

CONDENSATION RETURN PUMPS

Condensation return pumps may be of the following types:

- Automatic pumps and receivers
- Continuous operation non-automatic return pumps

Volumetric Capacities of Receivers.—To be not less than 3 times the maximum minute volumetric flow of condensation to be handled, measured between the high and low water lines in the receiver.

Piston Speeds in Feet per Minute.—Not more than 10 times the square root of the number of inches in the length of stroke.

The ratio between the pump displacement and the maximum vol-

TABLE 69. DUPLEX PISTON TYPE RETURN PUMPS WITH RECEIVERS STANDARD PRESSURE

SIZE OF PUMP	RECEIVER CAPACITY GALLONS	SQ. FT. DIRECT RADIATION	LB. CONDENSATE PER HOUR	MINIMUM STEAM PRESSURE
3 × 2 × 3½	12	6000	2000	50
4½ × 2¾ × 4	20	10,500	3500	40
5¼ × 3½ × 5	40	19,500	6500	35
6 × 4 × 6	60	30,000	11,000	35
7¼ × 5 × 6	100	45,000	15,000	30

Low Pressure

SIZE OF PUMP	RECEIVER CAPACITY GALLONS	SQ. FT. DIRECT RADIATION	LB. CONDENSATE PER HOUR	MINIMUM STEAM PRESSURE
4½ × 2 × 4	12	6000	2000	25
5¼ × 2½ × 5	20	10,000	3500	20
6 × 2½ × 6	40	120,000	4000	15
6 × 3 × 6	40	180,000	6000	20
6 × 3½ × 6	60	290,000	9000	25

TABLE 70. CENTRIFUGAL RETURN PUMPS WITH RECEIVERS

SIZE OF PUMP DISCHARGE INCHES	RECEIVER CAPACITY GALLONS	SQ. FT. DIRECT RADIATION	LBS. CONDENSATE PER HOUR	H. P. TO DRIVE	TOTAL HEAD FT.
1	40	12,000	4000	1	25
1½	60	25,500	8500	1½	50
2	100	42,000	14,000	2	50

TABLE 71. CHARACTERISTICS OF CENTRIFUGAL 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	¾	5' 3" x 3' 8"	700
102	16,000	22	1725	0.6	¾	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

umetric rate of the flow of condensate to be handled shall be not less than 3.0 for automatic pumps and receivers and 2.0 for non-automatic return pumps.

Normal Capacities for Centrifugal Pumps.—Not less than 2 times the maximum rate of flow of the condensation to be handled.

RETURN LINE VACUUM HEATING PUMPS

These may be of the following types:

- Direct acting reciprocating steam driven return line vacuum pumps
- Reciprocating power driven return line vacuum pumps
- Motor driven return line vacuum pumps

High pressure traps should never discharge directly into a vacuum return. An excessive amount of vapor will form due to re-evaporation of a considerable part of the hot condensation. This may cause a very

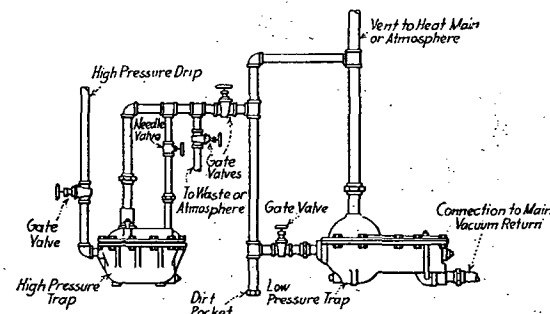


FIG. 42. METHOD OF DISCHARGING HIGH-PRESSURE APPARATUS INTO LOW-PRESSURE HEATING MAINS AND VACUUM RETURN MAINS THROUGH A LOW-PRESSURE TRAP

material reduction in the vacuum maintained by the pump. Fig. 42 shows a method of disposing of the greater part of the vapor of re-evaporation and at the same time lowering the temperature of the condensate.

DISPOSAL OF VACUUM PUMP DISCHARGE

The discharge from reciprocating vacuum pumps of either the steam or power driven type is a mixture of water and air. Means must be provided for releasing the entrained air. This requires water surface area in either a tank having a large horizontal cross section or a stand pipe of enough sectional area to permit a low velocity of downward water flow while the entrained air is escaping to the surface against the water current. For removal of air allow one square foot of horizontal cross-section for each 2100 lb. of water per hour. A stand pipe with diameter equal to that of the pump cylinder is usually sufficient.

Wherever a suitable location may be obtained the freely vented air