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CHAPTER 28

DISTRICT HEATING

Steam Requirements, Boiler Plants, Steam Distribution, Design Considerations, Distribution Pressures, Pipe Sizes, Conduits for Piping, Manholes and Tunnels, Accessory Equipment, Insulation, Building Piping and Equipment, Metering, Hot Water Distribution

THE term *district heating* refers to the supplying of heat from a central plant to a group of buildings in a city, institution, housing development, or industrial or commercial area. The heat may be used for any applicable purpose such as space heating, air conditioning, or processing. It is usually preferable that groups of commercial, industrial, or institutional buildings be supplied with heat from a central plant rather than from individual plants in order to permit design for better combustion efficiency with less expensive fuel, and reduction of labor per unit of output. The central plant justifies use of more competent personnel, and often decreases the investment required.

Those phases of district heating which frequently fall within the province of the heating engineer are treated here, and information is given for solving incidental problems. Some data are included with reference to special requirements for steam piping in buildings served with district steam. The data are confined principally to the use of steam as the heating medium, but the use of hot water has gained some recognition in recent years.¹

In the design of a district heating system to provide public utility service in a city, it is advantageous to make a thorough study of the entire problem with competent men having experience in both design and operation of such systems.

STEAM REQUIREMENTS

The first step in the design of a district heating system is to determine the maximum hourly and the annual steam requirements of each of the buildings to be supplied. Methods of determining the maximum *hourly* requirements will be found for space heating in Chapter 12, for building service-water heating in Chapter 49, and for various process applications in Table 1.² Measured demands of several types of buildings are given in Table 9, Chapter 18.

Methods of estimating *annual* steam requirements for heating various types of buildings are also given in Chapter 18. Table 7 in Chapter 18 lists the average annual steam consumption per degree-day for buildings located in all sections of the United States. Annual steam requirements for building service-water heating are given in Table 2 of this chapter. Additional data on annual steam requirements, including those for process uses and air conditioning, of various types of buildings in a number of cities may be found in the *District Heating Handbook*, Third Edition.²

BOILER PLANTS

In the design of a plant for district heating, consideration should be given to the following factors:

1. *Annual load factor.* This factor is the ratio of the average hourly plant send-out (defined as rate of flow to the distribution system) to the maximum hourly send-out,