

FIG. 7. UNIT HEATER CONNECTION TO HIGH PRESSURE STEAM SYSTEM

In high pressure systems it is customary to vent the air through a pet cock which is left slightly open at all times. Where possible it is advisable to install pressure reducing valves to permit operation of the heaters at lower pressure. Traps used must be suitable for the operating pressure encountered.

In connecting piping to hot water unit heaters, the piping should be pitched to permit escape of air to the high point in the piping where it can be vented to the atmosphere. An air vent at the heater is used to facilitate air removal or to vent the top of the heater. Provision should be made for complete drainage of the system if shutdown in freezing weather is possible.

Maintenance

Regular inspection based upon a schedule determined by the amount of dirt in the atmosphere will insure maximum economy in operation and maintenance of heating capacity.

Heating elements should be cleaned when necessary by brushing or blowing with high-pressure air, or by using a steam spray. Removal of the heating element and washing with a mild alkali solution, followed by thorough rinsing with water, may be necessary in certain installations.

Dirty fan blades may cause unbalance and vibration with consequent noise and damage to bearings. Hence, fan blades should be cleaned when necessary. Vibration may also be caused by improper fan position or loose set screws.

There is considerable difference in the attention required by the various types of motors used with unit heaters. This is particularly true of lubrication, the instructions for which must be carefully followed for trouble-free operation. Excessive lubrication may cause lubricant to reach and damage the rotor. An improper lubricant may cause failure of bearings. Instructions for care of the motor on any unit heater should therefore be obtained from the manufacturer and should be kept at the unit.

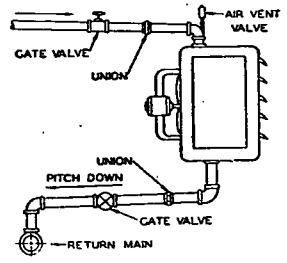

FIG. 8. CONNECTION OF HORIZONTAL UNIT HEATER TO HOT WATER SYSTEM

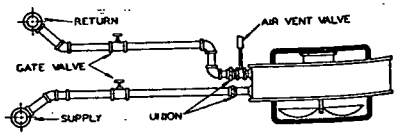

FIG. 9. CONNECTION OF VERTICAL UNIT HEATER TO HOT WATER SYSTEM

Fan bearings and drives must be given the lubrication and other attention specified by the manufacturer. If the unit is direct-connected, the couplings should be inspected periodically for wear and alignment. V-belt drives should have all belts replaced with a matched set if one belt shows wear.

Periodical inspection of traps, check valves, and air valves, and the replacement of worn parts are important maintenance items. Strainers should be cleaned regularly.

When filters are incorporated in the unit, they must be cleaned or replaced when dirty.

For prevention of corrosion in unit heaters, see Chapter 42, Corrosion and Water Formed Deposits, Causes and Prevention, in this edition, and also Bulletin 12, The Care and Maintenance of Steam and Hot Water Unit Heaters, published by the *Industrial Unit Heater Association*.

BOILER CAPACITY FOR STEAM UNIT HEATERS

The capacity of the boiler should be based on the rated capacity of the unit heaters at the lowest entering air temperature and highest fan speed that will occur, plus an allowance for pipe line losses. It is unwise to install a single unit heater as the sole load on any boiler, particularly if the unit heater motor is started and stopped by thermostatic control. The wide and sudden fluctuations of load that occur under such conditions would require closer attention to the boiler than is usually possible in a small installation. Where oil or gas fuel is used in the boiler, it is possible by means of a pressure operated switch to control the boiler, in response to this rapid fluctuation. In most cases, and particularly where the boiler is coal-fired, it is advisable to use two or more smaller units instead of one large unit heater.

Steam pressures below 5 lb can be used with safety for recirculating unit heaters when their heating surfaces are designed for those pressures, and when proper provision is made for returning the condensate. If units receive air that may be at a temperature below freezing, a steam pressure of not less than 5 lb should be maintained in the heating element, or a corresponding differential in pressure between the supply and return piping should be maintained by means of a vacuum.

UNIT VENTILATORS

A unit ventilator as defined earlier in this chapter, has the function of introducing outdoor air for ventilation and cooling in addition to heating. The typical unit is arranged to introduce outdoor air and recirculated air to the room in varying quantities and is equipped with a system of control that permits both the heating and cooling effect to be varied while the fans are operating continuously. Either steam or forced hot water may be employed as the heating medium. Unit ventilators are intended primarily for use in schools, meeting rooms, offices, or other applications where the density of occupancy indicates the need for ventilation. In normal operation, the discharge air temperature from a unit ventilator is varied in