

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 attendance to the boiler than is usually possible in a small installation. Where oil or gas is used to fire the boiler, it is possible by means of a pressurestat to control the boiler, in response to this rapid fluctuation. In most cases, however, and particularly where the boiler is coal-fired, it is advisable to use two or more smaller heating units instead of one large unit.

Steam pressures below 5 lb can be used with safety for recirculating unit heaters when their coils are designed for the purpose and when proper provision is made for returning the condensate. If ventilators are

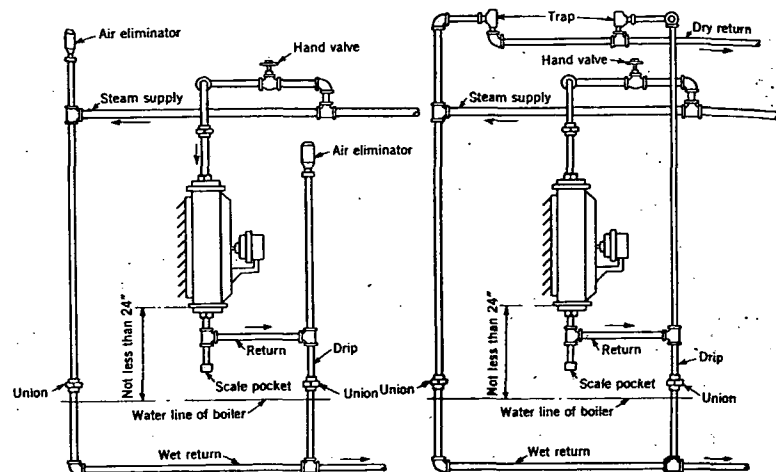


FIG. 4. UNIT HEATER CONNECTION TO ONE-PIPE GRAVITY STEAM SYSTEM

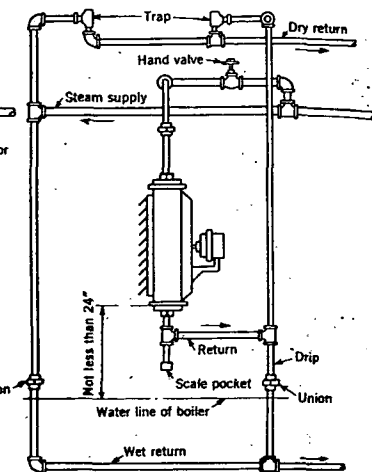


FIG. 5. UNIT HEATER CONNECTED TO GRAVITY SYSTEM WITH WET AND DRY RETURNS

to take in air that may be at a temperature below freezing, however, a steam pressure of not less than 5 lb should be maintained on the convector or a corresponding differential in pressure between the supply and returns be maintained by means of a vacuum.

PIPING CONNECTIONS

Piping connections for unit heaters are similar to those for other types of fan-blast heaters. The piping around the unit heaters must strictly conform to the system requirements while at the same time permitting the heaters themselves to function as intended. Some of the more frequently encountered piping arrangements are illustrated in Figs. 4, 5, 6 and 7. Unit heaters may be applied to one-pipe gravity and vapor systems if the piping connections are arranged with proper care and attention.

A method of connecting a unit heater to a one-pipe gravity system is illustrated in Fig. 4. In those cases where the unit heater is to be con-

nected to a dry return instead of a wet return it is necessary to provide a water pocket or loop about 5 ft in depth to prevent steam passing into the return and thus into other equipment.

A method of connection is shown in Fig. 5, where there is a wet return and a dry return. In this case the condensate from the heater and the drip from the supply main drop to the wet return by gravity, while the air passes upward through the traps to the dry return and is vented from the system at any suitable location.

A sketch of an arrangement where there is a dry return line through which both air and condensate pass to be handled by some suitable means, such as a condensation pump and receiver is given in Fig. 6. The return line is not subjected to vacuum, and consequently all arrangements must facilitate gravity flow of the condensate toward the receiver. Traps must

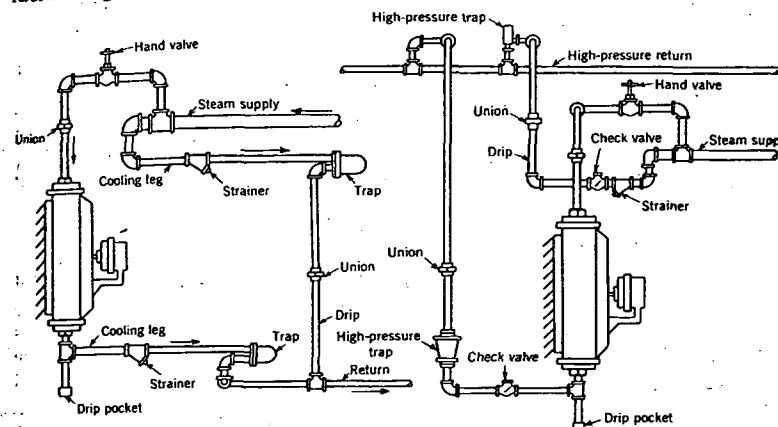


FIG. 6. UNIT HEATER CONNECTION FOR VACUUM OR VAPOR SYSTEM DISCHARGING CONDENSATION INTO DRY RETURN

FIG. 7. METHOD OF CONNECTING UNIT HEATER TO HIGH PRESSURE RETURN

pass air and condensate rapidly to keep the return piping only partially full of water.

Since unit heaters are often constructed with sufficient strength to resist high pressures, use of high pressure steam in them is a common practice. In Fig. 7 the condensate and air reach the return overhead through traps, and check valves are located in the return piping.

For two-pipe closed gravity return systems, the return from each unit should be fitted with a heavy duty of blast trap, and an automatic air valve should be connected into the return header of each unit. Pressure drop must be compensated for by elevation of the heater above the water line of the boiler or of the receiver.

In pump and receiver systems the air may be eliminated by individual air valves on the heaters, or it may be carried into the returns the same as for vacuum systems and the entire return system be free-vented to the atmosphere, provided all units, drip points, and radiation are properly trapped to prevent steam entering the returns.