18-03 Jack

FR-A-7 BOILER

by

AMERICAN-Standard

INSTALLATION—OPERATION AND MAINTENANCE MANUAL

FOR

BOILER-BURNER UNITS

FOR OIL HEATING

AMERICAN-Standard

First in heating . . . first in plumbing

BP-7957-FRA7

PLAINTIFF'S EXHIBIT
ASI - 279

SPECIAL INSTRUCTIONS

FR-A-7 SERVICE DOOR

Plate Box Sundry Parts Bag contains a steel retaining plate and a 1/2" steel washer which replaces the cast iron catch plate normally provided for securing the Service Door on oil boilers.

Install the 1-1/2" square head bolt in the bolt pocket, add the 1/2" washer, retaining plate and nut in that order after mounting the Service Door.

With the plate in position over the door latch, align the door with the door seat and tighten the nut. Loosen nut and turn plate as required for access to the combustion chamber.

FORM FR-A-7 SUPP.
2-66

NOTICE

MR. STEAMFITTER!

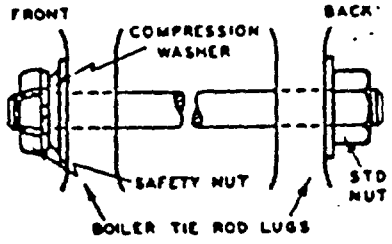
Use regular steel nuts and flat washers for assembling boiler. Apply oil or grease freely to tie rod threads while assembling sections to prevent stripping of threads on rod.

After drawing up boiler, remove steel tie rod nuts at front of boiler and place sheet metal COMPRESSION WASHERS on rods with open (cupped) side against regular washer.

Place SAFETY NUTS on front end against compression washers and leave regular steel nuts on back end of tie rods.

Lubricate nuts well and tighten with FINGERS ONLY.

FAILURE TO OBSERVE THIS MAY RESULT IN DAMAGE TO BOILER



IMPORTANT!

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See instructions Page 4 on proper setting of boiler for installation.

When boiler sections have been assembled, it is essential that boiler be tested for leaks before platework, jacket or piping is installed.

BEFORE FIRE IS STARTED IN BOILER, plug all boiler tappings and fill entirely with cold water.

To protect and safeguard the accuracy of steam or water gauge supplied, DO NOT INSTALL GAUGE UNTIL AFTER TESTING OF BOILER OR SYSTEM.

Testing pressure should be at least 10 pounds but should not exceed 50 pounds.

EXAMINE BOILER CAREFULLY, INSIDE AND OUTSIDE, to insure against leaks through concealed breakage caused in shipping and handling.

After making certain that there are no leaks, remove plugs for boiler trim and other connections.

This precaution is for your protection and will simplify handling of necessary replacements and adjustment claims.

DRAIN TAPPING

Back of boiler is provided with drain tapping at lowest water space practicable, as per A.S.M.E. Heating Boiler Code. This tapping must be used to drain boiler entirely.

DO NOT PLACE DRAIN COCK IN RETURN PIPING LINE. Installer should provide suitable drain connection before assembling jacket to boiler.

EXTERNAL HEATER TAPPINGS

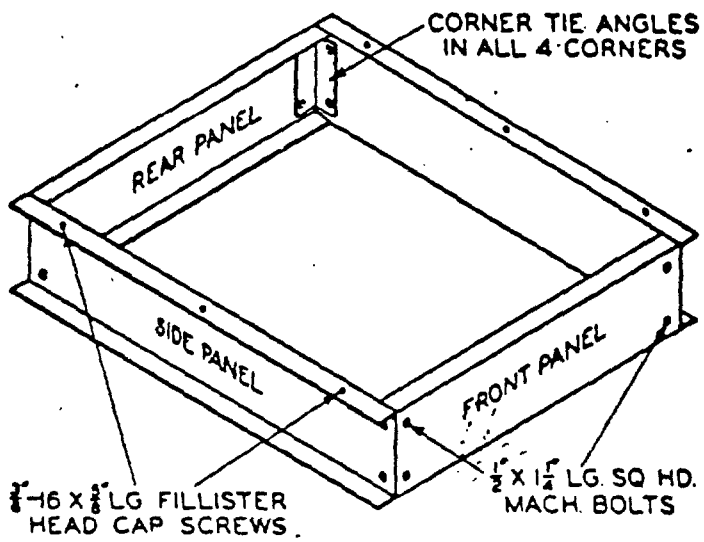
Boilers are provided with two 3" tappings on Back Section below water line for external water heater. Knockouts must be removed from rear jacket panel if these tappings are used.

CAUTION -- WATER BOILERS

The expansion tank should not be set in a cold or an exposed place. If the pipe leading to or from the tank freezes, serious damage may result. If valve of any description is installed in the piping leading to or from the expansion tank, BE SURE THAT IT IS OPEN WHILE THE BOILER IS IN OPERATION.

USE THIS BOOK

FOR REFERENCE WHEN ERECTING BOILER, ORDERING PARTS AND FOR OPERATION



3-REQ'D. PER SIDE PANEL FOR 8, 9 & 10 SECT.
4-REQ'D. PER SIDE PANEL FOR 11, 12, 13 & 14 SECT.

STEEL PEDESTAL BASE (Optional - Boiler must be pitted to depth of sub-base if sub-base is not used).

Sections must be assembled according to the arrangements listed below to insure proper operation of boiler and that jacket openings match with connecting sections.

CODE LETTERS

FX - Front Connecting
CX - Center Connecting
FC - Front Center
RC - Rear Center
C - Center
RCX - Rear Center Connecting
BX - Back Connecting

STEAM BOILER NUMBERS

OIL-FIRED	ARRANGEMENT OF SECTIONS FROM FRONT OF BOILER 1	2	3	4	5	6	7	8	9	10	11	12	13	14
~~FR-A-705-SO~~	~~FX~~	~~C~~	~~C~~	~~C~~	~~BX~~									
FR-A-706-SO	FX	C	CX	C	RC	BX								
FR-A-707-SO	FX	C	C	CX	C	RC	BX							
FR-A-708-SO	FX	FC	C	CX	C	RC	RC	BX						
FR-A-709-SO	FX	FC	CX	C	C	CX	RC	RC	BX					
FR-A-710-SO	FX	FC	CX	C	C	CX	C	RC	RC	BX				
FR-A-711-SO	FX	FC	FC	CX	C	C	CX	RC	RC	RC	BX			
FR-A-712-SO	FX	FC	FC	CX	C	C	CX	C	RC	RCX	RC	BX		
FR-A-713-SO	FX	FC	FC	CX	C	C	CX	C	C	RCX	RC	RC	BX	
FR-A-714-SO	FX	FC	FC	CX	C	C	CX	C	C	CX	RC	RC	RC	BX

WATER BOILER NUMBERS

OIL-FIRED	1	2	3	4	5	6	7	8	9	10	11	12	13	14
~~FR-A-705-WO~~	~~FX~~	~~C~~	~~C~~	~~C~~	~~BX~~									
FR-A-706-WO	FX	C	CX	C	RC	BX								
FR-A-707-WO	FX	C	C	CX	C	RC	BX							
FR-A-708-WO	FX	FC	C	CX	C	RC	RC	BX						
FR-A-709-WO	FX	FC	CX	C	C	CX	RC	RC	BX					
FR-A-710-WO	FX	FC	CX	C	C	CX	C	RC	RC	BX				
FR-A-711-WO	FX	FC	FC	CX	C	C	CX	RC	RC	RC	BX			
FR-A-712-WO	FX	FC	FC	CX	C	C	CX	C	RC	RCX	RC	BX		
FR-A-713-WO	FX	FC	FC	CX	C	C	CX	C	C	RCX	RC	RC	BX	
FR-A-714-WO	FX	FC	FC	CX	C	C	CX	C	C	CX	RC	RC	RC	BX

NOTE: - "X" in code designates 4" tapping.

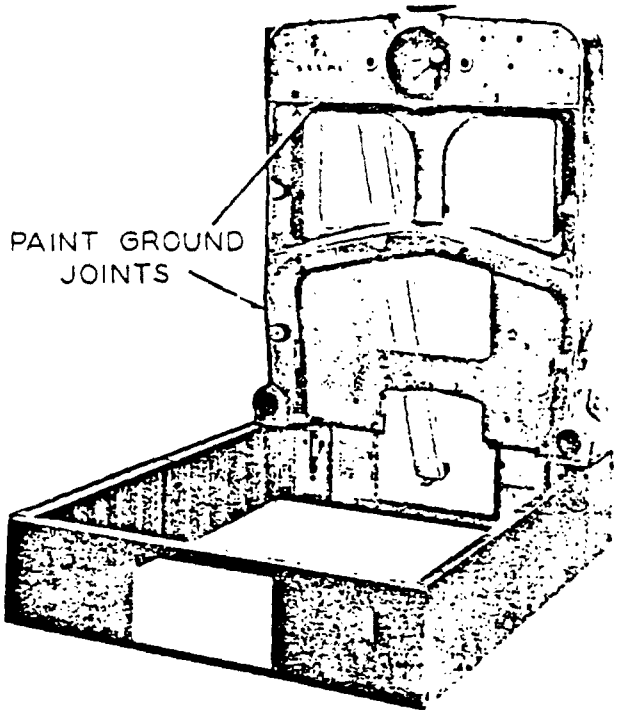


Fig. 1

1. IMPORTANT - In setting up the boiler, it is necessary that adequate clearance and combustion space be provided for proper functioning of the oil burner. Where necessary, boiler should be raised by bricking up base or pitting to provide required head room or clearance between boiler crownsheet and oil burner.

OPTIONAL STEEL PEDESTAL BASE - An 8" steel pedestal base is available for optional use in elevating oil boilers to obtain more clearance between the boiler crownsheet and oil burner. The steel base is used for 8-section and larger boilers.

When provided, the steel base must be assembled by the installer. Each of the two side channels have two or more 3/8" tapped holes in one flange only. THIS FLANGE MUST BE AT TOP when base is assembled. If not provided, the boiler must be pitted to the depth of the sub-base (8").

Bolt a corner angle piece to each end of the Front and Rear Channels between flanges. Angles must be flush at each end. Leave bolts slightly loose. Place the end channels between the side channels and bolt corners. Use 1/2" bolts and lock washers as provided for entire base assembly. See Page 2.

See that all corners are square and that sides and ends are in the same plane, then draw all nuts up uniformly tight. Assemble 3/8" Fillister Head Cap Screws provided, in all of the tapped holes in the top flange of the side channels. Level base in final position with regard to chimney before mounting cast iron base.

2. CAST IRON BASE - Bolt side base panels together (except for 5-section boiler) with 1/2" x 1-1/2" bolts provided. Tighten nuts only moderately. Six- through 10-section boilers have two-piece sides, 11- and 12-section boilers have three-piece sides.

Assemble the bolted side panels to the Front and Back base panels with the ribs inside. Use 1/2" x 1-1/2" bolts and tighten nuts only moderately. See that all corners are square and that bolted side panels are in proper alignment before tightening nuts on all bolts, then level base in final position with regard to chimney. See Fig. 1.

Cover plates are provided for unused openings in the base. Before starting assembly of sections, installer should attach large connecting arm opening cover plates to the front base panel and small cover plates with straps to the back base panel. Close the draft opening in the back base panel with sheet steel cover plate and four screws provided.

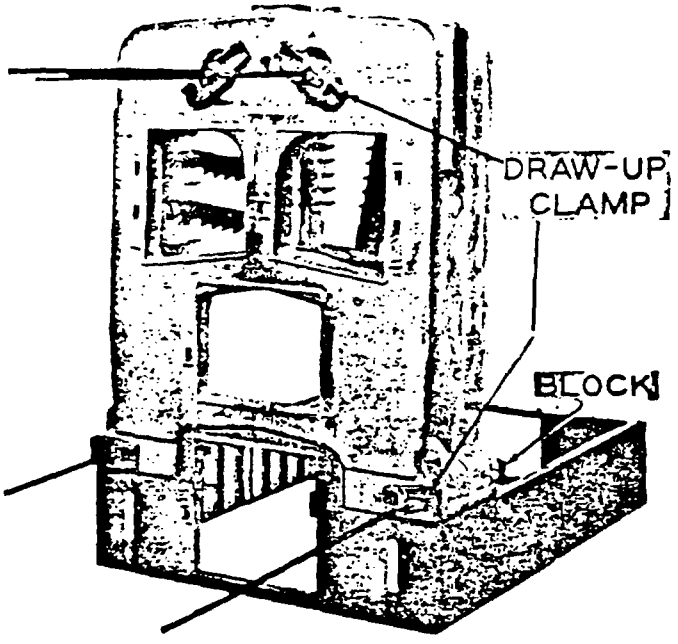


Fig. 2

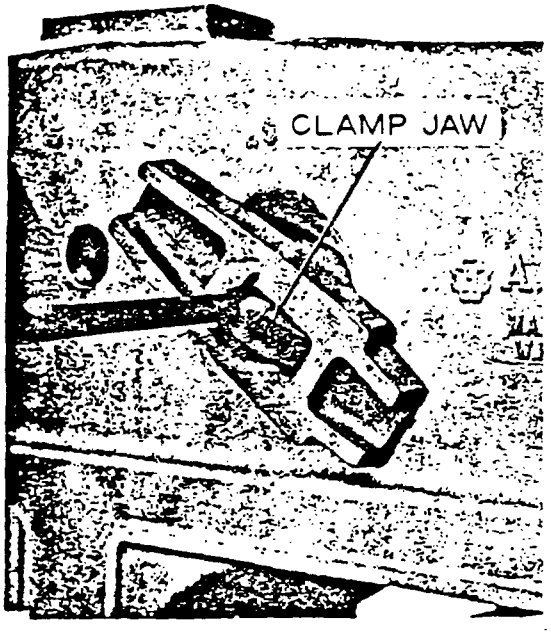


Fig. 3

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3. ASSEMBLY OF SECTIONS -- Center the front section on base and support with prop. Important! The two 3/8" tapped holes in the front section at either side of the clinker grate opening must be in line with the elongated holes in the front base panel. Clean nipples and nipple openings with Kerosene or gasoline and apply good lubricating oil. DO NOT USE PAINT OR RED LEAD. See Fig. 1.

Drive nipples squarely into approximate final position using block of wood and hammer or preferably an aluminum headed hammer if available. See Page 6 for instructions regarding nipples and use of nipple setting gauge.

Paint ground joints of each section with red lead before adding next section.

From arrangement of sections (see table on Page 3), select next section according to code letters on section. IMPORTANT - SECTIONS MUST BE ASSEMBLED IN PROPER ORDER AND FACED CORRECTLY. Word FRONT on FC section and word REAR on RC and RCX sections indicates how these sections are to be faced in relation to front of boiler. Sections marked C or CX are reversible in boiler.

Clean nipple openings and place sections on nipples in front section.

To facilitate assembly, it is advisable to enter the upper nipple first in its port, then enter the lower nipples in their respective ports.

Place nut and flat washer on one end of each of two tie rods and insert tie rods from the rear, one in each of the two holes on either side of the upper nipple port.

Place plain assembling block together with nut and washer on each of the two remaining rods and insert, from the rear, one through each of the lower nipple ports and tappings in the front section. See Fig. 2.

Place large draw-up clamp on each of the upper rods and small draw-up clamp on each of the lower rods. Insert loose jaws in clamps and tap lightly with hammer to insure tight grip on rods. Fig. 3 shows clamp and jaw in position for drawing up sections.

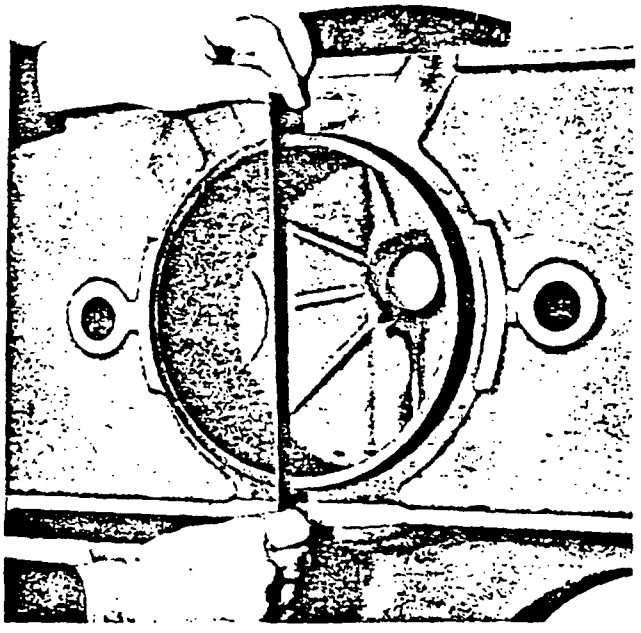

Fig. 4

4. Drive section in place with heavy block of wood, striking blows as squarely as possible over nipples. Draw-up evenly on all tie rod nuts starting with lower tie rods. Tighten nuts alternately until sections make contact at ground joints.

Continue assembling sections in their respective order. NEVER ASSEMBLE MORE THAN ONE SECTION AT A TIME.

NOTE: - AVOID DAMAGE TO THE TIE ROD THREADS WHEN ATTACHING DRAW-UP CLAMPS AND WHILE DRAWING UP SECTIONS. APPLY OIL OR GREASE FREELY TO TIE ROD THREADS WHILE ASSEMBLING SECTIONS TO PREVENT STRIPPING OF THREADS ON ROD.

Special nipple setting gauge is provided for larger nipple. Gauge nipple in both directions to insure that same is driven squarely and to proper depth into nipple opening. Cutout in gauge must rest on nipple, with legs of gauge touching finished face of section, when nipple is properly driven. See Fig. 4.

Use rule or suitable gauge for smaller nipples, to insure that same are properly driven and project equally all around. Nipples must project 1/16" more than half their length outside of finished face of section.

It is important that nipples be driven as directed, to insure tight joints. Most nipple leaks are caused by tilted or cocked nipples.

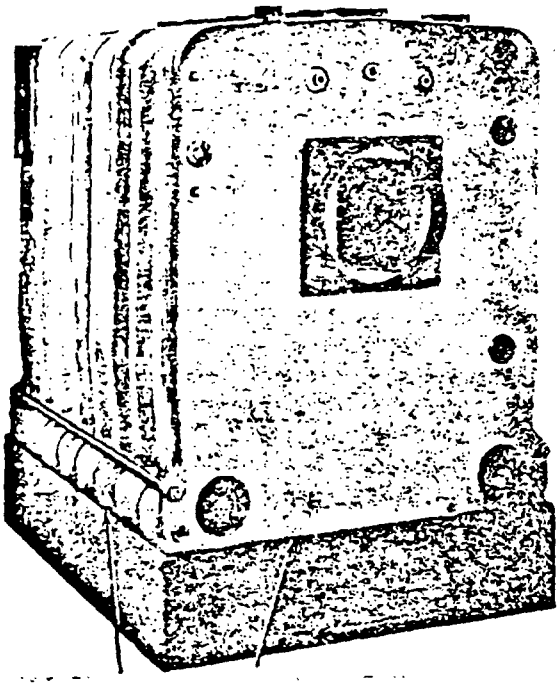

Fig. 5

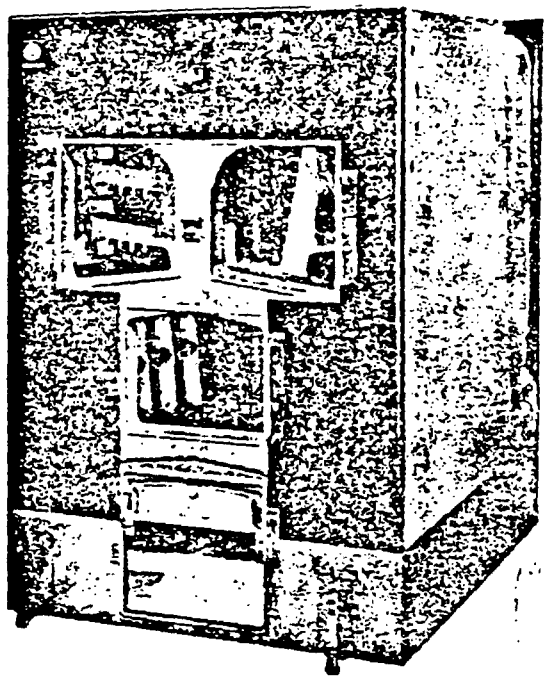

Fig. 6

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5. Remove upper and lower tie rods with draw-up clamps and assembling blocks. Place Back on base and engage nipples. Insert tie rod in each of the two upper cored holes and through the lugs on each side of the Front and Back sections.

Place regular steel nuts and flat washers on rods and draw nuts up evenly on all four rods until Back and next to Back sections are tight at ground joints.

6. AFTER SECTIONS ARE ASSEMBLED COMPLETE: Remove steel tie rod nuts at front of boiler and place sheet metal compression washers on rods with open (cupped) side against regular washer. See that upper rods do not project more than 1/4" beyond face of Front and that lower rods project equally at front and rear. Place safety nuts on front end of tie rods against compression washers. Lubricate nuts well and tighten with fingers only; failure to observe this may result in damage to boiler. See Page 1.

By use of pinch bar adjust the entire boiler assembly on its base as found necessary to enter two 3/8" x 1" hex. head cap screws with flat washers into the front section tappings through the two elongated holes in the front base panel.

See that the boiler assembly is against the front base panel and then draw both cap screws up tight.

7. Paint ground seat on face of back section with red lead and attach smoke collar with 3/8" hex. cap screws provided. See Fig. 5.

Attach flow and return piping lines and insert all bushings and plugs in sections. IMPORTANT - See instructions for testing boiler on Page 1.

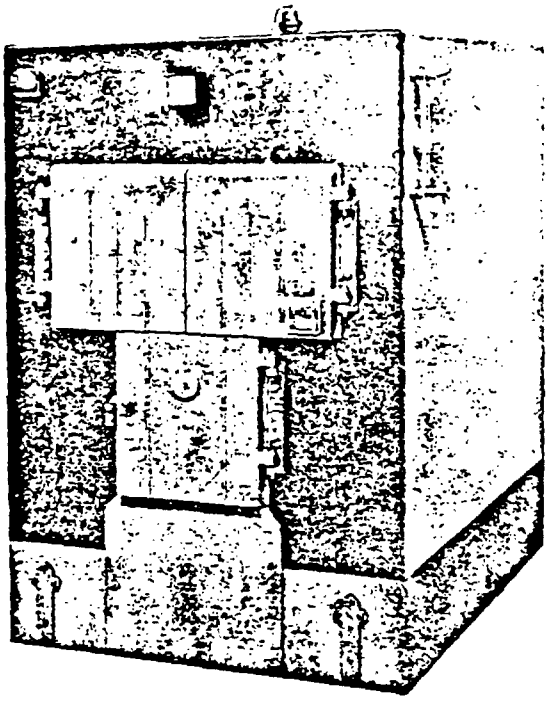


Fig. 7

8. Refractory crownsheet baffles are provided for the 5- through 7-section boilers. The baffles are assembled by entering the boiler through the door opening in the front section. Either baffle may be placed first as far back as possible, with the straight or bottom edge resting on lugs located at either side of the back and next to back sections. Rest the upper rear end on the cast-on lug located on the center face of the back section.

Place the remaining baffle on the side lugs as directed for the first baffle and raise the upper edge approximately to the crownsheet. Raise the upper edge of the first baffle and interlock the two upper edges as the baffles are lowered together.

Four upper and two bottom hot flue baffles are provided for 5- to 11-section oil boilers inclusive. The baffles with rectangular ends are used in the two upper and two intermediate outside flues on each side. The baffles with the angular shaped ends are used in lower outside flues. The hot flue baffles should be installed with ends at the joint line (high point) of the NEXT TO FRONT section for 5- to 10-section boilers inclusive, and with ends at the joint line (high point) of the second from front section for the 11-section boiler. Baffles should rest on the short projections cast on each end. See Page 14.

9. Putty outside of sections at joints with boiler putty also at joint between front section and front base panel. Grout between bottom of sections and base and between base and floor with a mixture of one part of Portland cement and three parts of asbestos cement.

10. ASSEMBLY OF JACKET - Attach left lower front panel and right lower front panel using 1/4-20" x 1/2" washer head jacket screws. Do not draw screws up tight.

11. Assemble four special hexagon jacket studs, as provided, in 3/8" tappings on face of back section. Remove knockouts as required for pipe connections and controls from both halves of the rear jacket panel.

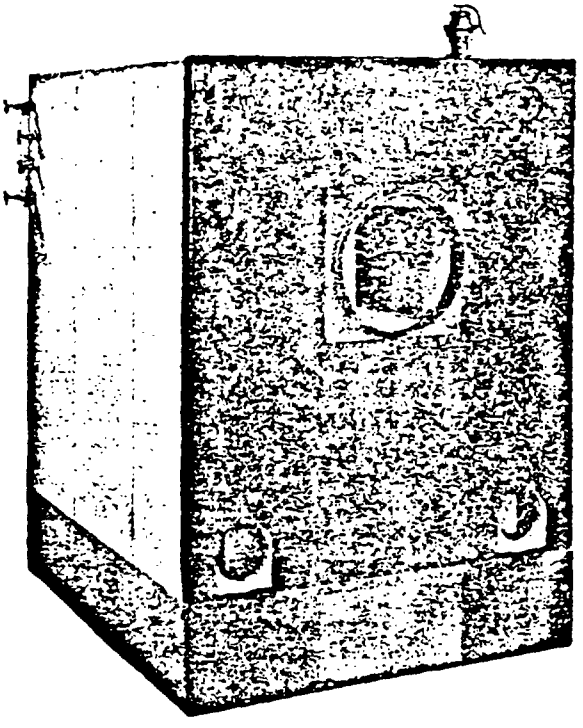


Fig. 8

Attach the right hand half (viewing from front) of the rear panel, then the left hand half to the jacket studs using 1/4-20" x 1/2" washer head screws. Insert jacket screws in all holes of the joint, at center.

12. JACKET SCREWS - Except as noted, jacket is assembled with #10 x 1" sheet metal screws throughout. Screws should be inserted in all holes of adjacent panels as assembly progresses. DO NOT DRAW SCREWS UP TIGHT UNTIL JACKET IS FULLY ASSEMBLED.

13. Place right front side panel in position with offset at bottom, back of the top edge of the base side. STEAM BOILERS ONLY - Remove knockout pieces for gauge glass and try cock fittings before assembly. See that front panel is outside of the projecting lug on corner of the front base panel, then attach side panel to front panel. See Fig. 6.

14. Assemble right hand intermediate panel (except for five-section boiler), then the right hand rear side panel.

15. Place the upper front panel in position and insert sheet metal screw in the remaining hole of the right front side panel. Assemble the left front side panel and remaining left side panels same as directed for the right hand side jacket panels.

16. Assemble the top jacket panels in the following order. Right hand front, right hand intermediate, except for 5-section boiler, then right hand rear. Assemble the left hand top panels in the same order using #10 x 1" sheet metal screws except for the center joint where #10 x 1/4" sheet metal screws are provided.

After jacket is completely assembled, all screws should be drawn up uniformly tight.

17. Attach door hinges and catches and make only moderately tight. Lug on back of hinge or catch must rest on lower inside edge of pocket. Doors should lift over catches easily and seat firmly against section when closed. Correct adjustment is obtained by tapping hinge plate (near top) on inner side in case door binds on catch. Catch for cleanout doors may be moved up slightly, if required, to facilitate fitting.

If door does not engage catch properly, tap outer side of hinge plate near top. Tighten bolts after adjustments are completed.

18. STEAM BOILERS - Install pressure and vacuum gauge, water column trim, automatic regulator and safety valve. In case of territory where one 3" or two smaller safety valves are provided, it will be necessary to remove the knockout from the rear jacket panel opposite the uppermost 3" tapping on the back for safety valve installation. No. 269 Low Water Cutoff is available for optional use on steam boilers.

Fig. 7 shows oil-fired, steam boiler assembled complete.

Fig. 8 shows rear view of automatically fired steam boiler assembled complete.

19. WATER BOILERS - Install combination altitude gauge and thermometer. Install relief valve, see Table on Page 16 for location.

FILLING SYSTEM

CAUTION: Never start boiler unless it is properly filled. Steam boilers should be filled until water is visible approximately half way up in the water gauge glass. After boiler is in operation, make-up water should be added slowly.

Fill open hot water system 1/3 height of expansion tank. Remove rim and glass from the Altitude and Temperature gauge and set movable pointer under the automatic pointer, then replace rim and glass.

When filling a closed hot water system, the pressure must not exceed 50 pounds. If it does, it must be relieved immediately and the relief valve failure investigated and corrected, otherwise pressure may build up and cause damage to heating system.

ATTENTION TO BOILER WHILE IN OPERATION

Keep water in steam boiler approximately half way up in the water gauge glass.

Keep open water system filled to 1/3 of expansion tank as indicated by the moving hand being even with the stationary hand on the Altitude gauge. PRESSURE MUST NOT EXCEED 50 POUNDS ON ANY SYSTEM. IF IT DOES, IT MUST BE RELIEVED IMMEDIATELY AND THE CAUSE OF FAILURE INVESTIGATED AND CORRECTED, OTHERWISE PRESSURE MAY BUILD UP AND CAUSE DAMAGE TO HEATING SYSTEM.

Clean boiler surfaces at regular intervals. Keep radiators and convectors clean.

Do not draw water from boiler while in use. When adding water while boiler is in operation, do not open supply valve fully but add water slowly.

On Steam Boilers - at the start of each heating season and once or twice during season try SAFETY VALVE to be sure it is in working condition. To do this fasten wire or cord to lever of valve and pull lever - standing a safe distance away from valve.

If a hot water radiator is hot at the bottom but not at the top, it indicates that air has accumulated inside and should be vented. To vent radiator: Hold small cup under air vent (located near top of radiator), open vent until water escapes and then close.

If much water is added to system, it is advisable to heat system to a high temperature and vent again. This will make less venting necessary during the winter.

Where an expansion tank is used, make sure that neither the tank nor its drain pipe is exposed to freezing temperatures. If valve of any description is installed in the piping leading to or from the expansion tank, BE SURE THAT IT IS OPEN WHILE THE BOILER IS IN OPERATION.

ATTENTION TO BOILER WHILE NOT IN OPERATION

At end of heating season clean boiler surfaces thoroughly. Spray flue and firebox surfaces with light lubricating or crankcase oil using gun with extended stem so as to reach all corners.

Leave boiler doors open to permit air circulation through boiler. Clean and remove smokepipe where feasible and oil door hinges.

With steam boilers, at end of season add sufficient water to fill boiler to top of water column and leave it that way until fall, when water should be drained again to proper level. If at this time boiler water is dirty, drain water, flush out boiler, and refill with clean water to prescribed water level.

On water boilers keep system filled with water. In other words, leave water alone. It is advisable in fall to drain a little water to remove sludge, but not more than necessary.

IF BOILER IS NOT USED DURING WINTER TIME IT MUST BE FULLY DRAINED (See Page 1).

COMBINATION ALTITUDE AND TEMPERATURE GAUGE FOR WATER BOILERS

IMPORTANT - To avoid damage to gauge or possible impairment of its accuracy, DO NOT INSTALL UNTIL BOILER OR SYSTEM HAS BEEN WATER TESTED FOR TIGHTNESS.

Combination Gauge is used with water boilers and is connected into tapping at front of boiler. Gauge serves to indicate the following:

1. Temperature of water at the boiler.

2. Height of water level in feet above the gauge for OPEN SYSTEMS where expansion tank is used.

3. Water pressure in pounds per square inch for CLOSED SYSTEMS where pressure is controlled by means of automatic relief or regulating valves WITH or WITHOUT use of air tight pressure or cushion tank.

   IN CASE OF OPEN SYSTEM, where expansion tank is used, it will be necessary to fill system with water up to 1/3 of the expansion tank as directed under "FILLING SYSTEM." The rim and glass in gauge should then be removed after loosening two screws or other means of holding rim in place.

   It will be found that the automatic pointer on the ALTITUDE SCALE, which indicates HEIGHT IN FEET and PRESSURE IN POUNDS has moved up and indicates height of water level above the boiler in the expansion tank. The adjustable pointer (generally finished in color) should then be moved by hand UNTIL DIRECTLY UNDER AUTOMATIC POINTER.

   Any loss of water within the system will be indicated by the AUTOMATIC POINTER receding to a smaller figure on the Altitude Scale at which time the water supply should be opened until the Automatic Pointer is again directly over the Adjustable Pointer.

   After setting Adjustable Pointer, replace rim and glass and tighten screws.

CLEANING BOILERS

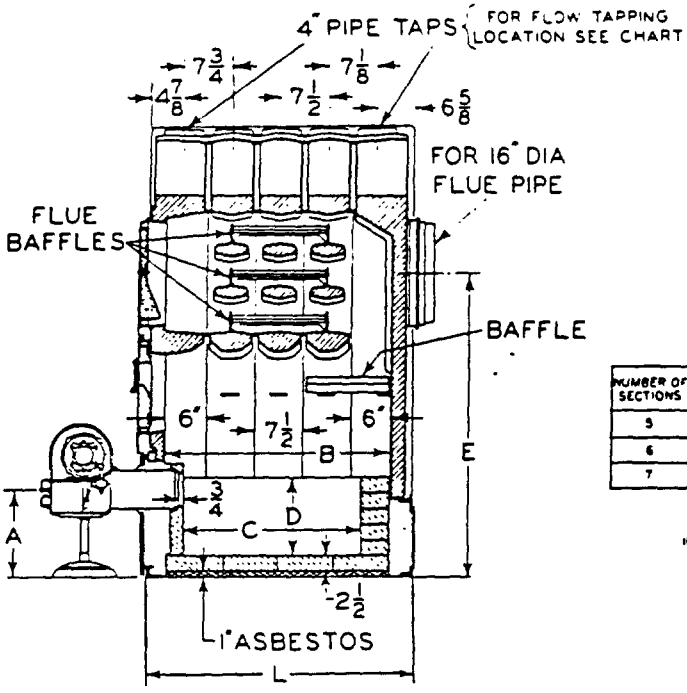
The grease used to lubricate the cutting tools during erection of new piping systems serves as a carrier for sand and dirt, with the result that a scum of fine particles and grease accumulates on the surface of the water in all new boilers, while heaver particles may settle to the bottom of the boiler and form sludge. These impurities tend to cause foaming, preventing the generation of steam and causing an unsteady water line.

This unavoidable accumulation of oil and grease should be removed by blowing-off the boiler as follows: If not already provided, install a surface blow connection of at least 1-1/4" nominal pipe size with outlet extended to within 18" of the floor or to sewer, inserting a valve in line close to boiler. Bring the water line to center of outlet, raise steam pressure, and while fire is burning briskly, open valve in blow-off line. When pressure recedes, close valve and repeat process adding water at intervals to maintain proper level. As a final operation, bring the pressure in the boiler to about 10 pounds, close blow-off, stop the burner, and open drain valve. After boiler has cooled, partly fill and flush out several times before filling it to proper water level for normal service. The use of soda or any alkali, vinegar or any acid is not recommended for cleaning heating boilers because of the difficulty of complete removal and the possibility of subsequent injury after the cleaning process has been completed.

Keep system in good repair. It is advisable to have it inspected by your heating contractor at least once a year.

GIVE BOILER SIZE and SERIES NUMBER WHEN

ORDERING REPAIR PARTS



SECTION THRU OIL FIRED BOILER BURNER UNIT

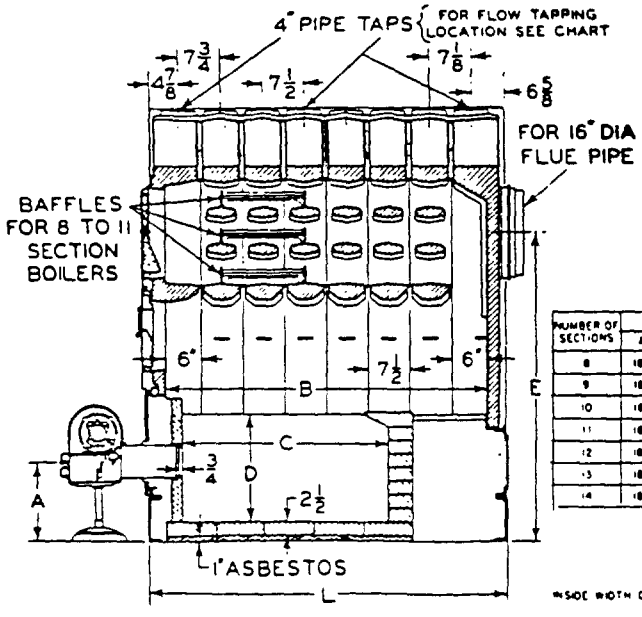
NUMBER OF SECTIONS	DIMENSIONS						NUMBER OF 4" FLOW TAPPINGS	NUMBER OF 6" RETURN TAPPINGS
	A	B	C	D	E	L		
5	14	34 3/8	27 1/2	12 1/2	47 3/8	42 1/2	2	2
6	14	42 1/2	35	12 1/2	47 3/8	50	3	2
7	14	49 3/8	42 1/2	12 1/2	47 3/8	57 1/2	3	2

INSIDE WIDTH OF COMBUSTION CHAMBER 28"

CODE LETTERS

FX—FRONT SECTION
FC—FRONT CENTER SECTION
C—CENTER SECTION
CX—CENTER CONNECTING SECTION
RC—REAR CENTER UPTAKE SECTION
RCX—REAR CENTER CONNECTING SECTION
BX—BACK SECTION
"X"—IN CODE DESIGNATES 4" TAPPING

NUMBER OF SECTIONS	ARRANGEMENT OF SECTIONS													
5	FX	C	C	C	BX									
6	FX	C	CX	C	RC	BX								
7	FX	C	C	CX	C	RC	BX							
8	FX	FC	C	CX	C	RC	RC	BX						
9	FX	FC	CX	C	C	CX	RC	RC	BX					
10	FX	FC	CX	C	C	CX	C	RC	RC	BX				
11	FX	FC	FC	CX	C	C	CX	RC	RC	RC	BX			
12	FX	FC	FC	CX	C	C	CX	C	RC	RCX	RC	BX		
13	FX	FC	FC	CX	C	C	CX	C	C	RCX	RC	RC	BX	
14	FX	FC	FC	CX	C	C	CX	C	C	CX	RC	RC	RC	BX

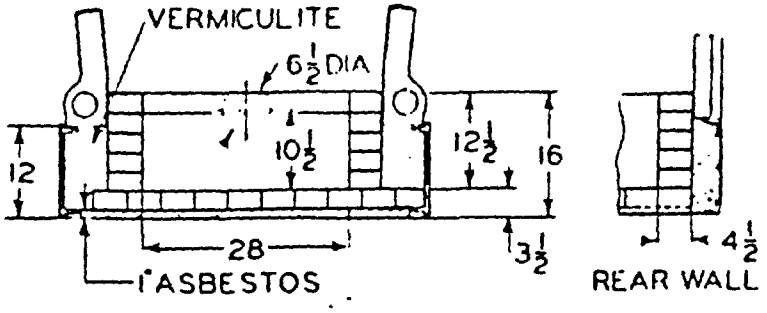


NUMBER OF SECTIONS	DIMENSIONS						NUMBER OF 4" FLOW TAPPINGS	NUMBER OF 6" RETURN TAPPINGS
	A	B	C	D	E	L		
8	18	57 3/8	38	19 1/2	55 3/8	65	3	2
9	18	64 3/8	41	19 1/2	55 3/8	72 1/2	4	2
10	18	72 1/2	44	19 1/2	55 3/8	80	4	2
11	18	79 3/8	47	19 1/2	55 3/8	87 1/2	4	2
12	18	87 1/2	50	19 1/2	55 3/8	95	5	2
13	18	94 3/8	53	19 1/2	55 3/8	102 1/2	5	2
14	18	102 1/2	56	19 1/2	55 3/8	110	5	2

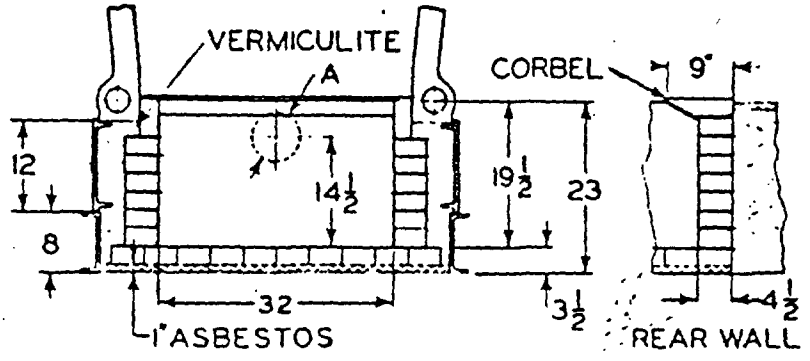
INSIDE WIDTH OF COMBUSTION CHAMBER 32"

SECTION THRU OIL FIRED BOILER BURNER UNIT

00282

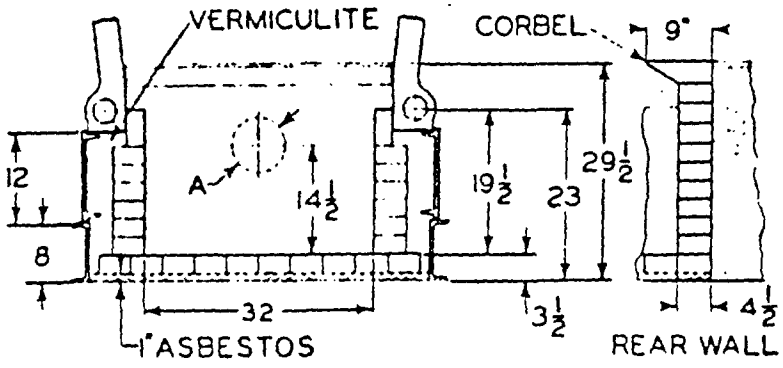


REFRACTORY COMBUSTION CHAMBER
FOR 5, 6, & 7, SECTIONS



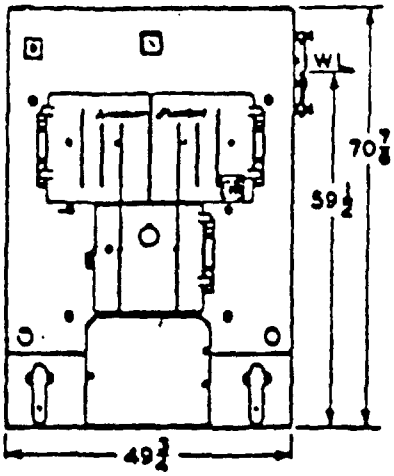
NO OF SECTIONS	8	9	10
DIMENSION "A" (HOLE IN FRONT BRICK)	6½	7⅛	7⅜

REFRACTORY COMBUSTION CHAMBER
FOR 8, 9, & 10, SECTIONS

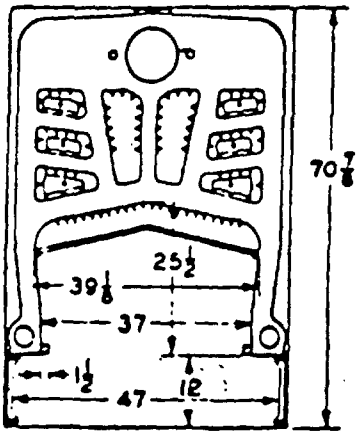


NO OF SECTIONS	11	12	13	14
DIMENSION "A" (HOLE IN FRONT BRICK)	7⅜	7⅜	7⅜	6⅜

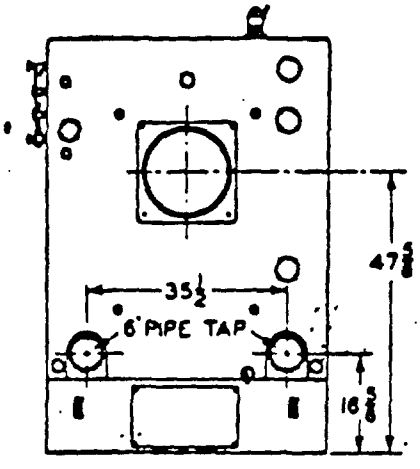
REFRACTORY COMBUSTION CHAMBER
FOR 11, 12, 13, & 14, SECTIONS



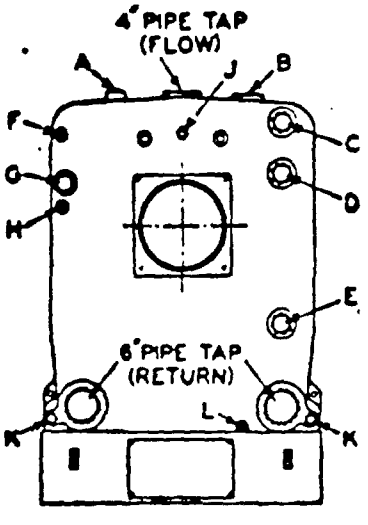
FRONT VIEW-OIL FIRED



CENTER SECTION - OIL FIRED
SHOWING BAFFLES



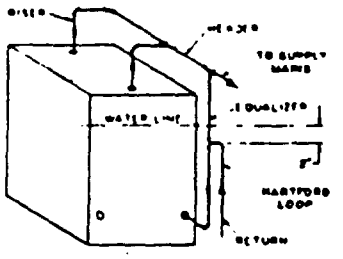
BACK VIEW - OIL FIRED



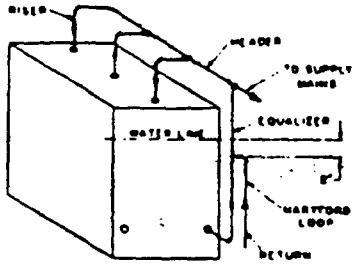
BACK VIEW - SHOWING
CONTROL TAPPINGS

APPLICATION OF CONTROLS FOR AUTOMATICALLY FIRED BOILERS			
LOCATION ON BOILER	SIZE OF PIPE TAP	STEAM BOILERS	WATER BOILERS
A	1"	DAMPER REG HAND FIRED BOILER	NOT USED
B	2½"	POP SAFETY VALVE	RELIEF VALVE
C	3"	BLOW OFF OR POP SAFETY VALVE	WATER HEATER EXTERNAL TYPE
D	3"	WATER HEATER EXTERNAL TYPE	WATER HEATER EXTERNAL TYPE
E	3"	WATER HEATER EXTERNAL TYPE	WATER HEATER EXTERNAL TYPE
F	½"	STEAM PRESSURE LIMIT CONTROL	WATER TEMPERATURE LIMIT CONTROL
G	2½"	LOW WATER CUT OFF	NOT USED
H	¾"	WATER TEMP CONTROL DOMESTIC HOT WATER	WATER TEMP CONTROL DOMESTIC HOT WATER
J	1½"	INSPECTION OR BLOW OFF TAPPING	INSPECTION OR BLOW OFF TAPPING
K	1½"	INSPECTION OR WASH OUT TAPPING	INSPECTION OR WASH OUT TAPPING
L	1"	DRAIN TAPPING	DRAIN TAPPING

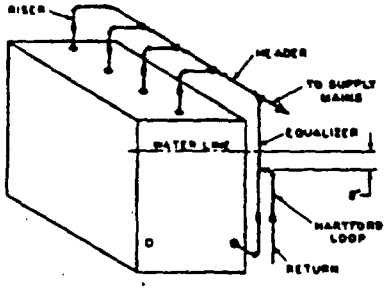
MINIMUM PIPING RECOMMENDATIONS FOR AUTOMATICALLY FIRED STEAM BOILERS



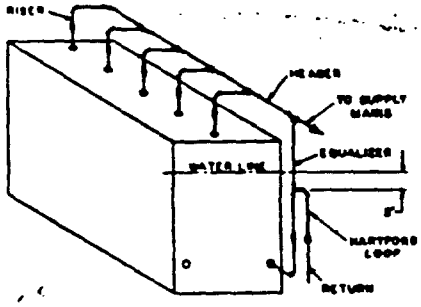
BOILER	BOILER RISERS	HEADER	EQUALIZER	RETURN
FR-A-705	4"	5"	2½"	2½"



BOILER	BOILER RISERS	HEADER	EQUALIZER	RETURN
FR-A-706	4"	5"	2½"	2½"
FR-A-707	4"	5"	2½"	2½"
FR-A-708	4"	6"	2½"	2½"

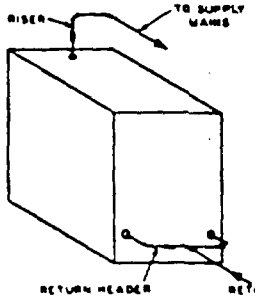


BOILER	BOILER RISERS	HEADER	EQUALIZER	RETURN
FR-A-709	4"	6"	2½"	2½"
FR-A-710	4"	6"	4"	2½"
FR-A-711	4"	6"	4"	2½"

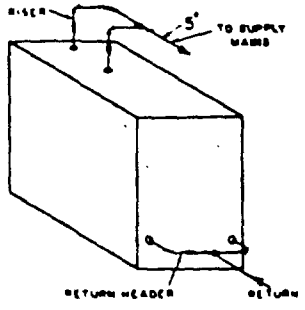


BOILER	BOILER RISERS	HEADER	EQUALIZER	RETURN
FR-A-712	4"	8"	4"	3"
FR-A-713	4"	8"	4"	3"
FR-A-714	4"	8"	4"	3"

MINIMUM PIPING RECOMMENDATIONS FOR AUTOMATICALLY FIRED WATER BOILERS WITH FORCED CIRCULATION



BOILER	BOILER RISER	RETURN	RETURN HEADER
FR-A-705	4"	4"	4"
FR-A-706	4"	4"	4"
FR-A-707	4"	4"	4"
FR-A-708	4"	4"	4"
FR-A-709	4"	4"	4"



BOILER	BOILER RISERS	RETURN	RETURN HEADER
FR-A-710	4"	5"	4"
FR-A-711	4"	5"	4"
FR-A-712	4"	5"	4"
FR-A-713	4"	5"	4"
FR-A-714	4"	5"	4"