

VACUUM HEATING PUMPS

Return line vacuum heating pumps may be of the following types:

- (1) Direct acting reciprocating steam driven return line vacuum pumps;
- (2) reciprocating power driven return line vacuum pumps; (3) motor driven return line vacuum pumps, of the centrifugal or rotary type having one of the following arrangements:

TABLE 9. CHARACTERISTICS OF CENTRIFUGAL RETURN PUMPS AND RECEIVERS DELIVERING AGAINST 15 LB.

SIZE	SQ. FT. EQUIVALENT DIRECT RADIATION	GAL. PER MIN.	R. P. M.	ACTUAL H. P.	H. P. MOTOR SUPPLIED	FLOOR SPACE	SHIPPING WEIGHT
101	8000	11	1725	0.4	$\frac{3}{4}$	5' 3" x 3' 8"	700
102	16,000	22	1725	0.6	$\frac{3}{4}$	5' 3" x 3' 8"	700
103	26,000	35	1725	0.8	1	6' 5" x 3' 8"	750
104	40,000	60	1140	1.0	1½	7' 6" x 4' 2"	1050
105	65,000	90	1140	1.4	2	7' 6" x 4' 2"	1100

TABLE 10. SIZES, SPEEDS, HORSE POWERS AND CAPACITIES OF MOTOR DRIVEN CONDENSATION RETURN PUMPS

Rating in Sq. Ft.	0-2000	2000-4000	4000-8000	8000-16000
Discharge Pressure, Lb.	10 20	10 20	10 20	10 20
Gallons per Min.	3 3	6 6	10 10	20 20
H. P. Motor	$\frac{3}{8}$ $\frac{3}{4}$	$\frac{3}{8}$ $\frac{3}{4}$	$\frac{3}{8}$ $\frac{3}{4}$	$\frac{3}{8}$ $\frac{3}{4}$
R. P. M. 60 Cycle and D. C.	1700 1700	1700 1700	1700 1700	1700 1700
R. P. M. 25 Cycle	1440 1440	1440 1440	1440 1440	1440 1440
Shipping Weight	330 350	350 370	420 440	535 565

TABLE 11. MOTOR DRIVEN CONDENSATION PUMP CAPACITIES FOR DELIVERING AGAINST VARIOUS PRESSURES

RADIATION IN SQ. FT. OF DIRECT RADIATION	MINIMUM GALLONS PER MIN.	MAXIMUM BOILER PRESSURE LB.	MOTOR H. P.	SUGGESTED SIZE OF PIPING INCHES	RADIATION IN SQ. FT. OF DIRECT RADIATION	MINIMUM GALLONS PER MIN.	MAXIMUM BOILER PRESSURE LB.	MOTOR H. P.	SUGGESTED SIZE OF PIPING INCHES
4000	6-8	10	$\frac{1}{4}$	1	15,000	25-30	10	$\frac{3}{4}$	2
4000	6-8	15-40	$\frac{1}{2}$	1	15,000	25-30	15	1	2
4000	6-8	50-60	$\frac{3}{4}$	1	15,000	25-30	20-30	1½	2
					15,000	25-30	40	2	2
					15,000	25-30	50-60	3	2
6000	9-12	10	$\frac{1}{4}$	1½	20,000	30-40	10	$\frac{3}{4}$	2
6000	9-12	15-40	$\frac{1}{2}$	1½	20,000	30-40	15	1	2
6000	9-12	50-60	1	1½	20,000	30-40	20	2	2
					20,000	30-40	30-40	3	2
					20,000	30-40	50-60	5	2
8000	12-16	10	$\frac{1}{2}$	1½	25,000	40-50	10	1	2½
8000	12-16	15	$\frac{3}{4}$	1½	25,000	40-50	15	1½	2½
8000	12-16	20	1	1½	25,000	40-50	20	2	2½
8000	12-16	30-60	1½	1½	25,000	40-50	30-40	3	2½
					25,000	40-50	50-60	5	2½
10,000	15-20	10	$\frac{1}{2}$	1½	30,000	50-60	10	1	2½
10,000	15-20	15	$\frac{3}{4}$	1½	30,000	50-60	15	1½	2½
10,000	15-20	20-30	1	1½	30,000	50-60	20	2	2½
10,000	15-20	30-40	1½	1½	30,000	50-60	30-60	5	2½
10,000	15-20	50-60	2	1½					

CHAPTER XVIII—PUMPS AND TRAPS FOR HEATING AND VENTILATING EQUIPMENT

- (a) One pumping unit and motor for handling both air and condensate.
- (b) One pumping unit and motor for handling air and a separate pumping unit and motor for handling condensate.
- (c) One pumping unit and motor for handling condensate with an air ejector operated by a recirculated portion of the condensate for handling the air.
- (d) One pumping unit for handling condensate and another for handling the air, both operated by one motor.

The volumetric displacement rate of the water cylinders of steam or power driven reciprocating return line vacuum pumps should be from 8 to 10 times the volumetric rate of flow of the condensate to be handled.

The piston speed in feet per minute of steam or power driven reciprocating

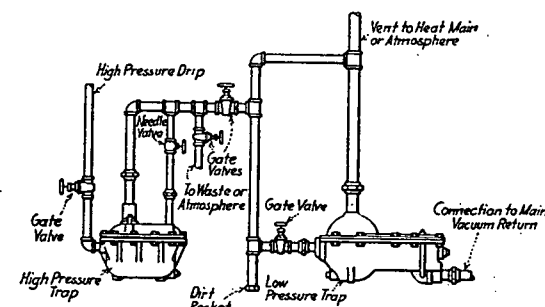


FIG. 4. METHOD OF DISCHARGING HIGH-PRESSURE APPARATUS INTO LOW-PRESSURE HEATING MAINS AND VACUUM RETURN MAINS THROUGH A LOW-PRESSURE TRAP

cating return line vacuum pumps should not be more than 20 times the square root of the number of inches in the length of stroke.

The speed of crank shafts of power driven reciprocating return line vacuum pumps should not exceed 40 r.p.m.

The type of drive to be employed between motor and pump may be chain, belt or gear. When gears are used they should be of a type which will be quiet in operation.

The receiving tank may be placed either on the suction or on the discharge side of the pump; generally on the suction side of centrifugal or rotary pumps and on the discharge side of reciprocating pumps.

The capacity of receiving tanks, when placed on the suction side of pumps, should be proportioned to the operating condition to be met. To this end its capacity should be such as to retain the condensate and to take care of fluctuations between the rate of returning condensate and the rate of the pump delivery. This capacity in case of automatically controlled units should be the capacity of the tank in gallons between the high and low water levels in the tank, as determined by the water line control, and when not otherwise provided for, should be in accordance with Table 12.

Air capacities of vacuum heating pumps are in general referred to as equivalent cast-iron direct radiation, and may be assumed on a decreasing