AB KNOCK-DOWN STEAM BOILER

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ASSEMBLY INSTRUCTIONS FOR BRYAN 'KNOCKDOWN' BOILER AB – SERIES BOLT TOGETHER STEAM BOILERS

KD-1

Indicates the boiler is shipped completely assembled but constructed to be knocked down as necessary. Boiler not welded to base, to reassemble on job site. Care should be taken to observe disassembly procedure, since reassembly is exact reverse procedure.

Consult instructions for reassembly.

KD-2

Indicates the boiler partially disassembled after inspection, with controls, jacket and flue collector removed. The vessel has tubes installed, with the base and gas burners (atmospheric) installed. Each is crated separately and shipped for job site reassembly. (Boiler not welded to base.)

Consult instructions for reassembly.

KD-3

Indicates the boiler completely disassembled after inspection, with jacket and flue collector removed. The vessel has tubes removed. The base has gas burners (atmospheric) installed. Each is crated separately and shipped for job site reassembly. (Boiler not welded to base.)

Consult instructions for reassembly.

FOR REFERENCED ITEM # INDENTIFICATION, SEE
DISASSEMBLED VIEW INCLUDED WITH THESE INSTRUCTIONS

AB-BT Series, Forced Draft, Steam Boilers Form 2347

Refer to Section 8 for recommended tools needed to complete assembly

BOILER FOUNDATION

Before uncrating, the boiler location should be prepared. The boiler should be set upon a good, level concrete floor. If the floor is not level or in good condition, a concrete foundation should be built, the dimensions to be slightly larger than the outside dimensions of the boiler.
IMPORTANT: If the boiler is installed directly on a concrete floor where it is important that the floor be kept particularly cool, such as an upper floor or mezzanine, set the boiler up on insulating tile or steel framework, so air can circulate underneath.

CAUTION	DO NOT INSTALL BOILER ON COMBUSTIBLE FLOORING. DO NOT INSTALL BOILER ON CARPETING.

CAUTION	DO NOT RUN WIRING IN CONCRETE FLOOR UNDERNEATH BOILER.

NOTICE BEFORE BOILER IS SET IN PLACE CONSULT INSTALLATION, OPERATION & MAINTENANCE MANUAL FOR PROPER CLEARANCES.

1.0 BOILER FRAME & TUBE INSTALLATION

1.1 Set boiler base assembly (Figure #1) in place on cement pad. Make sure that the base is properly positioned on the pad to assure the correct orientation of the Pressure Vessel assembly.

NOTE: Boiler foundation information on page 1.

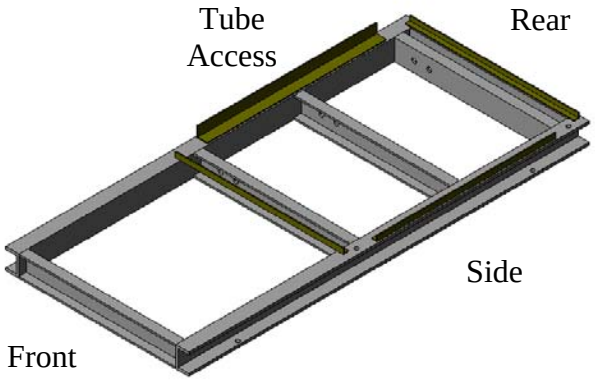


Figure 1

1.2 Position Pressure Vessel assembly onto the boiler base assembly. Steel brackets are welded onto Pressure Vessel to assist alignment of mating parts. When bolt alignment is complete, bolt the Pressure Vessel to base assembly. Do not tighten. See Figure 2.

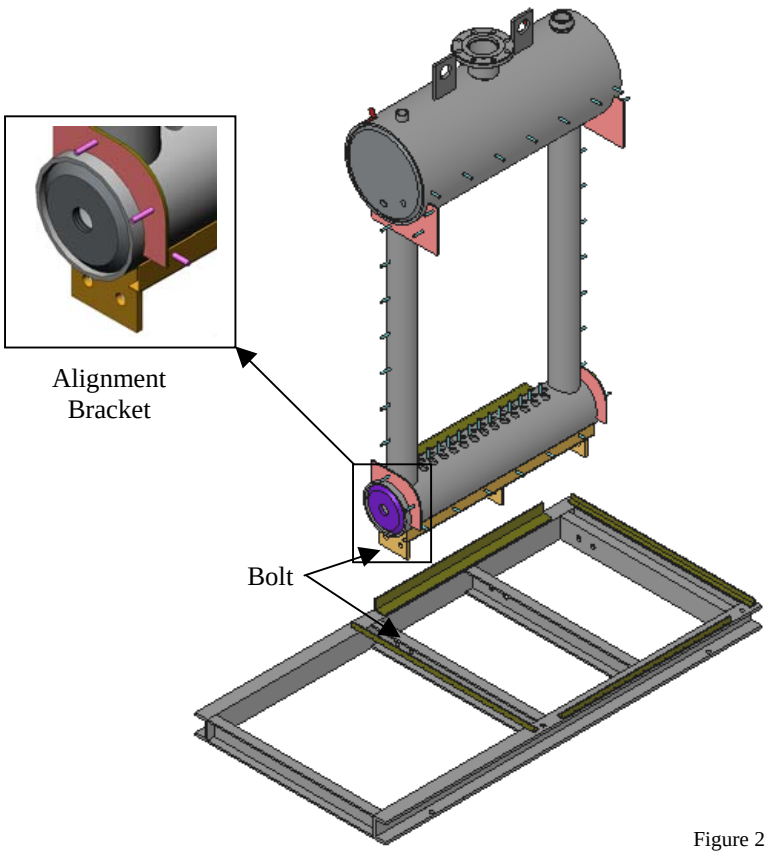


Figure 2

1.3 Shipping braces shipped loose for KD-1, used only if needed. See Figure 3.

1.4 Next place a 24" long level across the top of the boiler outlet nozzle and make sure it is level on both 'X' and 'Y' axis. Tighten bolts from paragraph 1.2 after leveling is complete. The shipping braces are for shipping purposes only. Please remove after Pressure Vessel is positioned. See Figure 3.

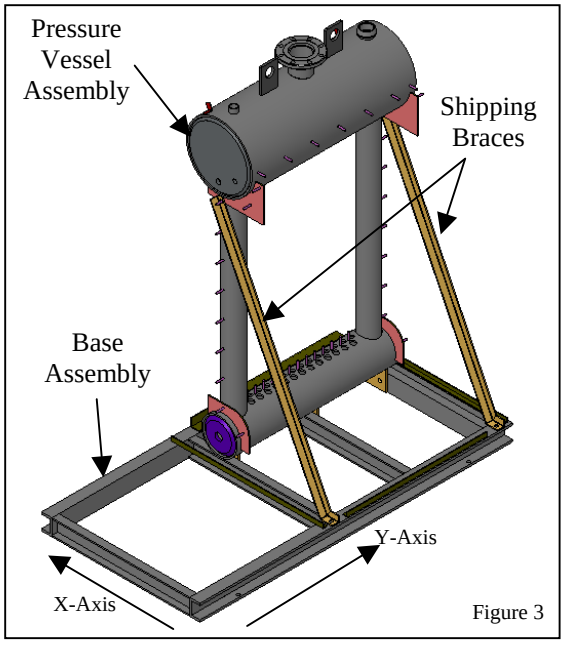


Figure 3

1.5 Bolt Base Pan onto Pressure Vessel assembly. Make sure Base Pan is setting level on Base assembly.

NOTE: If boiler tubes are already installed, go to paragraph 2.0.

1.6 BOILER TUBE INSTALLATION - Applies only to KD-3 Construction – (See attached instruction #34-3 tube replacement). Note: Tube holes must be lubricated before tubes are installed. It is recommended that a 50-50 mixture of pipe dope and machine oil be mixed together and applied with a small paintbrush to each hole.

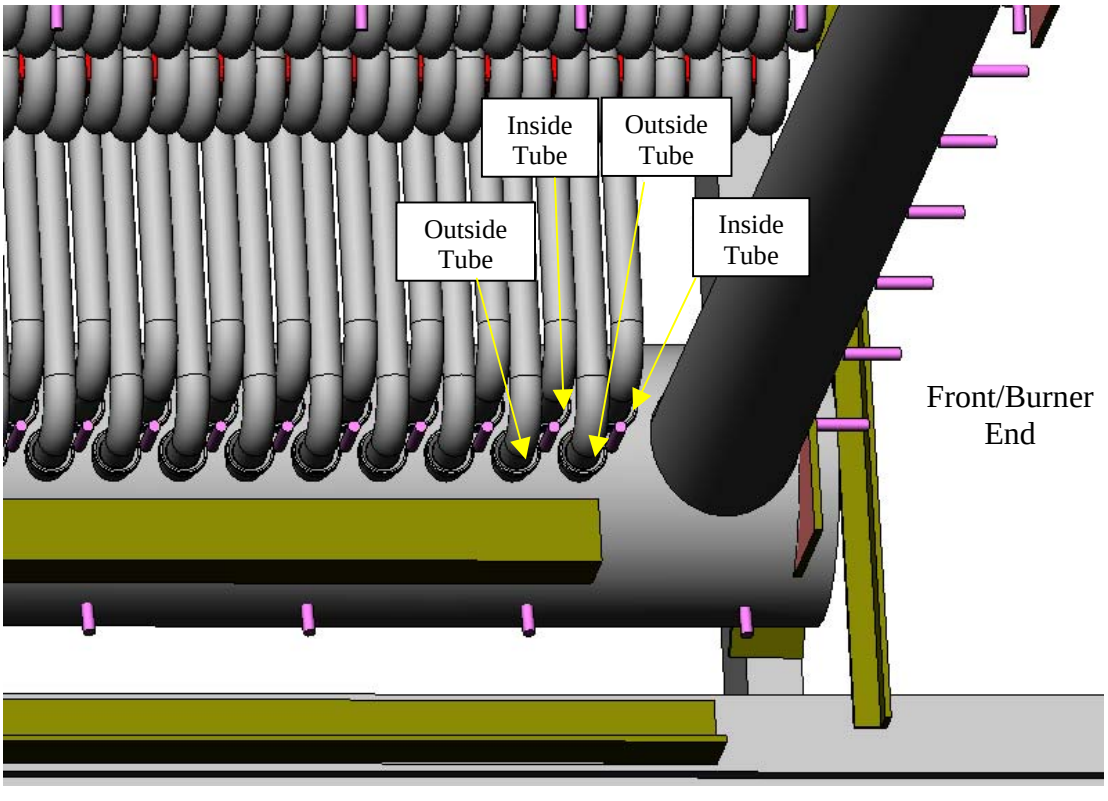


Figure 4

1.7 (KD3 only) Next, install an inside tube (long neck down). Then install an outside boiler tube (short neck down.) Repeat this process until all boiler tubes are installed. See Figure 4.

1.8 (KD-3 only) Square up the tube bank in order to assemble flue collector ends without difficulty.

1.9 (KD-3 only) Using a 2lb. Hammer and tube driver tool, drive each tube into Pressure Vessel assembly. After all tubes have been driven, install tube clamps and nuts as required.

1.10 (KD-3 only) NOTE: Your state boiler inspector may require inspection of the boiler tubes under a hydrostatic test pressure of 1.5 times the maximum working pressure of the boiler (or 60 psig for boilers of 40 psig or less maximum working pressure.) If this inspection is required, it should be done now.

CAUTION	DO NOT DRIVE THE TAPERED TUBE FITTING EXCESSIVELY DEEP. THIS IS NOT REQUIRED TO ACHIEVE A GOOD SEAL.

CAUTION	THE HYDROSTATIC TEST PRESSURE MUST NOT EXCEED THE PRESSURE RATING OF THE TRIM AND CONTROLS ON THE BOILER. CHECK THESE RATINGS CAREFULLY.

2.0 INSULATION & TUBE BAFFLE INSTALLATION

2.1 Cut 2” monoblock insulation to tightly fit inside Base Pan. The Base Pan will need one layer of monoblock insulation (bottom) and one layer of white blanket insulwool insulation with the intention of filling the Base Pan cavity.

2.2 After monoblock and insulwool is placed inside Base Pan, cut 1” white blanket insulwool insulation to fit over the Base Pan and wrap over the stud sides. See Figure 5.
Note: Flue collector will hold white blanket in place.

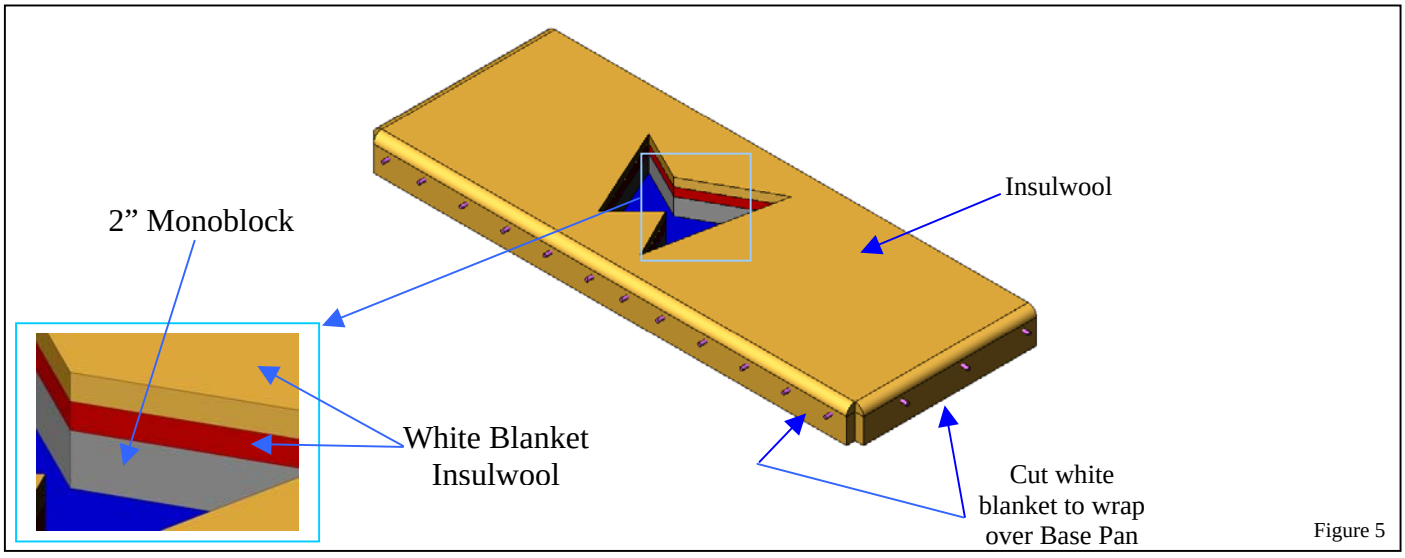


Figure 5

2.3 Cut 1” Insulwool white blanket to tightly fit around down comers. Fold insulation to overlap a small amount around down comer. Construct insulation to come together inside combustion chamber toward front end therefore flue Collector front will hold insulation in position when bolted into place. Use tape to hold white blanket stationary until Flue Front is in position. See Fig 6 & 7.

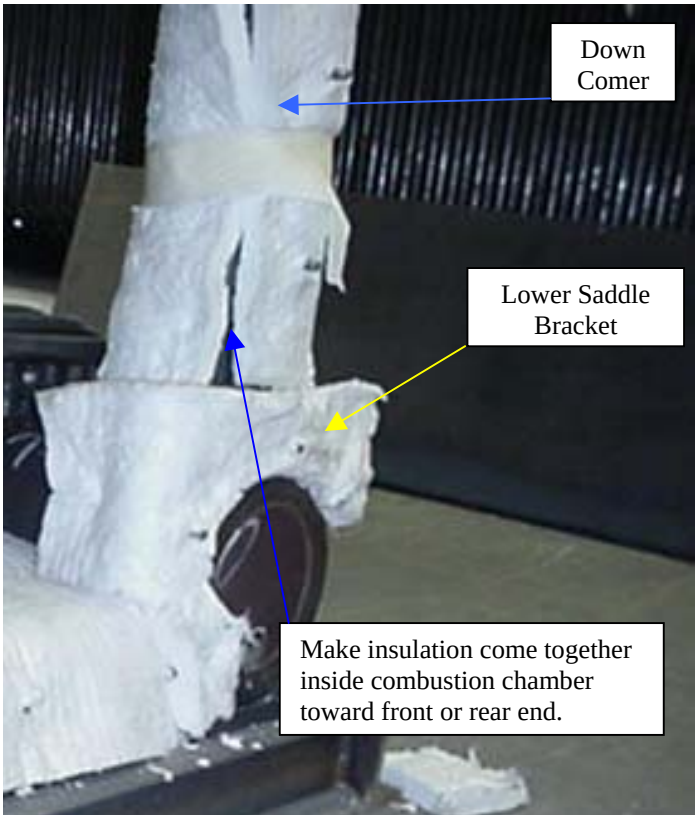


Figure 6

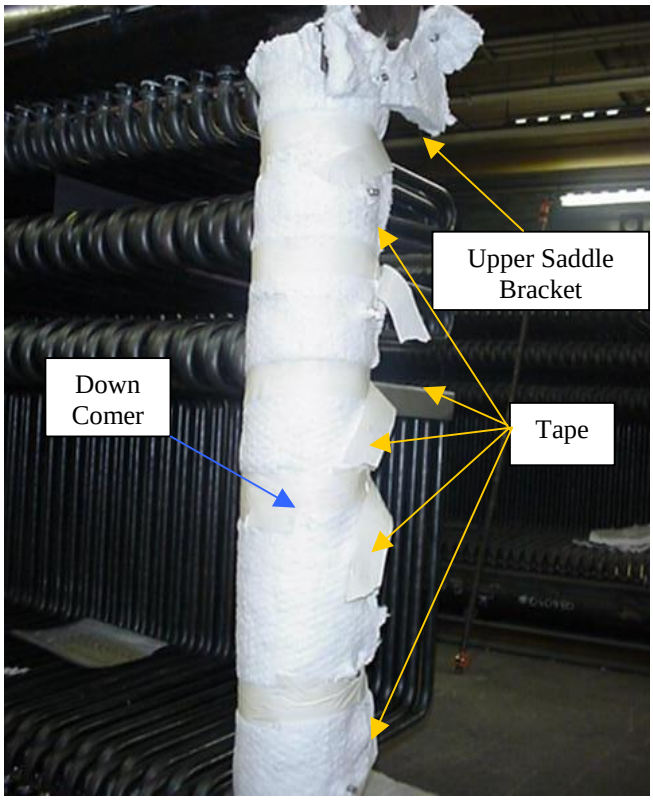


Figure 7

2.4 Cut 1” Insulwool white blanket to closely fit around upper and lower drum saddle bracket. See Figures 6 & 7. Push studs through insulation in order to hold insulation in place.

2.5 Place the upper tube baffle in position on top of the tubes at the rear end (opposite the burner end) of the boiler. The flange on the upper baffle must be hooked over the endmost tube. See Figure 8.

2.6 Place the lower tube baffle in position on the last pass of tubes at the front end (burner end) of the boiler. The flange on the lower baffle must be hooded over the front tube. See Figure 8.

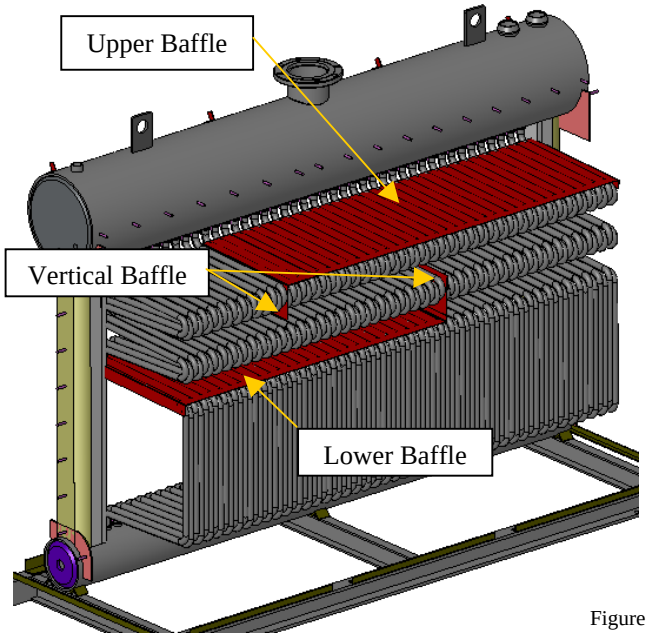


Figure 8

2.7 See Figure 8 & 9 for vertical baffle location. Figure 9 also displays all AB Series baffle placement. The arrows indicate the path of flue gas through the boiler.

BAFFLE LOCATION

BOILER MODEL	BAFFLE #3 BETWEEN TUBES	BAFFLE #4 BETWEEN TUBES
AB 90	15 & 16	7 & 8
AB 120	21 & 22	9 & 10
AB 150	26 & 27	12 & 13
AB 200	37 & 38	17 & 18
AB 250	45 & 46	19 & 20
AB 300	53 & 54	21 & 22

1 - FORCED DRAFT BURNER
2 - LOWER BAFFLE
3 - VERTICAL BAFFLE
4 - UPPER BAFFLE
5 - INSULATION
6 - COMBUSTION CHAMBER FLOOR
7 - FLUE COLLECTOR
8 - STACK
9 - COMBUSTION CHAMBER
10 - 6 PASS TUBES
11 - PEEPSITE

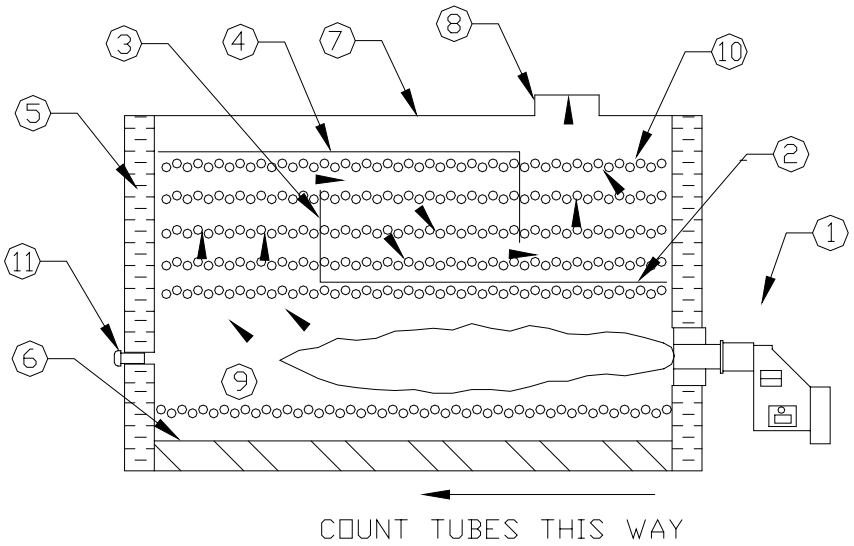


Figure 9

3.0 BOILER FLUE COLLECTOR INSTALLATION

3.1 Arrange Flue Collector Front end onto Pressure Vessel and Base Pan Assembly. See figure 10. **Do not** tighten nuts until the whole flue collector is assembled with all nuts and bolts in place.

3.2 Install Flue Collector Rear end onto Pressure Vessel and Base Pan Assembly. See figure 10. **Do not** tighten nuts until the whole flue collector is assembled with all nuts and bolts in place.

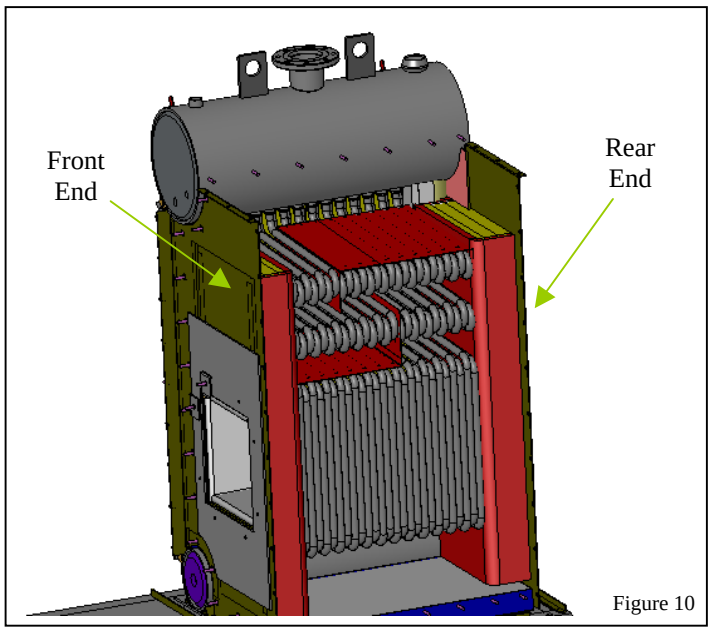


Figure 10

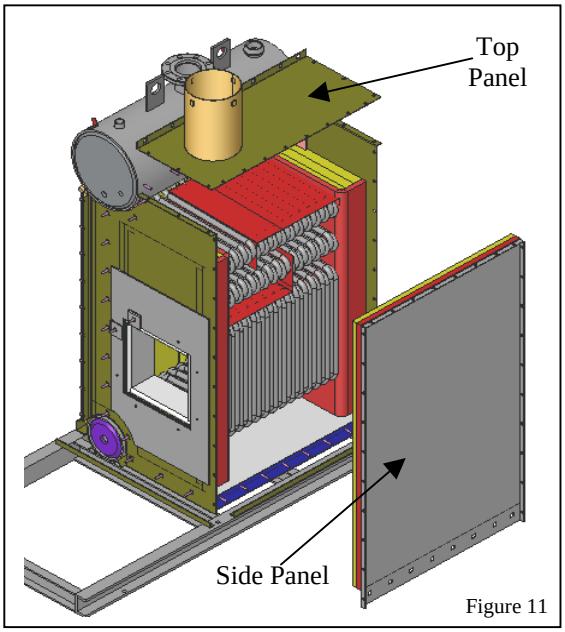


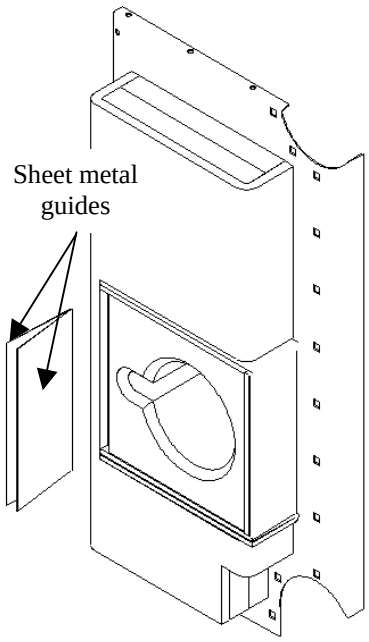
Figure 11

3.3 Install flue collector side panel/panels starting with the panel closest to front end. Place all nuts and bolts in place but **do not** tighten.

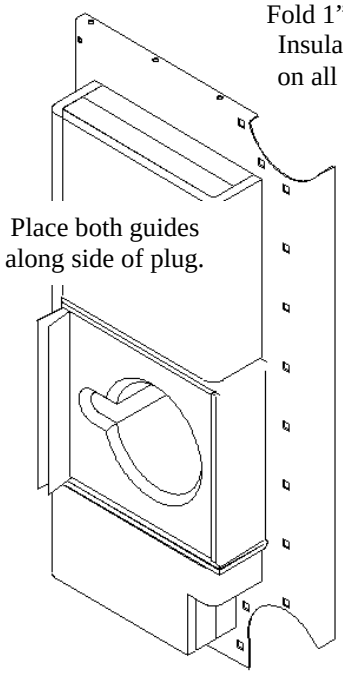
3.4 After front end, rear end, and side panel/panels are positioned, situate top panel in order for boltholes to line up. See figure 11. Install all nuts and bolts. After every nut and bolt is set, tighten all nuts and bolts. Note: Flue collector should be square with the Pressure Vessel.

3.5 Wrap Burner Plug flange with rope gasket. Place burner plug into Front End opening with the pressure tapping orientated to the top left corner. Figure 12 displays a Gordon Piatt burner plug. **The burner plug MUST be properly packed with white blanket insulation or the manufacturers warranty is null and void.** Figure 12 displays the proper procedure for packing a square opening. The easiest way to center burner plug in opening is to situate the bottom insulation into opening before the burner plug and then place burner plug on top of insulation. ***There must be no opening in the corners where the insulation intersects.*** After burner plug is in place, position clips to hold plug stationary.

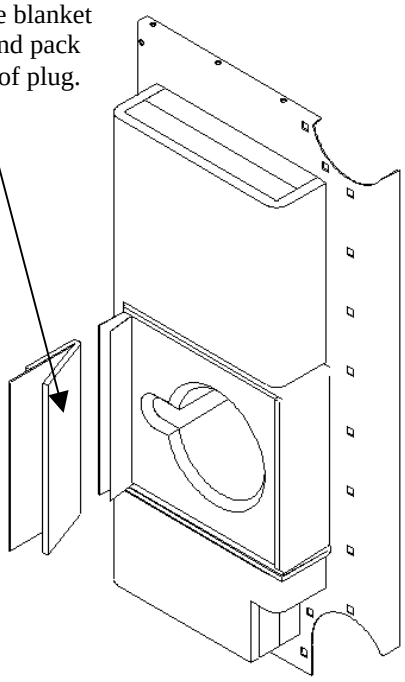
3.6 Place peep site plug into Rear End of the flue collector. **The peep site plug MUST be properly packed with white blanket insulation or the manufacturers warranty is null and void.** Figure 12 displays the proper procedure for packing a square opening. The easiest way to center peep site plug in opening is to situate the bottom insulation into opening before the peep site plug and then place peep site plug on top of insulation. ***There must be no opening in the corners where the insulation intersects.*** See Figure 12. After peep sight plug is in place, position clips to hold plug stationary.



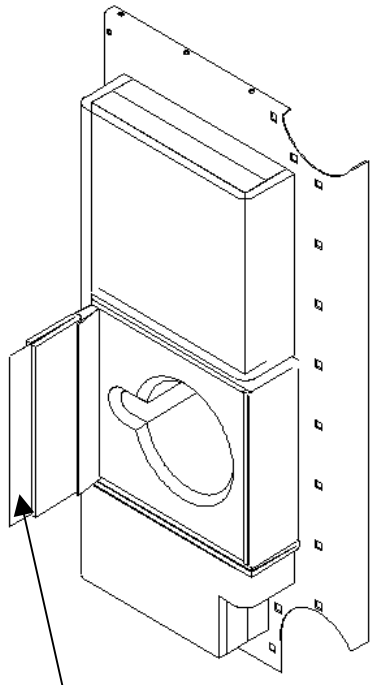
STEP 1



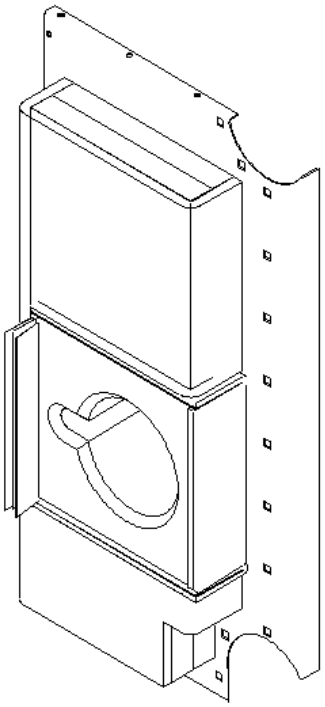
STEP 2



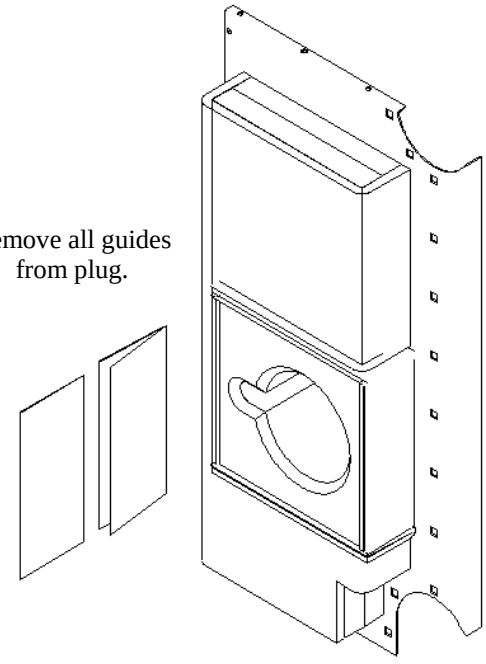
STEP 3



STEP 4



STEP 5



STEP 6

NOTE: Repeat step 1-6 for all sides.

Figure 12

3.7 Assemble the jacket top supports by screwing the supports to the ears welded on top of pressure vessel. Next, screw at least two sheet metal screws into the 10-1/2” long angles on the opposite end of jacket top support. The jacket top support and 10-1/2” angle will not be attached to the flue collector, but will rest on top. Note: Make sure 10-1/2” long angles do not interfere with nuts and bolts. See Figure 13.

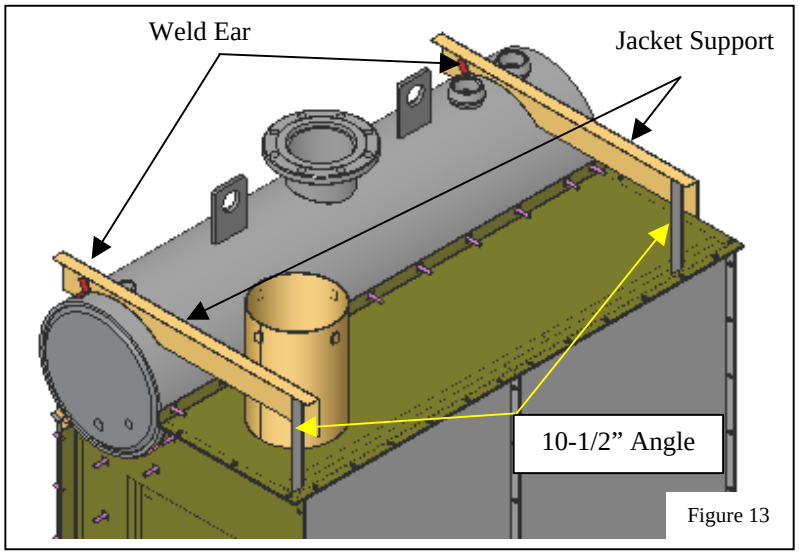


Figure 13

3.8 Wrap Pressure Vessel and Flue Collector with yellow John’s Mannsville insulation. The purpose of this insulation (not shown) is to guard the outside jacket from getting warm to the touch. Make sure the entire Pressure Vessel and Flue Collector is covered.

3.9 Cut yellow insulation for the top of boiler first. Allow the insulation to overlap the upper drum enough to almost touch the tubes. The jacket Door Bar panel will press the overlap against upper drum.

3.10 Starting on the Front End (Burner End), wrap yellow insulation horizontally around boiler. Start with Front End, then the Side, and then the Rear End. Do not wrap tube access side. Permit 6-10” to extend beyond the top. This overlap will be folded under the Jacket Top to ensure there is no open area in the corner. Punch welded sheet metal tabs (not shown) through yellow insulation and then bend tabs over to hold insulation in place.

4.0 BOILER JACKET INSTALLATION

4.1 Arrange boiler jacket top panel in place. Do not screw.

4.2 Place jacket Side panel/panels upon the edge of the boiler base assembly. Position the flange of the jacket Side panel to overlay Jacket Top panel. Align side panel/panels with the base assembly jacket Front and Rear angles. See Figures 14 & 15. If boiler uses multiple Side panels, the panels should overlap one another. Once alignment is complete, screw the bottom of the Side panel into the base assembly jacket Side angle. Use a pipe clamp to hold the top of the Side panel in position. See figure 15.

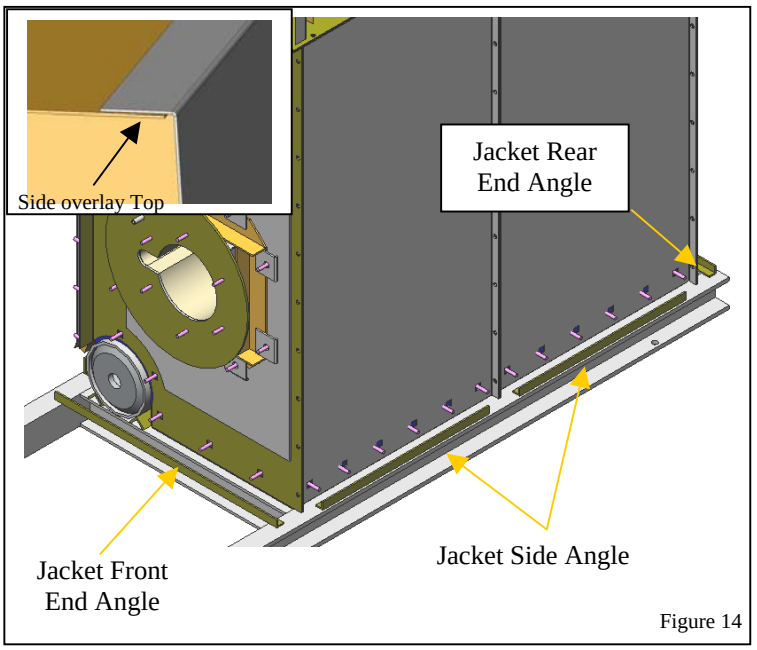


Figure 14

4.3 Situate jacket Rear in place. The Rear End should slide over jacket Top and jacket Side. Make sure Rear is vertically level by using at least a 24" long level. Once jacket Rear is level, place one sheet metal screw in each top corner.

4.4 Situate jacket Front in place. The Front should slide over jacket Top and jacket Side. Make sure Front is vertically level by using at least a 24" long level. Once jacket Front is level, place one sheet metal screw in each top corner.

4.5 Make sure again that jacket Front and Rear is level. Screw in the bottom of jacket Front/Rear about every 8". Next, screw along the rest of the top of jacket Front and Rear. Finally, screw in the top of jacket Side Panel. See figure 15.

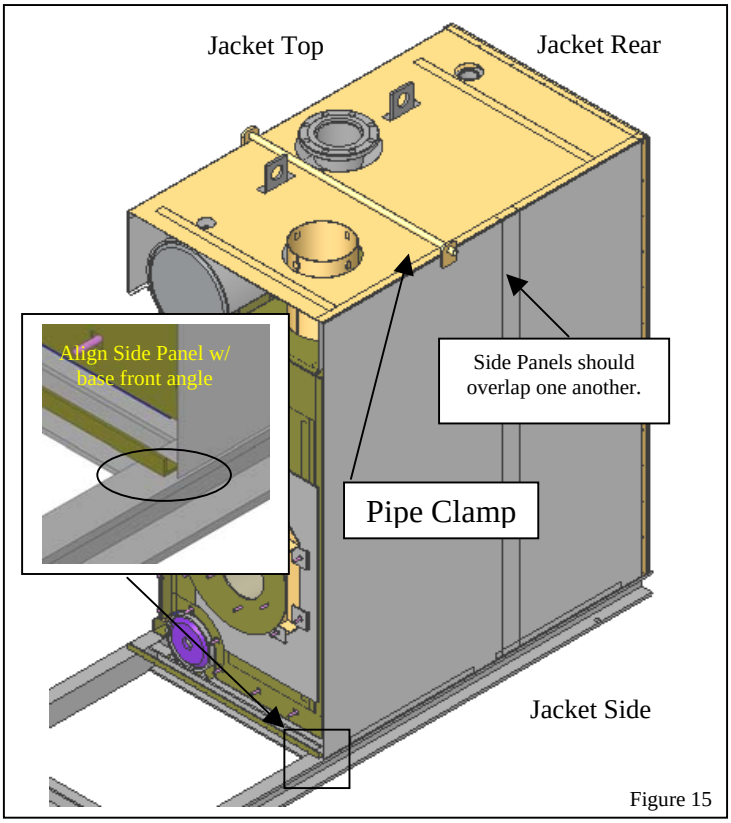


Figure 15

4.6 Start inserting the Tube Access door closest to the Rear and insert doors working toward the Front. Now, fasten the Tube Access doors in place with the tube clamps and nuts.

4.7 Install Door Bar by sliding it between the yellow insulation wrap and jacket Top, Front and Rear. Secure Door Bar in place with provided sheet metal screws. See Figure 16.

4.8 Install both jacket door Filler bars but do not screw into place. Install all jacket Doors with a 1/16" gap and lock door latches. Square door Filler Bars by means of the door side in addition to about a 1/16" gap and screw Filler bars into place. Unlock doors and confirm they can still be removed smoothly and easily. See Figure 16.

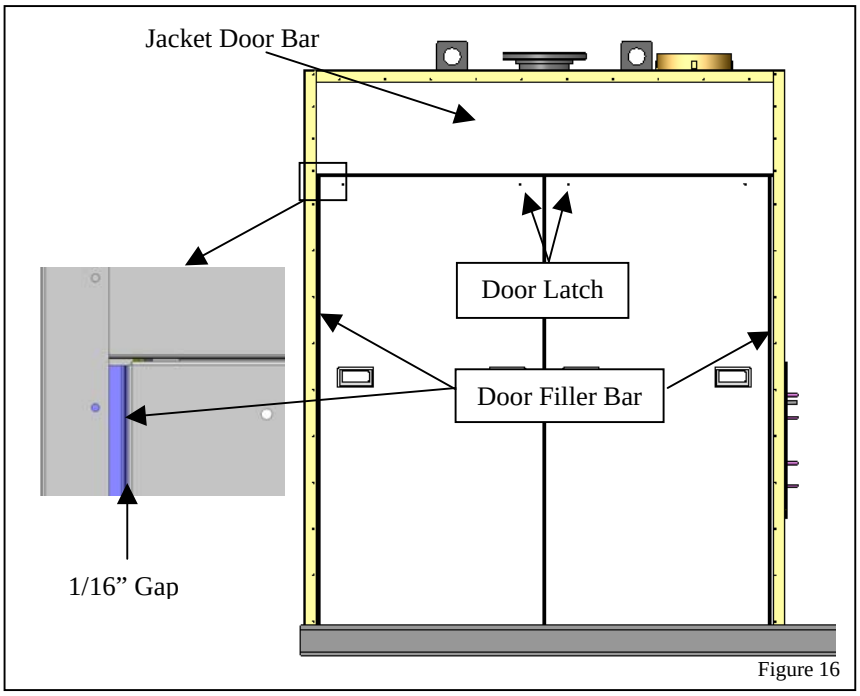


Figure 16

4.0 FINAL ASSEMBLY

4.1 Install low water cut-off(s) and wire to control box.

4.2 Install heat transfer paste and low fire start aquastat sensor bulb (if provided) into immersion well. Replace retaining clops. Install any remaining wire moldings as required.

4.3 Install relief valve(s) and pipe nipple(s).

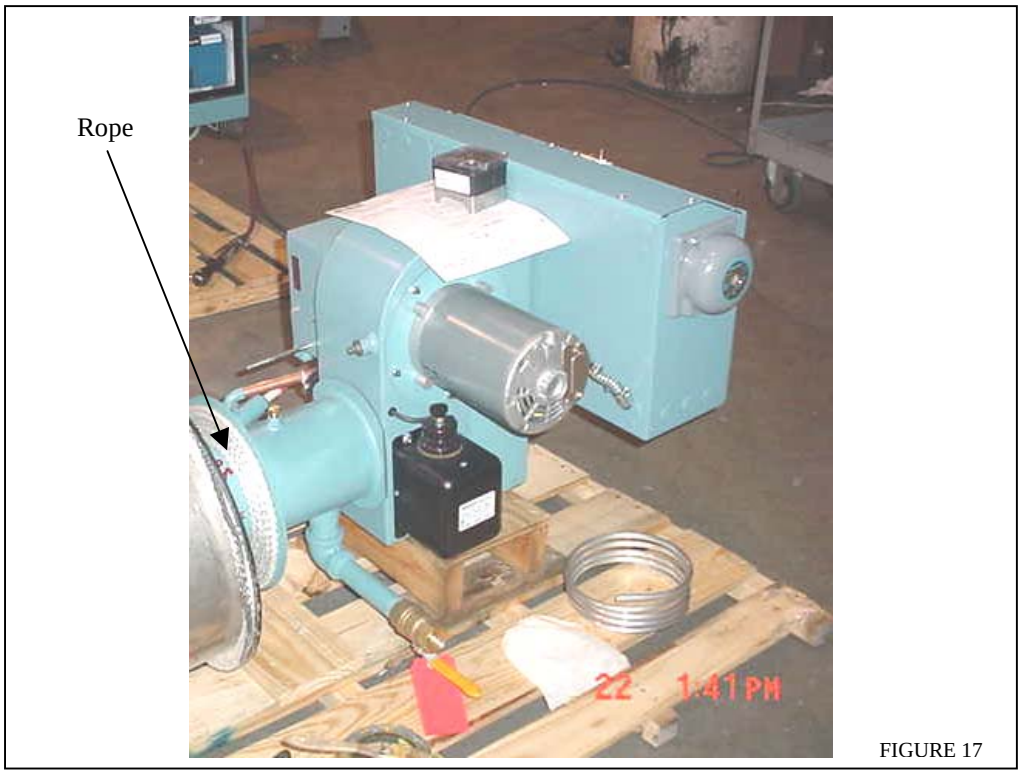


FIGURE 17

4.4 Align the top of the burner control housing parallel with the floor going from left to right. Once the burner has been rotated to the correct position, check to see that the rope gasket on the plug is correctly positioned.

Secure the burner assembly in position and clamp in place with the clamps and nuts provided.

4.5 Wire the forced draft burner, gas valves, and high/low gas pressure switches or any other components as required. Refer to the wiring diagram(s) provided with the boiler.

5.0 CONNECTIONS

5.1 Refer to Form IM-8: Installation, Operation and Service Manual.

5.2 Connect all fuel and water (or steam) piping and electrical connections as required. Refer to Form IM-7R for recommended practice.

5.3 Perform hydrostatic test of boiler and pressure test of fuel piping as directed in Form IM-8.

5.4 Be certain that proper provision has been made for combustion air and flue gas venting as directed in IM-8.

5.5 Make certain that the boiler room is always at a neutral or positive pressure relative to outdoors and that the stack is properly installed and designed to avoid downdrafts. The Boiler cannot function in a negative pressure room or under conditions of sustained downdraft without the use of carefully designed and selected mechanical draft equipment.

6.0 CLEANING THE BOILER AND SYSTEM

6.1 Refer to Section 3 of Form IM-8.

6.2 Care must be taken on old systems to clean all piping and system components to remove all sediment. Be certain that there are no leaks and that the air removal and expansion tank system are functional. Install a cartridge filter and inspect it frequently for debris.

7.0 START-UP AND OPERATION

7.1 Refer to section 2 of IM-8

IMPORTANT	THIS EQUIPMENT SHOULD BE STARTED AND ADJUSTED BY A QUALIFIED BURNER TECHNICIAN. COMBUSTION DATA SHOULD BE TAKEN AND RECORDED ON THE START-UP REPORT FORM SUPPLIED IN THE BOILER MANUAL. THIS IS ESSENTIAL FOR SAFE AND PROPER OPERATION OF THIS BOILER.

8.0 TOOLS NEEDED FOR ASSEMBLY

1.) Electric Drill
2.) #26 Drill Bit
3.) Adjustable Wench
4.) 1/4" nut driver
5.) Ratchet Wench
6.) 9/16" Deep Socket
7.) 24" Level
8.) 2 Pound Hammer
9.) Tube Driver
10.) Tube Puller
11.) 40" Pipe Clamp

EFF.DATE: 3/26/05

REPL.: NEW

AB BOLT TOGETHER
FORCED DRAFT - STEAM
PARTS LIST

FORM: 2347

PAGE: AB - BT - FD - S - 1

ITEM	DESCRIPTION	AB90-S		AB120-S		AB150-S		AB200-S		AB250-S		AB300-S	
		REQ	PART NO.	REQ	PART NO.	REQ	PART NO.	REQ	PART NO.	REQ	PART NO.	REQ	PART NO.
1	**PRESSURE VESSEL - (With Tubes) - 15#**	1	400221.90	1	400221.120	1	400221.150	1	400221.200	1	400221.250	1	400221.300
1	**PRESSURE VESSEL - (With Tubes) - 150#**	1	400249.90	1	400249.120	1	400249.150	1	400249.200	1	400249.250	1	400249.300
	Pressure Vessel Downcomer Insulation	2	300619	2	300619	2	300619	2	300619	2	300619	2	300619
	BOILER TUBE ASSEMBLY												
2	Boiler Outside Tube	13	77120	18	77120	22	77120	30	77120	37	77120	44	77120
3	Boiler Inside Tube	13	77121	17	77121	22	77121	29	77121	37	77121	44	77121
	Boiler Tube Studs (3/8"-16 x 2-3/8")	26	25187	35	25187	44	25187	59	25187	74	25187	88	25187
	Tube Clamp	26	23622	35	23622	44	23622	59	23622	74	23622	88	23622
	Tube Clamp Nut (3/8")	26	25114	35	25114	44	25114	59	25114	74	25114	88	25114
	BOILER BASE												
4	Boiler Base Assembly	1	400211.90	1	400211.120	1	400211.150	1	400211.200	1	400211.250	1	400211.300
5	Floor Pan Assembly	1	400034.90	1	400034.120	1	400034.150	1	400034.200	1	400034.250	1	400034.300
	FLUE COLLECTOR PANELS												
6	Flue Collector - Front Assembly	1	400222	1	400222	1	400222	1	400222	1	400222	1	400222
7	Flue Collector - Rear Assembly	1	400223	1	400223	1	400223	1	400223	1	400223	1	400223
8	Flue Collector - Side Starter Panel Assembly	1	400179.38	1	400179.23S	1	400179.28S	1	400179.34S	1	400179.29S	1	400179.34S
9	Flue Collector - Side Center Panel Assembly	--	--	--	--	--	--	--	--	1	400179.29C	1	400179.34C
10	Flue Collector - Side End Panel Assembly	--	--	1	400179.23E	1	400179.28E	1	400179.38E	1	400179.29E	1	400179.34E
11	Flue Collector - Top Front Assembly	1	400217.90	1	400217.120	1	400217.150	1	400217.200	1	400217.250	1	400217.300
12	Flue Collector - Top Rear	--	--	--	--	--	--	--	--	1	300468.47	1	300468.61
13	Flue Collector - Outside Wrap Insulation	1	300606.90	1	300606.120	1	300606.150	1	300606.200	1	300606.250	1	300606.300
14	Flue Collector - Peep Site Plug	1	400214	1	400214	1	400214	1	400214	1	400214	1	400214
15	Flue Collector - Peep Site Plug Insulation	4	300543	4	300543	4	300543	4	300543	4	300543	4	300543
	TUBE BAFFELS												
16	Upper Horizontal Tube Baffel	1	77240	1	77241	1	77242	1	77243	1	77244	1	300617
17	Lower Horizontal Tube Baffel	1	77230	1	77231	1	77232	1	77233	1	77234	1	300618
18	Upper Vertical Tube Baffel	1	300675	1	300675	1	300675	1	300675	1	300675	1	300675
19	Lower Vertical Tube Baffel	1	77235	1	77235	1	77235	1	77235	1	77235	1	77235
	TUBE ACCESS PANELS												
20	Tube Access Starter Panel Assembly	1	400220.18	1	400220.27	1	400220.18	1	400220.18	1	400220.18	1	400220.18
21	Tube Access Filler Panel Assembly	--	--	--	--	1	400220.19	1	400220.34	1	400220.28	3	400220.22
22	Tube Access Burner Panel Assembly	1	400220.24	1	400220.24	1	400220.24	1	400220.24	1	400220.24	1	400220.24

EFF.DATE: 3/26/05
REPL.: NEW

AB BOLT TOGETHER
FORCED DRAFT - STEAM
PARTS LIST

FORM: 2347
PAGE: AB - BT - FD - S - 2

ITEM	DESCRIPTION	AB90-S		AB120-S		AB150-S		AB200-S		AB250-S		AB300-S	
		REQ	PART NO.	REQ	PART NO.	REQ	PART NO.	REQ	PART NO.	REQ	PART NO.	REQ	PART NO.
23	**JACKET DOOR**												
	Jacket Access Door Assembly (#1)	--	--	--	--	--	--	1	400177.34	--	--	--	--
	Jacket Access Door Assembly (#2)	1	400177.41	--	--	--	--	1	400177.41	1	400177.41	--	--
	Jacket Access Door Assembly (#3)	--	--	--	--	--	--	--	--	1	400177.50	--	--
	Jacket Access Door Assembly (#4)	--	--	1	400177.51	--	--	--	--	--	--	--	--
	Jacket Access Door Assembly (#5)	--	--	--	--	2	400177.30	--	--	--	--	--	--
	Jacket Access Door Assembly (#6)	--	--	--	--	--	--	--	--	--	--	2	400177.53
	JACKET PANELS												
24	Jacket Front (Burner End)	1	78334	1	78334	1	78334	1	78334	1	78334	1	78334
25	Jacket Rear (Peep Site End)	1	78330	1	78330	1	78330	1	78330	1	78330	1	78330
26	Jacket Side (First Panel)	1	78340		78341	1	78342	1	78343	1	78343	1	78343
27	Jacket Side (Second Panel)	--	--	--	--	1	78341	1	78341	1	78340	1	78344
28	Jacket Top	1	78350	1	78351	1	78352	1	78353	1	78354	1	300398
29	Jacket Door Filler Strip	2	38274	2	38274	2	38274	2	38274	2	38274	2	38274
30	Jacket Door Bar	1	300546.45	1	300546.54	1	300546.63	1	300546.79	1	300546.94	1	300546.108
31	Jacket Peep Site Overlay	1	38486	1	38486	1	38486	1	38486	1	38486	1	38486
32	Jacket Peep Site Ovservation Port Overlay	1	38485	1	38485	1	38485	1	38485	1	38485	1	38485
33	Jacket Support	2	300332	2	300332	2	300332	4	300332	4	300332	4	300332
34	Jacket Support Bracket	2	300118.11	2	300118.11	2	300118.11	4	300118.11	4	300118.11	4	300118.11
	BURNER ASSEMBLY												
	BURNER - See Burner Parts Data Sheet	**REFER TO EQUIPMENT LIST**											
35	Burner Plug (Gordon Piatt Burner)	1	400252	1	400252	1	400252	1	400252	1	400252	1	400252
36	Burner Plug Filler Insulation	4	300529	4	300529	4	300529	4	300529	4	300529	4	300529
	Rope Gasket (Ft.)	10	24621	10	24621	10	24621	10	24621	10	24621	10	24621
	STEAM TRIM	**REFER TO EQUIPMENT LIST**											
	Control Panel												
	Terminal Strip *												
	Gauge Glass												
	Gauge Glass Valves												
	Pressuretrol - Operator												
	Pressuretrol - High Limit												
	Low Water Cut Off & Pump Control												
	Auxiliary Low Water Cut Off												
	Try Cocks												
	Pressure Gauge												

EFF.DATE: 3/26/05

REPL.: NEW

AB BOLT TOGETHER
FORCED DRAFT - STEAM
PARTS LIST

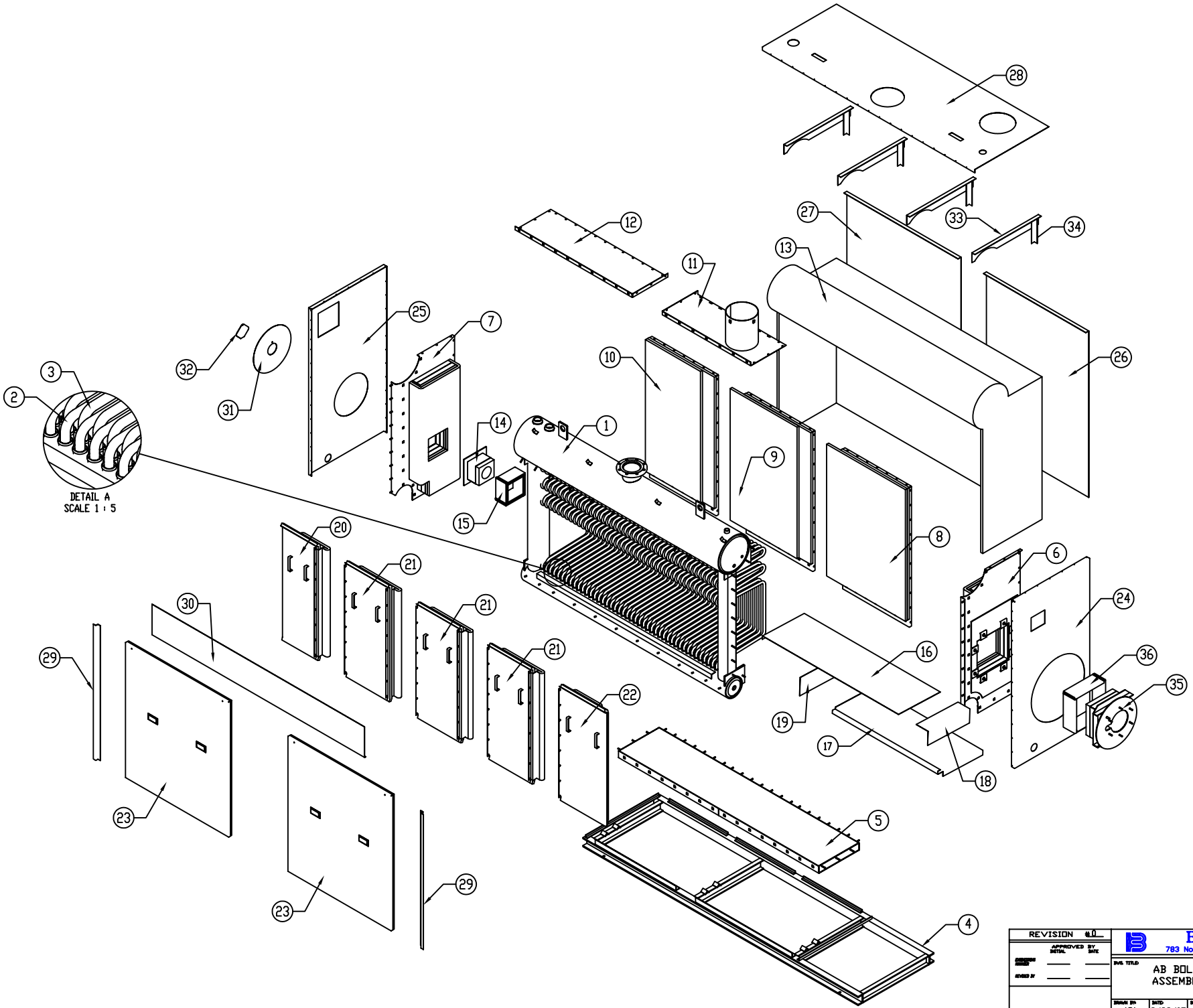
FORM: 2347

ITEM	DESCRIPTION	AB90-S		AB120-S		AB150-S		AB200-S		AB250-S		AB300-S	
		REQ	PART NO.	REQ	PART NO.	REQ	PART NO.	REQ	PART NO.	REQ	PART NO.	REQ	PART NO.
	STEAM TRIM	**REFER TO EQUIPMENT LIST**											
	Pressure Shutoff Cock												
	Blowdown Valves (Optional)												
	Pressure Relief Valve												
	SERVICE TOOLS												
	Tube Puller **	1	28905	1	28905	1	28905	1	28905	1	28905	1	28905
	Tube Driver **	1	28901	1	28901	1	28901	1	28901	1	28901	1	28901
	Tube Brush ***	1	28917	1	28917	1	28917	1	28917	1	28917	1	28917

* Depends on Number of Terminals Required

** Furnished as Standard on High Pressure Steam Only

*** Not Standard. Available Upon Request.



REVISION #0		BRYAN STEAM 783 North Chili Avenue Peru, IN 46970				
APPROVED BY INITIAL	DATE	DWG TITLE	AB BOLT TOGETHER STEAM ASSEMBLY EXPLODED VIEW			
		DRAWN BY	DATE	SCALE	SIZE	DWG NO
		JSL	3/28/05	NONE	FS	A21220

Bryan Boilers

Removal and Replacement of Flexible Water Tubes

Instruction 34
(1/97)

Follow this easy step-by-step procedure to remove or replace the flexible water tubes in Bryan Boilers. This process requires no rolling or welding. Follow the steps as outlined for the most efficient and least time consuming procedure.

CAUTION: GOGGLES OR SAFETY GLASSES SHOULD BE WORN TO PREVENT INJURY. Before removing tube(s), boiler must be completely drained of water. If boiler outlet and return are equipped with shutoff valves, close both to avoid draining the entire system.

TOOLS REQUIRED

Hammer

A. For 3/4" and 1" tubes, two pound hammer
B. For all 1 ½" tubes, four pound hammer

Tube Puller (Available from Bryan)

A. For 3/4" tubes, number 4 puller
B. For 1" tubes, number 2 puller
C. For 1 ½" tubes, number 3 puller

Tube Driver (Available from Bryan)

A. For 3/4" and 1" tubes, number 1 driver
B. For 1-1/2" tubes, number 2 driver

Nut Wrench - 3/8"

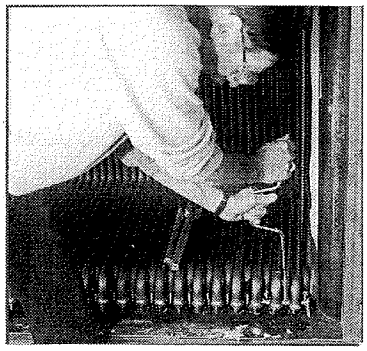
TUBE ORDERING INFORMATION

For Bryan Boiler Series	Order tubes by configuration
F, D and HED Series	Tubes are long or short. Outside is long, inside is short.
L Series	Tubes are right hand or left hand. (facing burner end)
LM, AB, RV and RW Series	Tubes are inside or outside

PREPARATION

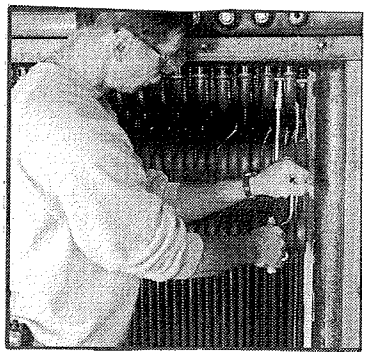
Begin by removing the insulated jacket side panels or doors, exposing the inner tube access panels. On some models (L, LM and RW Series) tube access is from both sides. On each end of every tube is a welded steel tapered ferrule which is driven into tapered holes in the upper and lower steel headers.

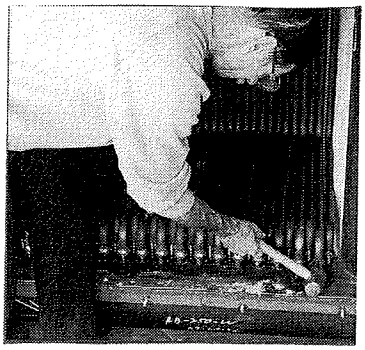
REMOVAL OF TUBES



1. Remove lower tube clamps. On most models a stud and clamp are required over the steel ferrule. Remove the retaining nut and clamp before attempting to remove the tube(s). To facilitate removal, you may need to soak with good penetrating fluid.

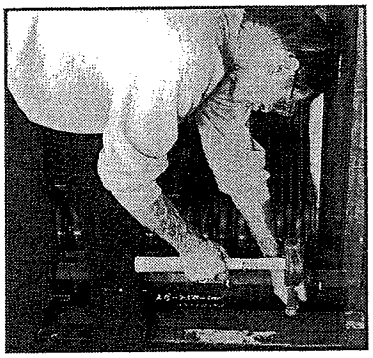
2. Remove upper tube clamps. Follow the same procedure as step one. ➜





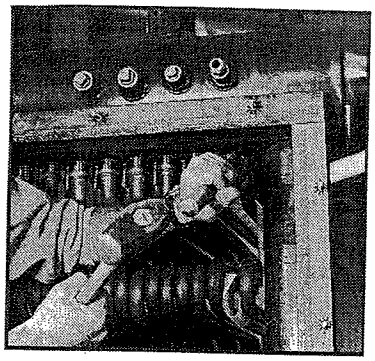
3. Loosen tube ferrules. Strike the side of the tube ferrule two or three times with a hammer to help loosen the tube ferrule in the upper and lower header.

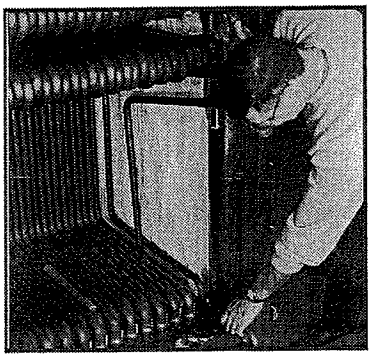
4. Pull lower tube ferrule (outer row of tubes). Drive the tube puller wedges under the lip of the tube ferrule with several blows of the hammer on the end of the handle. Alternate with downward blows to lift the tube ferrule. Hold the leverage and repeat to drive the wedge further. ➜



5. Clear tube Ferrule from the header. Continue driving wedge under and leveraging fitting up until it pops the end of the tube free from the hole in the header.

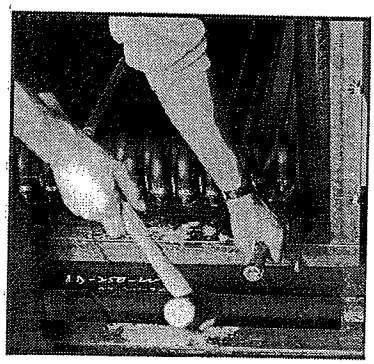
6. Pull upper tube ferrule. Repeat the procedure to pull the tube ferrule of the same tube from the upper header.





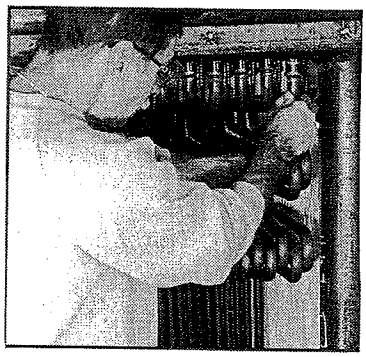
7. Remove outer row tube. Remove the tube and repeat with other outer row tubes to gain access to rear tubes. If a tube leak occurs in an inner tube, two adjacent outer tubes must be removed to access the inner tube for removal.

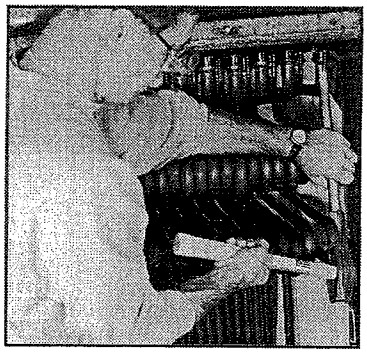
8. Pull inner row tube ferrules. Repeat the procedure in steps four through seven to remove inner tube or tubes.

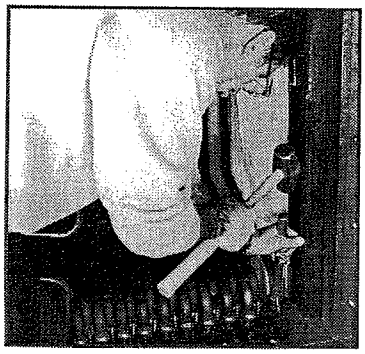


REPLACEMENT OF TUBES

Before placing a new tube into the headers, clean the holes by wiping gently with emery cloth to be sure there are no burrs. If replacement tube has been sitting for a long period of time and shows rust, repeat the cleaning procedure on the tube ferrule. With a small brush, apply a thin coating of gray pipe dope around the inside of the hole and all around the tube ferrule.

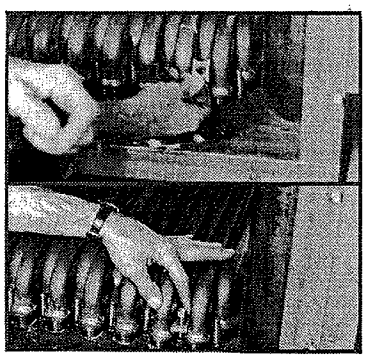






9. To replace tubes, start with the inner tube. Insert the lower tube ferrule in the bottom header first then the top tube ferrule in the top header. Replace all tubes before driving.

10 &11. Drive the tube ferrules until they seat. With the driver tool positioned on the ring, strike the end of the driver with the hammer three or four blows. DO NOT DRIVE THE FERRULE DOWN TO THE RING. Before the ring reaches the header, after three or four good hits, you will hear a solid hit. This indicates the tube is seated.



12. Replace tube clamps. If your unit is equipped with studs and clamps, reinstall the tube clamps and secure them with nuts. Tighten the nut only until snug. Do not try to compress the ferrule into the holes with the clamps, because the clamps might break or the studs might shear.

REFILL THE BOILER

Refill the boiler with water. Fill until pressure is slightly under the relief valve set pressure. Inspect all tube ferrules for leaks. If the tube(s) you replaced leaks, reduce the pressure in the boiler to zero, then strike the fitting once or twice with the driver and hammer as shown in steps ten and eleven above. After inspection, replace the tube access panels and jacket access doors.

Form # 2390
Date: 04/10/12
Replaces: 11/06/09

Bryan Boilers
Installation and Operating Service Manual Supplement

Bryan Boilers is currently supplying boilers with product enhancements to our flexible tubes. Most flexible tubes will no longer have a separate ferrule welded to each end. We have developed a way to form the ferrule from the tube material directly on the bent tube see figure 1. We will identify these tubes as **"End-Formed".** Patent Pending

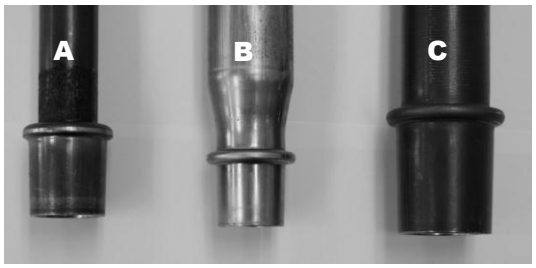


Figure 1

A. 1" End-Formed Tube.
B. Triple-Flex End-Formed Tube.
C. 1-1/2" End-Formed Tube.

These tubes will require a specific driver to install the tubes into the boiler vessel. The tube driver required is shown in Figure 2.

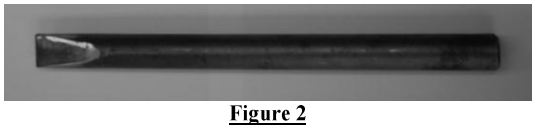


Figure 2

This driver is required to drive all end-formed tubes. The driver (see Figure 3) previously used to drive 1" tubes will adequately drive 1" end-formed tubes only.

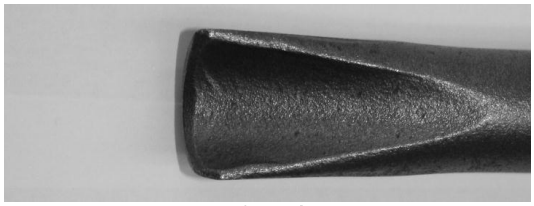


Figure 3

If you have a driver that looks like Figure 4 – B, your driver will need to be modified by grinding to match Figure 4 – A.

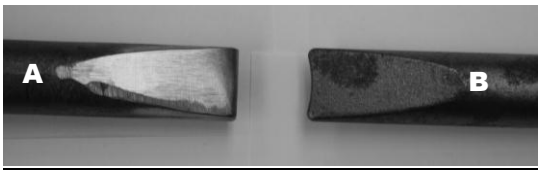


Figure 4

The new driver and current tube pullers will work for all tubes regardless if end-formed or welded ferrule.

We have changed to end-formed tubes for the following boilers, DR, AB, RV, and RW. The Triple-Flex boiler has shipped with end-formed tubes since introduction.

The table below is provided as a cross-reference until the parts list can be revised with the new numbers.

NOTE:

If you order tubes with old part number, you will receive end-formed tube replacements.

End-Formed Tube Cross Reference		
Boiler Series Outside or Inside	With Fittings (Old Part#)	End-Formed (New Part#)
DR Outside	400004	301442
DR Inside	400003	301443
CLM	400176	N/A
CL	400131	N/A
AB Outside	77120	301446
AB Inside	77121	301447
RV Outside	38100	301448
RV Inside	38101	301449
RW Outside	50101	301450
RW Inside	50100	301451
K Outside	32124	N/A
K Inside	32125	N/A
Tube Driver	28906.1	