City of Portland, Maine - Building or Use Permit Application

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

Permit No:	Issue Date:	CBL:
06-1384		037 D024001

Location of Construction:	Owner Name:	Owner Address:	Phone:
519 CONGRESS ST	MAINE CHARITABLE MECHANI	519 CONGRESS ST	
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	AAA Energy Service	4 Commercial Road, Po Box 908 Scar	2077725719
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	**Zone:**
		HVAC	B-3

Past Use:	Proposed Use:	Permit Fee:	Cost of Work:	CEO District:
Commercial	Commercial install a HB Smith oil boiler	$190.00	$17,000.00	1

FIRE DEPT: ☑ Approved ☐ Denied

NFPA 31

Signature: Lorea Cass

INSPECTION:

Use Group: B Type: HVAC

IMC 2003

Signature: [illegible] 09/07/06

Proposed Project Description:

Install a HB Smith oil boiler

PEDESTRIAN ACTIVITIES DISTRICT (P.A.D.)

Action: ☐ Approved ☐ Approved w/Conditions ☐ Denied

Signature: Date:

Permit Taken By:	Date Applied For:
dmartin	09/20/2006

1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.
2. Building permits do not include plumbing, septic or electrical work.
3. Building permits are void if work is not started within six (6) months of the date of issuance. False information may invalidate a building permit and stop all work..

PERMIT ISSUED
OCT - 2 2006
CITY OF PORTLAND

Zoning Approval

Special Zone or Reviews	Zoning Appeal	Historic Preservation
☐ Shoreland	☐ Variance	☐ Not in District or Landmark
☐ Wetland	☐ Miscellaneous	☐ Does Not Require Review
☐ Flood Zone	☐ Conditional Use	☐ Requires Review
☐ Subdivision	☐ Interpretation	☐ Approved
☐ Site Plan	☐ Approved	☐ Approved w/Conditions
Maj ☐ Minor ☐ MM ☐	☐ Denied	☐ Denied
Date: 9/20/06	Date:	Date:

CERTIFICATION

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

SIGNATURE OF APPLICANT ADDRESS DATE PHONE

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE DATE PHONE

CITY OF PORTLAND, MAINE

Department of Building Inspections

Sept 20 20 06

Received from Energy Services Co

Location of Work 517 Congress

Cost of Construction $_____

Permit Fee $ 195.

Building (IL) X Plumbing (I5) ___ Electrical (I2) ___ Site Plan (U2) ___

Other HVAC

CBL: 29 D 024

Check #: 1680 **Total Collected** $ 195

THIS IS NOT A PERMIT

No work is to be started until PERMIT CARD is actually posted upon the premises. Acceptance of fee is no guarantee that permit will be granted. PRESERVE THIS RECEIPT. In case permit cannot be granted the amount of the fee will be refunded upon return of the receipt less $10.00 or 10% whichever is greater.

WHITE - Applicant's Copy
YELLOW - Office Copy
PINK - Permit Copy

37 D 024

PERMIT ISSUED
OF
CITY OF PORTLAND

FILL IN AND SIGN WITH INK

APPLICATION FOR PERMIT
HEATING OR POWER EQUIPMENT

To the INSPECTOR OF BUILDINGS, PORTLAND, ME.

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

Location / CBL 517 Congress St Use of Building Retail Date 9-20-06

Name and address of owner of appliance Maine Charitable Mechanics Association

Installer's name and address AAA Energy Service Co 4 Commercial Rd
PO Box 908 Scarborough me Telephone 883-1473

Location of appliance:
- ☑ Basement
- ☐ Floor
- ☐ Attic
- ☐ Roof

Type of Fuel:
- ☐ Gas
- ☑ Oil
- ☐ Solid

Appliance Name: H B Smith
U.L. Approved ☑ Yes ☐ No

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

IF NO Explain:

DEPT. OF BUILDING INSPECTION
CITY OF PORTLAND, ME
SEP 20 2006
RECEIVED

The Type of License of Installer:
- ☐ Master Plumber #
- ☐ Solid Fuel #
- ☑ Oil # MS30005915
- ☐ Gas #
- ☐ Other

Type of Chimney:
- ☐ Masonry Lined
  Factory built
- ☐ Metal
  Factory Built U.L. Listing # MH 25531
- ☐ Direct Vent
  Type UL#

Type of Fuel Tank
- ☑ Oil
- ☐ Gas

Size of Tank 275 gal

Number of Tanks 2

Distance from Tank to Center of Flame 12 **feet.**

Cost of Work: $ 17000

Permit Fee: $ 196

Approved

Fire:
Ele.:
Bldg.:

Approved with Conditions

☐ See attached letter or requirement

Inspector's Signature Date Approved 09/27/06

Signature of Installer

White - Inspection Yellow - File Pink - Applicant's Gold - Assessor's Copy

#16080

City of Portland, Maine - Building or Use Permit

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

Permit No:	Date Applied For:	CBL:
06-1384	09/20/2006	037 D024001

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519 CONGRESS ST	MAINE CHARITABLE MECHANI	519 CONGRESS ST	
Business Name:	**Contractor Name:**	**Contractor Address:**	**Phone**
	AAA Energy Service	4 Commercial Road, Po Box 908 Scar	(207) 772-5719
Lessee/Buyer's Name	**Phone:**	**Permit Type:**	
		HVAC	

Proposed Use:	Proposed Project Description:
Commercial install a HB Smith oil boiler	Install a HB Smith oil boiler

Dept: Zoning **Status:** Approved **Reviewer:** Marge Schmuckal **Approval Date:** 09/20/2006

Note: **Ok to Issue:** ☑

Dept: Building **Status:** Approved with Conditions **Reviewer:** Michael A. Collins **Approval Date:** 09/27/2006

Note: **Ok to Issue:** ☑

1) Installation shall comply with 2003 International Mechanical Code and State of Maine Oil and Solid Fuel Board Laws and Rules

2) Equipment must be installed in compliance with the manufacturer's specifications

Dept: Fire **Status:** Approved with Conditions **Reviewer:** Cptn Greg Cass **Approval Date:** 09/25/2006

Note: **Ok to Issue:** ☐

1) Install shall comply with NFPA 31.
A compliance letter shall be required

City of Portland, Maine - Building or Use Permit

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28A SERIES BOILER
INSTALLATION INSTRUCTIONS

WARNING

Any appliance that burns natural gas, propane gas, fuel oil, wood or coal is capable of producing carbon monoxide (CO).

Carbon Monoxide (CO) is a gas which is odorless, colorless and tasteless but is very toxic.

If your Smith boiler is not working properly, or is not vented properly, dangerous levels of CO may accumulate. CO is lighter than air and thus may travel throughout the building. **BRIEF EXPOSURE TO HIGH CONCENTRATIONS OF CO, OR PROLONGED EXPOSURE TO LESSER AMOUNTS OF CO MAY RESULT IN CARBON MONOXIDE POISONING.**

EXPOSURE CAN BE FATAL AND EXPOSURE TO HIGH CONCENTRATIONS MAY RESULT IN THE SUDDEN ONSET OF SYMPTOMS INCLUDING UNCONSCIOUSNESS.

Symptoms of CO poisoning include the following:

dizziness	vision problems	shortness of breath
headaches	loss of muscle control	unclear thinking
nausea	weakness	unconsciousness

The symptoms of CO poisoning are often confused with those of influenza, and the highest incidence of poisoning occurs at the onset of cold weather or during flu season. A victim may not experience any symptoms, only one symptom, or a few symptoms. Suspect the presence of carbon monoxide if symptoms tend to disappear when you leave your home.

The following signs may indicate the presence of carbon monoxide:
- Hot gases from appliance, venting system, pipes or chimney, escaping into the living space.
- Flames coming out around the appliance.
- Yellow colored flames in the appliance.
- Stale or smellly air.
- The presence of soot or carbon in or around the appliance.
- Very high unexplained humidity inside the building.

If any of the symptoms of CO poisoning occur, or if any of the signs of carbon monoxide are present, **VACATE THE PREMISES IMMEDIATELY AND CONTACT A QUALIFIED HEATING SERVICE COMPANY OR THE GAS COMPANY OR THE FIRE DEPARTMENT.**

To reduce the risk of CO poisoning, have your heating system "tuned up" by a licensed heating contractor or the gas company -- preferably before each heating season. Also have the service company check your chimney or vent pipes for blockage.
Your home should also be adequately ventilated, particularly if you have insulated your home.

ONLY QUALIFIED, LICENSED SERVICE CONTRACTORS SHOULD PERFORM WORK ON YOUR SMITH BOILER.

WARNING

Install, operate and maintain unit in accordance with manufacturer's instructions to avoid exposure to fuel substances or substances from incomplete combustion which can cause death or serious illness. The State of California has determined that these substances may cause cancer, birth defects, or other reproductive harm. Also, install and service this product to avoid exposure to airborne particles of glasswool fibers and/or ceramic fibers known to the State of California to cause cancer through inhalation.

Smith CAST IRON BOILERS
WESTCAST, INC.
260 NORTH ELM STREET WESTFIELD, MA 01085
TEL. (413) 562-9631 FAX (413) 562-3799

INSTALLER
READ THESE INSTRUCTIONS CAREFULLY.
THEY WILL SAVE TIME IN ASSEMBLING BOILER.

28A SERIES BOILER
INSTALLATION INSTRUCTIONS

STEAM OR WATER HEATING
PRESSURIZED FOR FIRING OIL OR GAS

DESIGNED AND TESTED ACCORDING TO THE A.S.M.E.
BOILER AND PRESSURE VESSEL CODE, SECTION IV
FOR MAXIMUM ALLOWABLE WORKING PRESSURE.
STEAM - 15 PSIG, WATER - 80 PSIG

CAUTION

Do not use automotive anti-freeze in boiler waterways. If necessary to use anti-freeze, be sure to employ a preparation designed for hydronic heating systems such as ethylene or propylene glycol.

Water treatment is not recommended. This boiler uses gaskets to seal the ports of adjoining sections. These gaskets are made of a fluorocarbon elastomer (designation FKM) marketed under the brand name Viton. Consult a water treatment professional before adding any chemicals to the boiler water. Any water treatment or anti-freeze added to the sytem must be compatible with the Viton gaskets.

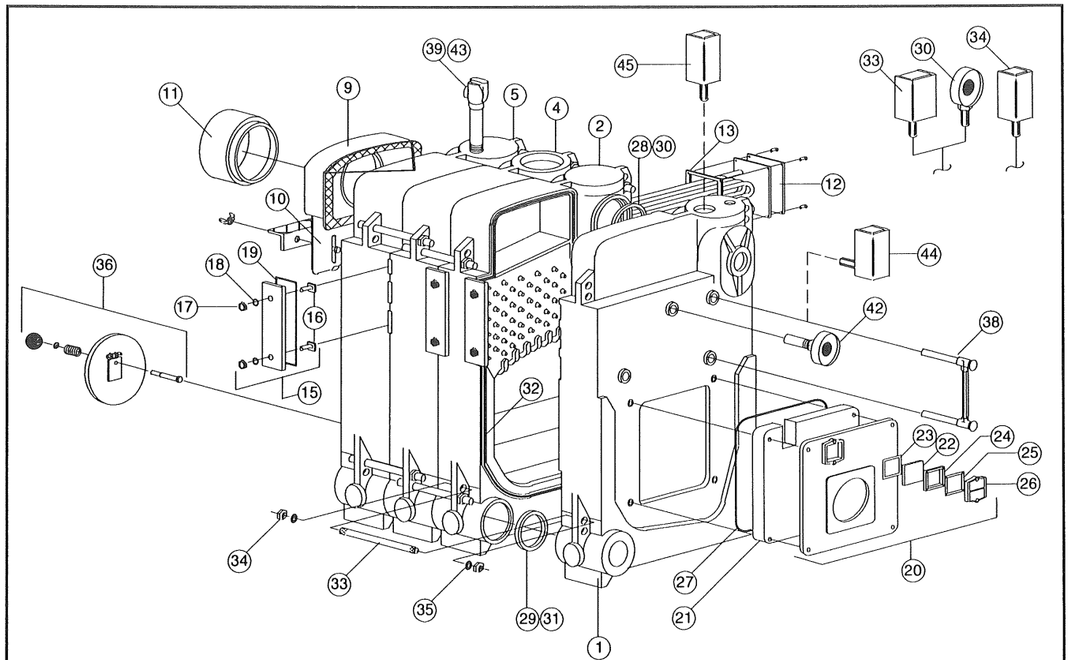
SEE SEPARATE JACKET AND BURNER INSTRUCTIONS

THESE INSTRUCTIONS TO BE LEFT WITH THE BOILER FOR REFERENCE PURPOSES.

Smith CAST IRON BOILERS
WESTCAST, INC.
260 NORTH ELM STREET WESTFIELD, MA 01085
TEL. (413) 562-9631 FAX (413) 562-3799

28A SERIES BOILER
INSTALLATION INSTRUCTIONS

FIG. NO. 1 - BOILER ASSEMBLY



BOILER PARTS LIST

Ref #	Name of Part	Part No.
1	Front Section	3621
2	Plain Leg Section with Boss	3622
	Plain Leg Section less Boss	3658
	Heater Leg Section with Boss	3623
	Heater Leg Section less Boss	3659
4	Tapped Leg Section with Boss (Steam)	3624
	Tapped Leg Section less Boss (Steam)	3660
5	Back Section	3630
	Smokehood Assembly includes:	
	Smokehood, Slide Damper, Angle Bracket, and Hardware	
9	10" Smokehood Assy. (4-5 Section)	70633
	12" Smokehood Assy. (6-7 Section)	70611
	14" Smokehood Assy. (8-10 Section)	70612
	16" Smokehood Assy. (11-18 Section)	70613
10	Slide Damper Only (4-7 Section)	3417
	Slide Damper Only (8-11 Section)	3418
	Slide Damper Only (12-18 Section)	3419
11	16" to 18" Increaser	69904
	16" to 20" Increaser	60905
12	Tankless Cover Plate Assy	70628
13	Tankless Cover Plate Gasket	60327
13A	Tankless Coil (8 GPM)	50653
13B	Tankless Coil (12 GPM)	50655
	Cleanout Cover Assembly Includes:	
	Cleanout Plate, Insulation, Rope and Hardware	
15	Clean Out Cover Plate Assy	70592
16	Clean Out Cover Plate Bolt	61414
17	Clean Out Cover Plate Nut	60869
18	Clean Out Cover Plate Washer	62095
19	Rope Seal (3/8 x 3 3/4 ft.)	76538

Ref #	Name of Part	Part No.
	Burner Mounting Plate Assembly includes:	
	Mounting Plate with Observation Glass and Cover	
20	Burner Mounting Plate Assy 9" (#3411)	70641
	Burner Mounting Plate Assy 10 1/4" (#3410)	70640
	Burner Mounting Plate Assy 12 1/2" (#3552)	70510
—	Burner Mounting plate H'ware	71267
21	Burner Insulating Block	69645
—	Burner Insulating Block H'ware	71268
22	Observation Glass Only	60326
23	Observation Glass Gasket	60317
24	Observation Glass Gasket	60318
25	Observation Glass Holder	60314
26	Observation Cover Plate	3420
27	Rope Seal 1/4 x 7 ft. Required	60026
28	Upper Port Gasket (Viton)	60337
29	Lower Port Gasket (Viton)	60338
30	Upper Port Gasket (Chlorobutyl)	60315
31	Lower Port Gasket (Chlorobutyl)	60316
32	7/16" Rope (12' 6" lengths)	70660
33	5/8" x 9" Draw Rod	60101
34	5/8" Hex Nut	60877
35	5/8" Washer	62099
–	Flue Brush	60090
–	Spray Adhesive	70492
36	Rear Observation Port Assy	70614
—	Rear Observation Port H'ware	71301

28A SERIES BOILER
INSTALLATION INSTRUCTIONS

B. WATER BOILERS

Normally, cleaning of water boilers is unnecessary unless boiler or system contamination is known to be unusually heavy.

If cleaning is necessary, it should be performed as outlined above for steam boilers with the following changes:

1) Include system water when determining the amount of boilout solution.
2) Operate the circulator during the boilout.
3) Maintain a system temperature from 160° to 200°F.
4) If portions of the heating system are non-drainable, refill the system with water and operate the circulator to flush those sections.
5) Drain and refill system.

WARNING: Monitor the boiler pressure constantly during the boilout. Do not allow the pressure to exceed 40 PSIG for water boilers, 80 PSIG for high test boilers. Direct safety valve discharge away from all personnel during boilout. Failure to adhere to this warning could result in property damage, severe personal injury or death!

17. MAINTENANCE SCHEDULE

The following instructions are offered to achieve the best performance from the boiler and burner:

A. Keep the boiler fireside surfaces clean. Cleaning should be done at least once annually. Flue temperatures above 550°F indicate that cleaning may be necessary.

B. An unstable waterline or system steam hammer may indicate contaminated boiler water. Blow down the boiler to remove the contamination. Excessive blow down should be avoided since this can reintroduce contamination to the boiler. Contaminated boiler water will eventually lead to scaling, pluggage and possible section damage.

C. Periodically check all of the operating and limit controls for proper operation.

D. Check the flame safeguard controls regularly to insure that safe burner shutdown occurs.

IMPORTANT

STEAM BOILERS: Do not place cold boilers in service on a hot steam line or severe damage may occur to boiler and piping. Keep cold boilers valved off line, fire until boiler reaches line pressure and then open steam main isolation valve. Steam entering a cold boiler cools quickly causing severe steam hammer. Boilers not valved off the system should have an overflow installed to prevent idle boilers from flooding. If this is not done, cold boilers must be heated to near steaming conditions (210°) and then drop water level to normal.

WATER BOILERS: Avoid thermal shock of water boilers. Establish water circulation through the boiler before starting burner. Where hot standby is required, special piping and operation procedures are required. Consult your Smith representative.

BOILER SERVICE LOG

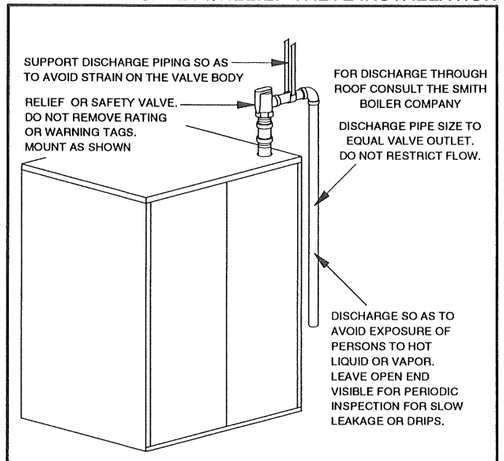
DATE	SERVICE PERFORMED

15. SAFETY VALVE INSTALLATION

The safety or relief valve is located in the 3" tapping at the top of the rear section for both steam and water boilers.

WARNING: Relief valve discharge piping must be piped to avoid exposure of persons to hot liquid or vapor, see Figure 14. Never install any type of valve between the boiler and the relief valve. Failure to comply with this warning can result in an explosion causing severe personal injury or death!

FIG. NO. 14 — SAFETY/RELIEF VALVE INSTALLATION



16. CLEANING BOILER WATERWAYS

CAUTION
Do not use boiler cleaning compound or additives that contain petroleum derivatives. These will attack the hydronic seals.

A. STEAM BOILERS

The boiler must be completely assembled before cleaning. The burner must be installed and made operational with the operating, limit and safety controls functional. Combustion should be adjusted to prevent sooting of the boiler flues.

Final burner adjustment is to be made after the cleaning. The system return piping should not be connected for cleaning. Plug any unused boiler tappings and install the gage glass and safety valve. If desired or if the boiler appears to be heavily contaminated by visual inspection, a skimmer connection can be made at the top 6" tapping in the front section to remove surface scum. Install a blow down valve in one of the lower 3" tappings to remove any sediment.

The cleaning solution is mixed as follows:
1 lb. caustic soda
1 lb. trisodium phosphate

Refer to Table 5 for boiler water content.

CAUTION
Avoid clothing, skin or eye contact with boilout chemicals. If contact occurs, flush with large quantities of clean water.

TABLE 5

BOILER WATER CONTENT (GALLONS)		
BOILER SIZE	STEAM	WATER
4	103.8	123.4
5	125.8	150.3
6	147.8	177.2
7	169.8	204.1
8	191.8	231.0
9	213.8	257.9
10	235.8	284.8
11	257.8	311.7
12	279.8	338.6
13	301.8	365.5
14	323.8	392.4
15	345.8	419.3
16	367.8	446.2
17	398.8	473.1
18	411.8	500.0

Mix chemicals to form a concentrated solution and pour it into the boiler through a top tapping. Plug the tapping and fire the boiler intermittently for at least 5 hours. Maintain 0-2 PSIG steam pressure during boilout. Blow down the boiler intermittently through the lower blow down valve to remove any sediment. Maintain a water level at the normal water line, 50 1/2" from floor. If skimmer removes water as it is added, a constant water level will be maintained.

WARNING: Monitor the boiler pressure constantly during the boilout. Do not allow pressure to exceed 15 PSIG. Direct the safety valve discharge away from all personnel during the boilout. Failure to adhere to this warning could result in property damage, severe personal injury or death!

Stop firing the burner and allow the boiler to cool below 120°F and drain. Remove the plugs from the upper and lower front and rear tappings and flush the boiler from top to bottom with a water hose. Flush the water column and control piping. Inspect the boiler visually for presence of oils or other contamination on the walls of each section. If the boiler is not clean, repeat the previous cleaning process.

Install the system piping and plug all unused tappings. Fill the boiler to the normal water level. The system is now ready for service. Complete the burner adjustment as outlined in the separate instructions included.

Ref #	Name of Part	Part No.
	Steam Trim and Controls	
37	3½" Steam Gauge	60269
38	Gauge Glass ⅝" X 11½"	61931
39	1¼" Steam Relief Valve (4-5 Sect.)	61983
	1½" Steam Relief Valve (6-7 Sect.)	61984
	2" Steam Relief Valve (8-12 Sect.)	61985
	2½" Steam Relief Valve (13-17 Sect.)	61986
	3" Steam Relief Valve (18 Sect.)	61987
40	PA404A Operating Control	50493
41	L404C Limit Control	50494

Ref #	Name of Part	Part No.
	Water Trim and Controls	
42	3½" Theraltimeter	60267
43	¾" Relief Valve 40# (4 Section)	61997
	1" Water Relief Valve 40# (5-6 Section)	61998
	1¼" Water Relief Valve 40# (7-10 Section)	61999
	1½" Water Relief Valve 40# (11-14 Section)	62000
	2" Water Relief Valve 40# (15-18 Section)	62002
44	L4007A Operating Control	50510
45	L4006E Limit Control	50507

1. GENERAL

28A Series boilers are supplied completely knocked down for field assembly, completely assembled as packaged boilers or as assembled blocks of sections. All items should be inspected for damage upon receipt and any damage reported to the wholesaler and trucker. All components should be stored in a clean dry area.

2. CODES AND REGULATIONS

All work shall be performed in strict accordance with the requirements of state and local regulating agencies and codes dealing with boiler installations.
In the absence of such local requirements the following should govern:

A.S.M.E. Section IV - "Heating Boilers"
A.S.M.E. Section VI - "Care and Operation of Boilers"
ANSI/NFPA 31 - "Installation of Oil Burning Equipment"
ANSI/Z223.1 - "Natural Fuel Gas Code"
ANSI/NFPA 70 - "National Electrical Code"

3. BOILER LOCATION

The boiler should be installed on a concrete floor or pad. If a pad is used, it should be at least 2" high and strong enough to support the boiler's weight. Do not install electrical conductors of any type under the boiler or pad. The pad must be as level and flat as possible.

WARNING: If this boiler is to be installed on combustible flooring, local building authorities must be consulted for proper installation. Failure to comply with this warning can result in a fire, severe personal injury or death!

Locate the boiler close to the chimney to minimize the breeching length, but allow adequate clearance for piping, service, maintenance and tankless coil replacement. A clearance of 36" on each side of the boiler is recommended. (Check local code requirements).

4. CHIMNEY AND BREECHING

The breeching connection between the boiler and chimney should be as short as possible with a minimum number of elbows. It should be pitched upwards 1/4" /ft. The breeching must be the same diameter as the boiler outlet up to 13 section boilers 18" for 14 to 17 section boilers and 20" for 18 section boilers.

If extreme length, excessive number of turns or a reduction in diameter is necessary, consult your Smith representative for recommendations.

The boiler is constructed for pressurized operation with burners selected to operate against a back pressure of +0.10" W.C. at the boiler outlet, before the slide damper. If venting conditions cause a greater back pressure, burner capacity may be reduced. Consult the Smith Co. for verification of burner capacity under these conditions.

WARNING: Configuration of breeching and chimney on some installations may result in a positive breeching pressure. In these cases, the breeching must be constructed of pressure tight material. Consult local building authorities for proper installation. Failure to comply with this warning can result in carbon monoxide poisoning or a fire resulting in severe personal injury or death!

5. COMBUSTION AND VENTILATION AIR

WARNING: This boiler must be vented in accordance with Part 7, Venting of Equipment, or the latest revision of the National Fuel Gas code, ANSI Z223.1 and all applicable local building codes. Improper venting of this appliance can result in excessive levels of carbon monoxide which can result in severe personal injury or death!

Requirements differ for various types of installations. Forced air supplied to the boiler room must have the approval of local authorities and should provide a minimum of 30 CFM/GAL of oil and 0.25 CFM/MBH of gas burned.

6. FACTORY ASSEMBLED SECTIONS AND PACKAGED BOILERS

Careful inspection should be made of all assemblies to detect possible damage during shipment. Factory assembled blocks of sections and package boilers are hydrostatically tested at the factory to insure pressure tightness. Before piping connections are made to the boiler, hydrostatically retest boiler sections to detect leaks that may have developed from rough handling during shipment.

All completed boilers shall satisfactorily pass the hydrostatic tests as prescribed by AMSE, Code Section IV.

1. Steam boilers - the assembled boiler shall be subjected to a hydrostatic test pressure of not less than 45 psig.
2. Water boilers - the assembled boiler shall be subjected to a hydrostatic test pressure of not less than 1 1/2 times the maximum allowable working pressure.
3. The required test shall not exceed the test pressure by more than 10 psi.

Maintain the test pressure while carefully checking for leaks. If a leak is found it must be eliminated. Once the cast iron sections have proven to be water tight drain them and remove the plugs from any tappings that will be used in service.

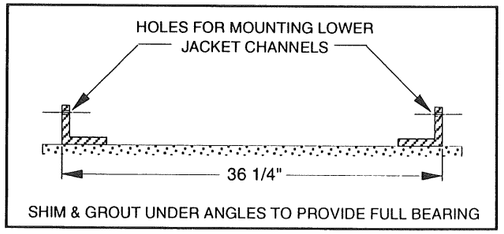
NOTE:Remove the shipping lugs bolted to the ends of the base angles and the straps from the draw rods to angle base after the boiler is in place. Leave the boiler on the angle iron base. The lifting lugs on assembled blocks of sections must be removed for the boiler to accept its jacket.

Remove left side jacket panels and check that the cleanout covers are secure and gas tight.

7. ASSEMBLY OF KNOCKED-DOWN BOILERS

A. Drilled and tapped steel angles are furnished to provide a level footing, ease section assembly and provide a means of attaching the jacket. Set the angles in parallel position measuring 36 1/4" apart to the outside of the angles. Shim the angles to make them level and grout after the sections are assembled, see Fig. No. 2.

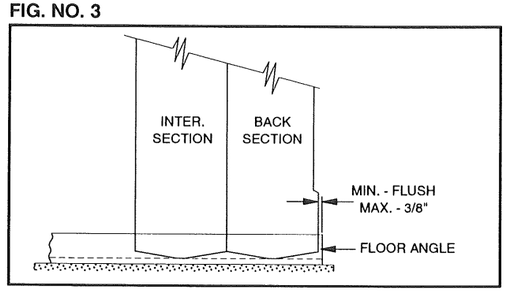
FIG. NO. 2



B. Place the back section in position on the angles as shown in Fig. No. 3.

CAUTION
Support the section vertically in a manner that will prevent it from falling or shifting.

FIG. NO. 3



Clean the hydronic gasket recesses and rope groove with a stiff wire brush. Apply the spray-on adhesive supplied with the boiler to the rope groove to hold the wicking in place during assembly. Do not spray adhesive into the hydronic seal ports. Apply a length of wicking avoiding bends and twists. Be sure the ends extend past the cleanout cover opening, see Fig. No. 5. Place the hydronic seals in the recessed port on the back section.

IMPORTANT
Do not use any tape, grease or adhesive to hold the seals in place during assembly. These will cause the seals to deteriorate.
Tabs on the upper seal fit into slots in the casting to hold the seal in place during assembly. Lower seals may be stretched just before assembly, temporarily elongating them to obtain a snug fit.

C. Select the correct intermediate section and slide it in place against the back section. Insure that the sections are plumb and the seals properly seated in the port recess, refer to Fig. No. 4. Install the draw rods and hardware and tighten lightly.

CAUTION
It is essential to locate steam uptake and special heater sections, as shown in Table 1, for steam boilers in order to maintain steam quality and jacket fit. Note that only one intermediate section with an external leg boss is included with each boiler. The recommended location for this intermediate section is shown in Table 1.

Inspect the rope wicking to insure that it remains in its groove. Check the section alignment and seal position by looking through the ports. Reposition the seals by loosening the draw rods and then retighten them. Check the floor angles and sections for alignment.

FIG. NO. 4 — SECTION ALIGNMENT

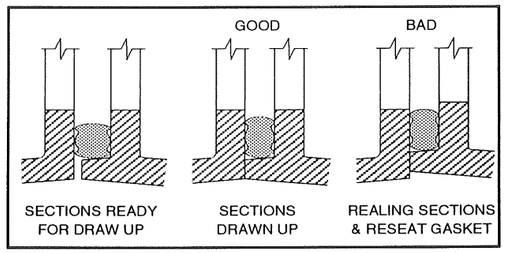
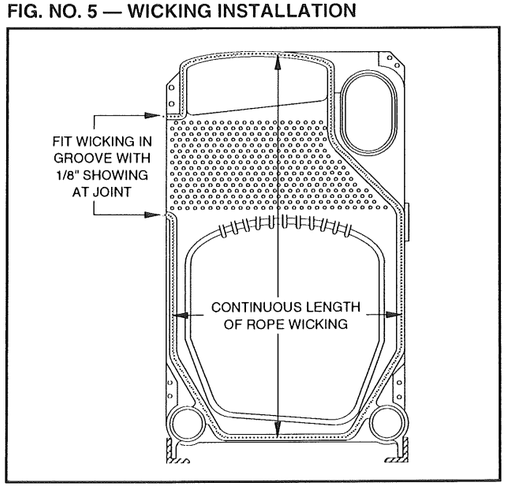


FIG. NO. 5 — WICKING INSTALLATION



11. JACKET INSTALLATION

Jacket assembly instructions are contained in a separate instruction booklet.

12. CONTROL TAPPING LOCATION

Fig. No. 12 shows the location of tappings for controls and piping for both water and steam boilers.

13. CONTROL LOCATIONS

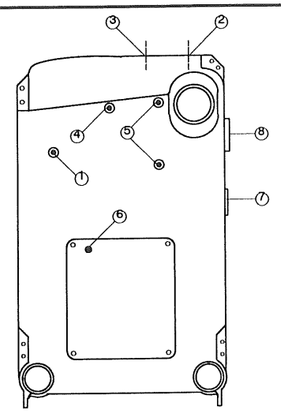
Fig. No. 13 shows the suggested location of limit and operating controls.

14. INSTALLATION OF WATER COLUMN PIPING

28A Series boilers are available with a variety of water level control devices. Water column piping is available from Smith to mount each control at its proper height for both steam and water boilers. Fig. No. 13 shows a typical water column piping arrangement. For all installations, the 1" x 7 1/2" hydronic nipple is installed in the lower water column tapping. The remaining hydronic nipple is installed above the control device.

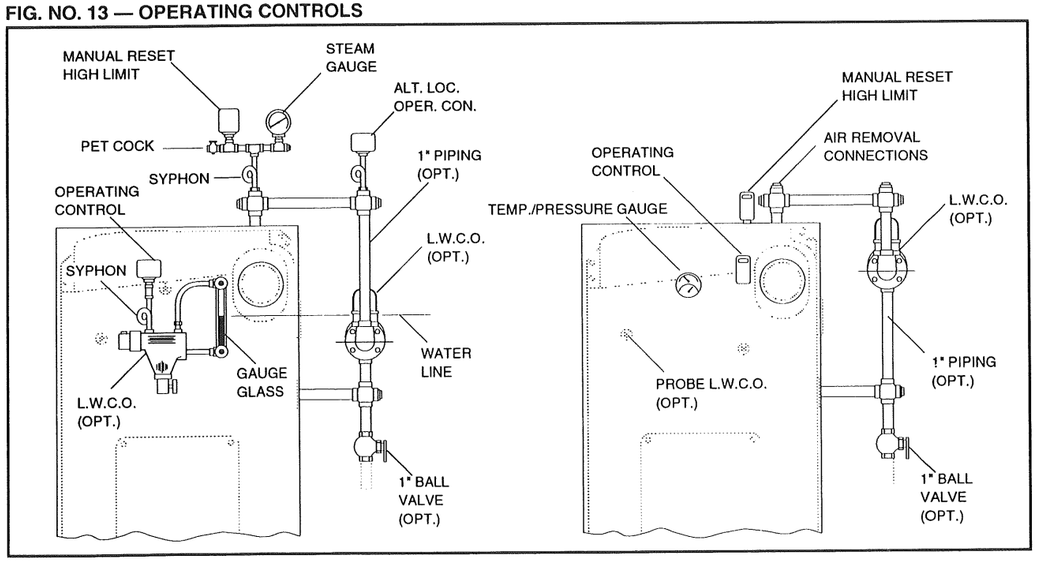
IMPORTANT
Be sure all of the controls are mounted at the correct level. Refer to the control instructions for the proper location.

FIG. NO. 12 — TAPPING LOCATIONS



TAPPING NO.	TAPPING SIZE	STEAM BOILER	WATER BOILER
1	3/4"	PROBE LWCO	----------
2	1"	WATER COLUMN - TOP	AIR REMOVAL
3	3/4"	MANUAL RESET HI LIMIT & STEAM GAUGE	MANUAL RESET HI LIMIT
4	3/4"	----------	TEMP./PRESSURE GAUGE
5	3/4"	WATER GLASS (2)	OPER. CONTROL (TOP)
6	1/4"	OVERFIRE DRAFT	OVERFIRE DRAFT
7	1" 1 1/2"	WATER COLUMN - BOTTOM INSPECTION TAPPING - TOP	WATER COLUMN - BOTTOM ----------
8	3/4"	TANKLESS HEATER OPERATING CONTROL (LOCATED IN HEATER MOUNTING PLATE)	----------

FIG. NO. 13 — OPERATING CONTROLS

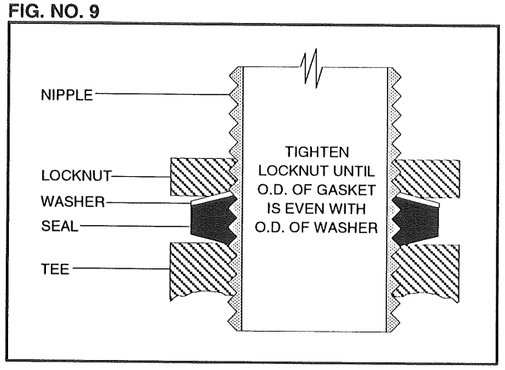


Screw the tapered thread end of the hydronic nipples into the tappings on the rear section and tighten. Make the distance from the boiler to the branch of the hydronic tees on each side of the boiler the same by turning the tees on the running thread. Make up the center assembly similar to previous assemblies and screw the tapered thread end of standard pipe nipple into branch of the right or left tee.

Screw the tapered thread end of the hydronic nipple into the branch of the other tee and tighten. Make sure the fitting alignment is as close as possible with the adjustment available from the hydronic connections. Tighten all the tapered threads. Tighten the locknuts against the washers compressing the hydronic seals. Tighten each nut until the O.D. of the gasket is the same as the washer, refer to Fig. No. 9.

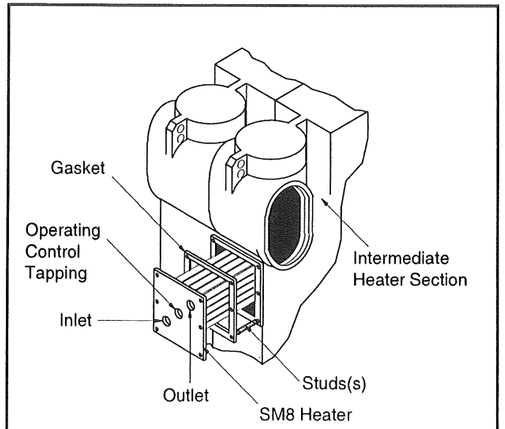
CAUTION
Do not overtighten the seal locknuts. If a leak persists, tighten the locknuts 1/8 turn at a time until the leak stops. If leak cannot be stopped, disassemble the seal and inspect it for damage to the threads or seal.

FIG. NO. 9



10. TANKLESS HEATER INSTALLATION
A. STEAM BOILERS
Clean the heater flange to remove any dirt or rust. Install the 7/16" x 1 1/2" studs in the screw seats around heater opening. Place the heater gasket over the studs and install the heater. Install the nuts and tighten them evenly to ensure uniform gasket compression. Install the operating control in one of the heater mounting plates. This ensures quick burner response to hot water demand. Fig. No. 11 shows an acceptable piping arrangement for multiple heaters.

FIG. NO. 10 — TANKLESS HEATER



IMPORTANT
Before installing any controls or instrumentation on the front section, the front jacket panel, F-1, must be installed.

FIG. NO. 11 — TANKLESS PIPING

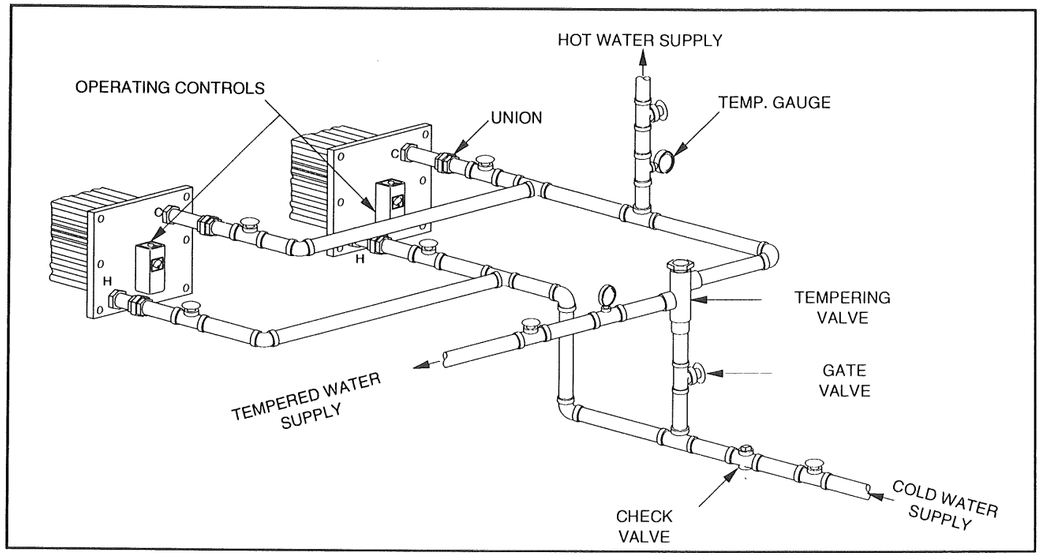


TABLE 1 - ARRANGEMENT OF SECTIONS FOR STEAM BOILERS

4 SECTION	F	**T**	Hb	B													
5 SECTION	F	H	**Tb**	H	B												
6 SECTION	F	**T**	Hb	**T**	H	B											
7 SECTION	F	**T**	Hb	P	**T**	H	B										
8 SECTION	F	**T**	Hb	P	H	**T**	H	B									
9 SECTION	F	**T**	Hb	P	H	P	**T**	H	B								
10 SECTION	F	H	**Tb**	H	P	H	P	**T**	H	B							
11 SECTION	F	H	**Tb**	H	P	**T**	P*	H	**T**	H	B						
12 SECTION	F	H	**Tb**	H	P	**T**	H	P	H	**T**	H	B					
13 SECTION	F	H	**Tb**	H	P	H	**T**	H	P	H	**T**	H	B				
14 SECTION	F	H	**Tb**	H	P	H	**T**	H	P	H	P	**T**	H	B			
15 SECTION	F	H	**Tb**	H	P	H	P	**T**	H	P	H	P	**T**	H	B		
16 SECTION	F	H	**Tb**	H	P	H	P	H	**T**	H	P	H	P	**T**	H	B	
17 SECTION	F	H	**Tb**	H	P	H	P	H	**T**	H	P	H	P	H	**T**	H	B
18 SECTION	F	H	**Tb**	H	P	H	P	H	P	**T**	H	P	H	P	H	**T**	H	B

FRONT SECTION	F
INT. SECTION WITH 5" TAPPING	**T**
OPTIONAL INT. HEATER SECTION	H
PLAIN INTERMEDIATE SECTION	P
BACK SECTION	B
INT. SECTION W/ TAPPING & BOSS	**Tb**
INT. HEATER SECTION W/ BOSS	Hb

* If 5th tankless heater is required, relocate middle tapped section to this location and insert 5th heater section in this place.
NOTE: Tapped intermediate sections are furnished for uptakes on steam boilers only.

D. Prepare the rope groove and gasket recess on the intermediate section as described for the back section in section 7-B.

E. Select the next appropriate intermediate section and repeat the assembly process in section 7-C.

F. After the front section has been installed, tighten all of the draw rods until metal-to-metal contact is achieved at the upper and lower ports. DO NOT EXCEED THE SPECIFIED TORQUES INDICATED BELOW.

TORQUE FOR SERIES 28A

Step 1	***Step 7***
Upper Right ..... 5 ft./lb.	Lower Right..... 25 ft./lb.
Step 2	***Step 8***
Lower Left..... 5 ft./lb.	Upper Right..... 50 ft. /lb.
Step 3	***Step 9***
Lower Right ..... 5 ft./lb.	Lower Left ..... 50 ft./lb.
Step 4	***Step 10***
Upper Left..... 5 ft./lb.	Lower Right..... 50 ft./lb.
Step 5	***Step 11***
Upper Right ..... 25 ft./lb.	Upper Right..... 105 ft./lb.
Step 6	***Step 12***
Lower Left..... 25 ft./lb.	Upper Left ..... 30 ft./lb.

WARNING: The sections of this boiler must be assembled to the proper torque. Read instructions.

IMPORTANT
Do not exceed 50 ft.-lbs. torque on the bottom draw rods, 105 ft.-lbs. on the upper right side draw rods (75 ft.-lbs. on old installations) and 30 ft.-lbs. on the upper left side rods. Alternately tighten the rods next to the 3 ports followed by upper left side rods.
Overtightening draw rods does not improve the sealability of the joint. Excessive torque may damage castings.

G. Plug all openings in the boiler waterways and test hydrostatically for leaks per Section 6 on page 3. Seals may leak if they have been twisted or pinched during assembly. Separate the boiler at the leaks and reposition the seal. If a seal has been cut, replace it with a new one.

NOTE: In cold weather, hydronic seals may require some time to conform to the boiler surface. In this case, allow the boiler to stand empty for a few hours before testing.

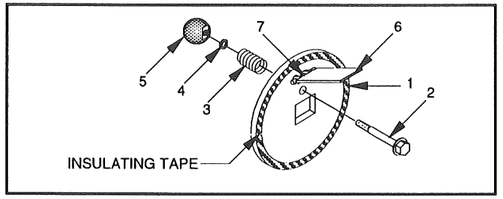
H. Cement the 3/8" diameter rope wicking into the groove of the burner mounting plate with spray-on adhesive. Install the 7/16" x 2 1/2" studs in the screw seats around the opening in the front section. Install the burner mounting plate insulation block in the hole in the front section with the small flame observation port cutout on the top left side. Place the burner mounting plate over the block and force the block inward until the studs extend far enough through holes in the burner mounting plate to accept the nuts.

Tighten the nuts lightly. Install the 1/4" x 5" machine screws through the holes in burner mounting plate, supporting the insulation block on the inside to prevent tearing. Install the 2" x 1 1/2" stainless steel washers and nuts over the insulation block and tighten lightly, being careful not to crush the insulation. At the time of burner installation the burner hole may have to be enlarged and shaped. This may be done with a hacksaw blade.

I. Screw the 5/16 x 1 1/2" studs into the screw seats around the opening for the rear observation port. Apply a thin layer of furnace cement over the mounting flap and install the port assembly. Install the washers and nuts and tighten.

REAR OBSERVATION PORT
INSTRUCTIONS FOR ASSEMBLY:

1. Locate steel "flapper door", Item 6 as shown in Figure below. Drive Item 7, "expansion pin", into hole in Item 1 to secure 6 in position.
2. Lift Item 6 up and install Item 2, "hex bolt".
3. Slide Item 3, "compression spring" over the hex bolt and screw Item 4 "hex nut" to hex bolt.
4. Screw Item 5, "ball knob" into position and lock location using Item 4 as a "jam" nut.
5. Adhere 24 1/2" insulating tape as shown to observation port frame, Item 1.
6. Mount assembly to back section of boiler.



IMPORTANT
Item 6 must always be part of the assembly. Check condition twice/year and replace as needed.

J. Screw the 5/16" studs into the screw seats around smokehood outlet on the back section. Place 1/8" flat x 3/4" wide Type A adhesive tape insulation over the studs. Place the smokehood in position and install the washers and nuts, tightening the nuts uniformly. The 1/8" flat x 3/4" x 18" length of Type B tape is installed on the horizontal surface of the damper anchoring angle on the bottom side of the smokehood. Open the slide damper all the way and leave ready for adjustment during burner lightoff.

K. Cleanout covers come insulated from the factory. Inspect the insulation before installing. Prepare the wicking in the grooves at the top and bottom of the cleanout cover openings between the sections to insure an air tight seal when the covers are installed. Cleanout cover hex nuts should be set at 15 lbs. torque. After periodic flue cleaning, replace the nuts at 15 ft./lbs. torque. Use Hi-Temp silicone caulk around the cleanout covers to seal air tight.

NOTE: Most large burners require support to the floor. See Burner Manufacturer's Manual for such specifications, if needed.

8. STEAM BOILER PIPING

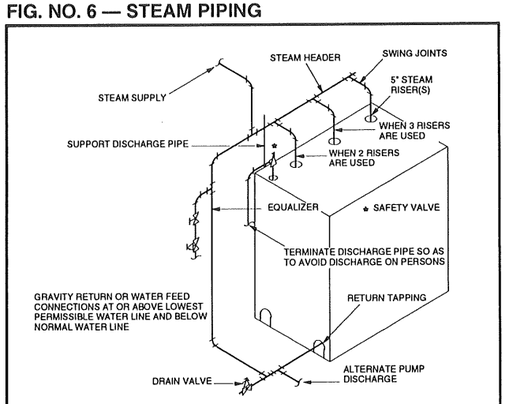
A. Steam piping schedule is shown in Table 2. Pitch the piping to allow condensate to flow in the same direction as the steam. Return tappings should be yoked to equalize the return flow. Refer to Fig. No. 6 for an acceptable steam piping arrangement. Swing joints are recommended.

TABLE 2

STEAM BOILER PIPING			
BOILER SECTION	NO. OF 5" RISERS	HEADER	EQUALIZER
28-S-4 & 5	1	5"	2 1/2"
28-S-6 & 7	2	5"	2 1/2"
28-S-8-10	2	6"	4"
28-S-11-18	3	8"	4"

IMPORTANT
Spacing of steam risers must be checked for each boiler installation.

FIG. NO. 6 — STEAM PIPING



CAUTION
Makeup water connections must be made to the return pipe system, not to the boiler.
Boiler blowdown valves must be located at the lowest possible water space, preferably opposite the return piping connections.

B. Feedwater requirements for steam boilers at full input are shown in Table 3. Addition of water to the boiler should be controlled by sensing the actual boiler water level. One inch water column tappings are provided on the front section to mount various low and high water cutoffs and controllers.

TABLE 3

STEAM BOILER FEEDWATER RECOMMENDATIONS				
BOILER SIZE	I=B=R GROSS OUTPUT MBH	EVAPOR-ATION RATE - GPM	MIN. FEED WATER PUMPING RATE - GPM	CONDENSATE RECEIVER CAPACITY GAL.
28A-S-4	900	1.93	3.9	37
28A-S-5	1166	2.50	5.0	48
28A-S-6	1433	3.08	6.2	59
28A-S-7	1699	3.65	7.3	69
28A-S-8	1965	4.22	8.4	80
28A-S-9	2232	4.79	9.6	91
28A-S-10	2498	5.37	10.7	102
28A-S-11	2764	5.94	11.9	113
28A-S-12	3031	6.51	13.0	124
28A-S-13	3297	7.08	14.2	135
28A-S-14	3563	7.65	15.3	145
28A-S-15	3830	8.23	16.5	156
28A-S-16	4096	8.80	17.6	167
28A-S-17	4362	9.37	18.7	178
28A-S-18	4629	9.94	19.9	189

NOTE: These recommendations are considered normal for compact buildings. Where buildings are spread out, additional receiver capacity may be necessary because of the extended time required for condensate to return to the receiver.

C. Front sections have 3" tappings at the base for installation of 3" close nipples and 3" caps. Removal of caps allows flushing of sediment from boiler.

9. WATER BOILER PIPING

IMPORTANT
Install the rear observation port before installing water boiler return yoke, see paragraph I in Section 7.

A. Piping for water boilers is shown in Fig. No. 7. A flexible precut return yoke is provided as standard equipment for each water boiler. The yoke size is 3" up to 9 sections and 4" for larger boilers. Table 4 contains a pipe size schedule for water boilers.

FIG. NO. 7 — WATER PIPING

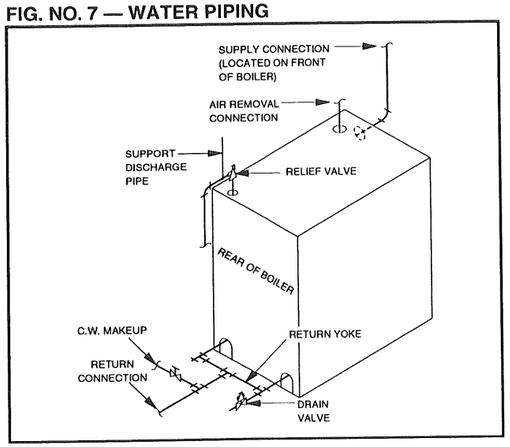


TABLE 4

WATER BOILER PIPING (BASED ON 20° Δ T SYSTEM TEMP. DROP)		
BOILER SIZE	RETURN CONN.	SUPPLY SIZE
28-W-4 & 5	3"	3"
28-W-6-9	4"	4"
28-W-10-18	5"	5"

CAUTION
Do not apply pipe dope, grease, tape or any other compound to hydronic seals or seal failure will occur.

RETURN YOKE

B. For boilers having 9 sections or less, 4" x 3" hex bushings must be installed in the 4" lower rear section tappings. Larger boilers do not require hex bushings. The yoke is to be field pre-assembled into 3 sub-assemblies and then attached to the boiler. Refer to Fig. No. 8 and Fig. No. 8A. Screw the two shorter locknut nipples into the running thread leg of the 3" x 3" x 3" hydronic tees, 4" x 4" x 4" tee for 10 to 18 section boilers. Place the locknut, beveled washer and hydronic seal on the running thread portion of each nipple. Assemble the short standard pipe nipples and pipe caps.

FIG. NO. 8 — RETURN YOKE (4 TO 9 SECTIONS)

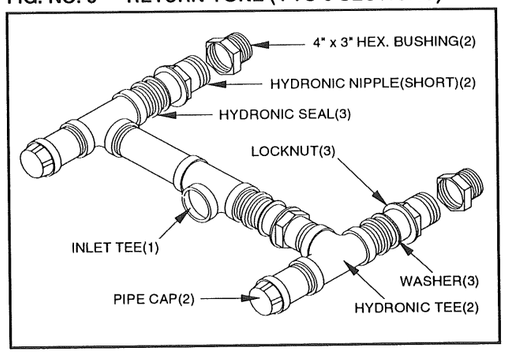


FIG. NO. 8A — RETURN YOKE (10 TO 18 SECTIONS)