

INSTALLATION DATA

All pumps should be set on substantial foundations and be provided with heavy cast iron sub-bases, securely anchored to foundation and provided with drip ring with drain properly connected to sump or sewer.

The exhaust from steam driven pumps supplying steam for heating purposes should be taken through an efficient oil separator before entering any part of the heating system or other apparatus.

A full set of the manufacturers working drawings should be used in connection with each installation.

Motors should be not less than $\frac{1}{2}$ greater in horsepower than that actually required to drive the pump under full load conditions.

CHAPTER IX

WARM-AIR FURNACE HEATING*

IN this chapter of THE GUIDE consideration will be given to the design of gravity circulating warm-air heating systems. For fan circulating systems see the Chapter XX on Design and Construction of Air Ducts. Complete engineering data, including the procedure to be followed in designing a typical system, are presented in the first part of the chapter, while the last part of the chapter presents a Standard Code Regulating the Installation of Warm-Air Heating Furnaces in Residences, approved by the *National Warm Air Heating and Ventilating Association*, *AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS*, *National Association Sheet Metal Contractors*, *Western Warm Air Furnace and Supply Association*, and the *Midland Club*, as a workable Code for furnacemen.

DEFINITIONS

In general, warm-air furnace heating plants consist of a fuel burning furnace or heater enclosed in a casing of sheet metal or brick, which is placed in the basement of the building. The heated air, taken from the top or sides near the top of the furnace casing, is distributed to the various rooms of the building through sheet metal warm-air pipes. The warm-air pipes in the basement are known as leaders, and the vertical warm-air pipes which are run in the inside partitions of the building are called stacks. The heated air is finally discharged into the rooms through registers which are set in register boxes placed either in the floor or in the side wall, usually at or near the baseboard.

The air supply to the furnace may be taken (1) entirely from inside the building through one or more recirculating ducts, or the air supply may be taken (2) entirely from outside the building, in which case no air is recirculated. Sometimes a combination of the inside and outside air supply system is employed.

Furnace heating plants may be (1) of the gravity circulating type in which the motive head producing flow depends upon the difference in weight between the heated air leaving the casing and the cooler air entering the bottom of the casing, or (2) of the fan circulating type in which a fan may supply all or part of the motive head producing flow. In most house installations, the former type of system is in general use.

*Material for this section was prepared especially for THE GUIDE by Arthur C. Willard, Professor of Heating and Ventilation and Head of the Department of Mechanical Engineering, University of Illinois, Urbana, Illinois.

All figures and much of the engineering data which follow are from Bulletin No. 141, "Warm Air Furnaces and Heating Systems," Part II, by Professors A. C. Willard, A. P. Kratz and V. S. Day, Engineering Experiment Station, University of Illinois.