

The majority of the meters used by district heating companies for the sale of steam to their customers are of either the condensation or flow meter type.

### Condensation Meters

The condensation meter is a popular type for use on small and medium sized installations, where all of the condensate can be brought to a common point for metering purposes. Its simplicity of design, ease in testing, accuracy at all loads, low cost and adaptability to low pressure distribution has made it standard equipment with many heating companies.

Two types of condensation meters are in general use; the *tilting bucket* meter and the *revolving drum* or *rotor* meter of which there are several makes on the market.

Condensation meters should not be operated under pressure. They are

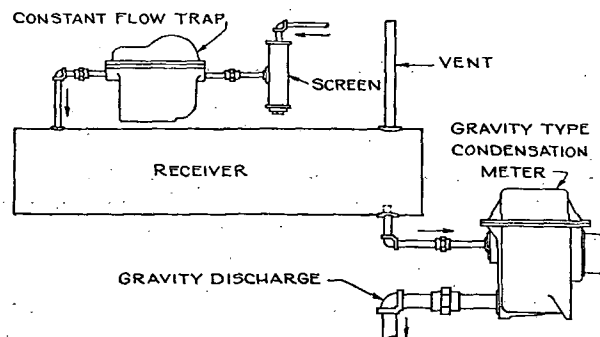


FIG. 5. GRAVITY INSTALLATION FOR CONDENSATION METER USING VENTED RECEIVERS

made for either gravity or vacuum installation. Continuous flow traps and vented receivers ahead of gravity type meters are desirable. A typical gravity installation for a condensation meter is shown in Fig. 4, while Fig. 5 is a gravity installation using a vented receiver ahead of the meter. Fig. 6 shows a vacuum installation without a master trap. The pipe discharge from the meter should be of ample size and pitched so as to rapidly remove the condensate from the meter. It is advisable to follow the instructions of the meter manufacturer in installing a meter as the successful operation of any meter depends upon its being properly connected.

### Flow Meters

Steam flow meters are available in many types and combinations as indicated in the subdivision of fluid meters on page 379.

The *orifice and plug* meter is one in which the steam flow varies directly as the area of the orifice. The vertical lift of the plug, which is proportional to the flow, is transmitted by means of a lever to an indicator and to a

pencil arm which records the flow on a strip chart. The total flow over a given period is obtained by planimetry the area on the chart and applying the meter constant.

Flow meters using an orifice, venturi tube, flow nozzle, or Pitot tube as the primary device are made by a number of manufacturers and can be obtained in either the mechanical or electrically operated type. The electric flow meter makes it possible to locate the instruments at some distance from the primary element which is not always possible with the mechanical flow meter.

Flow meters employing the orifice, venturi tube, flow nozzle or Pitot tube should be so selected as to keep the lower operating range of the

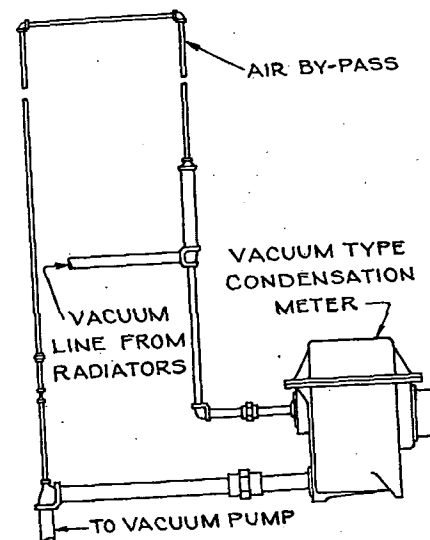


FIG. 6. VACUUM CONDENSATION METER INSTALLATION WITHOUT MASTER TRAP

load above 20 per cent of the capacity of the meter. This is desirable for accuracy as the differential pressure at light loads is too small to properly actuate the meter. A few general points to be considered in installing a meter of this type are as follows:

1. It is desirable to place the differential medium in a horizontal pipe in preference to a vertical one where either location is available.
2. Reservoirs should always be on the same level and installed in accordance with the instructions of the meter company.
3. The meter body should be placed at a lower level than that of the pressure differential medium. Special instructions are furnished where the meter body is above.
4. Meter piping should be kept free from leaks.
5. Sludge should not be permitted to collect in the meter body.
6. The meter body and meter piping should be kept from freezing temperatures.