Damage — If any electrical component or wiring came into contact with water, or was suspected to have come into contact with water, replace the boiler with a new Williamson -Thermoflo boiler.

CAUTION Frozen Water Damage Hazard

Residences or buildings that are unattended in severely cold weather, boiler system components failures, power outages, or other electrical system failures could result in frozen plumbing and water damage in a matter of hours. For your protection, take preventative actions such as having a security system installed that operates during power outages, senses low temperature, and initiates an effective action. Consult with your boiler contractor or a home security agency.

1 Routine maintenance schedule

| | |
|--|---|
| <p>Beginning each heating season</p> | <ul style="list-style-type: none"> <input type="checkbox"/> Call a qualified service technician to perform annual service. |
| <p>Daily during heating season</p> | <ul style="list-style-type: none"> <input type="checkbox"/> Check that boiler area is free from combustible materials, gasoline and other flammable vapors and liquids. |
| <p>Weekly during heating season</p> | <ul style="list-style-type: none"> <input type="checkbox"/> Check for and remove any obstructions to flow of combustion or ventilation air to boiler. <input type="checkbox"/> Check that breeching is attached between boiler and chimney. If breeching is loose or damaged, immediately turn off switch on boiler and call service technician to repair. <input type="checkbox"/> Check for oil leaks in oil piping and around burner. If found, immediately call qualified service technician to correct situation. <input type="checkbox"/> Check for water leaks in boiler and piping; also check for leaks around tankless heater plate, if installed. If found, immediately call service technician to repair. <input type="checkbox"/> Check float-type low water cutoff, when used: Refer to control manufacturer's instructions. <p>⚠ DANGER Scald potential. Do not blow down low water cutoff unless blow down piping has been installed according to Boiler Manual. If piping is not in place, call qualified service technician to install.</p> |
| <p>Periodically during heating season</p> | <ul style="list-style-type: none"> <input type="checkbox"/> Test probe-type low water cutoff, when used: refer to control manufacturer's instructions. |
| <p>End of heating season</p> | <ul style="list-style-type: none"> <input type="checkbox"/> If tankless heater is installed, boiler will continue to operate. Check for the following: <ul style="list-style-type: none"> • All daily and weekly instructions listed on this page must be followed. • Burner motor may have to be oiled. Some motors are permanently lubricated and do not need additional oil. Check for oiling instructions on burner or motor. |
| <p>Boiler shutdown</p> | <ul style="list-style-type: none"> <input type="checkbox"/> Do not drain boiler unless exposure to freezing temperatures will occur. <input type="checkbox"/> Do not use antifreeze in steam systems. <input type="checkbox"/> Always keep manual fuel supply shut off if burner is shut down for an extended period of time. <ul style="list-style-type: none"> • Turn off switch at boiler and any external switch to boiler. • Close fuel valves. • Turn off water feed valve. • Cover burner to protect from dust and dampness. |

2 Please read this before proceeding

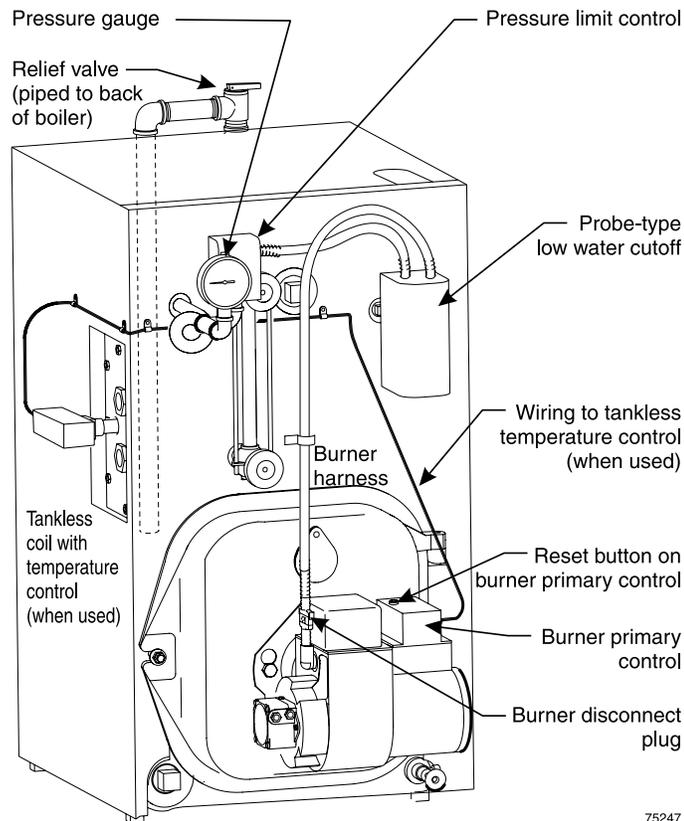
Start-up

1. If burner does not fire, check for:
 - Boiler switch turned off?
 - Fuses blown or breaker tripped?
 - Thermostat set below room temperature?
 - Fuel valves turned off?
 - Water not visible in gauge glass?
 - Not enough oil in tank to supply burner?
2. Correct problems found in step #1. If burner does not fire, press the reset button on burner primary control only once. Repeated presses will deposit oil in chamber, creating a fire hazard.

⚠ DANGER Burner must never be fired when oil is in combustion chamber. Immediately call a qualified service technician.

3. If burner still does not fire, call a qualified service technician.

Figure 1 Boiler and components



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Check daily

Boiler area

- Check that boiler area is free from combustible materials, gasoline and other flammable vapors and liquids. Ensure that no air-contaminating materials (see page 7) are present in the area.

Pressure gauge

- Pressure gauge must not show more than 15 psig (normally 5 psig). Contact a qualified service technician if high pressure occurs.

Air openings

- Verify that combustion and ventilation air openings to the boiler room and/or building are open and unobstructed.

Check monthly

- Venting system, see page 23.
- Boiler and system piping, see page 23.
- Boiler relief valve, see page 24.

Periodically

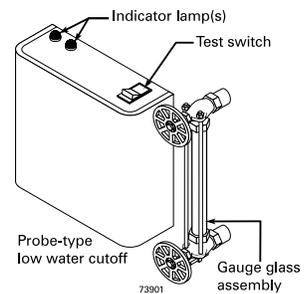
Oil motors equipped with oil cups

Burner motors may require oiling. Such motors are fitted with oiling cups. Use a few drops only of SAE 20 detergent oil. Do not use household oils. Excessive oiling can damage motors. Do not attempt to “fill up” the oiling cup.

Test low water cutoff(s)

Probe-type low water cutoff

1. Turn off power to boiler and wait 5 minutes.
2. Drain water to bottom of gauge glass.
3. Turn on power.
4. Set thermostat to call for heat. Red neon lamp on low water cutoff should light.
5. Wait 5 minutes. Boiler should not fire.
6. Refill boiler to correct water line. Red lamp should go off.
7. Wait 5 minutes. Boiler should fire.
8. Return thermostat to normal setting.



Float-type low water cutoff (by others, if used)

Blow down control and test per control manufacturer’s instructions.

⚠ DANGER Scald potential. Do not blow down low water cutoff unless blow down piping has been installed according to control manufacturer’s instructions. If piping is not installed, call a qualified service

⚠WARNING HOMEOWNER and SERVICE TECHNICIAN — read and follow completely.

3 Troubleshooting

⚠WARNING Homeowners — The problems and corrections below represent common situations that can occur. There may be others not listed below. It is important always to contact a qualified service technician if you have any questions about the operation of your boiler or system.

| Common problems | Common causes | Possible corrections |
|---|--|---|
| Rapid cycling - burner turns on and off frequently. | Thermostat installed where drafts or heat affect reading. | Locate thermostat on inner wall away from heat sources or cool drafts. |
| | Heat anticipator setting in thermostat set incorrectly. | Consult thermostat manufacturer instructions or set heat anticipator to match current draw of circuit it is attached to. (Burner primary control, T-stat switching relay coil, etc.). |
| | Main and/or radiator vents not working properly (one-pipe steam) or traps not working properly (two-pipe steam). | Contact service technician to check, repair or replace air vents and traps. |
| | Incorrect pressure limit setting. | Set pressure cut-in and differential according to system needs. Typical one and two pipe systems need less than 2 psig. Typical cut-in setting is ½ -1 psi and differential of 1 psi. Try increasing differential in ½ psi increments for longer cycle times. |
| Frequent release of water or steam through relief valve. | Inoperative limit control. | If pressure in boiler is approaching 15 PSI, check pressure control setting, operation & wiring. Replace if defective. |
| | Incorrect or defective relief valve. | Check for proper relief valve (15 psi). If opening at less than 15 psig, replace. |
| Need to frequently add makeup water. | Leaks in boiler or piping. | Have qualified service technician repair leaks at once to avoid constant use of makeup water. |
| Black or rust colored water condition. | Black oxide or oxidation (rust) due to leaks in boiler, air vents or piping. Improper pH. | Have qualified service technician repair leaks at once. Keep pH of water between 7.0 to 8.5. |
| Popping or percolating noise heard in boiler. | Mineral deposits in sections due to constant use of makeup water. Or incorrect pH. | Have qualified service technician de-lime boiler and repair leaks at once to avoid constant use of makeup water and check ph (7.0 to 8.5). |
| Metal flakes found in vent outlet or vent — flue way corrosion. | Contaminated combustion air supply. | Remove any contaminating products. See page 7 of this manual. Provide outside air for combustion. |
| | Condensation of combustion gases in flue ways. | Have a qualified service technician check burner nozzle and oil pump pressure for proper firing rate and check/adjust combustion settings with analyzer. |
| Some radiators or baseboard units do not heat. | Main or radiator air vents (one pipe system) or traps (two pipe system) not operating correctly. | Have qualified service technician inspect, repair or replace faulty air vents or traps. |
| | Incorrect pressure limit setting. | Set pressure cut in and differential according to system needs. Typical one and two pipe systems need less than 2 psig. Typical cut in setting is ½ -1 psi and differential of 1 psi. |
| | Clogged piping, valves or radiator. Or inoperable/ closed radiator valve. | Have qualified service technician clean or replace clogged components. |
| Water disappearing from gauge glass and back into system through return piping. | Incorrect Hartford loop piping. | Have qualified service technician pipe boiler exactly as shown in boiler manual. |
| | Check-valve inoperative. | Have qualified service technician clean or replace check-valve. |
| | Vacuum-breaker inoperative. | Have qualified service technician clean or replace vacuum breaker. |
| Violent waterline fluctuations surging. OR Water passing into steam mains priming. | Dirt, oil or other impurities in water. | Have qualified service technician skim boiler. |
| | Waterline too high. | Have qualified service technician adjust waterline to normal height. |
| | Incorrect piping. | Have qualified service technician pipe boiler exactly as shown in boiler manual. |
| | Sudden release of boiler steam pressure by action of zone valves. | Have qualified service technician adjust valve operating time or install slow-opening valves. |
| Domestic water from tankless heater is hot then suddenly turns cold. Or Domestic water from tankless heater is always lukewarm. | Mineral deposits insulate internal waterways of heater. | Have qualified service technician delime or replace coil. |
| | Boiler stop-leak compound has been added to boiler water and is insulating outside of coil. | Have qualified service technician remove and clean coil and drain and flush boiler to remove stop-leak. |
| | Incorrect mixing valve setting for tankless heater. | Have qualified service technician adjust mixing valve setting. |
| | Domestic flow rate too high. | Have qualified service technician install flow check valve set to rating of tankless heater. |
| | Incorrect setting on tankless heater control. | Have qualified service technician raise tankless control setting. Adjust differential on tankless control to lower setting. |

4 Prepare boiler location

▲ DANGER Home Owner — STOP! The procedures and information on this and following pages are intended only for a qualified service technician who has the necessary equipment to inspect and adjust boiler and burner. A homeowner should never attempt these procedures. The service technician must also read pages 1 through 6 before proceeding.

Codes & checklist

Installations must follow these codes:

- Local, state, provincial, and national codes, laws, regulations and ordinances.
- NFPA-31 – latest edition, Installation of Oil-Burning Equipment.
- Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1, – latest edition, when required.
- National Electrical Code, ANSI/NFPA 70, – latest edition and any additional national, state or local codes.

Before locating the boiler:

- Check for nearby connection to:
 - Makeup water and steam piping
 - Venting connections (page 8)
 - Combustion and ventilation air provisions (page 7)
 - Oil supply piping (page 17 and burner manual)
 - Electrical power
- Check area around boiler. Remove any combustible materials, gasoline and other flammable liquids.

▲ WARNING Failure to keep boiler area clear and free of combustible materials, gasoline and other flammable liquids and vapors can result in severe personal injury, death or substantial property damage.

- Boiler must be installed so that burner and control system components are protected from dripping or spraying water or rain during operation or service.
- If new boiler will replace existing boiler, check for and correct system problems, such as system leaks causing oxygen corrosion or section cracks from hard water deposits.

Clearances

Minimum clearance to combustible materials

Minimum clearances from vent pipe to combustible material (see Figure 2, vent clearances indicated with “*”):

- Type “L” double wall vent — 6 inches minimum
- Single wall vent — 9 inches minimum

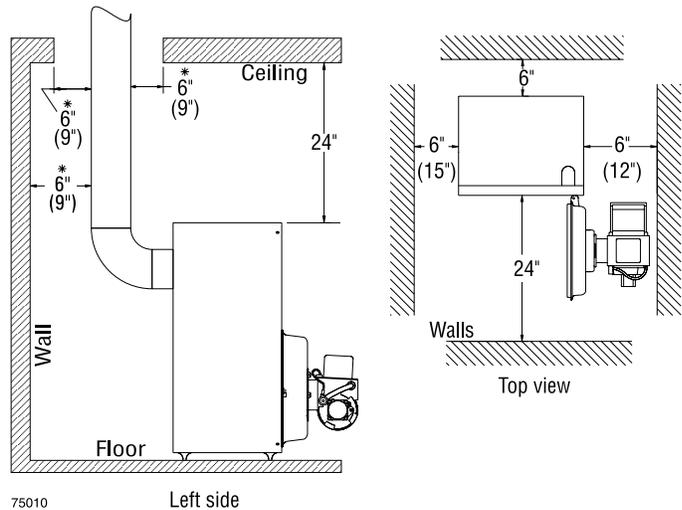
NOTICE Flue pipe clearances must take precedence over jacket clearances (listed below).

Service clearances

Recommended **service** clearances (see Figure 2):

- Front and top — 24 inches
- Left side, back and right side — 6 inches
- Right side for burner door swing radius — 12 inches.

Figure 2 Minimum clearances



Flooring and foundation

Flooring

The OSB boiler is approved for installation on combustible flooring, but must never be installed on carpeting.

▲ WARNING Do not install boiler on carpeting even if foundation is used. Fire can result, causing severe personal injury, death or substantial property damage.

Foundation

1. Provide a solid brick or minimum 2-inch thick concrete foundation pad if any of the following is true:
 - floor can become flooded.
 - the boiler mounting area is not level.
2. See Table 1 for minimum foundation dimensions.

Table 1 Minimum foundation size

| Boiler model number | Length inches | Width inches | Minimum height inches |
|---------------------|---------------|--------------|-----------------------|
| OSB-3 | 17 | 22 | 2 |
| OSB-4 | 20 | 22 | 2 |
| OSB-5 | 23 | 22 | 2 |
| OSB-6 | 26 | 22 | 2 |

Residential garage installations

Take the following special precautions when installing the boiler in a residential garage. If the boiler is located in a residential garage:

- Mount the boiler a minimum of 18 inches above the floor of the garage to ensure the burner and ignition devices will be no less than 18 inches above the floor.
- Locate or protect the boiler so it cannot be damaged by a moving vehicle.

▲WARNING SERVICE TECHNICIAN ONLY — read and follow completely.

4 Prepare boiler location continued

Air for combustion and ventilation

▲WARNING Adequate combustion and ventilation air:

- Assures proper combustion.
- Reduces risk of severe personal injury or death from possible flue gas leakage and carbon monoxide emissions.
- Do not install exhaust fan in boiler room.

Consider building construction

Older buildings with single-pane windows, minimal weather-stripping and no vapor barrier often provide enough natural infiltration and ventilation without dedicated openings.

New construction or remodeled buildings are most often built tighter. Windows and doors are weather-stripped, vapor barriers are used and openings in walls are caulked. As a result, such tight construction is unlikely to allow proper natural air infiltration and ventilation.

Follow state, provincial or local codes when sizing adequate combustion and ventilation air openings. In absence of codes, use the following guidelines when boiler is in a confined room (defined by NFPA 31 as less than 7200 cubic feet per 1 GPH input of all appliances in area. A room 8 ft. high x 30.0 ft. x 30.0 ft. is 7200 cu. ft.).

Provide two permanent openings:

One within 12 inches of ceiling, one within 12 inches of floor. Minimum height or length dimension of each rectangular opening should be at least 3 inches.

When inside air is used:

Each opening must freely connect with areas having adequate infiltration from outside. Each opening should be at least 140 sq. in. per 1 GPH input (1 sq. in. per 1000 Btu input) of all fuel-burning appliances plus requirements for any equipment that can pull air from room (including clothes dryer and fireplace).

When outside air is used:

Connect each opening directly or by ducts to the outdoors or to crawl or attic space that freely connects with outdoors. Size per below:

- Through outside wall or vertical ducts — at least 35 sq. in. per 1 GPH input (1 sq. in. per 4000 Btu input) of all fuel burning appliances plus requirements for any equipment that can pull air from room (including clothes dryer and fireplace).
- Through horizontal ducts — at least 70 sq. in. per 1 GPH boiler input (1 sq. in. per 2000 Btu input) of all fuel-burning appliances plus requirements for any equipment that can pull air from room (including clothes dryer and fireplace).
- Where ducts are used, they should have same cross-sectional area as free area of openings to which they connect. Compensate for louver, grille or screen blockage when calculating free air openings. Refer to their manufacturer's instructions for details. If unknown, use:
 - Wood louvers, which provide 20-25% free air.
 - Metal louvers or grilles, which provide 60-75% free air.

Lock louvers in open position or interlock with equipment to prove open before boiler operation.

Air contamination

Please review the following information on potential combustion air contamination problems.

See Table 2 for products and areas which may cause contaminated combustion air.

▲WARNING To prevent potential of severe personal injury or death, check for products or areas listed below before installing boiler. If any of these contaminants are found:

- remove contaminants permanently.
 - OR —
- isolate boiler and provide outside combustion air. See national, provincial or local codes for further information.
- Contact your qualified service technician to install an outside air kit (if available) for the burner. An outside air kit allows ducting of outside air directly to the burner.

Table 2 Corrosive contaminants and likely locations

| Products to avoid |
|--|
| Spray cans containing chloro/fluorocarbons |
| Permanent wave solutions |
| Chlorinated waxes/cleaners |
| Chlorine-based swimming pool chemicals |
| Calcium chloride used for thawing |
| Sodium chloride used for water softening |
| Refrigerant leaks |
| Paint or varnish removers |
| Hydrochloric acid/muriatic acid |
| Cements and glues |
| Antistatic fabric softeners used in clothes dryers |
| Chlorine-type bleaches, detergents, and cleaning solvents found in household laundry rooms |
| Adhesives used to fasten building products and other similar products |
| Areas likely to have contaminants |
| Dry cleaning/laundry areas and establishments |
| Swimming pools |
| Metal fabrication plants |
| Beauty shops |
| Refrigeration repair shops |
| Photo processing plants |
| Auto body shops |
| Plastic manufacturing plants |
| Furniture refinishing areas and establishments |
| New building construction |
| Remodeling areas |
| Garages with workshops |

5 Prepare boiler

Place boiler

▲WARNING The boiler contains ceramic fiber and fiberglass materials. Use care when handling these materials per instructions on page 25 of this manual. Failure to comply could result in severe personal injury.

1. Remove boiler from pallet.

NOTICE Do not drop boiler or bump jacket or burner on floor or pallet. Damage to boiler or burner can result.

▲CAUTION Smaller sized boilers may be top heavy. Use caution when handling to avoid minor personal injury or property damage.

2. Check level. Shim legs if needed.
3. Open burner mounting door. Verify that chamber ceramic liner is securely in place on target wall, chamber floor and burner door. Verify door seal is intact and in place. Close and securely bolt the door.
4. Visually check:
 - a. Flue collector hood seal.
 - b. Burner mounting door seal.

▲WARNING Obtain gas-tight seal to prevent possible flue gas leakage and carbon monoxide emissions, which can lead to severe personal injury or death.

Tankless heater, if used

1. Remove tankless heater knockout in left side of jacket panel.
2. Remove tankless heater cover plate and gasket.
3. Install new gasket and tankless heater over studs around opening. Secure with 3/8" nuts.
4. Install tankless heater operating control in tapping in tankless heater. If not furnished, use operating control with maximum 10 °F differential.

Hydrostatic pressure test

1. Remove steam pressure gauge furnished with boiler. Install water pressure gauge for test only. Be sure gauge can handle test pressure.
2. Install air vent in tapping on top of boiler.
3. Remove pressure control and low water cutoff. Plug tappings.
4. Plug supply and return tappings.
5. Drain valve is already factory-installed.
6. Fill boiler. Vent all air. Pressure test boiler at 45-55 psig.

▲WARNING Do not leave boiler unattended. Cold water fill can expand and damage cast iron, resulting in severe personal injury, death or substantial property damage.

7. Check for maintained gauge pressure for more than 10 minutes. Visually check for leaks if gauge pressure drops.
8. Drain boiler. Repair leaks if found.

▲WARNING Using petroleum-based compounds to repair leaks can damage system components, resulting in property damage.

9. Retest boiler after repairing leaks.
10. Remove pressure gauge, air vent and plugs. Reinstall steam pressure gauge, pressure control and low water cutoff furnished with boiler.

6 Connect breeching

General venting requirements

▲WARNING Failure to follow all instructions can result in flue gas spillage and carbon monoxide emissions, causing severe personal injury or death.

▲DANGER Inspect existing chimney before installing boiler. Insufficient draft can cause flue gas leakage and carbon monoxide emissions. Failure to clean or replace perforated pipe or tile lining and/or patch mortar and joints can cause severe personal injury or death.

The OSB boilers are designed to operate with an over-fire draft of -0.01" to -0.02" w.c. Proper draft for these oil boilers may be achieved using either a conventional chimney (natural draft) or a power vent (sidewall) system that has been properly designed for use with oil-fired equipment. Power vent manufacturer's instructions must be followed.

Use vent material approved by local codes for oil-fired burners. In their absence, refer to:

- NFPA 31, latest edition - Installation of Oil-Burning Equipment.
- NFPA 21, latest edition - Standard for Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances.
- NFPA 211, latest edition - requires chimney to be lined before connected to boiler.
- To prevent downdrafts, extend chimney at least 3 feet above highest point where it passes through roof and 2 feet higher than any portion of building within 10 feet. Increase chimney cross-sectional area and height at least 4% per 1,000 feet above sea level.
- Provide minimum clearances from vent (flue) pipe to combustible material:
 - Type "L" double wall vent — 6 inches minimum
 - Single wall vent — 9 inches minimum
- Minimum chimney sizes should be used. See Table 3.

NOTICE Oversized chimneys, outside masonry chimneys and/or derated inputs can result in condensation in chimney.

Table 3 Chimney and breeching minimum sizes

| Boiler model size | Minimum breeching diameter <small>Note 1</small> | Minimum chimney size | | Minimum chimney height |
|-------------------|---|------------------------------------|-------|------------------------|
| | | Rectangle <small>Note 2</small> | Round | |
| OSB-3 | 5" | 8" x 8" | 6" | 15' |
| OSB-4 | 6" | 8" x 8" | 6" | 15' |
| OSB-5 | 6" | 8" x 8" | 7" | 15' |
| OSB-6 | 7" | 8" x 8" | 7" | 15' |

Notes: 1. Flue collar on boiler is 7.00" diameter.
2. 6-3/4" x 6-3/4" inside liner

6 Connect breeching continued

Connect breeching

WARNING Long horizontal breechings, excessive number of tees and elbows, or other obstructions restricting combustion gas flow can result in possibility of condensation, flue gas leakage and carbon monoxide emissions, which can lead to severe personal injury or death.

1. See Figure 3 - Back outlet (Standard).
2. For Top outlet (available only with optional "Top Vent Service Kit", See "14 Replacement parts" on page 26.) See Figure 4.
3. Connect full-sized breeching when possible. See Table 3, page 8.
4. Connection must be made above bottom of chimney to avoid blockage. Breeching must not enter chimney far enough to cause obstruction. Use thimble or slip joint where breeching enters chimney to allow removal for cleaning.
5. When burner and boiler are properly installed, draft overfire will be approximately -0.01" to -0.02" W.C. Install barometric control in breeching, per control manufacturer's instructions, when excess draft needs to be relieved or to comply with applicable codes and regulations. Use draft gauge to adjust proper opening.
6. An induced draft fan for the chimney may be necessary if:
 - Excessive resistance to flow of combustion gases can be expected.
 - Cross-sectional area of chimney is smaller than minimum recommended.
 - Chimney height is less than recommended.
 - Seal all vent joints. Interlock burner with fan operation.

Figure 4 Top outlet breeching connection for OSB-3 through 6 with OVD damper.

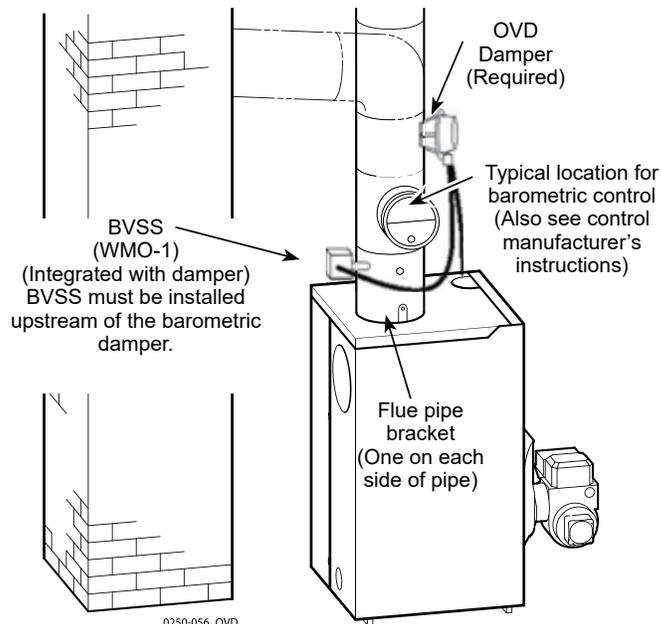
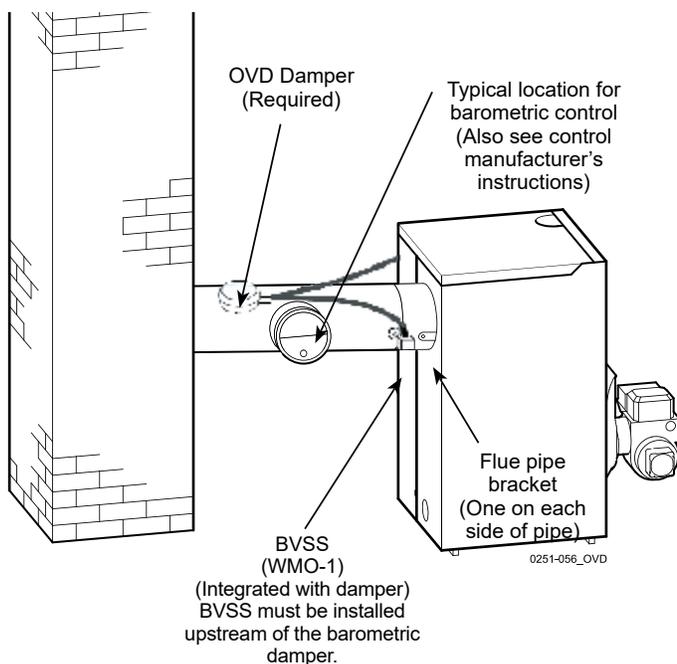


Figure 3 Back outlet breeching connection for OSB-3 through 6 with OVD Damper.



7. OVD Vent damper kit Part Number 381-800-515WT must be installed in all installations. The vent damper is supplied with the boiler. Refer to the damper instruction manual and to Figures 3 and 4 for damper location. A blocked vent shutoff switch (BVSS) is integrated into the damper wiring harness.

7 Connect steam piping

General

If installation is to comply with special codes, additional limit controls may be required. If installing a float-type low water cutoff, use only those devices that can be connected to the boiler gauge glass tapplings. Refer to the wiring diagrams on page 13 for correct wiring location of additional limit controls.

Relief valve

Install boiler relief valve in the 3/4" tapping in the back of the boiler, using the 3/4" nipple and elbow supplied in the bag with relief valve.

WARNING Follow the steps below to avoid potential severe personal injury, death or substantial property damage.

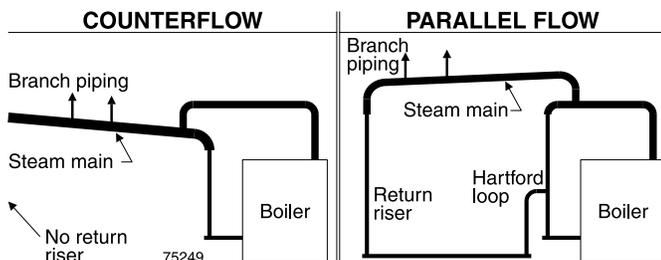
- When installing the relief valve, ensure that all connections, including the valve inlet, are clean and free from any foreign matter.
- Mount the relief valve only in the vertical position, directly connected to the tapping designated in the manual on top of the boiler.
- Use pipe compound sparingly, or tape, on external threads only.
- Do not use a pipe wrench! Use proper type and size wrench on wrench pads only.

ANGER During operation, this valve may discharge large amounts of steam and/or hot water. Therefore, to reduce the potential for bodily injury and property damage, a discharge line **MUST** be installed that:

- Is connected from the outlet to a safe point of discharge with no intervening valve.
- Allows complete drainage of both the valve and the discharge line.
- Is independently supported and securely anchored so as to avoid applied stress as possible.
- Terminates freely to atmosphere where any discharge will be clearly visible and is at no risk of freezing.
- Is, over its entire length, of a pipe size equal to or greater than that of the valve outlet.

Use only schedule 40 metal pipe for discharge. (Do not use schedule 80, extra strong or double strong pipe or connections.) **DO NOT CAP, PLUG OR OTHERWISE OBSTRUCT DISCHARGE PIPE OUTLET!** If discharge is piped upward, a condensate drain must be provided in the elbow below the vertical pipe to prevent condensate from returning into the valve. Failure to comply with these instructions will cause a dangerous spray of hot water and steam that would cause severe personal injury or death.

CAUTION The piping in Figure 5 applies only to the special case of counter flow steam systems. Refer to page 11 for parallel flow steam systems. See below.



Near-boiler piping

See Figures 6 and 7, page 11, for recommended piping of boiler sizes OSB-3, -4 and -5. See Figures 8 and 9, page 11, for recommended piping of OSB-6 boilers. These piping recommendations apply only to connections to parallel-flow one-pipe and two-pipe systems. For counter flow systems, connect boiler supply and return to counter flow system header as shown in Figure 5, below. Table 4, below, gives recommended pipe sizes.

Table 4 Recommended pipe sizing

| Boiler model size | Riser pipe size (Note 1) | | Header pipe size "H" (Note 2) | Equalize pipe size "J" |
|-------------------|--------------------------|--------|-------------------------------|------------------------|
| | A | B | | |
| OSB-3 | 2-1/2" | --- | 2-1/2" | 1-1/2" |
| OSB-4 | 2-1/2" | --- | 2-1/2" | 1-1/2" |
| OSB-5 | 2-1/2" | --- | 3" | 1-1/2" |
| OSB-6 | 2-1/2" | 2-1/2" | 4" | 1-1/2" |

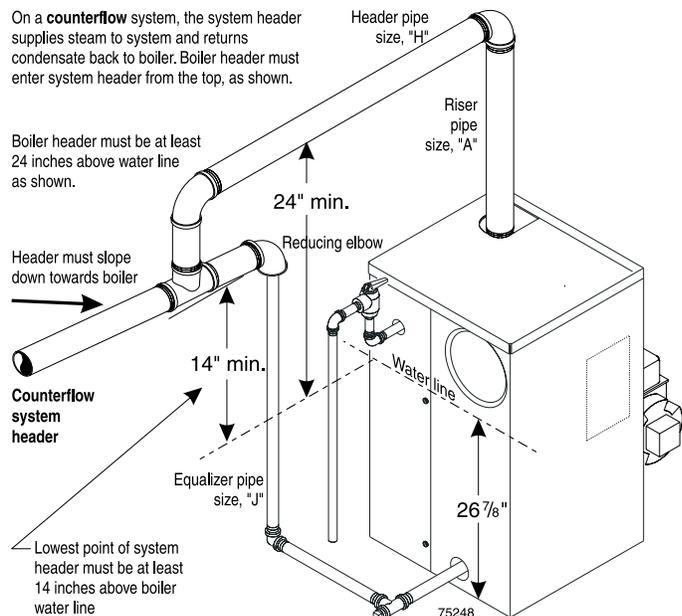
Notes:

1. Based on ASHRAE Fundamentals Handbook recommendations, allowing 1/2 oz. pressure drop at 0 psig.
2. Based on ASHRAE Fundamentals Handbook recommendations, allowing 2 oz. pressure drop per 100 feet of pipe at 3.5 psig. Maintain minimum 24" height from waterline to bottom of header. Note Figure 5, showing the special connection required to a counter flow system.

Connecting to counter flow piping

Apply the recommended piping in Figures 5 through 9 only when connecting to a parallel-flow system. When connecting to a counter flow system, the boiler steam supply must connect into the top of the counter flow system header, as shown in Figure 5, below.

Figure 5 Connection to counter flow steam piping only (for parallel flow systems, see page 11)



7 Connect steam piping continued

Figure 6 Recommended piping, OSB-3, -4 and -5, piping for parallel-flow systems only

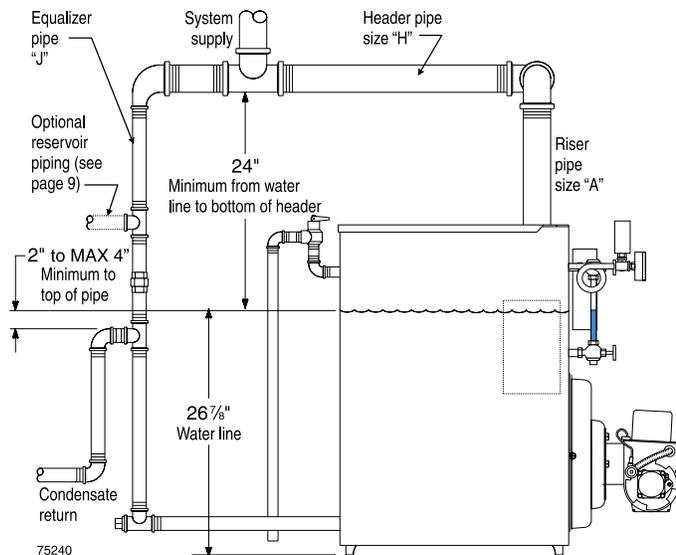


Figure 7 Recommended piping, OSB-3, -4 and -5, piping for parallel-flow systems only

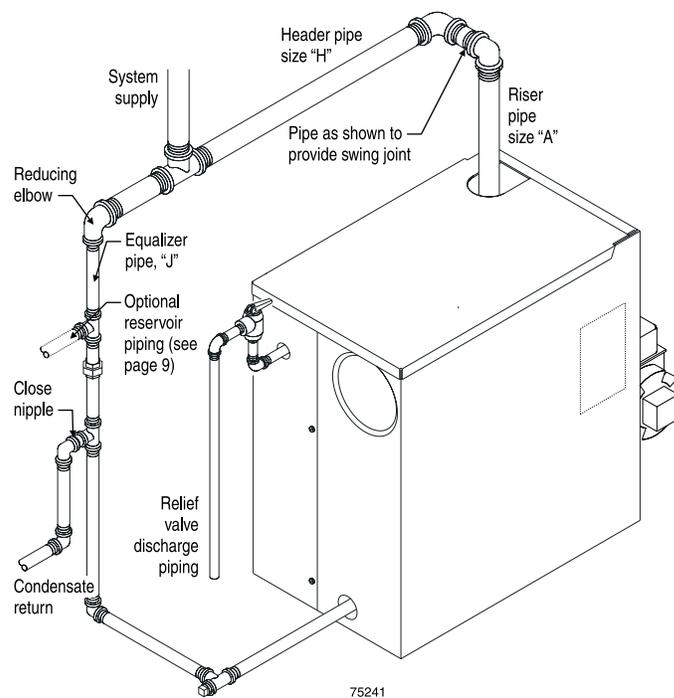


Figure 8 Recommended piping, OSB-6, piping for parallel-flow systems only

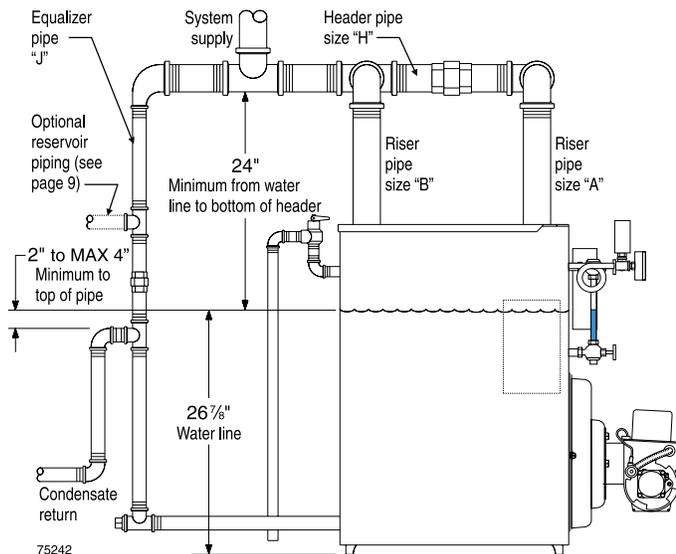
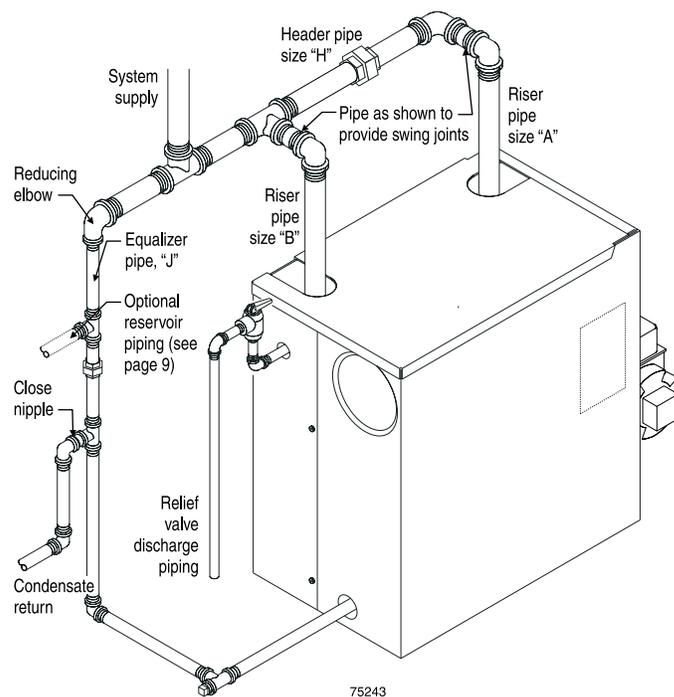


Figure 9 Recommended piping, OSB-6, piping for parallel-flow systems only



NOTICE Float-type low water cutoff — If field installing a float-type low water cutoff, it must be piped only to the gauge glass tapings. See Figure 20 on page 30. The tapings are spaced 9 7/8" on center. Use only float-type low water cutoffs with quick-connect hookups that will provide a low water cutoff point no higher than 2" above the center of the bottom tapping.

7 Connect steam piping continued

Condensate return

Modern steam boilers are designed to steam for less time than older, larger boilers. When replacing an older steam boiler the system condensate return time may be longer than the steaming time. This could cause the following problems:

1. Boilers fitted with an automatic water feed could overflow.
2. Units fitted with only a low water cutoff would shut down and cycle while waiting for condensate to return.

Following is a simple method for determining whether or not a reservoir pipe is required to lengthen steaming time for a residential installation:

1. Disconnect condensate return line at existing boiler.
2. Heat boiler and allow to steam for 10 minutes. Turn off boiler.
3. Measure length of time from when boiler started to steam to when condensate begins to return through condensate line.
4. Measure length of time from when condensate begins to return to when it stops returning. Divide this time by 2.
5. Add time measured in step 3 to time calculated in step 4. This sum is the average time required for condensate to return to the boiler.
6. If this total time is 10 minutes or less, no reservoir pipe is needed.

If total time for condensate to return to boiler (from step 5) is more than 10 minutes, a reservoir pipe (or boiler feed system) is recommended. See Table 5, this page, for suggested reservoir pipe size. Install as shown in Figures 10 and 11, below.

For larger systems (as noted in Table 5), use a boiler feed system with a condensate tank and feed pump. You will have to install a low water cutoff/pump control on the boiler to operate the pump. See "Low water cutoffs" on page 23 and Figure 17 on page 29. Use Table 6 to size boiler feed systems. (The use of a combination condensate tank and float-controlled condensate return pump is not recommended. These devices do not supply water to the boiler on demand from the boiler, and cannot compensate for long condensate return times.)

For most residential installations a reservoir pipe may be all that is necessary to ensure proper operation.

Table 5 Reservoir pipe sizing

| Boiler model number | Net output | Time from initial steaming to average condensate return (boiler steaming capacity based on 970 Btu per pound of steam) | | | | | |
|---|------------|--|--------------------|------------------------|--------------------|------------------------|--------------------|
| | | 15 minutes | | 20 minutes | | 30 minutes | |
| | | gallons | Pipe length (feet) | gallons | Pipe length (feet) | gallons | Pipe length (feet) |
| OSB-3 | 114 | 1 | 1 | 2 | 2 | Use boiler feed system | |
| OSB-4 | 144 | 1-1/4 | 1-1/4 | 2-1/2 | 2-1/4 | | |
| OSB-5 | 174 | 1-1/2 | 1-1/2 | 3 | 2-1/2 | | |
| OSB-6 | 210 | 1-3/4 | 1-3/4 | Use boiler feed system | | | |
| Designed full capacity steaming time of modern boilers is 10 minutes. | | | | | | | |

Table 6 Boiler feed system sizing

| Boiler model number | Net output (pounds steam per hours) | Condensate (gallons per hours) | Minimum condensate receiver capacity gallons for steaming times (minutes) of: (note 1) | | | | Suggested feed pump capacity (GPM @ 15 PSI) (note 2) |
|---------------------|-------------------------------------|--------------------------------|--|---------|---------|---------|--|
| | | | 15 min. | 30 min. | 45 min. | 60 min. | |
| | | | OSB-3 | 118 | 14 | 4 | |
| OSB-4 | 148 | 18 | 5 | 11 | 16 | 21 | 0.6 |
| OSB-5 | 179 | 22 | 6 | 13 | 19 | 26 | 0.7 |
| OSB-6 | 216 | 26 | 8 | 16 | 23 | 31 | 0.8 |

Notes:
 1. Maximum time to when condensate returns to boiler.
 2. If pump exceeds capacity shown, pump can be throttled with globe or ball valve.

Figure 10 Recommended piping for parallel-flow systems with optional reservoir pipe

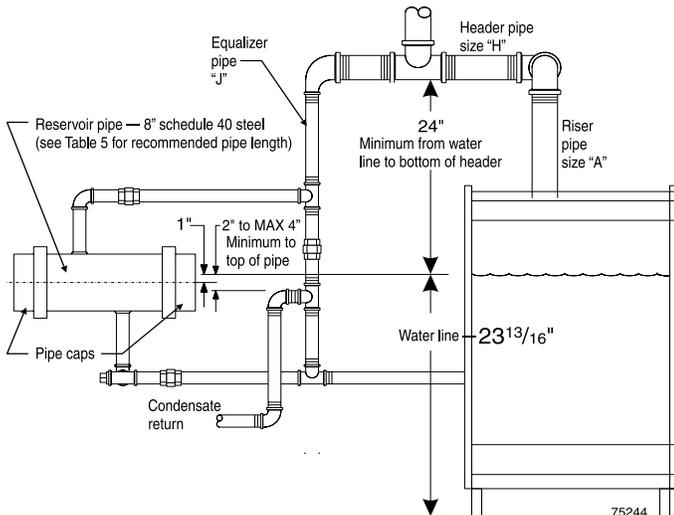
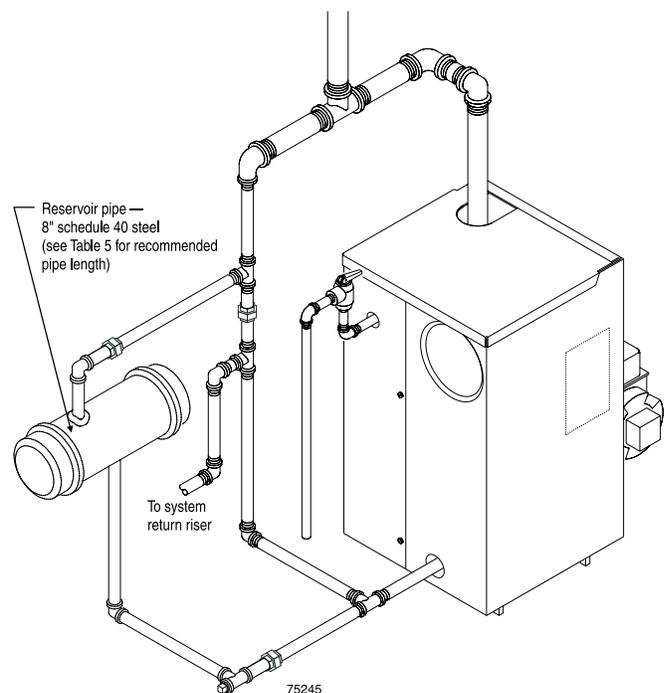


Figure 11 Recommended piping for parallel-flow systems with optional reservoir pipe



WARNING SERVICE TECHNICIAN ONLY — read and follow completely.

8 Connect tankless heater piping, if used

⚠ DANGER Hot water can scald!

- Consumer Product Safety Commission and some states recommend domestic hot water temperature of 130 °F or less.
- When installing an **automatic mixing valve**, selection and installation must comply with valve manufacturer's recommendations and instructions.
- Water heated to a temperature suitable for clothes washing, dish washing and other sanitizing needs will scald and cause injury.
- Children and elderly, infirm or physically handicapped persons are more likely to be injured by hot water. Never leave them unattended in or near a bathtub, shower or sink. Never allow small children to use a hot water faucet or draw their own bath. If anyone using hot water in the building fits this description, or if state laws or local codes require certain water temperatures at hot water faucets, take special precautions:
- Install **automatic mixing valve** set according to those standards.
- Use lowest practical temperature setting.
- Check water temperature immediately after first heating cycle and after any adjustment.

⚠ WARNING Studies have indicated that dangerous bacteria can form in potable water distribution systems if certain minimum water temperatures are not maintained. Contact local health department for more information.

Pipe tankless heater



Tankless water heaters for OSB boilers have been tested and certified by CSA Group (certificate # 2552127).

NSF/ANSI 372

1. Size piping no smaller than tankless heater inlet and outlet.
2. Following controls (furnished by others) must be installed:
 - a. **Automatic mixing valve.** See Figure 12. (Read **DANGER** statement at left.)
 - b. Flow regulating valve (see Figure 12). Size according to intermittent draw of tankless heater. See Table 7. Follow valve manufacturer's instructions to install.
3. Additional anti-scald devices may be installed at each hot water faucet, bath and shower outlet.
4. In hard water areas, soften cold domestic supply water to heaters to prevent lime buildup.

Figure 12 Piping connections to tankless heater, typical

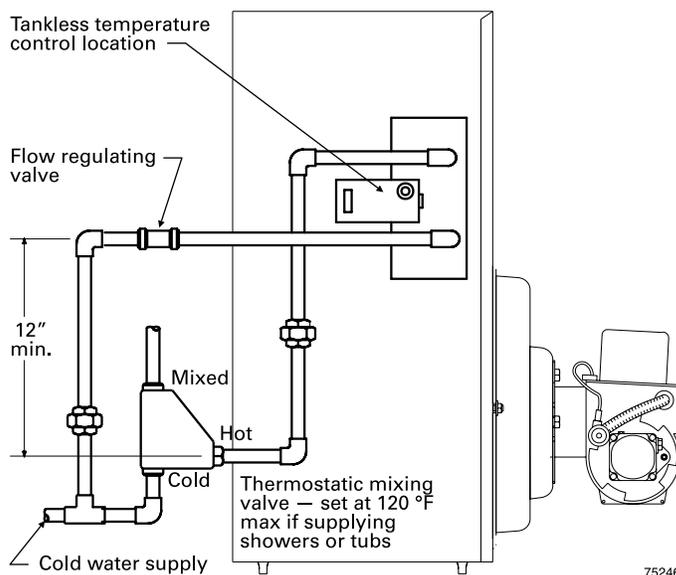


Table 7 Tankless heater ratings

| Boiler model number | Heater number | Intermittent draw ratings (GPM) (Note 2) | Inlet and outlet tapping sizes |
|---------------------|---------------|--|--------------------------------|
| OSB-3 | 35-S-29 | 3.25 | 3/4" |
| OSB-4 | 35-S-29 | 3.50 | 3/4" |
| OSB-5 | 35-S-29 | 3.75 | 3/4" |
| OSB-6 | 35-S-29 | 4.00 | 3/4" |

Notes:

1. To avoid supplying steam to system during summer tankless operation, raise water level to one inch above normal water line.
2. Gallons of water per minute heated from 40°F to 140°F with 200°F boiler water temperature. Tested in accordance with AHRI Testing and Rating Standard for Indirect Tankless Water Heaters Tested with Boilers.

NOTICE These single wall heat exchangers comply with National Standard Plumbing Code provided that:

- Boiler water (including additives) is practically nontoxic, having toxicity rating or class of 1, as listed in Clinical Toxicology of Commercial Products.
- Boiler water pressure is limited to maximum 30 psig by approved water relief valve.

NOTICE Tankless heater ratings are based on 200°F boiler water temperature. To get rated output, set tankless heater control to 200°F. Control can be adjusted to meet system hot water requirements.

9 Connect wiring

▲WARNING **Electric shock hazard.** Can cause severe personal injury or death if power source, including service switch on boiler, is not disconnected before installing or servicing.

Installations must follow these codes:

- National Electrical Code, ANSI/NFPA 70, – latest edition and any additional national, state or local codes.
- Wiring must be NEC Class 1. If original wire as supplied with boiler must be replaced, type 105 °C wire or equivalent must be used. Supply wiring to boiler and additional control wiring must be 14 gauge or heavier.
- Provide electrical ground at boiler as required by codes.

Thermostat wiring

- Install thermostat on inside wall away from influences of drafts, hot or cold water pipes, lighting fixtures, television, sun rays or fireplaces.
- Follow instructions with thermostat. If it has a heat anticipator, set heat anticipator in thermostat to match power requirements of equipment connected to it. Boiler wiring diagrams give setting for standard equipment.

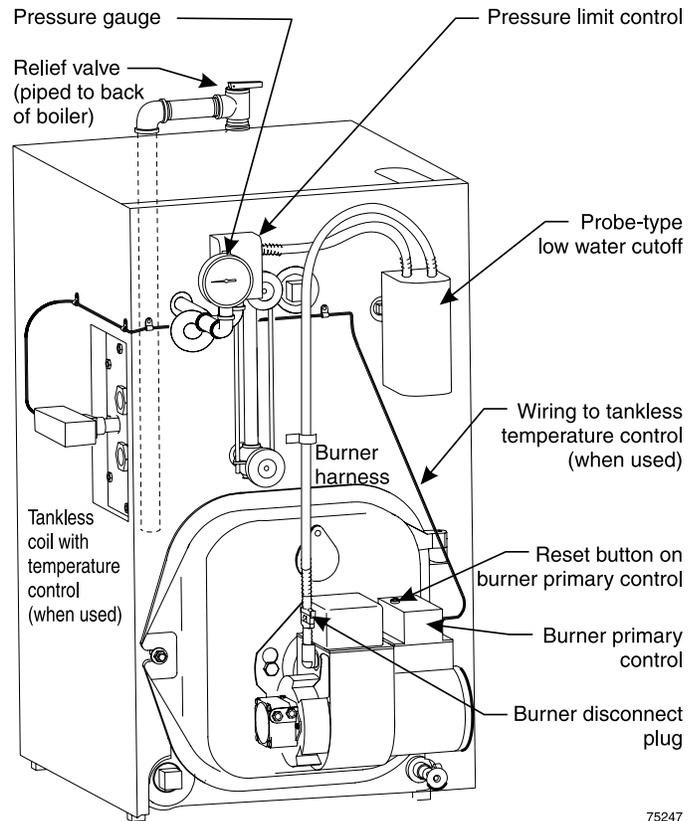
Burner wiring

- Burner harness incorporates a disconnect plug, providing a convenient way to disconnect wiring when burner mounting door is opened. See Figure 13.

Wiring entrance

- The probe low water cutoff enclosure houses electrical connections for all boiler components.
- Boilers have harnesses furnished. See Figure 13, (OSB boilers with low water cutoffs) for factory and field wiring information.
- All field-installed high voltage wiring must be sheathed in metal conduit.
- Connect incoming line voltage wires as shown in Figure 13. Field-install equipment ground wire to green wire with wire nut.
- Some local codes may require an emergency shut-off switch installed at a location away from boiler. Follow local codes.

Figure 13 Electrical components and harnesses



75247

High Temperature Limit

1. Installation requirements.

▲CAUTION

Do not tamper with the unit or controls.

- To comply with ASME, UL 726 or Canadian requirements, an additional high temperature limit is needed. Consult local inspector. Install the secondary control in the supply piping between boiler and isolation valve. Set the control to a minimum of 20°F above the set point of the combination control.

The maximum allowable set point is 220°F.

Wire the control as shown on page 16, probe-type LWCO.

2. General maintenance requirement

- Keep manual valve shut off when burner is shut down for an extended period of time.
- Maintain all cover plates, etc., in place, except during maintenance.

▲WARNING SERVICE TECHNICIAN ONLY — read and follow completely.

9 Connect wiring continued

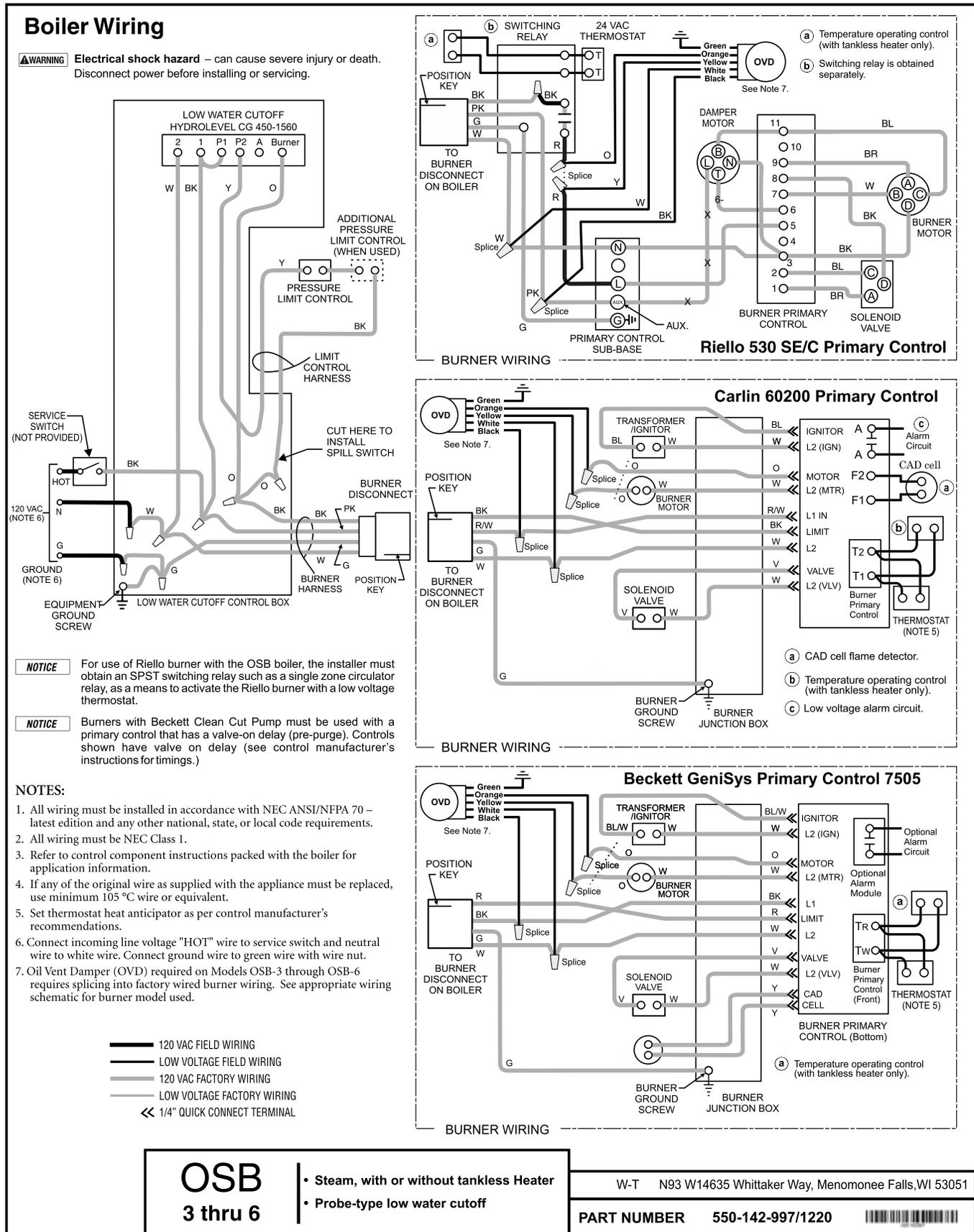
OVD Vent Damper Wiring

1. The vent damper P/N 381-800-515WT must be wired to the burner control for all installations.
2. When installing the boiler, wire all controls from vent damper and thermal switch in accordance with the Field Control OVD damper instruction sheet, which is provided with the damper.
3. Connect damper wires to the burner by splicing the burner wires as shown in the appropriate wiring diagram. See Figure 14, page 16.

WARNING SERVICE TECHNICIAN ONLY — read and follow completely.

9 Connect wiring continued

Figure 14 Wiring diagram — OSB boilers with low water cut-off



▲WARNING SERVICE TECHNICIAN ONLY — read and follow completely.

10 Connect oil piping

General oil piping requirements

- Location and installation of oil tanks, oil piping and burners must follow:
 - NFPA 31, latest edition - Standard for the Installation of Oil-Burning Equipment.
 - Local codes and regulations.
 - Information provided with burner and fuel pump.
- If any part of fuel oil tank is above level of burner, an anti-siphon device installation is highly recommended to prevent flow of oil in case of oil line break.
- Support oil lines as required by codes.
- Make tank connections with swing joints or copper tubing to prevent breaking in case the tank settles. Make swing joints so they will tighten as tank settles. Non-hardening pipe joint compounds should be used on all threads.

▲WARNING

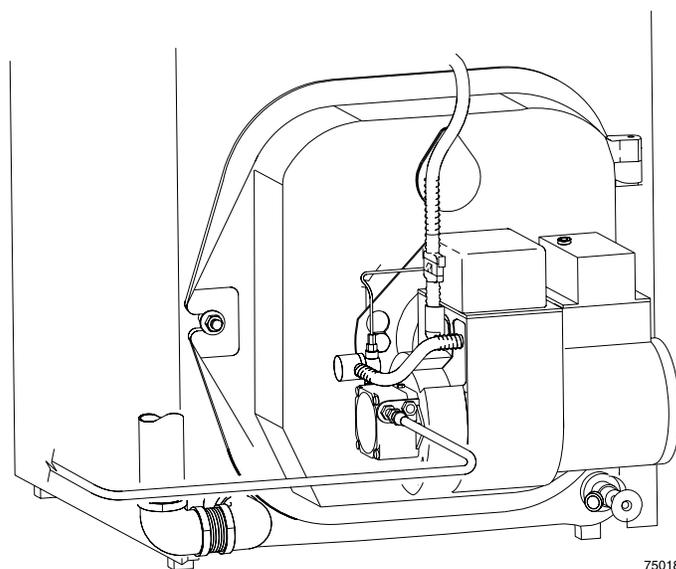
Do not use Teflon tape as an oil pipe sealant. It can cause valves to fail, creating hazards. Do not use compression fittings, only flare fittings. Failure to comply could result in severe personal injury, death or substantial property damage from oil leakage and/or fire hazard.

- Underground pipe must be run in a casing to prevent oil leaking into ground or under floor. Check local codes for information.

Oil piping connection at burner

- See Figure 15 for typical oil connection at burner, allowing burner mounting door to swing open completely for servicing.
- Connect oil line to burner using flare fitting (Figure 15).
- See local codes for appropriate arrangement and piping of filter, control valves, etc. connecting to oil tank.
- Refer to burner manual for oil system requirements. Verify that suction lift does not exceed stated limit. Where lift exceeds limit for a one-pipe system, use a two-pipe system as directed in burner manual.

Figure 15 Oil piping connection to burner, typical



75018

11 Start-up – Steam Boiler Water Treatment

Steam Heating Installation Considerations

Closed steam heating systems should not have high amounts of make-up water. Make-up water only occurs when the system is leaking or when make-up water is incorrectly administered. And, even with chemical treatment, make-up water will reduce boiler life due to corrosion. And chemical treatment may be difficult to execute if the system make-up volume is unpredictable.

Troubleshoot the system BEFORE considering water treatment. If the system is using make-up water, then the following may be likely:

- Leaking return lines, underground pipes, faulty steam traps, faulty air vents
- Automatic water feed is installed incorrectly or incorrectly adjusted
- If the system utilizes a condensate receiver, the feeder may be flooding due to long system time lag.

If the piping is NOT leaking, consider installing a boiler feed system (NOT a condensate return system). The boiler feed system provides condensate storage and allows the boiler to directly control water level. This is not the case with gravity return systems or condensate return systems — these only provide water to the boiler when the condensate returns from the system. If the system time lag is longer than boiler can provide steam, and the boiler is equipped with an automatic feeder, water will feed to the boiler before the condensate can return from the system. This will cause overflow and flooding when the condensate does return. Also, pumping cold make-up water directly into the boiler collapses the water level, causing false indications of need for make-up. With a boiler feed system, the float control on the boiler turns the feed pump on and off as needed. Make-up water is added at the boiler feed system tank. And the storage volume of the tank makes it unlikely that make-up will be needed UNLESS there is a system leak.

Chlorides

Over the last several decades, the level of chlorides in some ground water and city water supplies have increased due to use of salt during the removal of snow and ice from roads and highways, and the increased use of water softeners. Elevated levels of chlorides (over 200 ppm) in the water of steam boilers will accelerate water side corrosion and shorten the operating life of the boiler.

Chlorides and other dissolved solids are present in boiler make-up water and are not removed from the boiler when the boiler is producing steam. The level of chlorides and dissolved solids in the boiler water increase when make-up water is added to the boiler because of normal maintenance to low water cutoffs and system leaks. If there are high chloride and dissolved solid levels in boiler make-up water, boiler water treatment should be considered.

In general, cast iron steam boilers do not require water treatment for protection. However, some boiler water treatment chemicals can promote water level instability. Surging and priming in steam boilers can result even though the boiler was thoroughly cleaned before the treatment was added.

Systems where treatment should be considered are:

- Process applications
- Contaminated condensate
- Large make-up water requirements
- System components requiring corrosion inhibitor
- Extremely hard water
- Make-up water supply with higher than 30 ppm of chloride

Beware the Foam

Water treatment chemicals should be thoroughly reviewed before they are introduced into the boiler and heating system. Of particular concern are foaming agents that will interfere with the disengagement of the steam at the boiler waterline. For this reason, foaming agents cannot be tolerated in steam boilers.

Testing & Treatments

To test the boiler water treatment chemicals, prepare a small amount of the chemical intended for the boiler with water. In a ventilated area, put this mixture into a pan and bring to a “rolling boil” on the stove. If the mixture foams, it is not suitable for the boiler.

Recognized treatment compounds used for oxygen scavenging and corrosion protection should not affect the life of the elastomer sealing rings. Asking the treatment supplier to test a sealing ring in the proposed compound can eliminate any doubt. In any case, a compound containing petroleum should not be used.

Without Chemical Treatment

- When the chloride level is above 400 ppm, or the total dissolved solids (TDS) are above 1000 ppm, drain and refill the boiler with fresh water and bring the boiler to pressure for 15 minutes per the boiler manual to drive off excess oxygen.
- If chemical treatment is not used and chloride level and TDS levels are not monitored, drain and refill the boiler when the chloride level is above 400 ppm, or the total dissolved solids (TDS) are above 1000 ppm. After refilling the boiler, bring the boiler to pressure for 15 minutes per the boiler manual to drive off excess oxygen.

These steps will help prevent corrosion caused by high conductivity, but may not prevent under-deposit corrosion.

In general, cast iron steam boilers do not require water treatment for protection. However, some water conditions may require the boiler be drained and refilled, or in more aggressive areas, chemically treated.

WARNING SERVICE TECHNICIAN ONLY — read and follow completely.

11 Start-up

DANGER Follow information below to prevent severe personal injury, death or substantial property damage:

- Do not use gasoline crankcase drainings or any oil containing gasoline. See burner manual for proper fuel oil.
- Do not attempt to start burner when excess oil has accumulated, when unit is full of vapor or when combustion chamber is very hot.
- Do not start burner unless collector hood, breeching and burner mounting door are secured in place.
- Never burn garbage or paper in the boiler.
- Never leave combustible material around it.

Fill the system

1. Do not fill until boiler is ready to be fired (except for leak tests).
2. Fill to normal water line (center of gauge glass), as indicated on jacket front panel.
3. Boiler water pH 7.0 to 8.5 is recommended.

NOTICE Failure to maintain recommended pH level can cause section failure and leaks.

4. Follow “Skim steam boiler” to ensure proper operation.

Tips for steam systems

- Check boiler and system piping for leaks. Continual makeup water will reduce boiler life. Minerals can build up in sections, reducing heat transfer and causing cast iron to overheat, resulting in section failure.

CAUTION Failure to maintain recommended pH and repair leaks can cause section iron corrosion, leading to section failure and leaks. Do not use petroleum-based sealing or stop-leak compounds in boiler system. Damage to system components can result.

- For pH conditions outside 7.0 to 8.5 range or unusually hard water areas (above 7 grains hardness), consult local water treatment company.

Skim steam boiler:

NOTICE Steam boilers must be cleaned to remove any impurities. Failure to properly clean can result in violent water level fluctuations, water passing into steam mains, or high maintenance costs on strainers, traps or vents. Skim boiler only. Do not clean old piping or leaks can occur.

CAUTION Do not use petroleum-based compounds in boiler system. Damage to system components can result, causing property damage.

1. Provide 1½” skim piping from skim tapping to floor drain. Add a tee in piping to observe skim water level. Raise waterline to midpoint of skim tapping (see page 26 for location).
2. Fire burner to maintain water temperature below steaming temperature during skimming process.
3. Feed in water to maintain water level. Cycle burner to prevent rise in steam pressure. Continue skimming until discharge is clear.
4. While boiler is warm, but not hot, drain boiler through drain valve.
5. Remove skim piping. Close drain valve. Fill with fresh water to normal waterline. Start burner and steam for 15 minutes to remove dissolved gases. Stop burner.
6. Check traps and air vents for proper operation.
7. Process may need to be repeated after several weeks of operation.

Place in operation

1. Verify boiler is filled with water to normal waterline, as indicated on jacket front panel.
2. Open burner mounting door and verify rear target wall, floor and burner door insulations are in proper position and condition.
3. Verify burner mounting door is closed tightly and burner wiring harness is connected securely.
4. Burner should be adjusted to 13% CO₂ or less with a smoke level of zero and over-fire of -0.01” to -0.02”. Re-adjust burner combustion to account for environmental conditions. Actual CO₂ value will vary and should be adjusted for clean and safe combustion operation. Seasonal variations as well as sufficient combustion air supply can affect proper combustion and boiler performance. The burner should only be adjusted by a service professional with appropriate instrumentation.

NOTICE A burner nozzle change may be required - refer to the burner instructions or boiler’s rating label for correct selection.

WARNING Make final burner adjustments using combustion test equipment to assure proper operation. Do not fire boiler without water. Sections will overheat, damaging boiler and resulting in substantial property damage.

5. Check boiler and system piping for leaks. See “Tips for steam systems” on this page.
6. Inspect breeching and venting for proper operation.

NOTICE For additional information, refer to instructions packed with boiler or burner:

- Burner Manual
- Component literature

12 Checkout procedure

Check off steps as completed

- 1. Boiler properly filled with water?
- 2. Boiler piping check for leaks (including tankless heater, if used)?
- 3. System vents and/or traps operating properly?
- 4. Boiler properly skimmed?
- 5. Air purged from oil piping? Piping checked for leaks? Burner door closed, sealed and nut tight? Burner harness securely plugged in?
- 6. Proper draft and burner flame? Final adjustment made with combustion test equipment?
- 7. Test pressure limit control: While burner is operating, move indicator on limit control below actual boiler steam pressure. Burner should go off. Raise setting on limit control above boiler steam pressure and burner should reignite.
- 8. Test low water cutoff(s): Follow control manufacturer’s instructions for testing procedures. Make sure burner goes off when control responds to low water condition. Burner should re-ignite when proper water level is restored.
- 9. Test additional field-installed controls: If boiler has additional operating control or other controls, test for operation as outlined by control manufacturer. Burner should be operating and should go off when controls are tested. When controls are restored, burner should reignite.
- 10. Limit control set to system pressure requirements?
- 11. Thermostat heat anticipator setting (if available) set properly? Refer to “Connect wiring,” page 14.
- 12. Boiler cycled with thermostat? Raise to highest setting and verify boiler goes through normal start-up cycle. Lower to lowest setting and verify boiler goes off.
- 13. Observed several operating cycles for proper operation?
- 14. Set room thermostat(s) to desired room temperature?
- 15. Completed “Installation and service certificate” below?
- 16. Reviewed Homeowner’s Information pages 2 through 5 with owner or maintenance person and instructed person to keep for future reference?
- 17. Returned all instructions provided with boiler to its envelope and placed with boiler for future reference?

▲WARNING Obtain gas-tight seal at burner door to prevent possible flue gas leakage and carbon monoxide emissions, leading to severe personal injury or death.

Installation and service certificate

Boiler model _____ Series _____

Consumer Protection (CP) number _____ Date installed _____

Measured Btuh input _____

- Installation instructions have been followed.
- Checkout sequence has been performed.
- Above information is certified to be correct.
- Information received and left with owner/maintenance person.

Installer _____
(company) (address) (phone)

(installer’s signature)

▲WARNING SERVICE TECHNICIAN ONLY — read and follow completely.

13 Service and maintenance

Annual service and start-up

▲WARNING Follow the “Service and maintenance” procedures given throughout this manual and in component literature shipped with the boiler. Failure to perform the service and maintenance could result in damage to the boiler or system. Failure to follow the directions in this manual and component literature could result in severe personal injury, death or substantial property damage.

▲WARNING The boiler should be inspected and started annually, at the beginning of the heating season, only by a qualified service technician. In addition, the maintenance and care of the boiler designated in the table below, and explained on the following pages must be performed to assure maximum boiler efficiency and reliability. Failure to service and maintain the boiler and system could result in equipment failure.

| Annual Service Call Check List (follow in order listed below) | | D A T E | Comments |
|--|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|----------|
| 1 | Clean boiler flue ways. See page 22. | | | | | | | | | | |
| 2 | Check that boiler area is free from combustible materials, gasoline and other flammable vapors and liquids. | | | | | | | | | | |
| 3 | Check for and remove any obstruction to combustion and ventilation air flow to boiler. | | | | | | | | | | |
| 4 | Check boiler and piping for leaks and repair if found. | | | | | | | | | | |
| 5 | Perform service on low water cutoff, relief valve and gauge glass. See pages 23 and 24. | | | | | | | | | | |
| 6 | Check breeching and chimney or vent for obstructions, damage, etc. Repair or replace as necessary. | | | | | | | | | | |
| 7 | Make sure boiler is filled to correct water level. See page 23. | | | | | | | | | | |
| 8 | Inspect and adjust burner. See burner manual and: - change nozzle. - check ignition electrode settings. - clean blower housing and wheel. - make sure blower wheel turns freely. - oil burner motor, if required. - clean air inlet. - clean or change fuel filter and strainer. | | | | | | | | | | |
| 9 | Start unit and verify combustion settings with combustion test equipment. See page 24. | | | | | | | | | | |
| 10 | Verify operation of all controls on boiler. | | | | | | | | | | |

13 Service and maintenance

continued

Cleaning boiler flue ways

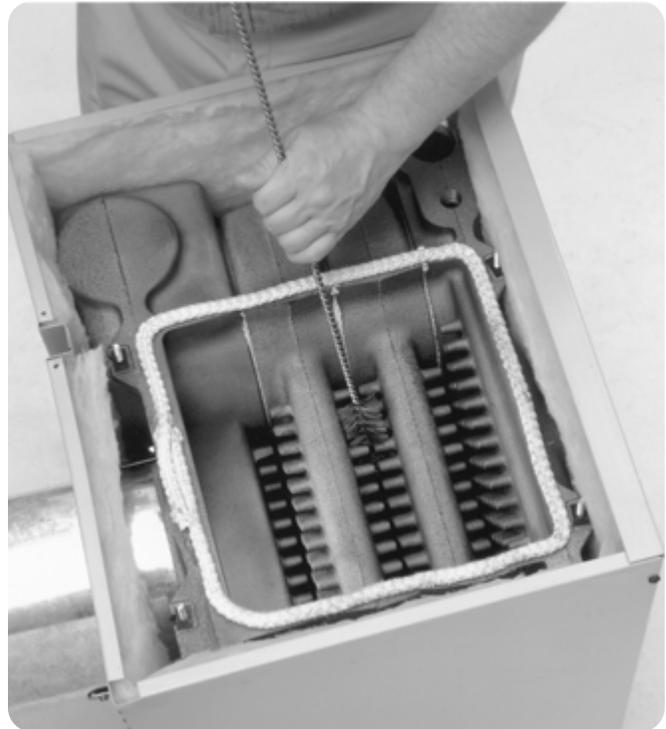
▲WARNING The boiler contains ceramic fiber and fiberglass materials. Use care when handling these materials per instructions on page 25 of this manual. This boiler contains ceramic fiber and fiberglass materials that have been identified as carcinogenic, or possibly carcinogenic, to humans). Failure to comply could result in severe personal injury.

▲DANGER Make sure all electrical connections to boiler are turned off and wait until boiler is warm, not hot, before cleaning. Failure to do so will result in severe personal injury, death or substantial property damage.

1. Remove jacket top panel.
2. Remove flue collector hood, saving hardware for reassembly.
3. Shut off oil valves. Arrange drip pans under the areas of oil piping that will be disconnected. Disconnect oil line at burner so that you can swing open the door completely.
4. Line combustion chamber floor with newspaper to catch any soot that will be loosened in the cleaning process.
5. Starting at the top of the boiler, use a wire flue brush to thoroughly clean between all pins at all angles. Be careful not to damage side walls of rear refractory.
6. Move to the bottom of the flue ways and clean up between the sections to reach pins left uncleaned in step #5.
7. Once the flue ways are cleaned, carefully remove the paper from the floor of the combustion chamber. Fold the paper to capture the refuse, seal in a plastic bag, and dispose.
8. Verify sealing rope around flue area is intact. Visually check condition and position of insulation in combustion chamber floor, and the refractories at the rear of boiler and in the burner mounting door. Replace any parts as necessary.
9. Close burner mounting door and tighten nut securely. Place flue collector hood on top of boiler. Secure with hardware from step #2. Maintain a gas-tight seal to avoid possible flue gas leakage and carbon monoxide emissions, which can lead to severe personal injury or death.

10. Check breeching for sooting and clean if necessary. Install jacket top panel and breeching.
11. Reconnect oil line and all electrical connections.

Figure 16 Cleaning boiler flue ways — Thoroughly clean flue ways between all pins at all angles. Start on top of boiler, finish from the bottom.



▲WARNING Wear a NIOSH -certified dust respirator (N95) while cleaning the boiler, per WARNING on page 25. Failure to comply could result in severe personal injury.

Inspect

Reported problems

Inspect any problems reported by owner and correct before proceeding.

Boiler area

1. Verify that boiler area is free of any combustible materials, gasoline and other flammable vapors and liquids.
2. Verify that boiler area is free of any of the contaminants listed in Table 2 on page 5 of this manual. If any of these are present in the boiler intake air vicinity, they must be removed. If they cannot be removed, install combustion air piping to the boiler in accordance with national, provincial or local codes.

Piping

1. Check the boiler interior piping and all system piping for signs of leaks.
2. Repair any leaks before proceeding.

▲DANGER Do not use petroleum-based cleaning or sealing compounds in boiler system. Severe damage to boiler will occur, resulting in substantial property damage.

▲WARNING Eliminate all system or boiler leaks. Continual fresh makeup water will reduce boiler life. Minerals can build up in sections, reducing heat transfer, overheating cast iron, and causing section failure. Leaking water may also cause severe property damage.

WARNING SERVICE TECHNICIAN ONLY — read and follow completely.

13 Service and maintenance

□ Service.

Gauge glass

Normal waterline is halfway up gauge glass. Clean when needed.

1. Close lower gauge cock.
2. Open pet cock.
3. Open lower gauge cock and allow a small amount of water to flush out through open pet cock.
4. Close pet cock.
5. Open lower gauge cock.

DANGER Boiler pressure must be low to eliminate potential of severe burns.

WARNING If gauge glass breaks, close both gauge cocks. Replace gauge glass. Do not replace with thin glass tubing. Failure to comply could cause severe personal injury, death or substantial property damage.

□ Check/test.

Boiler waterline

Normal waterline is halfway up gauge glass.

Limit controls

Inspect and test the boiler limit control. Verify operation by turning control set point below boiler pressure. Boiler should cycle off. Return dial to original setting.

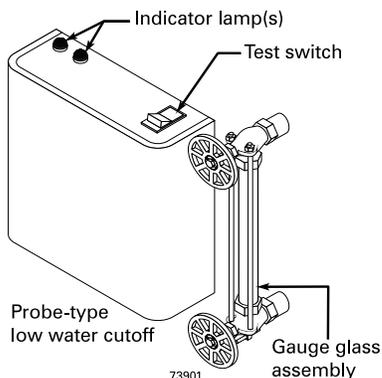
Low water cutoffs

Probe-type low water cutoff (see below)

Clean and test probe-type low water cutoff for proper operation.

Remove, inspect and clean the low water cutoff at least annually before testing. Refer to low water cutoff manufacturer's instructions in envelope assembly provided with boiler.

1. Turn off power to boiler and wait 5 minutes.
2. Drain water to bottom of gauge glass.
3. Turn on power.
4. Set thermostat to call for heat. Red neon lamp on lower water cutoff should light.
5. Wait 5 minutes. Boiler should not fire.
6. Refill boiler to correct waterline. Red lamp should go off.
7. Wait 5 minutes. Boiler should fire.
8. Return thermostat to normal setting.



continued

□ Check/test.

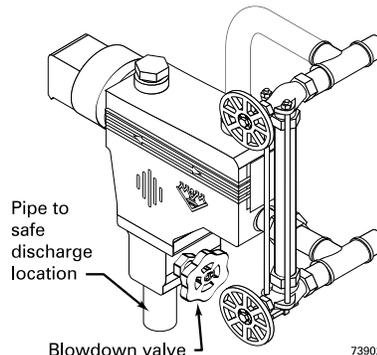
Float-type low water cutoff (when provided by others — see below)

Clean and test float-type low water cutoff (when provided by others) to clear float chamber of sediment.

1. Open blow down valve at bottom control.
2. Drain water into a bucket.

DANGER Scald potential. Boiler pressure must be low to avoid the potential of severe burns from steam.

3. Check float-type low water cutoff for proper operation:
 - a. Turn operating control to call for heat.
 - b. Before water gets hot, drain to bottom of gauge glass. Boiler should shut off after water level lowers a few inches.
 - c. Refill boiler to correct waterline. Boiler should come back on.



□ Check monthly

Venting system

Visually inspect all parts of the flue gas venting system for any signs of blockage, leakage or joints or deterioration of the piping. Notify your qualified service technician at once if you find any problem.

WARNING Failure to inspect the vent system as noted above and have it repaired by a qualified service technician can result in vent system failure, causing severe personal injury or death.

Boiler and system piping

Visually inspect for leaks around piping, circulators, relief valve and other fittings. Check oil lines and boiler air for signs of oil leakage. Immediately call a qualified service technician to repair any leaks.

WARNING Have leaks fixed at once by a qualified service technician. Continual fresh makeup water will reduce boiler life. Minerals can build up in sections, reducing heat transfer, overheating cast iron, and causing section failure.

WARNING Do not use petroleum-based cleaning or sealing compounds in boiler system. Severe damage to boiler and system components can occur, resulting in possible severe personal injury, death or substantial property damage.

13 Service and maintenance continued

Before operating boiler:

1. Follow steps under “Fill the system”, page 19.
2. Follow steps under “Tips for steam systems”, page 19.
3. Skim the boiler following “Skim steam boiler:”, page 19.

To place boiler in operation:

▲ DANGER Follow information below to prevent severe personal injury, death or substantial property damage:

- Do not use crankcase drainings or any oil containing gasoline. See burner manual for proper fuel oil.
- Do not attempt to start burner when excess oil has accumulated in combustion chamber, when unit is full of vapor, or when combustion chamber is very hot.
- Do not start burner unless collector hood, breeching and burner mounting door are secured in place. Never burn garbage or paper in the boiler.
- Never leave combustible material around boiler.

1. Verify boiler is filled with water to proper level.
2. Open burner door and verify rear target wall, floor and burner door insulations are in proper condition and position.
3. Verify burner mounting door is closed and bolted tightly and burner plug is connected.
4. Refer to burner manual for burner start-up, adjustment and checkout procedures. Factory burner adjustment and settings may not be suitable for specific job conditions.

▲WARNING Make final burner adjustments using combustion test equipment to assure proper operation. Do not fire boiler without water. Sections will overheat, damaging boiler and resulting in substantial property damage.

5. Check boiler and system piping for leaks.
6. Inspect breeching and venting for proper operation.

Review with owner

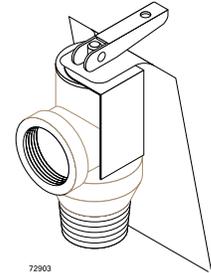
1. Review the Home Owner’s Information, pages 2 through 5 with the owner.
2. Emphasize the need to perform the maintenance schedule specified on page 3.
3. Remind the homeowner of the need to call in a licensed contractor should the boiler or system exhibit any unusual behavior.
4. Remind the homeowner to follow the proper shutdown procedure and to schedule an annual start-up at the beginning of the next heating season.

Annual service

Boiler relief valve

After following the warning directions below, if the relief valve weeps or will not seat properly, replace the relief valve.

▲ DANGER Before testing, make certain discharge pipe is properly connected to valve outlet and arranged to contain and safely dispose of boiler discharge. Wear gloves to protect your hands from hot surfaces. Verify that discharge piping is installed in accordance with this manual and the instructions on the relief valve tag. Failure to comply will expose operator and others to severe personal injury or death.



▲WARNING Safety relief valves should be reinspected AT LEAST ONCE EVERY THREE YEARS, by a licensed plumbing contractor or authorized inspection agency, to ensure that the product has not been affected by corrosive water conditions and to ensure that the valve and discharge line have not been altered or tampered with illegally. Certain naturally occurring conditions may corrode the valve or its components over time, rendering the valve inoperative. Such conditions are not detectable unless the valve and its components are physically removed and inspected. This inspection must only be conducted by a plumbing contractor or authorized inspection agency — not by the owner. Failure to reinspect the boiler relief valve as directed could result in unsafe pressure buildup, which can result in severe personal injury, death or substantial property damage.

▲WARNING Check the setting of the boiler limit control. The control should never be set with a pressure above 10 psig. Operating at a higher pressure can cause damage to the boiler relief valve.

▲WARNING The boiler relief valve must be tested at least monthly during the heating season to verify the valve and discharge piping flow freely. Inspect the boiler relief valve and the relief valve discharge pipe for signs of weeping or leakage. If the relief valve often weeps, the expansion tank may not be working properly.

- Immediately contact your qualified service technician to inspect the boiler and system.

If corrosion and/or deposits are noticed within the valve body, testing must be performed more often. A “try lever test” must also be performed at the end of any non-service period. Follow the instructions below for a “try lever test”:

- With the system at operating pressure, lift and hold the test lever fully open for at least 5 seconds to flush the valve seat free of sediment and debris. Then release lever and permit the valve to snap shut.

Handling ceramic fiber and fiberglass materials

REMOVAL OF COMBUSTION CHAMBER LINING OR BASE PANELS

▲WARNING

The combustion chamber lining or base insulation panels in this product contain ceramic fiber materials. Ceramic fibers can be converted to cristobalite in very high temperature applications. The International Agency for Research on Cancer (IARC) has concluded, “Crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1).”:

- Avoid breathing dust and contact with skin and eyes.
 - Use NIOSH certified dust respirator (N95). This type of respirator is based on the OSHA requirements for cristobalite at the time this document was written. Other types of respirators may be needed depending on the job site conditions. Current NIOSH recommendations can be found on the NIOSH web site at <http://www.cdc.gov/niosh/homepage.html>. NIOSH approved respirators, manufacturers, and phone numbers are also listed on this web site.
 - Wear long-sleeved, loose fitting clothing, gloves, and eye protection.
- Apply enough water to the combustion chamber lining or base insulation to prevent airborne dust.
- Remove combustion chamber lining or base insulation from the boiler and place it in a plastic bag for disposal.
- Wash potentially contaminated clothes separately from other clothing. Rinse clothes washer thoroughly.

NIOSH stated First Aid.

- Eye: Irrigate immediately
- Breathing: Fresh air.

REMOVAL OF FIBERGLASS WOOL — OR —

INSTALLATION OF FIBERGLASS WOOL, COMBUSTION CHAMBER LINING OR BASE PANELS:

▲WARNING

This product contains fiberglass jacket insulation and ceramic fiber materials in combustion chamber lining or base panels in gas fired products. Airborne fibers from these materials have been listed by the State of California as a possible cause of cancer through inhalation.

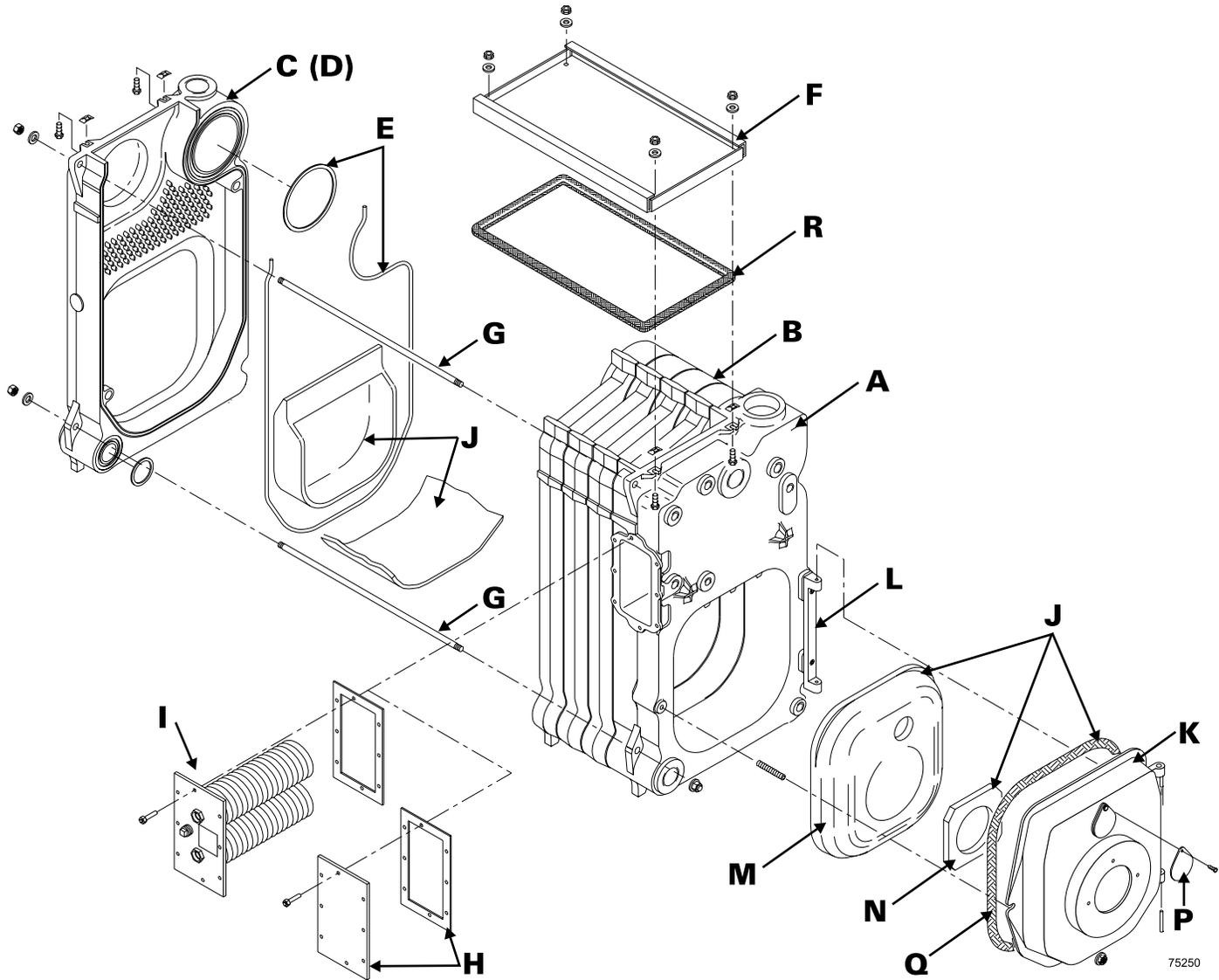
- Avoid breathing dust and contact with skin and eyes.
 - Use NIOSH certified dust respirator (N95). This type of respirator is based on the OSHA requirements for fiberglass wool at the time this document was written. Other types of respirators may be needed depending on the job site conditions. Current NIOSH recommendations can be found on the NIOSH web site at <http://www.cdc.gov/niosh/homepage.html>. NIOSH approved respirators, manufacturers, and phone numbers are also listed on this web site.
 - Wear long-sleeved, loose fitting clothing, gloves, and eye protection.
- Operations such as sawing, blowing, tear out, and spraying may generate airborne fiber concentration requiring additional protection.
- Wash potentially contaminated clothes separately from other clothing. Rinse clothes washer thoroughly.

NIOSH stated First Aid.

- Eye: Irrigate immediately
- Breathing: Fresh air.

14 Replacement parts

Figure 17 Boiler section assembly, refractories, collector hood and burner door assembly.



75250

▲WARNING SERVICE TECHNICIAN ONLY — read and follow completely.

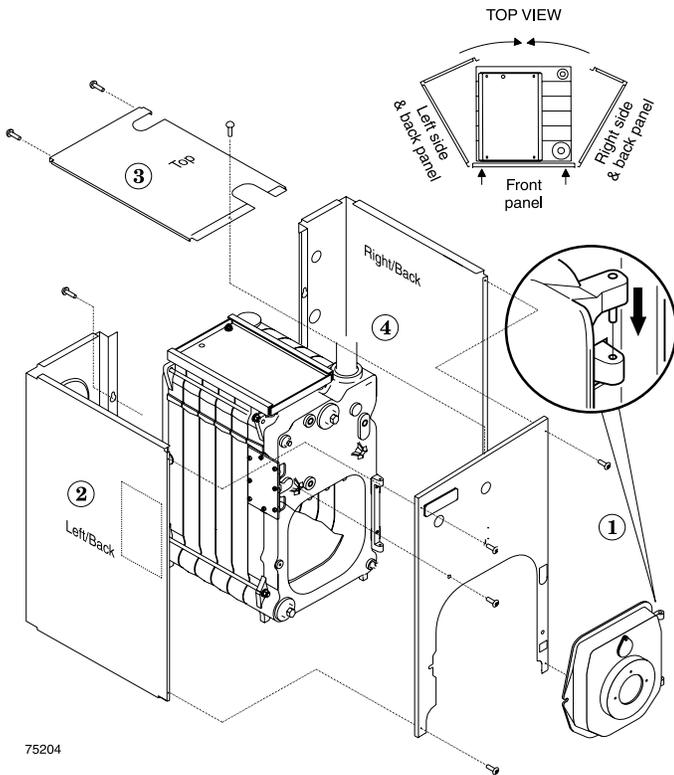
14 Replacement parts continued

Table 8 Parts list for Figure 17

| Figure number | Description | Boiler model number | Part number |
|---------------|--|---------------------|---------------|
| A | Wide front section, number 7121 | All | 316-700-326WT |
| B | Intermediate section, number 7015 | All | 316-700-065WT |
| C | Back section, number 7027 (steam, no top tapping) | OSB-3, -4, & -5 | 316-700-329WT |
| D | Back section, number 7027 (steam, top tapping) | OSB-6 | 316-700-312WT |
| E | Section replacement kit, front or back section (for 1 joint, includes seals, rope, adhesive and collector hood hardware) | All | 386-700-852WT |
| | Section replacement kit, intermediate section (for 2 joints, includes seals, rope and adhesive) | All | 386-700-851WT |
| | Section assembly complete | OSB-3 | 326-700-408WT |
| | | OSB-4 | 326-700-409WT |
| | | OSB-5 | 326-700-410WT |
| | | OSB-6 | 326-700-411WT |
| F | Standard Collector hood kit for back outlet (includes rope and hardware for installation) | OSB-3 | 386-700-237WT |
| | | OSB-4 | 386-700-238WT |
| | | OSB-5 | 386-700-239WT |
| | | OSB-6 | 386-700-240WT |
| G | Tie rod ½ x 12-1/4" | OSB-3 | 560-234-493WT |
| | Tie rod ½ x 15-3/8" | OSB-4 | 560-234-532WT |
| | Tie rod ½ x 18-1/2" | OSB-5 | 560-234-475WT |
| | Tie rod ½ x 21-5/8" | OSB-6 | 560-234-536WT |
| H | Heater cover plate carton (Cover plate, gasket, studs and nuts) | All | 389-900-103WT |
| I | Tankless heater carton, 35-S-29 (Heater, gasket, studs and nuts) | All | 386-700-350WT |
| J | Combustion chamber kit (rear and front refractory, door refractory blanket and water glass) | All | 386-700-836WT |
| | Burner mounting door assembly (door, observation port, rope, insulation and pins) | All | 343-500-546WT |
| K | Burner mounting door, number 7171 | All | 381-355-797WT |
| L | Door hinge, number 7054 | All | 330-054-300WT |
| M | Door refractory | All | 592-400-028WT |
| N | Door refractory blanket | All | 591-222-115WT |
| P | Observation port shutter | All | 460-039-867WT |
| Q | Door seal rope 5 feet | All | 590-735-105WT |
| R | Glass rope 3/8" for collector hood (7 feet for largest size hood) | All | 590-735-109WT |
| | Flue brush, 123D (not shown) | All | 591-706-214WT |

14 Replacement parts continued

Figure 18 Jacket parts and replacement instructions



75204

▲WARNING The boiler contains ceramic fiber and fiberglass materials. Use care when handling these materials per instructions on page 25 of this manual. Failure to comply could result in severe personal injury.

Before installing jacket:

Before installing jacket:

1. Remove the following knockouts:
 - Steam return knockout (lower left back panel).
 - Relief valve knockout (upper right back panel).
 - Rectangular tankless heater and tankless control knockouts (left side panel), if tankless heater is to be installed.
 - Remaining knockout (right back panel) if indirect-fired water heater is to be installed.
2. Make sure all unused tappings are plugged.
3. These parts may be on boiler:
 - Supply piping
 - Drain valve
 - Tankless heater
4. These parts must be off boiler:
 - Breeching connection
 - Steam or water trim parts and piping
 - Tankless heater control and piping
 - Return piping
 - Steam or water relief valve and piping
5. Remove burner mounting door by removing locking nut and lifting door off hinge. Do not remove hinge.

To install jacket:

1. Install jacket front panel to front section, making sure burner door hinge lugs extend through holes in lower jacket leg. Secure with two (2) 3/8" x 1/2" black machine screws.
2. Right and left side pieces are shipped as straight pieces. Before installing, bend about 90° at perforation as shown, to form sides and back panels.
 - a. Secure side panels to front panel with four (4) sheet metal screws.
 - b. To secure back panels, using two (2) 1/4" x 1/2" self-tapping screws:
 - 1) Start upper screw in boiler section. Do not tighten.
 - 2) Slip keyhole opening in back panels behind screw.
 - 3) Install lower screw and tighten both screws.
 - c. Install top panel and secure with two (2) sheet metal screws.
3. Reinstall burner mounting door and secure locking nut on stud, making sure door is secured gas-tight.

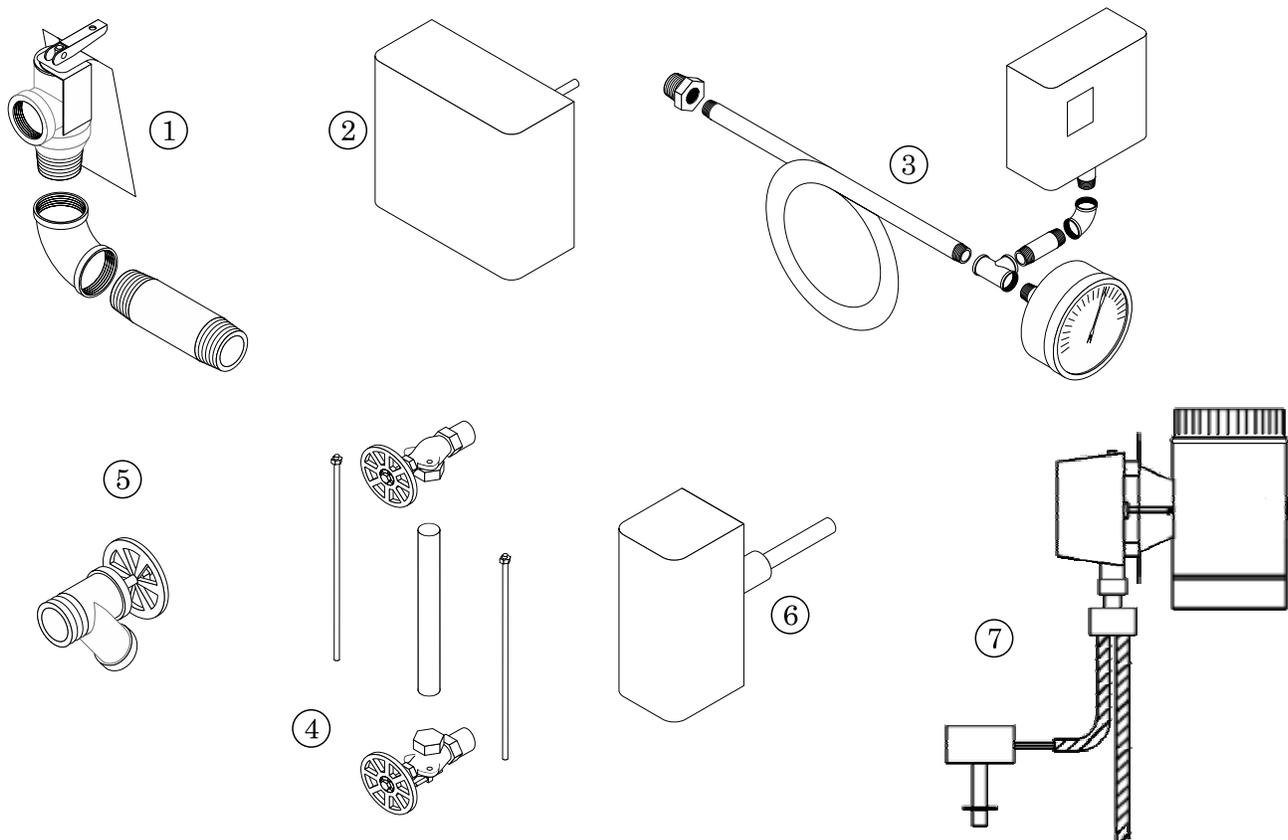
▲WARNING Gas-tight seal must be obtained at door to prevent possible flue gas leakage and carbon monoxide emissions, leading to severe personal injury or death.

| Item number | Description | Boiler model number | Part number |
|-------------|--|----------------------------------|--|
| 1 | Jacket panel, front | All | 426-722-005WT |
| 2 | Jacket panel, left side and back | OSB-3 OSB-4 OSB-5 OSB-6 | 426-722-341WT 426-722-342WT 426-722-343WT 426-722-344WT |
| 3 | Standard Jacket panel, top for back outlet | OSB-3 OSB-4 OSB-5 OSB-6 | 426-722-015WT 426-722-017WT 426-722-019WT 426-722-021WT |
| 4 | Jacket panel, right side and back | OSB-3 OSB-4 OSB-5 OSB-6 | 426-722-037WT 426-722-039WT 426-722-041WT 426-722-043WT |
| | Jacket hardware kit (screws for assembly) | All | 386-700-845WT |
| | Optional Top Vent Service Kit (includes jacket top, jacket cover, collector hood, vent cover and vent cover strap) | OSB-3 OSB-4 OSB-5 OSB-6 | 386-700-300WT 386-700-301WT 386-700-302WT 386-700-303WT |

WARNING SERVICE TECHNICIAN ONLY — read and follow completely.

14 Replacement parts continued

Figure 19 Trim and controls



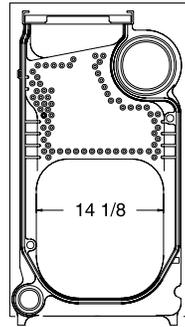
75205

| Item number | Description | Part number |
|-------------|---|--|
| 1 | Pressure safety valve, ASME, 30 PSIG, ¼ NPT (Fittings shown are included --- Ell ¼ NPT, Nipple ¼ NPT | 511-548-023WT |
| 2 | Low Water Cutoff, probe type | 511-100-008WT |
| 3 | Limit control/gauge assembly, includes: High limit pressure control Guage pressure 2-½" Dia. Siphon, ¼ NPT, 180° Brass Nipple, close ¼ NPT Tee, ¼ NPT Elbow ¼ NPT | 510-312-135WT 510-218-045WT 560-640-698WT 561-326-245WT 561-541-200WT 561-115-335WT |
| 4 | Gauge glass assembly, includes: Guage water glass Guage glass guards, 10.62" Guage cock set, Brass | 591-419-194WT 563-334-597WT 510-218-135WT |
| 5 | Drain valve, ¼ NPT, 1-½ Shank Standard | 511-210-423WT 511-246-392WT |
| 6 | Tankless temperature control (optional) 10° differential; with ¼ well | 510-312-209WT |
| 7 | OVD Vent damper kit | 381-800-515WT |
| not shown | Burner harness | 591-391-966WT |
| not shown | Pressure control LWCO harness | 591-391-912WT |
| not shown | Balanced draft damper (barometric) | 510-512-267WT |

15 Dimensions

Figure 20 Dimensional drawing — ALL DIMENSIONS IN INCHES

- ① Supply piping one (note 1)
- ② Supply piping two, OSB-6 only (note 1)
- ③ Return piping (note 1)
- ④ Relief valve, 3/4" NPT
- ⑤ Vent connection — 7" diameter
- ⑥ Burner opening — 4 3/8" diameter
- ⑦ Oil burner
- ⑧ Drain valve
- ⑨ Tankless coil & combination limit (when used)
- ⑩ Pressure gauge
- ⑪ Pressure limit control
- ⑫ Probe-type low water cutoff

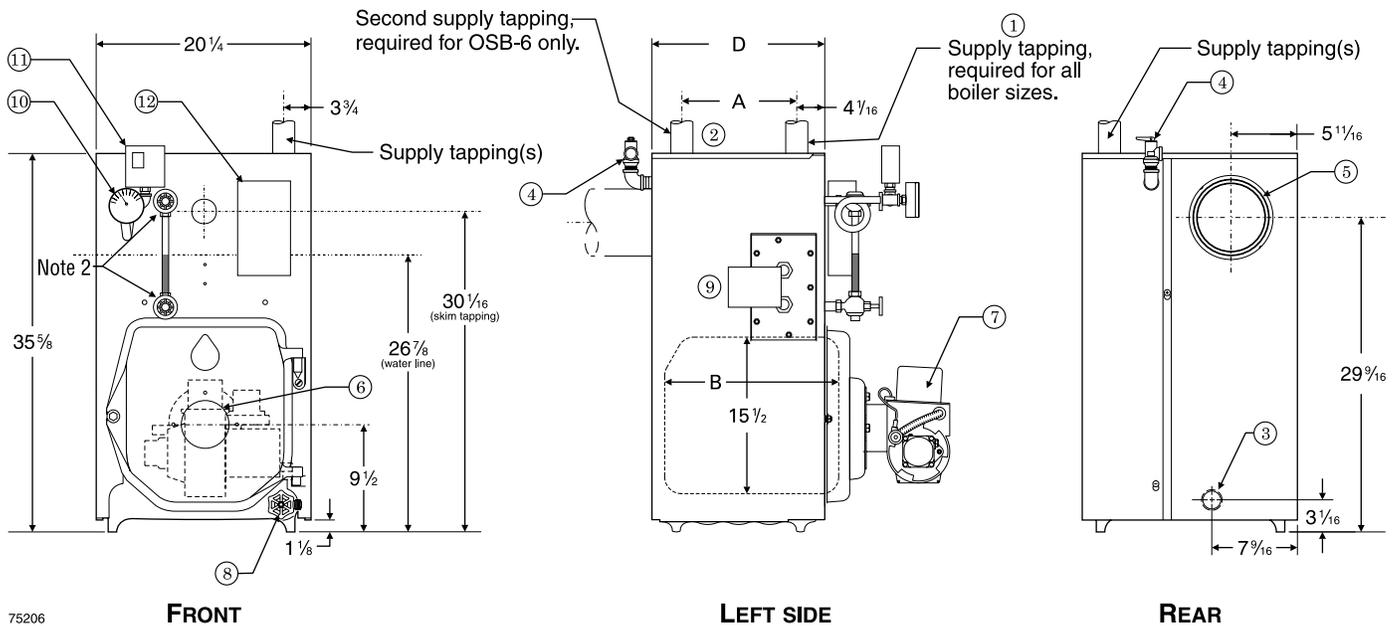


INTERMEDIATE SECTION

ALL DIMENSIONS IN INCHES

Note 1: Boiler supply tappings are 2 1/2" NPT. Return tapping is 2" NPT on all boiler sizes. See Table 4, page 10 for recommended system supply and return piping sizes. You must install two supply tappings for sizes OSB-6.

Note 2: Float low water cutoff, if used, must be installed in gauge glass tappings. No other location is acceptable.



75206

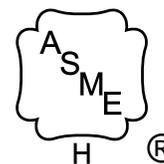
| Boiler model number | Supply tapping (inches NPT) | Return tapping (inches NPT) | "A" Supply riser spacing (inches) | "B" Combustion chamber depth (inches) | "D" Jacket depth (inches) |
|---------------------|-----------------------------|-----------------------------|-----------------------------------|---------------------------------------|---------------------------|
| OSB-3 | 2-1/2 | 2 | --- | 13-1/2 | 16-7/8 |
| OSB-4 | 2-1/2 | 2 | --- | 16-5/8 | 20 |
| OSB-5 | 2-1/2 | 2 | --- | 19-7/8 | 23-1/8 |
| OSB-6 | (2 X) 2-1/2 | 2 | 19 | 23-1/2 | 26-1/4 |

WARNING SERVICE TECHNICIAN ONLY — read and follow completely.

16 Ratings



DOE



AHRI Certified Rating

| Boiler model number | Burner Capacity | | Heating Capacity MBH | Net ratings | | Seasonal efficiency AFUE | Round flue outlet size inches | Minimum Chimney Dimensions | | | Boiler water content (at normal waterline) | Draft loss through boiler inches W.C. | OVD Damper Required |
|---------------------|-----------------|-----|----------------------|---------------|-----------|--------------------------|-------------------------------|----------------------------|--------------|-------------|--|---------------------------------------|---------------------|
| | | | | Steam sq. ft. | Steam MBH | | | Rectangle inches | Round inches | Height feet | | | |
| Note 8 | GPH | MBH | Notes 1 & 2 | Note 3 | | % | Note 4 | Note 5 | | | Gallons | Note 6 | Yes/No |
| OSB-3 | 0.95 | 133 | 114 | 358 | 86 | 85.0 | 7 | 8 x 8 | 6 | 15 | 10.7 | 0.020 | Yes |
| OSB-4 | 1.20 | 168 | 144 | 450 | 108 | 85.0 | 7 | 8 x 8 | 6 | 15 | 12.5 | 0.010 | Yes |
| OSB-5 | 1.45 | 203 | 175 | 546 | 131 | 85.0 | 7 | 8 x 8 | 7 | 15 | 14.2 | 0.015 | Yes |
| OSB-6 | 1.75 | 245 | 211 | 658 | 158 | 85.0 | 7 | 8 x 8 | 7 | 15 | 16 | 0.015 | Yes |

NOTES:

1. MBH refers to thousands of Btu per hour.
2. Based on 140,000 Btu per gallons of oil.
3. Based on standard test procedures prescribed by the United States Department of Energy, with combustion conditions of 13.0% CO₂ and -0.02" W.C. draft over fire.
4. Net AHRI ratings are based on net installed radiation of sufficient quantity for the requirements of the building and nothing need be added for normal piping and pick-up. Steam ratings are based on a piping and pick-up allowance of 1.33. An additional allowance should be made for unusual piping and pick-up loads.
5. See page 8 for minimum breeching diameter.
6. Listed draft losses are for factory-shipped settings.
7. OSB boiler are ASME rated for 50 psig working pressure.
8. Installation of OVD Automatic Vent Damper (P/N 381-800-515WT) is required.

Note: A burner nozzle change may be required - refer to the burner instructions or boiler's rating label for correct selection.

