Series 300 VTB

Installation Instructions

Sizes 7 – 12 – 16 – 20 – 30 HP
#2 Fuel Oil
Gas (500 to 2500 BTU)
Gas – Light Oil Combination
High Pressure Steam
Sizes 7 thru 16 HP (125 PSI)
Sizes 20 and 30 HP (150 PSI)

AESYS Technologies, LLC
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Website: www.aesystech.com

ID-65-464

Check Unit Upon Arrival

1. If unit is damaged, make claim to the carrier
2. Check specifications of electrical service to make sure that they correspond with the markings of the electrical characteristics on the unit.
3. Check total ampere rating of the blower motor, feedwater motor, control system, other circuits, to make sure the electrical service is adequate.
4. Check the pressure of the steam distribution system with the operating pressure of the steam generator to make sure they correspond.
5. Investigate the gas pressure required for maximum capacity of unit for a minimum of six inches (6") WC after gas regulator.

The successful operation of a York-Shipley boiler is proper installation. Please read these instructions carefully before starting the installation.

When starting a steam system run condensate to the sewer or waste to eliminate possibility of oil accumulation in the boiler. This procedure should be done for three or four days, or until all oil is out of the system.

Placing of the Unit

When placing the boiler unit, refer to the installation drawing on page 3 or 4. These drawings give the proper clearance around the unit to perform the necessary functions, such as cleaning, height clearance for piping and method of pipe sizing and components.

The unit should be placed so that the vent connection is as direct as possible and there is adequate space for service and maintenance. Refer to drawings for unit arrangements.

Protection of the Unit During Installation

If the unit is exposed to the elements, dust, cement, mortar and so forth, the unit should be covered with a tarpaulin or protected in an manner that will prevent damage to the boiler controls and other component equipment. If there is a possibility of flooding the boiler room, it is suggested that the necessary steps be taken to install cellar drainage or sump pumps.

Electrical controls are subject to damage through rust and moisture and therefore should be protected.

Operation and Maintenance

The starting, operation and maintenance of the boiler unit is just as important as the installation. For the proper procedure of starting, operating and maintaining the equipment use the York–Shipley service manuals.

List of Components

The components listed are shown as (standard) which are always furnished with the boiler and (optional) which can be obtained if desired. Components which are installed in the field by the installer for the convenience of the installer are also listed.

For location of the arrangement refer to the drawings on following pages.

Boiler

Item #	
1) Boiler	Std.
2) Chemical Feeder Connection & Feeder	Opt.
3) Nozzle Outlet	Std.
4) Hand Holes	Std.
5) Inspector's Test Gauge Conn.	Std.
6) Lifting Lug	Std.
7) Water Gauge	Std.
8) Stack Outlet	Std.
10) Peep Sight	Std.
11) Pressure Gauge (Steam)	Std.
12) Safety Relief Valve	Std.
13) Metal Jacket – Paint Protected(pg. 8)	Std.
14) Foil Faced Fiberglass Insulation (pg8)	Std.

Controls

15) Burner	Std.
16)High Limit Control	Std.
17) Low Water Cut-Off & Pump Switch	Std.

Feedwater System (see page 8)

Item #	
18) Condensate Tank	Opt.
19) Condensate Pump & Motor Set	Opt.
20) Sight Glass & Gauge Cocks	Opt.
21) Water Make-Up Feeder	Opt.
22) Main Condensate Return Line	Field
23) Condensate Vent to Atmosphere	Field
24) Swing Check Valve & Stop Valve	Field
Steam Piping (see page 6)	
25) Main Header Bleed Trap	Field
26) Stop Valve	Field
27) Insulation	Field
Blowdown (see page 10)	
28) "Y" Type Blowdown Valve (Steam)	Std.
Breeching	
29) Barometric Damper (when required)	Opt.
30) 2" 85% Magnesia Insulation	Field
Fresh Air	
31) Mechanical Fresh Air Louver	Field
Codes	
32) UL Label	Std.
33) ASME Code Design (Section 1)	Std.

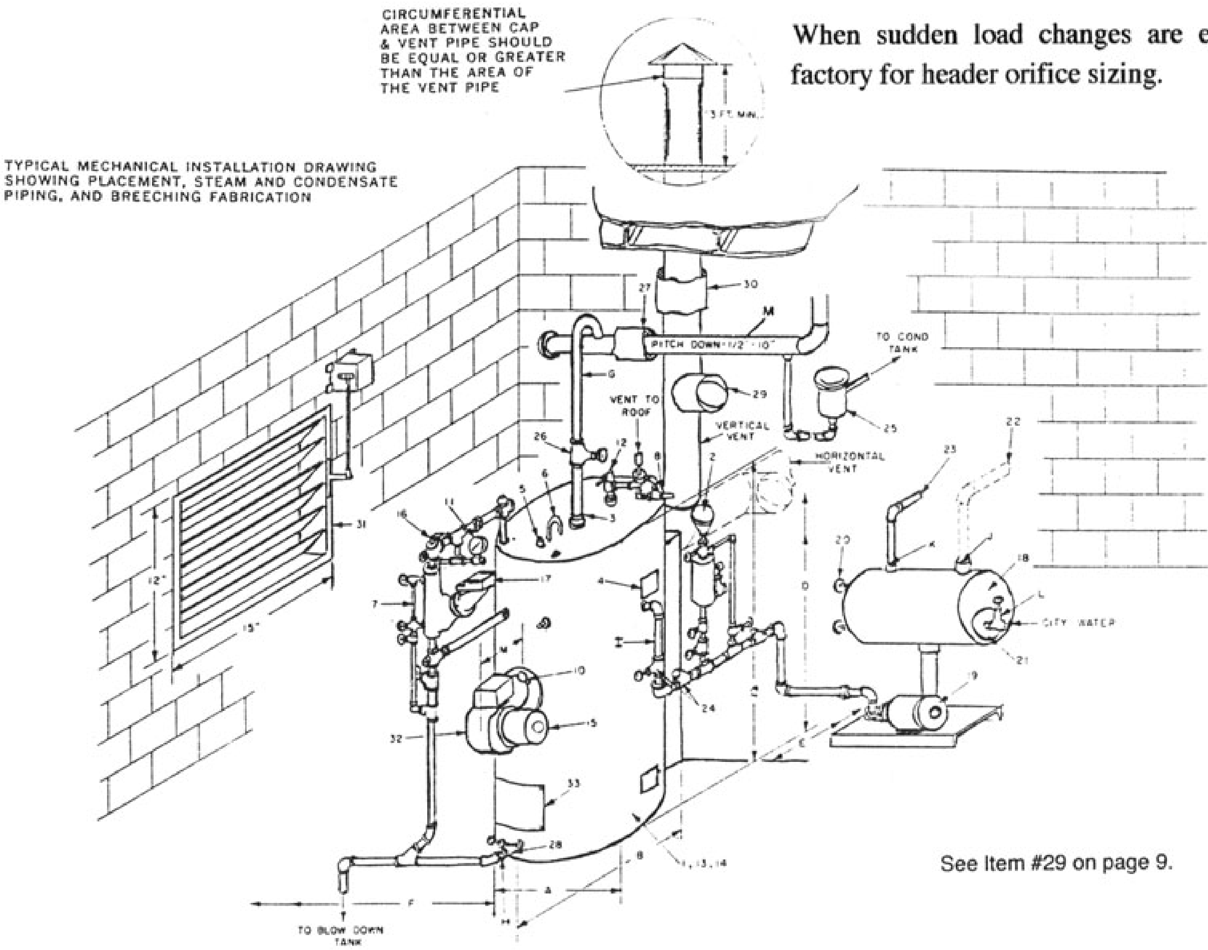
Installation Drawing VTB High Pressure Steam
With Separate Condensate Tank

Boiler Size	A	B	C	M-Oil	M-Gas	Vent Size
7 HP	32	39	66	12	12	8
12 HP	32	39	76	12	16	8
16 HP	36	41	81	12	16	8
20 HP	38	43	88	20	20	10
30 HP	51	32	88	20	20	2 - 8

Note: Dimensions D, E, F should be governed by code requirements and ample wiring and maintenance space for the size and number of units installed.

This drawing depicts only the general arrangement of valves, controls and other items. Unions and other similar piping conveniences are to be applied where necessary in accordance with good practice.

When sudden load changes are expected, consult factory for header orifice sizing.



See Item #29 on page 9.

Connection Sizing

Boiler Size	Steam Outlet "G"	Blowdown "H"	Feedwater "I"	Condensate Return "J"	Condensate Vent "K"	City Water "L"	Header "M"
7 HP	1-1/4"	3/4"	1-1/4"	1-1/4"	1-1/4"	3/4"	3"
12 HP	1-1/2"	3/4"	1-1/4"	1-1/4"	1-1/4"	3/4"	4"
16 HP	1-1/2"	1"	1-1/4"	1-1/4"	1-1/4"	3/4"	4"
20 HP	2"	1"	1-1/4"	2"	2"	3/4"	4"
30 HP	2"	1"	1-1/4"	2"	2"	3/4"	6"

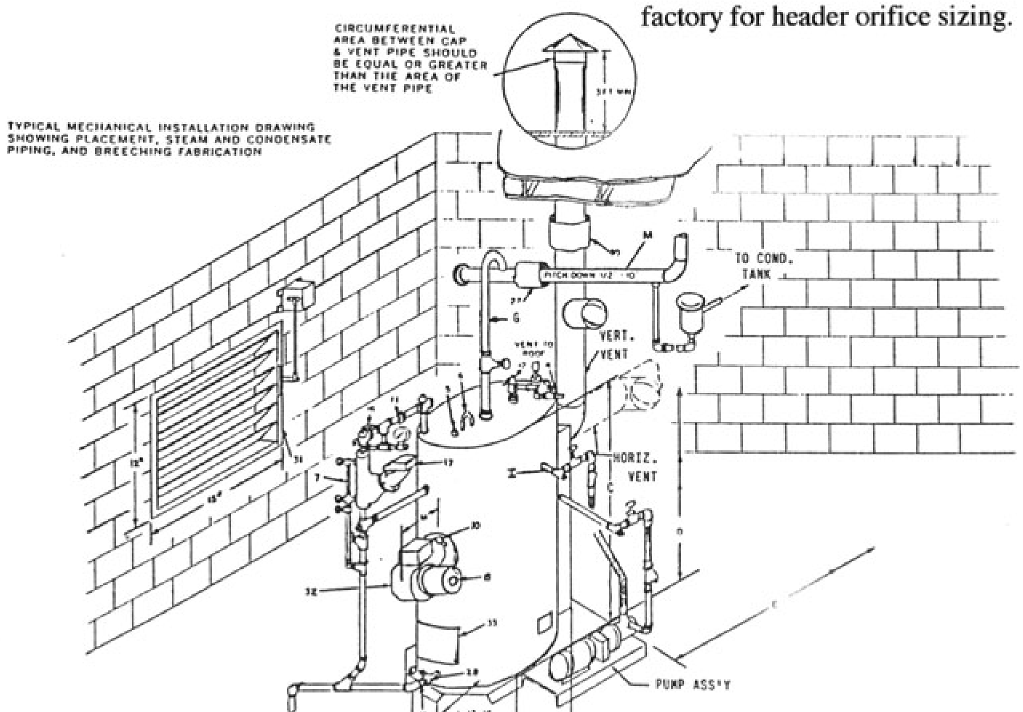
Installation Drawing VTB High Pressure Steam
With Built-In Condensate Tank

Boiler Size	A	B	C	M-Oil	M-Gas	Vent Size
7 HP	32	39	66	12	12	8
12 HP	32	39	76	12	16	8
16 HP	36	41	81	12	16	8
20 HP	38	43	88	20	20	10
30 HP	51	32	88	20	20	2 - 8

Note: Dimensions D, E, F should be governed by code requirements and ample wiring and maintenance space for the size and number of units installed.

This drawing depicts only the general arrangement of valves, controls and other items. Unions and other similar piping conveniences are to be applied where necessary in accordance with good practice.

When sudden load changes are expected, consult factory for header orifice sizing.



See Item #29 on page 9.

CONNECTIONS J, K, & L ON BUILT IN CONDENSATE TANK, NOT SHOWING ON DRAWING.

Connection Sizing

Boiler Size	Steam Outlet "G"	Blowdown "H"	Feedwater "I"	Condensate Return "J"	Condensate Vent "K"	City Water "L"	Header "M"
7 HP	1-1/4"	3/4"	1-1/4"	2"	1-1/4"	3/4"	3"
12 HP	1-1/2"	3/4"	1-1/4"	2"	1-1/4"	3/4"	4"
16 HP	1-1/2"	1"	1-1/4"	2"	1-1/4"	3/4"	4"
20 HP	2"	1"	1-1/4"	2"	1-1/4"	3/4"	4"
30 HP	2"	1"	1-1/4"	2"	1-1/4"	3/4"	6"

Item #2 Chemical Feeder Connections

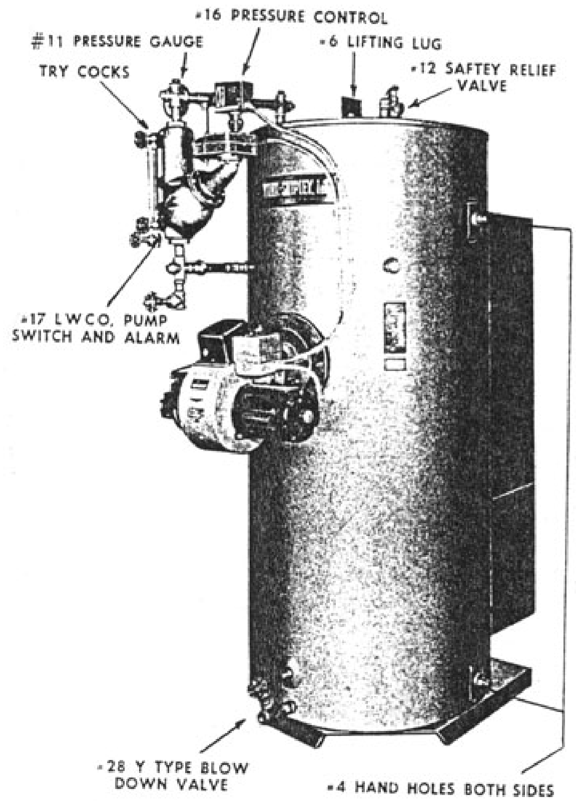
Feedwater Treatment

Water in the locality where the unit is to be installed must be analyzed by an organization currently in the water treatment business. Their recommendation as to the method of feedwater treatment must be followed, as the proper water treatment will increase the life of the boiler, as well as assist in higher efficiencies and trouble-free operation.

Feedwater Treatment Connection Located in Feedwater Pump Discharge Line As Close to Boiler As Possible

It is advisable to apply feedwater treatment to each boiler on an individual basis. This is necessary due to the inconsistent evaporation rate of multiple boiler applications. There are many types of chemical feeders available on the market. York-Shipley recommends that a reliable, nationally known, feedwater treatment company be consulted as to the type of feedwater treating apparatus to be applied to the installation. York-Shipley can furnish as optional equipment the One-Shot Feeder to inject chemicals into the boiler, shown on page 16.

Location Steam Trim
High Pressure Steam for Use with
Separate Condensate System
7 thru 20 HP



Type Supply Outlet (Item #3)

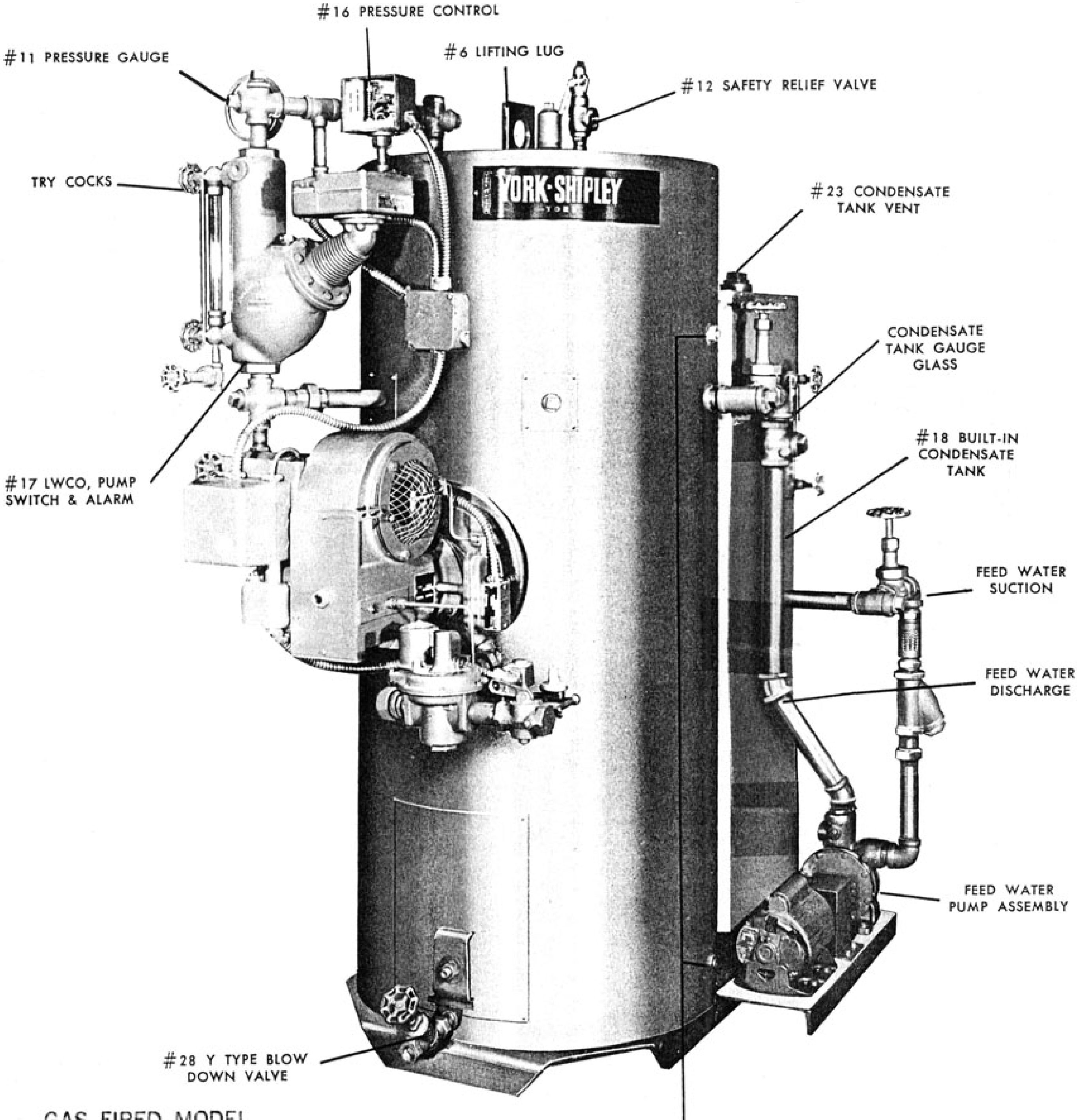
York-Shipley standardizes on threaded fittings as permitted by the boiler code. All accessory items such as header valves, stop check valves, and others of similar nature are available in either 300# or 150# threaded design.

Item #4 Hand Holes

Item #12 Safety Relief Valves

This standard item is also supplied on all industrial boilers manufactured by York-Shipley. This control further protects the boiler and operating personnel from injury should the safety limit controls fail to operate. The safety valve is factory set at the maximum design pressure of the boiler shell unless otherwise requested. Should the pressure exceed this rating, the safety valves open to relieve the excessive steam produced and thus prevent boiler rupture. The safety valve is provided with a threaded side outlet connection and should be piped to the outside of the building where the exhaust steam can be released without injury to personnel or property. Another practice is to run this pipe through the roof. Low point in all safety valves exhaust lines should be dripped to remove all water. It is necessary to connect the blow offs from the gauge glass cock, and blowdown valve of the low water cutoff to the blow down piping.

Location Steam Trim
High Pressure Steam with Built-In Condensate Tank
7 thru 20 HP

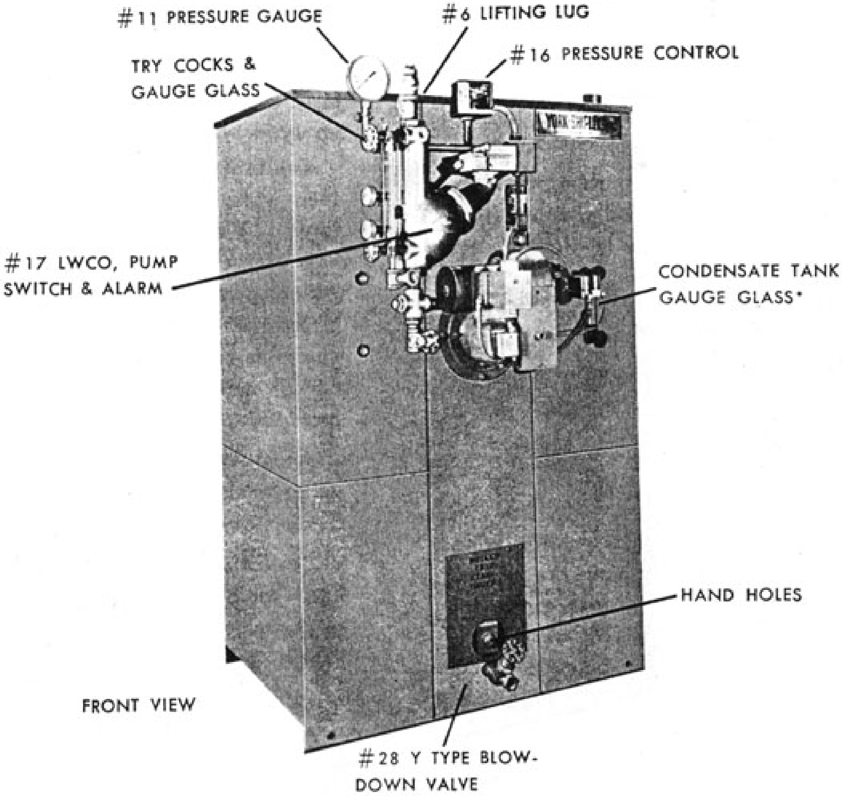


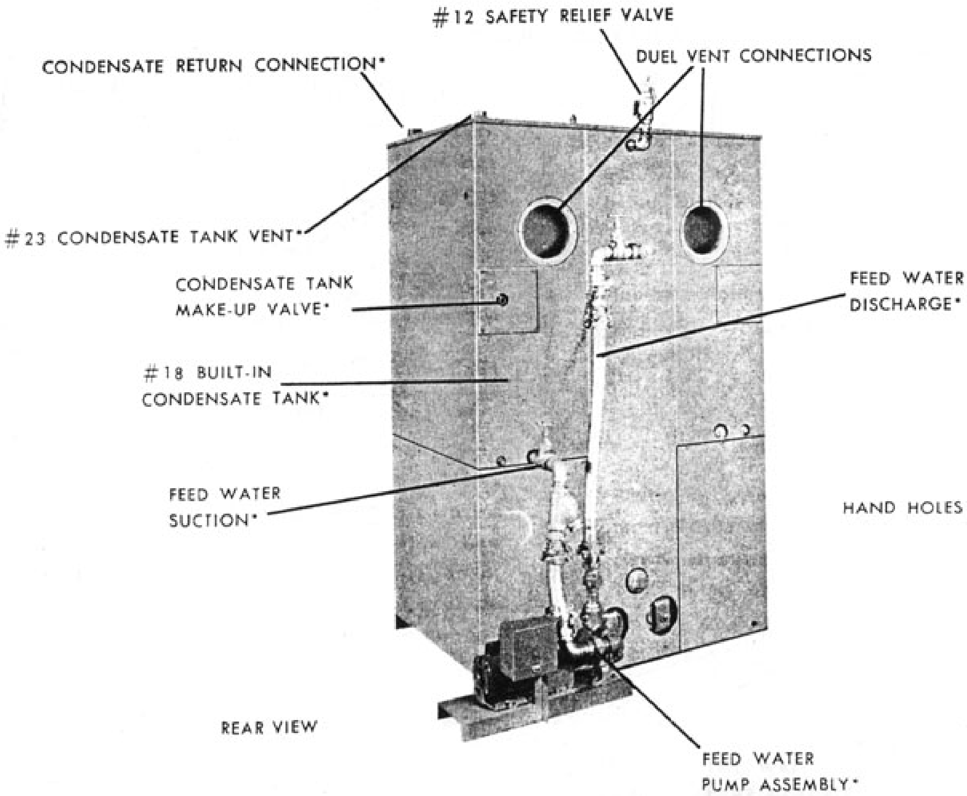
GAS FIRED MODEL

The blowdown piping, blow-offs from the gauge glass cock, and blowdown valve on the low water cut-off must be connected to the blowdown piping.

Note: Not shown on above is the return connection on top of built-in condensate tank and make-up valve and connection on the side of built-in condensate tank.

Location Steam Trim
30 HP High Pressure Steam with Built-In Condensate Tank





*Note: Not supplied with units intended for use with separate condensate system.

Concrete Pad

The boiler should be installed on a non-combustible floor, preferably a concrete pad of sufficient thickness. The weights are listed in the specification sheet to assist planning for the proper pad. The pad should be level so that all parts of the boiler assembly are firmly in contact with solid support. If the floor is uneven, it should be satisfactorily grouted.

Items #13 & 14 Metal Jacket and Insulation

The metal jacket is carefully painted. When making the installation, protect the finish with proper materials. The fiberglass insulation is attached to the inside of the metal jacket.

Item #29 Stack (Vent) Insulation

The stack should be run as directly as possible and must comply with all local regulations. Since the highest efficiency can be obtained only with the proper control of draft, it is recommended that a barometric damper be installed. (See page 2.) For oil fired units, a single acting damper can be used. For gas fired boilers use a double acting damper. When the breeching and stack are designed for Forced Draft Operation (Positive Pressure) the barometric damper should be omitted.

NOTE: The 30 HP VTB boiler has two (2) separate 8" diameter vent connections. These are located in the rear of the boiler, opposite the burner. Two independent stacks can be run from these connections to the outside, or the two connections can be joined to a common stack using a "TEE" or "Y". The common stack for the two connections should be a minimum of 12" diameter. The vent should be insulated to prevent high ambient temperatures in the boiler room. A good grade of 85% magnesium with a canvas covering would be satisfactory.

Feedwater System for Steam Boilers

Steam boilers require a feedwater system. The object of a feedwater system is to collect the condensate from the piping and store the water until the boiler needs water. The pump then injects the water into the boiler. The storage tank can be equipped with heaters to control the temperature of the water in the tank. The storage tank must be equipped with water make-up valves to replace any water which is lost.

Item #18 Separate Condensate Tank

The 22 gallon capacity tank is for use with VTB models 7, 12, and 16; the 40 gallon capacity tank is for use with the VTB-20 and VTB-30. When full, the capacity of these tanks will be a minimum of 33% of the output of the boiler, so that the boiler can produce the output for a minimum of 20 minutes without adding any makeup water to the tank.

The tank is elevated to create a positive head on the feedwater pump. The head provided is approximately three (3) feet from the normal water line to the centerline of the pump. This head is sufficient for pumping water up to 180º F.

The tank is equipped with a gauge glass (Item #20) and a make-up valve (Item #21). When large quantities of make-up water are added, provisions should be made to heat this water. When more than 5% make-up water is added, a water meter should also be added to indicate the amount of water used for treatment of the boiler water.

Item #22 shows the condensate line to the tank. This line should be equipped with a wasting tee and valve to prevent oil and foreign matter from getting into the tank on the first startup of the system.

Built-In Condensate Tank

All VTB Steam Boilers are available with a built-in condensate tank. These models do not require a separate tank. This tank is located on the rear of the 7, 12, 16, and 20 HP models, and on the side of the 30 HP size. This tank is equipped with a gauge glass, drain connection and make-up valve. The tank has two openings on top for condensate return and venting. The tank MUST be vented to the atmosphere to prevent a pressure build up.

NOTE: Waste condensate until all oil is out of piping system.

DO NOT PUT WATER TREATMENT INTO THE CONDENSATE TANK

Feedwater

When multiple installations are made, a common receiver can be located in a central position, piped as per installation drawing. It is recommended that each unit have its own pump and be operated as an independent unit, with an independent water level from the float pump switch on the unit. Discharge pump line is to be equipped with a swing check, stop valve #24. When condensate tank is higher than the boiler water line, a spring-loaded check valve is also required to prevent boiler from flooding after shutdown.

Item #23 Condensate Tank Vent to Atmosphere

Condensate return tank must be vented to the atmosphere to prevent the tank from collapsing due to vacuum buildup on shutdowns. It will also protect the tank against excessive pressure build-up. A pressure relief valve should be installed in the tank as an additional precaution against excessive pressure build-up. The vent provides a means for venting oxygen liberated by heating the water. The vent will also provide the necessary protection in the event excessive water is returned from the system to the tank.

The vent should be sized in accordance with the table below. The vent piping should be run full size with as few fittings as possible and with no reduction in size or restrictions. The vent piping should be pitched upwards so that water cannot be trapped in the vent piping. Also, precautions must be taken to prevent freezing of the vent line.

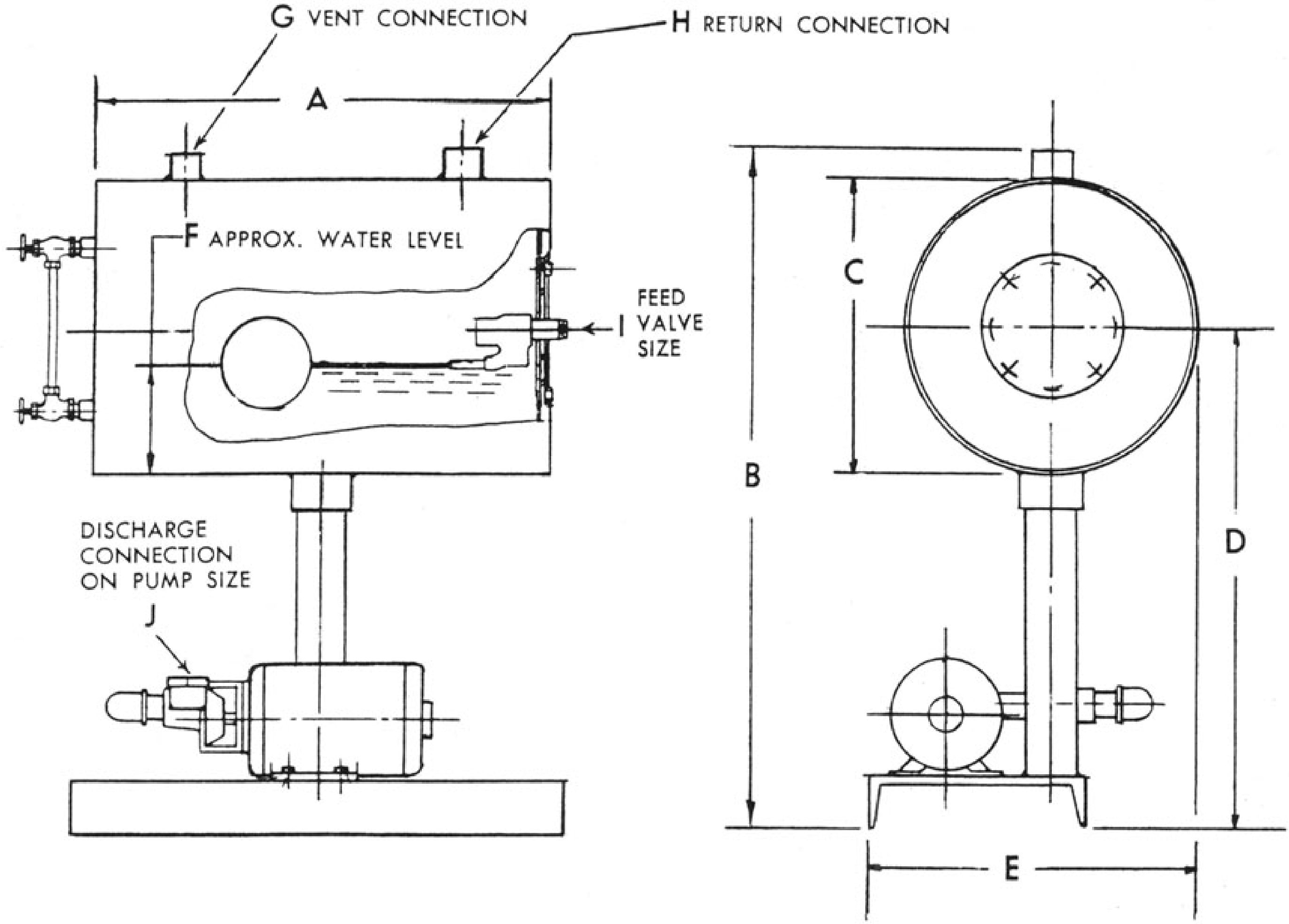
Vent Pipe Size

Tank Vent Conn. Size - IPS	Tank Vent Pipe Size – IPS	Tank Size - Gallons
1-1/4"	1-1/4"	22 & smaller
2"	2"	23 through 40

Height of condensate vent piping not to exceed 12' 0" from tank.

FEEDWATER SYSTEM

(Do not place Feedwater Chemicals into Condensate Tank)



Tank Size	A	B	C	D	E	F	G	H	I	J
22 gal.	26"	38"	16-1/4"	28"	18-1/4"	6"	1-1/4"	1-1/4"	3/4"	1"
40 gal.	38"	40"	18-1/4"	29"	19-1/4"	7"	2"	2"	3/4"	1"

Item #25 Steam Piping
Main Bleed Trap

A screwed connection is provided on the steam outlet. The size opening furnished on the unit should be maintained in all the piping from the unit to the steam header. During certain periods of operation of any steam plant, steam will condense in the header and remain there unless drained. In pressure piping, water caught in the rapid flow of live steam has been known to cause severe damage and destruction in steam lines and fittings. Any change in elevation should be provided with drains or automatic traps to drain or eliminate any possibility of an accumulation of water in the piping. The proper installation of traps should be provided with strainers and valves to facilitate cleaning and repairs of the traps.

Item #26 Stop Valve

Many times it will become necessary to take a boiler off the line and allow the others to remain in operation. This may be necessary due to cleaning the fire or water sides of the units, or to facilitate normal service to the equipment. A stop valve allows the unit to be cut off from the entire system without disrupting the other boilers needed to provide the steam load. This valve shall be dripped with trap and accessories when necessary.

Non-Return Valve

It is considered good practice that a non-return valve be installed. On multiple installations, a non-return valve is a necessity and should be installed as close to the boiler steam connection as is practical. This valve assembly will prevent the steam produced by the lead boiler or boilers from backing up into the boilers not operating at the same pressure.

If it were not for this valve, the steam produced by the lead boiler would flow into the steam space of other boilers, condense and eventually flood the remaining units. A rising steam valve should always be installed in the steam outlet after the non-return valve.

Items #27 and 30 Insulation Piping

It is recommended that all steam and return piping and breeching in the boiler room be covered. This covering is necessary to eliminate, as much as possible, radiation loss, making the plant more efficient and secondly, to cut down on ambient temperature build-up in the boiler room. A good grade of covering would be to use 85% magnesium and a desirable covering such as canvas to prevent deterioration of the insulation and for ease of painting.

Blowdown of Boiler (Steam Boilers)

To properly remove solids from the boiler, a blowdown connection is provided. Connect to the blowdown tank. There are blowdown connections on the water column and the low water cut-off. These should be connected to the blowdown tank. The installation drawings give the necessary instructions on this system.

Item #28 "Y" Blowdown Valve

This valve is used to regulate the flow of blowdown products from the boiler proper. The valve operation is such that it controls the amount of product being removed from the boiler through the blowdown procedure.

Blowdown Tank

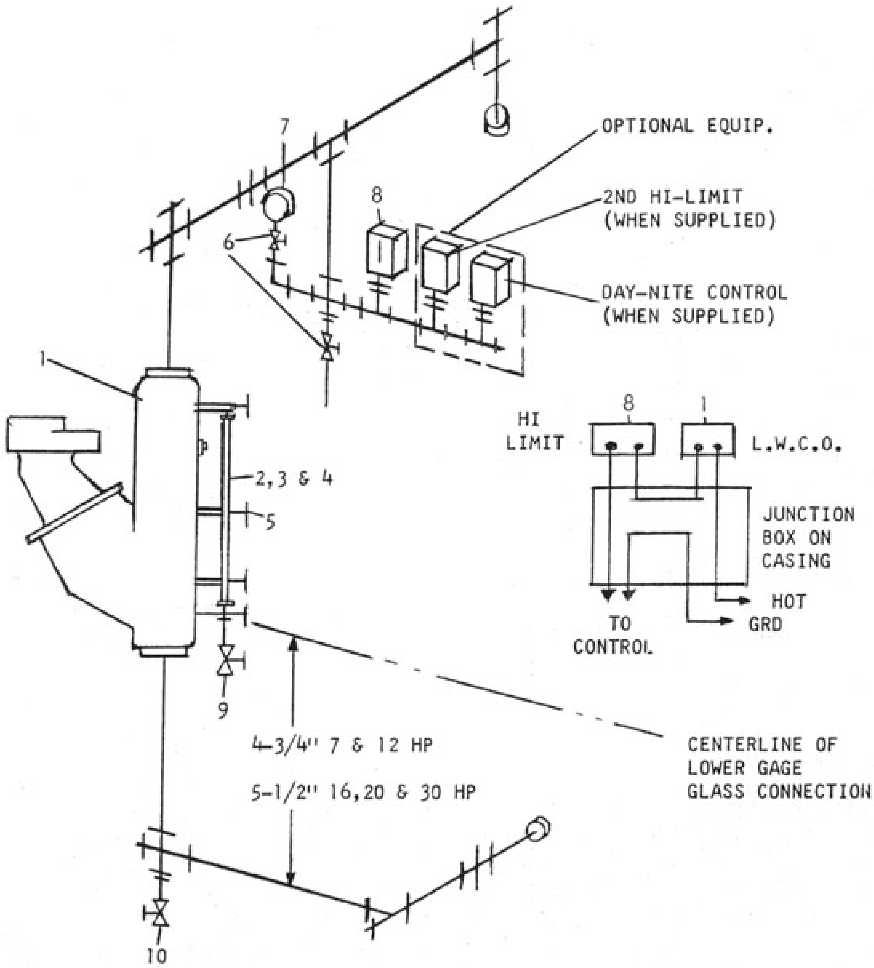
A blowdown tank is recommended for boiler installations to allow for proper blowdown of all the units without affecting the drain or sewer connection. City and State codes sometimes insist on complete protection against live steam or hot water under pressure being applied to sewer piping. Pressurized blowdown water can cause serious personal injury if not controlled.

The blowdown tank is vented to the atmosphere to prevent pressuring drains and sewers. The tank is also equipped with water valves which blend cold city water with the blowdown products, with a thermometer to adjust cold water to steam blowdown product to maintain a control temperature.

Item #31 Fresh Air to the Boiler Room

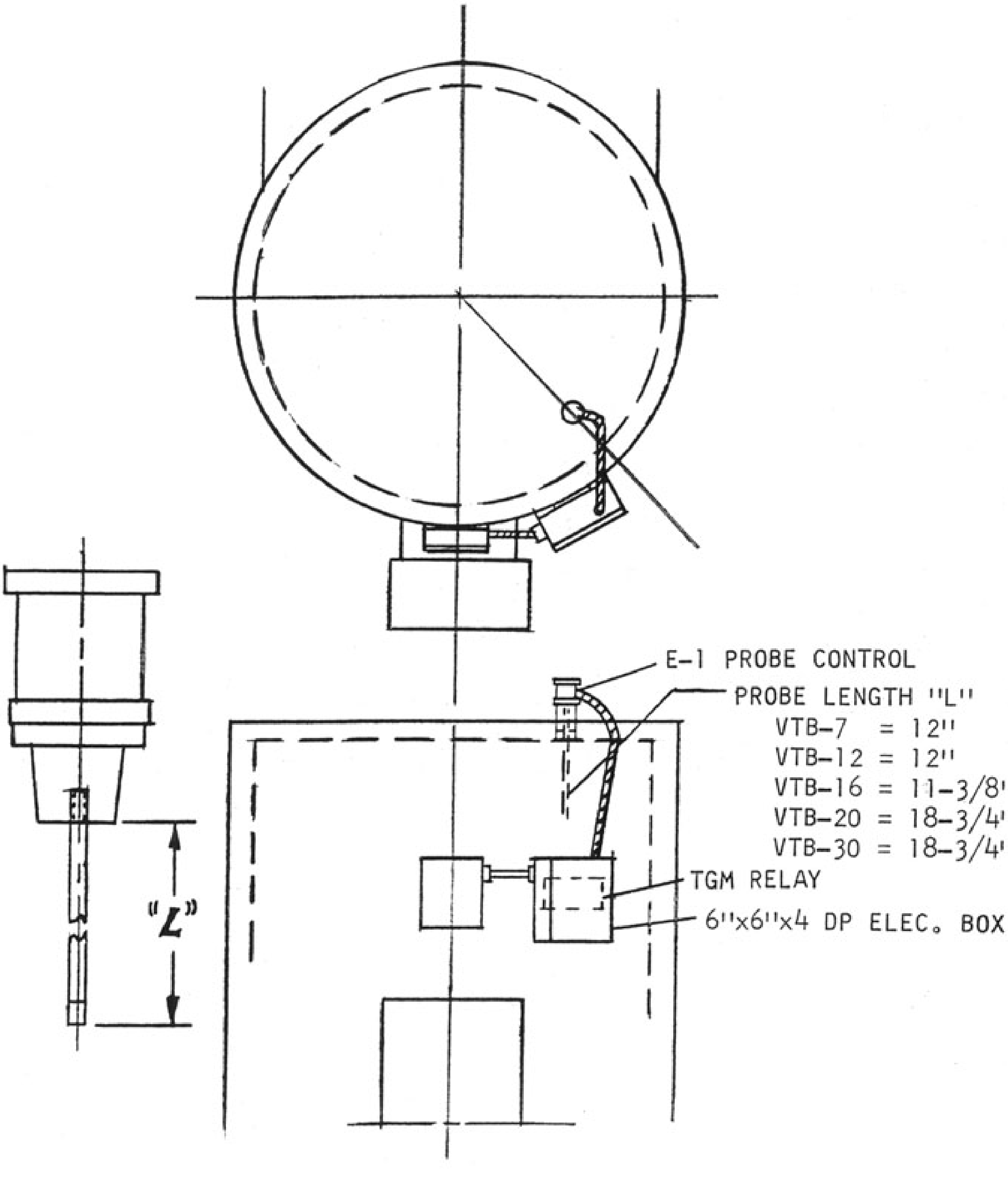
Maintain sufficient louvers or openings into the boiler room to admit air for combustion and to keep the ambient temperatures below 90^{o} F. See suggested sizes on page 2.

#157 LWCO Misc. Pipe Fittings
Vertical Tubeless Boiler
W/Optional Controls When Provided



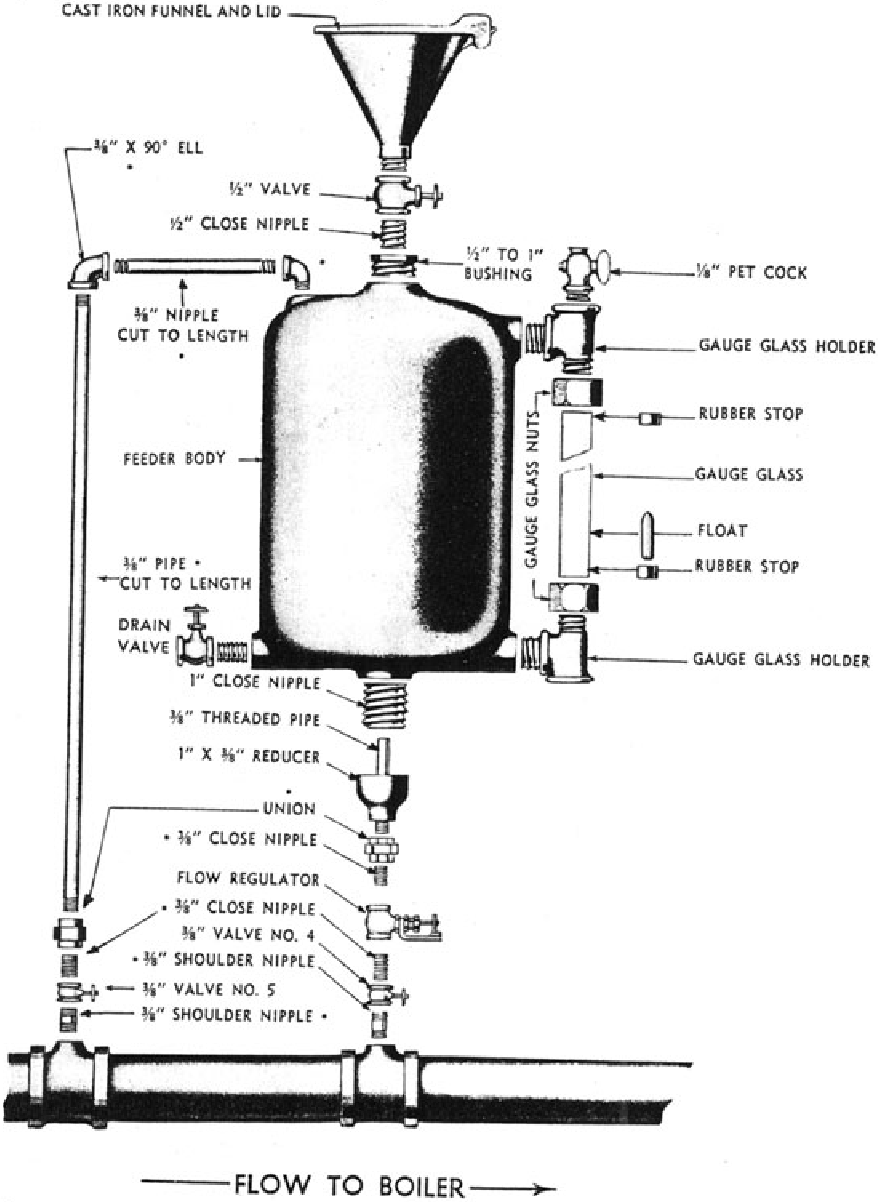
Ref. No.	Part Name	No. Req.	Part No.
1	M&M 157-YM LWCO with Manual Reset	1	51207
2	Gauge Glass Rod	2	51223
3	Water Gauge Set 1/2" IPS	1	64212
4	Water Gauge Glass	1	64624
5	Tricock 1/2" IPS	2	51224
6	Petcock 1/4" IPS Brass	2	67654
7	Pressure Gauge 4-1/2" 0-300#	1	55289
8	Pressuretrol 150# L404A	1	51227
9	Gate Valve 1/4" 200#	1	56780
10	Gate Valve 3/4" 200#	1	52420
	Safety Valve		
	3/4" 7, 12, & 16 HP (125 PSI)	1	109668
	1" 20 & 30 HP (150 PSI)	1	109662

E-1 Type 2nd LWCO
Vertical Tubeless Boilers
(Optional)



By-Pass Chemical Feeder

Important: Please check feeder parts carefully when unpacking. If feeder shipment is not complete, notify us immediately.



* Furnished by installer

Assembly of Feeder

Identify the above parts as you lay them out. Assemble the feeder as shown.

Install 3/8" nipple and 3/8" globe valve in bottom side opening of feeder for drain. Connect gauge glass by first inserting rubber washer inside one end of gauge glass 3/4" from the end. Then put in float and second rubber washer inside glass 3/4" from the end. This prevents the float from dropping out of sight. Put in gauge glass holders, installing the one with the petcock on top. Insert gauge glass.

Use 3/8" standard iron pipe for equalizing line and cast iron or malleable iron fittings as indicated.

Backwash and Flushout of Feeder

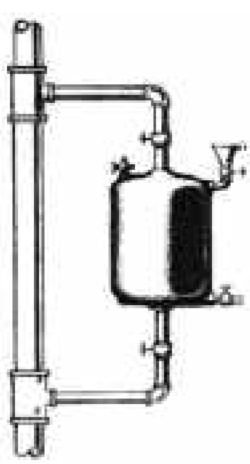
CAUTION: Each time before feeder is filled, it must be flushed out thoroughly. This is done by opening globe valve No. 5 and closing the flow regulator valve and opening the drain valve at bottom of feeder. In this way, the water flows directly through the feeder and out the drain, keeping the feeder clean.

IMPORTANT: Every time, while flushing feeder, backwash the flow regulator as follows: Close globe valve No. 5 and open gate valve No. 4. Open the drain valve. Turn the indicator wheel counter-clockwise until the flow regulator is opened full. Leave open 10 seconds. Close the regulator. Close the drain valve. Then reset the indicator wheel on the flow regulator to the point indicating the correct flow for the required dosage.

Filling the Feeder

When the feeder has been flushed and the flow regulator backwashed, close valves No. 4 and No. 5. Open the drain valve to relieve pressure. Open the funnel valve. Drain feeder. Then, close valve. Open petcock on upper gauge glass holder to vent feeder while filling. Pour in the required dosage of treatment which has been mixed with at least an equal quantity of water and stirred thoroughly. Crack No. 5 valve and allow water from the line to fill the feeder until water comes out of the vent petcock. Close valve No. 5, close petcock and funnel valve. Fill the funnel with water. Open valves No. 4 and No. 5 completely.

Adjust flow regulator so dosage will flow in gradually over period required. This is done by observing float in gauge glass. When feeder is filled, the float will be at top of the gauge glass. As treatment feeds out, the float gradually sinks and when all treatment has been fed into the system, the float will be at the bottom of the glass even though the feeder is still full of water. By observing the float sinking, indicator pointer on float regulator can be so adjusted that the dosage will feed gradually into the system over the required period of time. Valves No. 4 and No. 5 should always be left wide open while the feeder is in operation. All flow adjustment must be made with the flow regulator.



Optional One-Shot Feeder

The One-Shot Feeder is of cast-iron construction and is tapped for a one-inch feed line. The one-shot feeder comes supplied with feeder body, funnel, close nipples, globe valves, 90º street ell, pipe plug, reducer bushing and petcock. The One-Shot Feeder should be installed in a vertical section of the feed line – as close to the boiler as possible – and near convenient valves already located in the boiler feed line. The One-Shot Feeder is quite simple to use. Dosage is merely mixed with equal amounts of warm water and poured into the feeder through the funnel.