

For the determination of hot water supply requirements, refer to Chapter 23 on Water Supply Piping for Buildings.

Hot water supply boilers usually are rated in gallons of water heated through a specified temperature rise within a given time. It is important to determine the temperature rise and the time required, as there is considerable variation in the values as used by different manufacturers.

CLEANING FLUES

All boilers are provided with flue clean-out openings through which the heating surface can be reached by means of brushes or scrapers. Flues of solid fuel boilers should be cleaned often to keep the surfaces free of soot or ash. Gas boiler flues and burners should be cleaned at least once a year. Oil burning boiler flues should be examined periodically to determine when cleaning is necessary.

CARE OF IDLE HEATING BOILERS

During summer months damage is frequently done to heating boilers and is often more serious than during the period of operation. This is due chiefly to corrosion following the combination of sulphur from the fuel with the moisture in the cellar air. At the end of the heating season the following precautions should be taken:

1. All heating surfaces should be cleaned thoroughly and if the boiler is of steel the heating surfaces should be given a coating of lubricating oil on the fire side.
2. All machined surfaces should be coated with oil or grease.
3. Connections to the chimney should be cleaned and in case of small boilers the pipe should be placed in a dry place after cleaning.
4. If there is much moisture in the boiler room, it is advisable to drain the boiler to prevent condensation of moisture on the surfaces when the boiler temperature becomes lower than the dew point. In steel boilers kerosene poured on the surface of the water will form a protecting film over the inside surface as the water is drained out.
5. When the boiler room is comparatively dry, in the case of cast iron boilers, the water level should be raised into the steam riser to exclude air from the boiler. A hot water system usually is left filled to the expansion tank.
6. The grates and ashpit should be cleaned.

CHAPTER 16

CONDUCTORS AND CONVECTORS FOR HEATING BY STEAM AND BY HOT WATER

THIS chapter is intended to apply to the salient data on the different kinds of heating elements pertaining to that field where heating is done by direct radiators, direct-indirect or concealed heaters (performing their function of emitting the necessary heat by radiation or conduction) or wherein the heating is done by concealed built-in heaters, cabinet heaters or indirect heaters, performing these same functions, mainly by the processes of convection.

It should be understood that any heater, whether it be a cast-iron radiator or one of the newer non-ferrie, extended surface heaters specifically designed for enclosure within a wall or cabinet, heats the air which comes in contact with its surfaces almost wholly by conduction, the radiant effect being negligible.

Careless nomenclature has resulted in such confusion that the facts should briefly be reviewed.

An exposed cast-iron radiator emits from 10 per cent to almost 30 per cent of its heat emission, as radiant heat, as developed by the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS Research Laboratory. The balance or major portion of its emission is, of course, by conduction to the air in contact with the heated surfaces. Thereupon the heated air, through convection, sets up a circulation which tends to distribute the heat more or less uniformly in accordance with the manner in which the convection currents are utilized.

When a cast-iron radiator, or one of the newer non-radiating heaters provided with extended conducting surfaces, is enclosed within a wall or cabinet, it emits practically no heat by radiation, functioning as a conductor rather than a radiator. Hence the term *radiator* or *radiation* applied to such heaters, or such heat-surface, is distinctly a misnomer, which should not be perpetuated. And it should be equally emphasized that air is heated by conduction in contact with a heated surface, while convection is that phenomenon by which heat is distributed within a fluid, liquid or gas.

In an effort to pioneer more descriptive nomenclature, borrowing the terms from no less an authority than Prof. L. P. Breckenridge, a direct heater shall be termed a *conductor* and an enclosed heater a *convector*.

The following is a glossary of the terms used:

1. *Conductor* or *radiator*—a heater exposed to view, and which transfers heat by radiation to objects which it can "see" and by conductance to the air currents which pass over it.