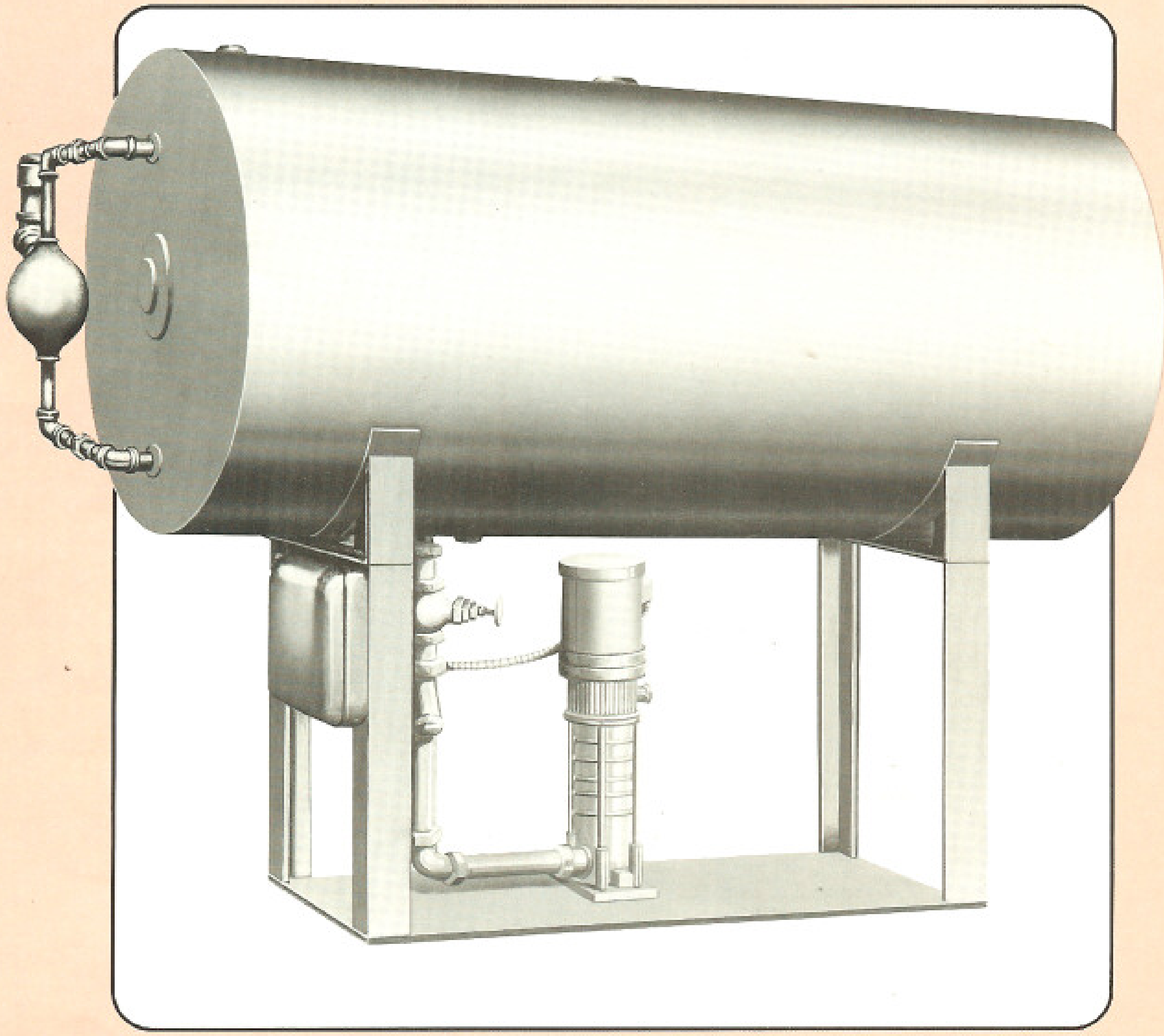
YORK SHIPLEY

feed·water

50 CYCLE



YORK-SHIPLEY™

693 N. Hills Road, York, PA

A Division of DONLEE Technologies Inc.

feed•water SUB - ASSEMBLIES

A. TANK ASSEMBLY
1. Tank with necessary connections
2. Gauge glass
3. Gauge cocks
4. Thermometer
5. Internal baffle

B. TANK STAND ASSEMBLY
1. Welded structural steel base

C. MAKE-UP WATER ASSEMBLY
Type #221
1. Built-in float valve with integral strainer
2. By-Pass valves

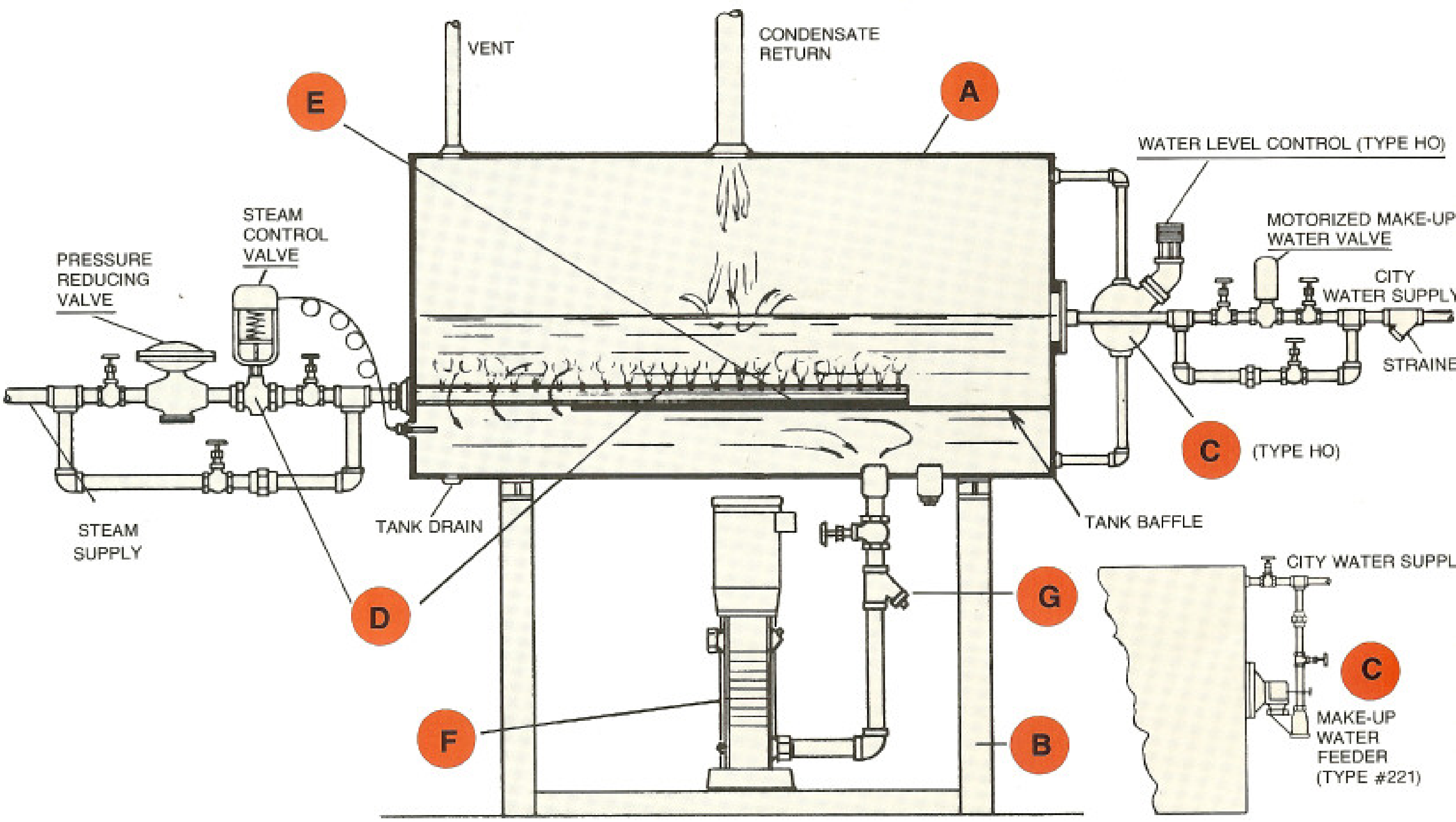
Type #HO
1. External float switch
2. Motorized water valve
3. Y-type strainer
4. By-Pass valves

D. HEATER ASSEMBLY
1. Direct acting thermostatic steam valve
2. Y-type strainer
3. Perforated steam diffuser tube
4. Steam pressure reducing valve (for high pressure steam only)

E. HIGH PRESSURE RETURN
1. Below water line perforated tube

F. PUMP
1. Centrifugal type feed water pump
2. Electric motor
3. Direct coupling
4. Coupling guard
5. Motor controller with overload protection. (Shipped loose)

G. TRIM & PIPING
1. Y-type strainer & gate valve
2. Gauge (compound)
3. Thermometer
4. Stop, check and spring loaded check valves. (Shipped loose)



COMPLETELY ASSEMBLED – DUPLEX PUMPS OR SINGLE PUMP

Selection of Feedwater Pump and Motor Assembly

Select a pump and motor for each boiler. The pump and motor assembly should be selected from the following tables. The pump and motor assembly must be sized for the maximum boiler rating (HP) and the design pressure of the boiler. The pump capacities are based on the conditions in the following table.

WATER LEVEL HEIGHT FROM C/L OF PUMP	
Temperature	**Height**
200°F	**7′**
190°F	**5′**
180°F	**4′**

CONSULT THE FACTORY FOR CORRECT HEIGHTS AND PUMP SELECTIONS FOR FEED WATER TEMPERATURES ABOVE 200°F.

* Fractional HP Motors-1 PH
Integral HP Motors-3PH

BOILER			FEED WATER PUMP				MOTOR	
Working Press P.S.I.	Size H.P.	Evap. Rate G.P.M.	Model No.	Capacity G.P.M.	Discharge Size	Suction Size	*H.P.	R.P.M.
#15	25	1.73	CR2-20U	12	1¼	1¼	½	2900
	30	2.07	CR2-20U	12	1¼	1¼	½	2900
	40	2.76	CR2-20U	12	1¼	1¼	½	2900
	50	3.45	CR2-20U	12	1¼	1¼	½	2900
	60	4.14	CR2-20U	12	1¼	1¼	½	2900
	70	4.83	CR2-20U	12	1¼	1¼	½	2900
	80	5.52	CR2-20U	12	1¼	1¼	½	2900
	100	6.90	CR2-20U	12	1¼	1¼	½	2900
	125	8.60	CR4-20U	23.48	1¼	1¼	¾	2900
	150	10.40	CR4-20U	23.48	1¼	1¼	¾	2900
	175	12.10	CR4-20U	23.48	1¼	1¼	¾	2900
	200	13.80	CR4-20U	23.48	1¼	1¼	¾	2900
	225	15.50	CR4-30U	31.86	1¼	1¼	1½	2900
	250	17.30	CR4-30U	31.86	1¼	1¼	1½	2900
	300	20.70	CR4-30U	31.86	1¼	1¼	1½	2900
	350	24.20	CP8-20U	44.7	2	2	1½	2900
	400	27.60	CP8-20U	44.7	2	2	1½	2900
	500	34.50	CR30-10U	90.7	2½	2½	3	2900
	600	41.40	CR30-10U	90.7	2½	2½	3	2900
	700	48.30	CR30-10U	90.7	2½	2½	3	2900
	800	55.20	CR30-10U	90.7	2½	2½	3	2900
	850	58.60	CR60-20/1U	136.49	4	4	5	2900
	1000	69.00	CR60-20/1U	136.49	4	4	5	2900
100#	7	.48	CR2-100U	9.25	1¼	1¼	3	2900
	12	.83	CR2-100U	9.25	1¼	1¼	3	2900
	16	1.10	CR2-100U	9.25	1¼	1¼	3	2900
	20	1.38	CR2-100U	9.25	1¼	1¼	3	2900
	25	1.73	CR2-100U	9.25	1¼	1¼	3	2900
	30	2.07	CR2-100U	9.25	1¼	1¼	3	2900
	40	2.76	CR2-100U	9.25	1¼	1¼	3	2900
	50	3.45	CR2-100U	9.25	1¼	1¼	3	2900
	60	4.14	CR2-100U	9.25	1¼	1¼	3	2900
	70	4.83	CR2-100U	9.25	1¼	1¼	3	2900
	80	5.52	CR2-120U	12.11	1¼	1¼	3	2900
	100	6.90	CR2-120U	12.11	1¼	1¼	3	2900
	125	8.60	CR4-100U	17.98	1¼	1¼	5	2900
	150	10.40	CR4-100U	17.98	1¼	1¼	5	2900
	175	12.10	CR4-120U	24.44	1¼	1¼	5	2900
	200	13.80	CR4-120U	24.44	1¼	1¼	5	2900
	225	15.50	CR4-160/14U	28.08	1¼	1¼	5	2900
	250	17.30	CR4-160/14U	28.08	1¼	1¼	5	2900
	300	20.70	CP8-100KU	41.91	2	2	7½	2900
	350	24.20	CP8-100KU	41.91	2	2	7½	2900
	400	27.60	CP8-120KU	47.25	2	2	10	2900
	500	34.50	CR16-60U	64.16	2	2	10	2900
	600	41.40	CR16-70U	81.82	2	2	10	2900
	700	48.30	CR16-70U	81.82	2	2	10	2900
	800	55.20	CR30-80/6U	107.32	2½	2½	20	2900
	850	58.60	CR30-80/6U	107.32	2½	2½	20	2900
	1000	69.00	CR30-80/7U	132.09	2½	2½	20	2900
125#	7	.48	CR2-120U	8.23	1¼	1¼	3	2900
	12	.83	CR2-120U	8.23	1¼	1¼	3	2900
	16	1.10	CR2-120U	8.23	1¼	1¼	3	2900
	20	1.38	CR2-120U	8.23	1¼	1¼	3	2900
	25	1.73	CR2-120U	8.23	1¼	1¼	3	2900
	30	2.07	CR2-120U	8.23	1¼	1¼	3	2900
	40	2.76	CR2-120U	8.23	1¼	1¼	3	2900
	50	3.45	CR2-120U	8.23	1¼	1¼	3	2900
	60	4.14	CR2-120U	8.23	1¼	1¼	3	2900
	70	4.83	CR2-120U	8.23	1¼	1¼	3	2900
	80	5.52	CR2-150U	12.38	1¼	1¼	5	2900
	100	6.90	CR2-150U	12.38	1¼	1¼	5	2900
	125	8.60	CR4-120U	17.07	1¼	1¼	5	2900
	150	10.40	CR4-160/14U	22.73	1¼	1¼	5	2900
	175	12.10	CR4-160/14U	22.73	1¼	1¼	5	2900
	200	13.80	CR4-160/14U	22.73	1¼	1¼	5	2900
	225	15.50	CP8-100KU	31.96	2	2	7.5	2900
	250	17.30	CP8-100KU	31.96	2	2	7.5	2900
	300	20.70	CP8-120KU	40.95	2	2	10	2900
	350	24.20	CP8-120KU	40.95	2	2	10	2900
	400	27.60	CP16-70U	54.30	2	2	10	2900
	500	34.50	CR16-80U	76.17	2	2	10	2900
	600	41.40	CR16-80U	76.17	2	2	10	2900
	700	48.30	CR16-80U	76.17	2	2	10	2900
	800	55.20	CR30-80/7U	94.11	2½	2½	20	2900
	850	58.50	CR30-80/7U	94.11	2½	2½	20	2900
	1000	69.00	CR30-80U	122.18	2½	2½	25	2900
150#	20	1.38	CR2-150U	9.69	1¼	1¼	5	2900
	25	1.73	CR2-150U	9.69	1¼	1¼	5	2900
	30	2.07	CR2-150U	9.69	1¼	1¼	5	2900
	40	2.76	CR2-150U	9.69	1¼	1¼	5	2900
	50	3.45	CR2-150U	9.69	1¼	1¼	5	2900
	60	4.14	CR2-150U	9.69	1¼	1¼	5	2900
	70	4.83	CR2-150U	9.69	1¼	1¼	5	2900
	80	5.52	CR2-150U	9.69	1¼	1¼	5	2900
	100	6.90	CR2-180U	12.66	1¼	1¼	5	2900
	125	8.60	CR4-160/14U	16.95	1¼	1¼	5	2900
	150	10.40	CP8-120KU	32.80	2	2	10	2900
	175	12.10	CP8-120KU	32.80	2	2	10	2900
	200	13.80	CP8-120KU	32.80	2	2	10	2900
	225	15.50	CP8-120KU	32.80	2	2	10	2900
	250	17.30	CP8-120KU	32.80	2	2	10	2900
	300	20.70	CR16-80U	42.63	2	2	15	2900
	350	24.20	CR16-80U	42.63	2	2	15	2900
	400	27.60	CR30-80U	83.43	2½	2½	25	2900
	500	34.50	CR30-80U	83.43	2½	2½	25	2900
	600	41.40	CR30-80U	83.43	2½	2½	25	2900
	700	48.30	CR30-80U	83.43	2½	2½	25	2900
	800	55.20	CR30-90U	115.58	2½	2½	25	2900
	850	58.60	CR30-90U	115.58	2½	2½	25	2900
	1000	69.00	CR30-90U	115.58	2½	2½	25	2900

Dimensions and specifications for components are subject to change without notice.

NOTE: Pump Ratings for 15# Pumps Based On 20 P.S.I. Pump Discharge. All other Pumps Based On 10 P.S.I. above Design Pressure.

Selection of Proper Tank Size

Determine total load on boiler or boilers. This may be smaller than the boiler size because of reserve or stand-by capacity. Using total load, select tank size from chart below.

Total Load Horsepower	Total Load Lbs. Steam Hr.	Tank Size Gal.	Weight Tank	Weight Tank Stand
25	862	50**	210 lbs.	220 lbs.
30	1035	50**	210 lbs.	220 lbs.
40	1380	50**	210 lbs.	220 lbs.
50	1725	50**	210 lbs.	220 lbs.
60	2070	90	320 lbs.	220 lbs.
70	2415	90	320 lbs.	220 lbs.
80	2760	90	320 lbs.	220 lbs.
100	3450	150	440 lbs.	235 lbs.
125	4313	150	440 lbs.	235 lbs.
150	5175	210	560 lbs.	235 lbs.
175	6038	260	680 lbs.	290 lbs.
200	6900	260	680 lbs.	290 lbs.
225	7763	315	725 lbs.	290 lbs.
250	8625	315	725 lbs.	290 lbs.
300	10350	400	835 lbs.	385 lbs.
350	12070	400	835 lbs.	385 lbs.
400	13800	500	1020 lbs.	385 lbs.
500	17250	500	1020 lbs.	385 lbs.
600	20700	650	1515 lbs.	385 lbs.
700	24150	750	1680 lbs.	385 lbs.
800	27600	750	1680 lbs.	385 lbs.
1000	34500	1050	2230 lbs.	560 lbs.
1200	41400	1250	2790 lbs.	575 lbs.
1400	48300	1400	3095 lbs.	575 lbs.
1600	55200	1650	3500 lbs.	725 lbs.
2000	69000	2050	4220 lbs.	725 lbs.

**Use 40 gallon packaged feedwater assembly when tank heater assembly not required. See Page 7 for dimensional data.

Selection of High Pressure Return Diffuser (When Required)*

Having determined the tank size from the chart, select the proper diffuser from the table below:

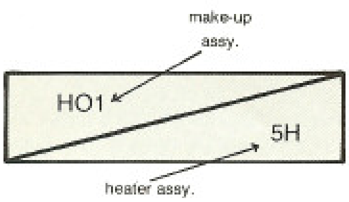
Tank Size	High Press. Return Ass'y.	Inlet Size (NPT)
50	A	1″
90	C	1″
150	C	1″
210	D	1″
260	F	1¼″
315	F	1¼″
400	F	1¼″
500	G	2″
650	G	2″
750	G	2″
1050	K	2½″
1250	K	2½″
1400	K	3″
2050	M	3″

* Used when live steam is returned to tank.
Note: Ass'y. length varies with tank length.

Selection of Proper Make-up Water Assembly and Tank Heater Assembly

Using the total load determined on the preceding page, use this chart to select the proper make-up assembly and heater assembly. The percent of make-up water must be measured or estimated.

The letter "H" in the heater assembly indicates it is for use with high pressure boilers. When used with low pressure boilers (15 psi or below) omit the letter "H" from the model number.



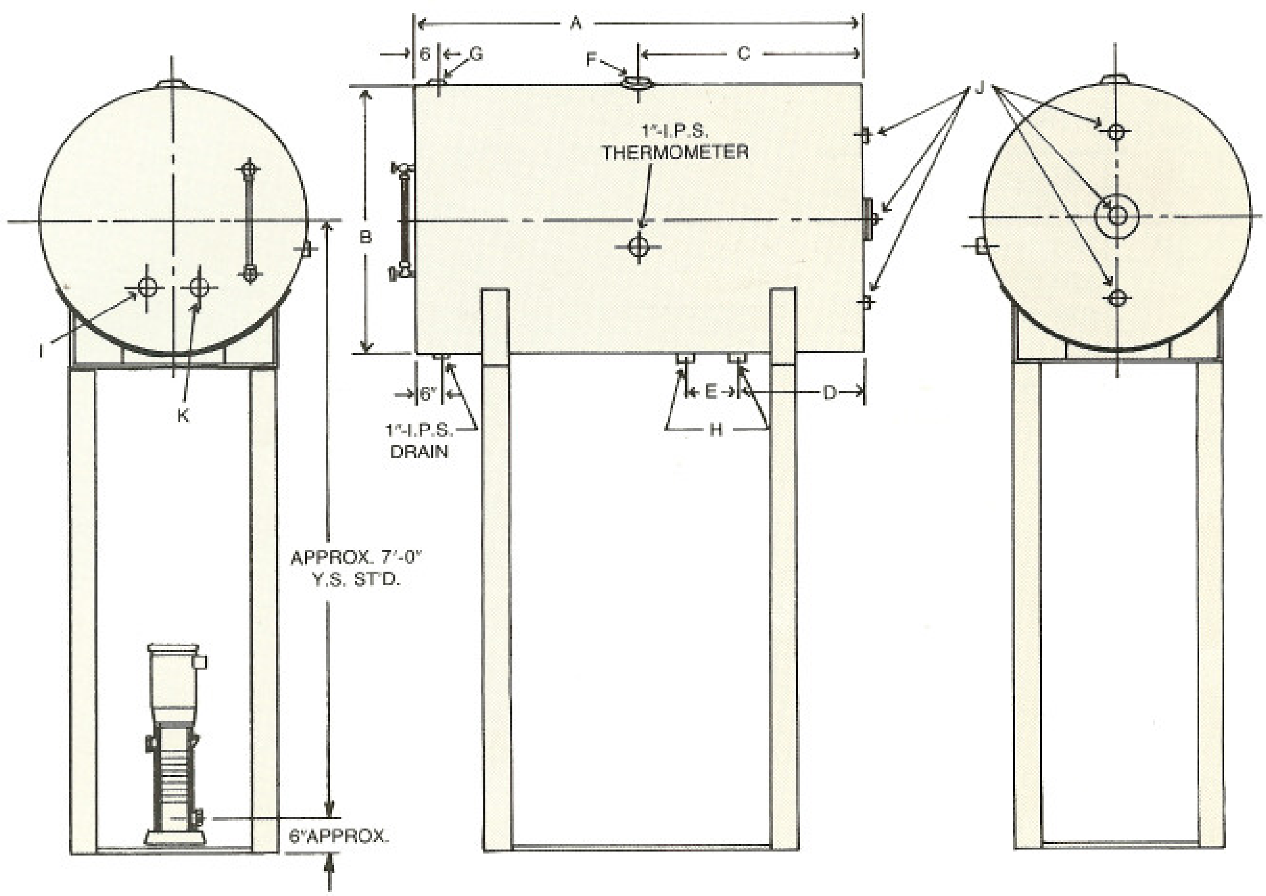
Make-Up Ass'y.	Inlet Size (NPT)	Heater Ass'y.	Inlet Size (NPT)
#221	¾"	4H thru 13H	½"
HO-1	1"	14H thru 20H	¾"
HO-1¼	1¼"	22H thru 32H	1"
		33H thru 38H	1¼"
		40H thru 45H	1½"
		46H thru 52H	2"
		54H thru 57H	2½"
		59H thru 60H	3"

Total Load Hp	PERCENT MAKE-UP 10%	25%	50%	75%	100%
25	221 / 4H	221 / 5H	221 / 6H	221 / 6H	221 / 14H
30	221 / 4H	221 / 5H	221 / 6H	221 / 14H	221 / 14H
40	221 / 4H	221 / 5H	221 / 6H	221 / 14H	221 / 14H
50	221 / 4H	221 / 5H	221 / 6H	221 / 14H	221 / 14H
60	221 / 8H	221 / 9H	221 / 15H	221 / 22H	221 / 22H
70	221 / 8H	221 / 9H	221 / 15H	221 / 22H	221 / 22H
80	221 / 8H	221 / 9H	221 / 15H	221 / 22H	221 / 22H
100	221 / 8H	221 / 9H	221 / 15H	221 / 22H	221 / 22H
125	221 / 8H	221 / 9H	221 / 15H	221 / 22H	221 / 22H
150	221 / 11H	221 / 16H	221 / 23H	221 / 23H	221 / 23H
175	221 / 12H	221 / 17H	221 / 24H	221 / 24H	221 / 33H
200	221 / 12H	221 / 17H	221 / 24H	221 / 24H	221 / 33H
225	221 / 13H	221 / 18H	221 / 25H	221 / 25H	221 / 34H
250	221 / 13H	221 / 18H	221 / 25H	221 / 25H	HO1 / 34H
300	221 / 13H	221 / 25H	221 / 25H	221 / 34H	HO1 / 40H
350	221 / 13H	221 / 25H	221 / 25H	HO1 / 34H	HO1 / 40H
400	221 / 19H	221 / 26H	221 / 35H	HO1 / 41H	HO1 / 46H
500	221 / 19H	221 / 26H	HO1 / 35H	HO1 / 41H	HO1 / 46H
600	221 / 20H	221 / 27H	HO1 / 36H	HO1 / 42H	HO1 / 47H
700	221 / 20H	221 / 27H	HO1 / 42H	HO1 / 47H	HO1 / 47H
800	221 / 20H	221 / 27H	HO1 / 42H	HO1 / 47H	HO1¼ / 47H
1000	221 / 29H	HO1 / 37H	HO1 / 49H	HO1 / 49H	HO1¼ / 54H
1200	221 / 30H	HO1 / 38H	HO1 / 50H	HO1¼ / 50H	HO1¼ / 55H
1400	HO1 / 30H	HO1 / 44H	HO1 / 50H	HO1¼ / 55H	HO1¼ / 55H
1600	HO1 / 31H	HO1 / 45H	HO1¼ / 51H	HO1¼ / 56H	HO1¼ / 59H
2000	HO1 / 32H	HO1 / 52H	HO1¼ / 57H	HO1¼ / 60H	HO1¼ / 60H

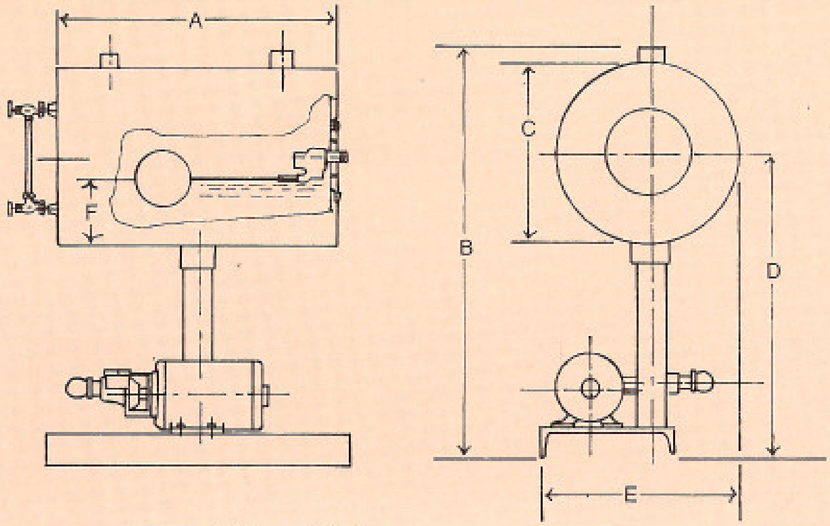
Tank Dimensions

TANK SIZE	LENGTH A	DIAM. B	C	D	E	LOW PRESSURE RETURN F	VENT G	SUCTION H	HI PRESSURE RETURN I	MAKE-UP J	TANK HEATER K
50	3′-0″	1′-8″	1′-6″	1′-0″	8″	3″	¾″	2″	1″	VARIES WITH PERCENTAGE MAKE UP	1″
90	3′-10″	2′-0″	1′-11″	1′-4″	8″	3″	¾″	2″	1″		1″
150	4′-1″	2′-6″	2′-½″	1′-4″	8″	4″	1″	2″	1″		1″
210	5′-0″	2′-8″	2′-6″	1′-6″	8″	4″	1½″	2″	1″		1″
260	6′-3″	2′-8″	3′-1½″	2′-0″	8″	4″	1½″	2″	1¼″		1¼″
315	5′-4″	3′-2″	2′-8″	2′-0″	8″	4″	1½″	2″	1¼″		1¼″
400	5′-6″	3′-6″	2′-9″	2′-0″	8″	4″	2″	2″	1¼″		1¼″
500	7′-0″	3′-6″	3′-6″	2′-0″	12″	4″	2″	2½″	2″		2″
650	7′-0″	4′-0″	3′-6″	2′-0″	12″	4″	2½″	2½″	2″		2″
750	8′-0″	4′-0″	4′-0″	2′-6″	12″	4″	2½″	3″	2″		2″
1050	11′-3″	4′-0″	6′-½″	4′-0″	12″	4″	2½″	3″	2½″		2½″
1250	8′-6″	5′-0″	4′-3″	3′-0″	12″	4″	2½″	3″	2½″		2½″
1400	9′-6″	5′-0″	4′-9″	3′-0″	12″	4″	2½″	3″	2½″		2½″
1650	11′-2″	5′-0″	5′-7″	4′-0″	12″	6″	2½″	3″	3″		3″
2050	13′-11″	5′-0″	6′-11½″	4′-6″	12″	6″	2½″	3″	3″		3″

Dimensions and specifications are subject to change without notice.



40 GAL. PACKAGED FEEDWATER ASSEMBLY



Model	Tank Size	Pump Model	A	B	C	D	E	F
40S-1	40 Gal.	7CT7M-¾ HP	38"	40"	18¼"	29"	19¼"	7"

Available for 25 and 30 hp. Includes pump, motor, coupling, base, tank, make-up water feeder valve, and gauge glass.

Feedwater System For Steam Boilers

Either low pressure or high pressure steam requires a feed water system. The object of a feed water system is to collect the condensate from the piping, store the water until the boiler needs water, and the pump 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 makeup valves to replace any water which is lost.

CONDENSATE TANK

Capacity should be 25% of the output of the boiler or 25% of the steam requirement so the boiler can produce the output of the boiler for approximately fifteen minutes without adding any makeup water to the tank.

The tank must be elevated to create a positive head on the feed water pump. This head depends on the temperature of the water in the tank.

For temperatures above 200°F. consult the factory for correct water level heights and pump selections.

For 200°F. water level in the tank should be 7' from C/L of the pump.

For 190°F. water level in the tank should be 5' from C/L of the pump.

For 180°F. water level in the tank should be 4' from C/L of the pump.

The tank should always be equipped with a gauge glass, make-up valve, thermometer and opening in the tank to accommodate the installation of other components which should be added when the condition calls for them. When the temperature in the tank goes below 180°, or when more than 5% fresh water makeup is added to the system, a Tank Heater System should be added to the tank. Consult factory for more information regarding tank heater systems.

When more than 5% makeup water is added, a water meter should also be added to indicate the amount of water for treatment of the boiler water.

The condensate return 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.

Waste condensate until all oil is out of piping system.

The condensate line should enter below the water line in the tank for high pressure returns only.

For low pressure steam the line enters the top of the tank.

Do not put water treatment into the condensate tank.

FEED WATER

When multiple installations are made, a common receiver is located in a central position, piped as shown on page 2. It is recommended that each unit have its own pump, Discharge line and Pressure Gauge and be operated as an independent unit, with an independent water level from the float pump switch on the unit. Pipe sizes are shown on pump chart. Discharge Pump line to be equipped with a swing check and stop valve. When condensate tank is higher than boiler water line spring-loaded check valve is also required to prevent boiler from flooding after shutdown.

CONDENSATE TANK VENT

Condensate return tank should be vented to the atmosphere to prevent the tank from collapsing due to vacuum buildup on shutdowns.

It also will 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.*

The vent provides a means for venting oxygen liberated by heating the water.

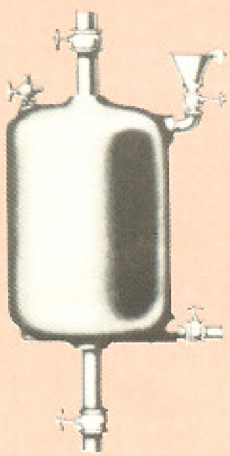
The vent will also provide the necessary protection in the event excessive water is returned from the system to the tank.

The vent should be sized in accordance with the table on page 6. *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 upward so that water cannot be trapped in the vent piping.* Also precautions must be taken to prevent freezing of the vent line.

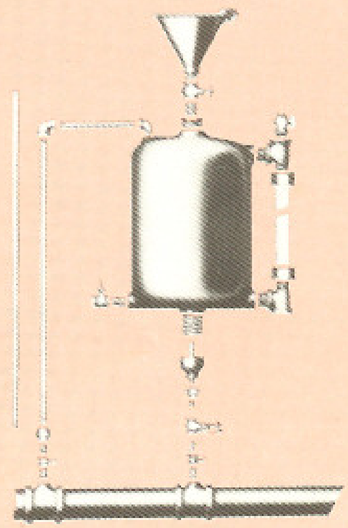
Treatment Feeders & Treatment Pump

Feed water treatment is essential to prolong and protect the life of any steam boiler. York-Shipley, Inc. recommends that a reliable water treatment company be consulted to perform regular checks of boiler water and prescribe proper treatment. Treatment must always be introduced directly into boiler and never through feed water pump or condensate tank. Boilers can be ordered with treatment feeder factory mounted and piped.

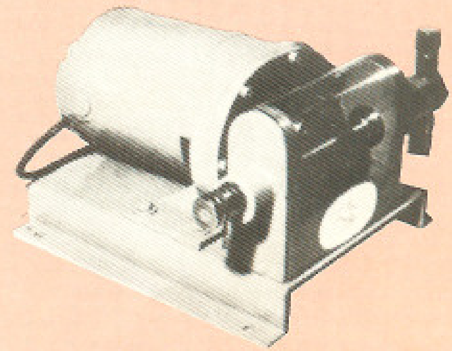
ONE-SHOT FEEDER



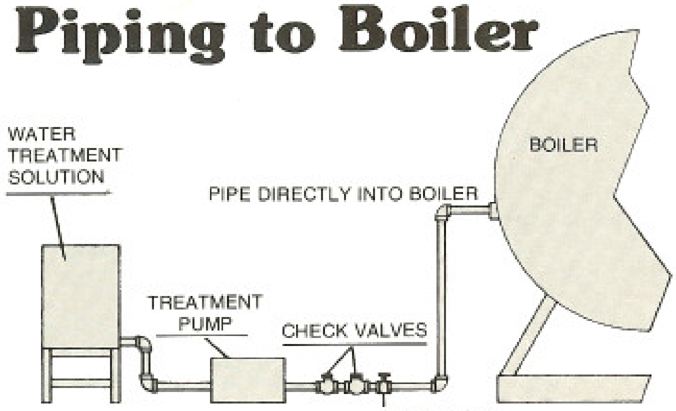
BY-PASS FEEDER

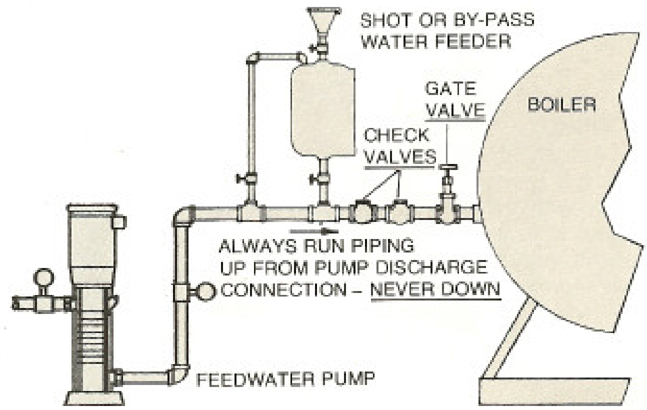


TREATMENT PUMP FEEDER



Piping to Boiler





NEVER PUT CHEMICAL TREATMENT THROUGH CONDENSATE PUMP OR IN CONDENSATE TANK

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