ROTH PUMP COMPANY

BULLETIN F204-1R5

350˚F Code Stations

Complete standardized factory assembled packages with Roth 350˚F one foot NPSH condensate pumps suitable for condensate temperatures up to 350˚F, capacities up to 150 GPM, and differential pressures up to 125 PSIG.

ROTH PUMP COMPANY TOLL FREE 1-888-444-ROTH

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INDUSTRIAL AND PROCESS STEAM

The chemical industry uses industrial steam in reactors, evaporators, distillation units, concentrators, and autoclaves in processing fats, oils, fatty alcohols, fermentation products, soaps, and detergents. Steam is used in hydrogenation polymerization, and solvent recovery processes.

Industrial steam is also used in the rubber industry for pressing and curing with hot presses, autoclaves, vulcanizers, and devulcanizers. It is used in the paper industry to heat digesters and rolls, in the food industry for melters and cookers, and in concrete block plants for drying and curing lightweight blocks. It is also required in dairies, laundries, dry cleaning plants, and recapping shops.

Saturated steam at pressures up to 125 PSIG proves the most economical heat source for industrial processes in these industries because of low energy cost per BTU and because of high rate of heat transfer and reliable and accurate range control.

SYSTEM DESIGN PROBLEMS

Designers of industrial steam equipment and systems have refined the use of steam in these industries to a high level of efficiency. Up to the present time, however, 125 PSI systems have incurred losses at higher temperature usage because of inadequate condensate return systems.

A high proportion of the equipment installed in industrial steam systems condenses steam at temperatures above 250˚F. Condensate return and boiler feed units designed for lower temperatures encounter many difficulties at these higher industrial temperatures.

Due to the lack of availability of high temperature condensate stations in the past, plant designers have found it necessary to flash high temperature returns to atmosphere in order to reduce temperature and pressure to within the limits of low temperature return stations.

PLANT OPERATING LOSSES

In this situation plant operators were forced to accept heat losses or risk returning higher temperatures to the low temperature return units with consequent breakdowns, idle time, and operating losses.

A vast improvement in this situation was the introduction in 1967 of Roth 250˚F Code Stations covered by Roth Bulletin A204. These pumping units utilize non-vented ASME code receivers and Roth low NPSH hot condensate pumps for condensate temperatures up to 250˚F.

A further advancement in Roth code stations, for temperatures up to 350˚F, was announced in 1971.

ROTH 350˚F CODE STATIONS

The Roth jacketed condensate pumps provided on 350˚F code stations are ideal mechanisms for moving boiling water. Due to their patented design no cavitation can occur handling boiling water with as low as one foot suction head.

A special balanced mechanical seal with jewel-hard tungsten carbide or silicon carbide seat is set in an isolated chamber and water jacketed to control seal operating temperature.

Automatic control of cooling water at the seal is provided by a flow switch and a solenoid valve in the cooling water line electrically interlocked with the pump motor starter.

A probe control in the condensate receiver shuts a solenoid valve controlling the cooling water flow and simultaneously opens the motor starter, stopping the pump when the condensate drops to low level in the receiver.

When receiver water reaches high level the probe control opens the solenoid valve and closes one point in the starter control circuit. The cooling water then actuates a flow switch which closes, completing the starter control circuit. The starter then closes, starting the pump motor after cooling water flow is assured.

Cooling water drops through an air gap into a drain cup after circulating through the seal jacket so that there is visible evidence of coolant flow whenever the pump is running.

The condensate receiver is a nonvented ASME code vessel rated for 200 PSI. Hot condensate at temperatures up to 350˚F may be collected and transferred by the pump directly to the boiler.

Due to the low NPSH characteristics of the pump, the entire unit is less than 60 inches high. Condensate return piping may be set at 36 inches above floor level. This low silhouette design permits collection of high temperature condensate from kettles, autoclaves, platen presses, and a variety of other high temperature condensing equipment.

FLASH SERVICE

In addition to serving as a dependable collection and return station for high temperature condensate, Roth 350˚F code stations may be used to flash steam from returning condensate for use in applications requiring steam at the temperature and pressure of the returns.

No adverse effect will result on the unit or the pump as a result of such flashing.

MAXIMUM SYSTEM EFFICIENCY

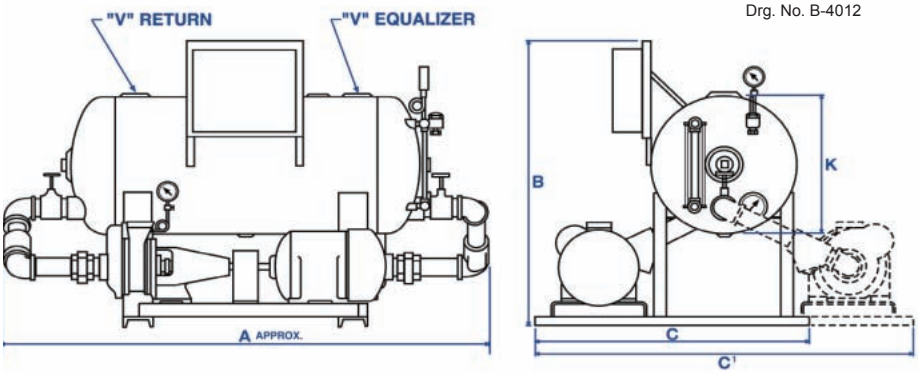
Plant operators who install Roth 350˚F code stations can eliminate the problems of steam and heat losses, caused in the past by flashing high temperature condensate, and the high maintenance on equipment which was actually designed for lower temperatures.

Roth 350˚F code stations will return 100% of high pressure condensate to the boiler without cavitation and with only normal annual pump maintenance.

SELECTION TABLES

Cond. Rate	Pump Diff. Pressure	Min. Pump GPM	Unit Number	Min. NPSH Feet	Actual Pump GPM	Motor H.P.	Motor RPM	Pump Disch.	Rec. Gal. Cap.
2500 Lb./ Hr. 5.0 GPM	10	10.0	HC2520	1	14.8	1/2	1750	1 1/4	30
	15	10.0	HC2520	1	13.3	1/2	1750	1 1/4	30
	20	10.0	HC2520	1	11.8	1/2	1750	1 1/4	30
	30	10.0	HC2540	1	14.4	3/4	1750	1 1/4	30
	40	10.0	HC2540	1	11.4	3/4	1750	1 1/4	30
	50	10.0	HC2575	1	13.9	2	3500	1 1/4	30
	60	10.0	HC2575	1	12.7	2	3500	1 1/4	30
	75	10.0	HC2575	1	10.7	2	3500	1 1/4	30
	100	10.0	HC3775	1	13.8	3	3500	1 1/4	30
	125	10.0	HC2599	1	11.1	5	3500	1 1/4	30
3750 Lb./ Hr. 7.5 GPM	10	15.0	HC5010	1	21.1	1/2	1750	1 1/4	30
	15	15.0	HC5010	1	19.3	1/2	1750	1 1/4	30
	20	15.0	HC5010	1	17.7	1/2	1750	1 1/4	30
	30	15.0	HC3730	1	16.9	1	1750	1 1/4	30
	40	15.0	HC3740	1	16.8	1 1/2	1750	1 1/4	30
	50	15.0	HC3775	1	19.5	3	3500	1 1/4	30
	60	15.0	HC3775	1	18.2	3	3500	1 1/4	30
	75	15.0	HC3775	1	16.2	3	3500	1 1/4	30
	100	15.0	HC5090	1	21.7	5	3500	1 1/4	30
	125	15.0	HC5090	1	18.7	5	3500	1 1/4	30
5000 Lb./ Hr. 10.0 GPM	10	20.0	HC5010	1	21.1	1/2	1750	1 1/4	30
	15	20.0	HC5020	1	22.3	3/4	1750	1 1/4	30
	20	20.0	HC5020	1	20.6	3/4	1750	1 1/4	30
	30	20.0	HC5030	1	20.2	1	1750	1 1/4	30
	40	20.0	HC5040	1	20.2	2	1750	1 1/4	30
	50	20.0	HC5060	1	29.5	3	3500	1 1/4	30
	60	20.0	HC5060	1	28.1	3	3500	1 1/4	30
	75	20.0	HC5090	1	26.0	5	3500	1 1/4	30
	100	20.0	HC5090	1	21.7	5	3500	1 1/4	30
	125	20.0	HC5099	1	26.7	7 1/2	3500	1 1/4	30
7500 Lb./ Hr. 15.0 GPM	10	30.0	HE7510	1	34.1	3/4	1750	1 1/4	60
	15	30.0	HE7515	1	31.7	1	1750	1 1/4	60
	20	30.0	HE7520	1	38.5	1 1/2	1750	1 1/4	60
	30	30.0	HE7530	1	33.9	2	1750	1 1/4	60
	40	30.0	HE7540	1	30.8	3	3500	1 1/4	60
	50	30.0	HE7590	1	39.5	5	3500	1 1/4	60
	60	30.0	HE7590	1	38.2	5	3500	1 1/4	60
	75	30.0	HE7590	1	35.3	5	3500	1 1/4	60
	100	30.0	HE7590	1	31.3	5	3500	1 1/4	60
	125	30.0	HE7599	1	39.0	10	3500	2	60
10,000 Lb./ Hr. 20.0 GPM	10	40.0	HF1010	1	43.4	1	1750	1 1/4	100
	15	40.0	HF1015	1	40.7	1 1/2	1750	1 1/4	100
	20	40.0	HF1220	1	55.5	3	1750	2	100
	30	40.0	HF1220	1	49.1	3	1750	2	100
	40	40.0	HF1220	1	43.6	3	1750	2	100
	50	40.0	HF1075	1	49.2	5	3500	1 1/4	100
	60	40.0	HF1075	1	47.2	5	3500	1 1/4	100
	75	40.0	HF1075	1	43.3	5	3500	1 1/4	100
	100	40.0	HF1090	1	42.7	7 1/2	3500	2	100
	125	40.0	HF1099	1	42.9	15	3500	2	100
12,500 Lb./ Hr. 25.0 GPM	10	50.0	HF1510	1	61.5	2	1750	2	100
	15	50.0	HF1220	1	58.0	3	1750	2	100
	20	50.0	HF1220	1	55.5	3	1750	2	100
	30	50.0	HF1520	1	58.5	3	1750	2	100
	40	50.0	HF1240	1	53.9	5	1750	2	100
	50	50.0	HF1250	1	53.6	7 1/2	3500	2	100
	60	50.0	HF1260	1	52.1	10	3500	2	100
	75	50.0	HF1275	1	59.3	10	3500	2	100
	100	50.0	HF1299	1	56.2	15	3500	2	100
	125	50.0	HF1299	1	53.2	15	3500	2	100
15,000 Lb./ Hr. 30.0 GPM	10	60.0	HF1510	1	61.5	2	1750	2	100
	15	60.0	HF1520	1	70.0	3	1750	2	100
	20	60.0	HF1520	1	67.4	3	1750	2	100
	30	60.0	HF1540	1	69.8	5	1750	2	100
	40	60.0	HF1540	1	60.5	5	1750	2	100
	50	60.0	HF1560	1	72.1	7 1/2	1750	2	100
	60	60.0	HF1560	1	64.5	7 1/2	1750	2	100
	75	60.0	HF1599	1	66.7	15	3500	2	100
	100	60.0	HF1599	1	64.3	15	3500	2	100
	125	60.0	HF1599	1	61.0	15	3500	2	100

Cond. Rate	Pump Diff. Pressure	Min. Pump GPM	Unit Number	Min. NPSH Feet	Actual Pump GPM	Motor H.P.	Motor RPM	Pump Disch.	Rec. Gal. Cap.
17,500 Lb./ Hr. 35.0 GPM	10	70.0	HG1715	1	75.0	3	1750	2	200
	15	70.0	HG1715	1	70.0	3	1750	2	200
	20	70.0	HG2210	1	80.7	3	1750	2	200
	30	70.0	HG2220	1	87.6	5	1750	2	200
	40	70.0	HG2220	1	79.7	5	1750	2	200
	50	70.0	HG1750	1	72.1	7 1/2	1750	2	200
	60	70.0	HG1760	1	78.0	10	1750	3F	200
	75	70.0	HG1775	1	75.2	15	1750	3F	200
	100	70.0	HG2590	1	100.5	20	3500	2	200
	125	70.0	HG2590	1	93.0	20	3500	2	200
20,000 Lb./ Hr. 40.0 GPM	10	80.0	HG2210	1	91.0	3	1750	2	200
	15	80.0	HG2210	1	84.0	3	1750	2	200
	20	80.0	HG2210	1	80.7	3	1750	2	200
	30	80.0	HG2220	1	87.6	5	1750	2	200
	40	80.0	HG2240	1	93.7	7 1/2	1750	2	200
	50	80.0	HG2250	1	88.4	10	1750	2	200
	60	80.0	HG3030	1	88.9	10	1750	3F	200
	75	80.0	HG3060	1	110.3	15	1750	3F	200
	100	80.0	HG2590	1	100.5	20	3500	2	200
	125	80.0	HG2590	1	93.0	20	3500	2	200
22,500 Lb./ Hr. 45.0 GPM	10	90.0	HG2210	1	91.0	3	1750	2	200
	15	90.0	HG2215	1	97.0	3	1750	2	200
	20	90.0	HG2220	1	95.0	5	1750	2	200
	30	90.0	HG2240	1	96.6	7 1/2	1750	2	200
	40	90.0	HG2240	1	93.7	7 1/2	1750	2	200
	50	90.0	HG3030	1	98.8	10	1750	3F	200
	60	90.0	HG3060	1	124.7	15	1750	3F	200
	75	90.0	HG3060	1	110.3	15	1750	3F	200
	100	90.0	HG2590	1	100.5	20	3500	2	200
	125	90.0	HG2590	1	93.0	20	3500	2	200
25,000 Lb./ Hr. 50.0 GPM	10	100.0	HG2515	1	104.0	5	1750	2	200
	15	100.0	HG2515	1	102.0	5	1750	2	200
	20	100.0	HG2530	1	109.0	7 1/2	1750	3F	200
	30	100.0	HG2530	1	100.9	7 1/2	1750	3F	200
	40	100.0	HG2530	1	108.9	10	1750	3F	200
	50	100.0	HG3060	1	134.8	15	1750	3F	200
	60	100.0	HG3060	1	124.7	15	1750	3F	200
	75	100.0	HG3060	1	110.3	15	1750	3F	200
	100	100.0	HG2590	1	100.5	20	3500	2	200
	125	100.0	ON APPLICATION						
27,500 Lb./ Hr. 55.0 GPM	10	110.0	HG3020	1	144.0	7 1/2	1750	3F	200
	15	110.0	HG3020	1	137.0	7 1/2	1750	3F	200
	20	110.0	HG3020	1	130.0	7 1/2	1750	3F	200
	30	110.0	HG3030	1	120.0	10	1750	3F	200
	40	110.0	HG3040	1	145.0	10	1750	3F	200
	50	110.0	HG3060	1	134.8	15	1750	3F	200
	60	110.0	HG3060	1	124.7	15	1750	3F	200
	75	110.0	HG3060	1	110.3	15	1750	3F	200
	100	110.0	HG3075	1	119.3	20	3500	2	200
	125	110.0	ON APPLICATION						
30,000 Lb./ Hr. 60.0 GPM	10	120.0	HG3020	1	144.0	7 1/2	1750	3F	200
	15	120.0	HG3020	1	137.0	7 1/2	1750	3F	200
	20	120.0	HG3020	1	130.0	7 1/2	1750	3F	200
	30	120.0	HG3030	1	120.0	10	1750	3F	200
	40	120.0	HG3040	1	145.0	10	1750	3F	200
	50	120.0	HG3060	1	134.8	15	1750	3F	200
	60	120.0	HG3060	1	124.7	15	1750	3F	200
	75	120.0	HG3075	1	126.9	20	3500	2	200
	100	120.0	ON APPLICATION						
	125	120.0							
37,500 Lb./ Hr. 75.0 GPM	10	150.0	HH3730	1	167.7	10	1750	3F	250
	15	150.0	HH3730	1	167.7	10	1750	3F	250
	20	150.0	HH3730	1	166.8	10	1750	3F	250
	30	150.0	HH3730	1	155.8	10	1750	3F	250
	40	150.0	HH3750	1	169.4	15	1750	3F	250
	50	150.0	HH3750	1	155.0	15	1750	3F	250
	60	150.0	ON APPLICATION						
	75	150.0							
	100	150.0							
	125	150.0							



Drg. No. B-4012

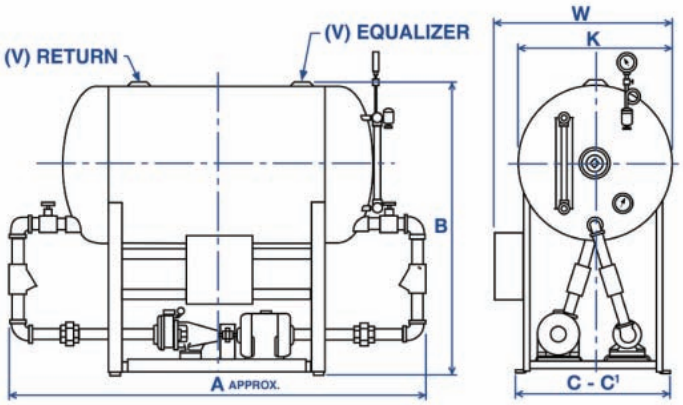
Style L can be installed where minimum height of receiver is the objective. Most 350˚F units can be supplied in either Style L or Style N to suit the needs of the design engineer.

SIMPLEX

Receiver Capacity	A	B	C	K	V
30 Gal.	54	53	33	16	3
60 Gal.	64	53	38	20	3
100 Gal.	88	53	42	24	3
200 Gal.	91	53	46	30	4
250 Gal.	97	53	54	36	4

DUPLEX

Receiver Capacity	A	B	C¹	K	V
30 Gal.	62	53	52	16	3
60 Gal.	72	53	54	20	3
100 Gal.	99	53	58	24	3
200 Gal.	102	53	65	30	4
250 Gal.	108	53	71	36	4



Drg. No. B-4013

NOTE: On 30 and 60 gallon Duplex units one pump will be mounted outside. Dim. C¹ applies.

Style N can be installed where minimum floor space is the objective. Most 350˚F units can be supplied in Style L or Style N to suit the needs of the design engineer.

SIMPLEX

Receiver Capacity	A	B	C	K	V	W
30 Gal.	54	44	21	18	3	29
60 Gal.	64	48	25	20	3	33
100 Gal.	88	65	30	24	3	38
200 Gal.	91	68	31	30	4	41
250 Gal.	97	72	37	36	4	47

DUPLEX

Receiver Capacity	A	B	C	C¹	K	V	W
30 Gal.	62	44	-	32	18	3	29
60 Gal.	72	48	-	38	20	3	33
100 Gal.	99	65	30	-	24	3	38
200 Gal.	102	68	31	-	30	4	41
250 Gal.	108	72	37	-	36	4	47

SPECIFICATION FORM

Furnish and install as called for on the drawings, one Roth Model _____ (specify simplex or duplex) 350˚F code station suitable for GPM at a differential pressure of PSI at 350˚F and 1 ft. NPSH. The unit shall consist of the following components:

1. One (substitute two for duplex) Roth 350˚F condensate pumps certified by the manufacturer for a minimum of____ GPM of 350˚F water at _____ PSI with 1 ft. net positive suction head. The pump shall be guaranteed by the manufacturer for one year against defects in workmanship and material. The pump shall contain a water cooled mechanical seal with a tungsten carbide seat suitable for 350˚F water. Pump must handle full rated capacity without loss or vapor binding at 1 ft. NPSH.

2. One horizontal steel receiver of ___ gallon capacity, 200 PSIG standard construction with ASME Code stamp, bolt-on channel legs and connections for inlet, outlet, drain, thermometer, vapor vent, pressure gauge, gauge glass, and probe control assembly. Receiver shall be removable in the field.

3. Piping between the receiver and pump to consist of one (substitute two for duplex) diagonal section containing a flexible connector, gate valve and Y-Type strainer to insure minimum pressure drop between receiver and pump. All pipe fittings to meet ANSI code.

4. One (substitute two for duplex) 1750 / 3500 RPM ODP motor for phase _____ volt current. Motor shall not be loaded to operate beyond the 1.0 rating.

5. **(a) Specify for Simplex Units.**
I. One General purpose three phase, three pole magnetic starter with reset, and with three overload heaters.
II. One solid state probe controller for ____ volt control circuit current.
III. One terminal block.
(b) Specify for Duplex Units.
I. Two general purpose three phase, three pole magnetic starters with resets, and with three overload heaters in each starter.
II. Two solid state probe controllers for ____ volt control circuit current.
III. One terminal block.
IV. One electrical alternator.

The above controls shall be panel mounted and wired in a Nema 1 enclosure. Starter(s) shall be wired to the motors.

Terminals for connecting control circuit current shall be provided on the terminal block.

6. For 250˚F-310˚F interconnecting piping installed from flow switch to pump water jackets and to visual flow gap(s). One Y strainer for coolant water supply.

7. For 310˚F-350˚F pump manufacturer shall provide a suitable heat exchanger (water-to-water, or air-to-water) for reducing the recirculated water from the original temperature to not over 250˚F. Manufacturer of pump shall supply all necessary recirculation piping or tubing, connected and ready to install on the unit.

8. One thermostatic air vent.

9. One (substitute two for duplex) Roth enclosed coupling guard.

10. One 1/2 inch 175 lb. pressure polished brass water gauge of proper size with bronze valve bodies conforming to ASTM specification B62, 1/8 inch bronze drain cock, non-heat round die cast valve wheels, 3/16 inch bronze guard rods and 5/8 inch high pressure glass tubing.

11. One stem mounted bi-metal thermometer with 3 inch dial 50˚F-500˚F range, 2 ½ inch stem and 1/2 inch connection.

12. Two (substitute three for duplex) stem mounted pressure gauges with 3 1/2 inch dial, drawn steel case, 0-300 lb. range, phosphor bronze tube and brass socket.

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