

¹⁰ Piping, Valves, Fittings and Accessories, *District Heating Handbook*, Third Edition, pp. 169-174, (National District Heating Association).

¹¹ Steam Traps and Drain Pockets, *District Heating Handbook*, Third Edition, pp. 175-176 (National District Heating Association).

¹² Control of Steam Flow, *District Heating Handbook*, Third Edition, p. 211 (National District Heating Association).

¹³ The Reinsulation of Underground Steam Mains (*Proceedings, National District Heating Association*, 1945, p. 21).

¹⁴ Underground Insulation Specifications, p. 162, Thermal Conductivity, p. 180, Steam Pipe Insulation, p. 184, Soil Temperature Surrounding a Buried Steam Line, p. 188, and Heat Loss from Insulated Buried Steam Line, pp. 189-194, *District Heating Handbook*, Third Edition (National District Heating Association).

¹⁵ Heat Loss, *Piping Handbook*, by Sabin Crocker, Fourth Edition, 1955, Chapter XI, p. 1016 (McGraw-Hill Book Co.).

¹⁶ Return of Condensate, *District Heating Handbook*, Third Edition, p. 158. (National District Heating Association).

¹⁷ Reducing and Relief Valves on Consumers' Premises, (Code for Pressure Piping ASA B 31.1, 1955, Section 4, paragraph 408, p. 66 (American Society of Mechanical Engineers)).

¹⁸ Economies Effected by Combination Pressure and Temperature Control Valve, by Norman H. Davidson. (*Proceedings, National District Heating Association*, 1956).

¹⁹ Temperature Control, *Principles of Economical Heating*, Fifth Edition, p. 25 (National District Heating Association).

²⁰ Hours of Heating, *Principles of Economical Heating*, Fifth Edition, p. 22 (National District Heating Association).

²¹ New Developments in Programming Building Heating, Henry T. Kucera. (*Proceedings, National District Heating Association*, 1956).

²² Utilization of Heat in Condensate, *Principles of Economical Heating*, Fifth Edition, p. 40 (National District Heating Association).

²³ Metering, *District Heating Handbook*, Third Edition, pp. 221-247 (National District Heating Association).

²⁴ Hot Water for District Heating, *District Heating Handbook*, Third Edition, pp. 423-429. (National District Heating Association.)

CHAPTER 29

CENTRAL SYSTEMS FOR AIR CONDITIONING

Features of Systems, Zoning, Humidity Control, Cooling Load, Heating Load, Air Quantity and Temperature Differential, Unitary-Central Systems, Low- and High-Pressure Induction Convectors, High Velocity Systems, Fan and Coil Units, Evaporative Cooling, Precooling, Sensible Cooling with Un-wetted Coils, Selection of System, Location of Apparatus

THE term, central, applied to an air conditioning system implies that the equipment such as fans, coils, filters and their encasement are designed for assembly in the field rather than in a factory as a unit. As a central system usually serves several different rooms, or spaces individual controls are required for each room.

FEATURES OF CENTRAL SYSTEMS

One advantage of a central air supply system is that one apparatus serving many rooms may involve a lower investment cost than that for a number of self-contained plants, each serving a single room. A central system may occupy basement or attic space that is relatively unimportant, whereas individual factory-assembled apparatus placed in each room may occupy otherwise valuable space. Another advantage of a central system is accessibility for servicing, since it is possible to provide doors in the encasement for cleaning and inspecting all of the component parts in a manner usually superior to that practicable with compact factory-assembled equipment. In addition service is concentrated in one or just a few places.

Central air conditioning systems usually are connected by ducts with the various rooms served, and preferably have exhaust fans that may effect complete removal and disposal of any desired proportion of the air. The return-air fan may return air to the supply system for recirculation, as a measure of economy of fuel or refrigeration.

Central air conditioning systems are served by heating and refrigerating equipment which may be located at some distance from the air supply apparatus, and which may serve one or more central air supply systems.

Fig. 1 is a sketch of a typical year-round central system. Outdoor air enters from an intake preferably on that side of the building least exposed to solar heat, and not close to the ground or to a sun-heated or dust-gathering roof. The outdoor-air damper is split into two sections, minimum outdoor-air and maximum outdoor-air, with the maximum outdoor-air damper interlocked with the return-air damper in such a manner that as the outdoor-air volume increases the return-air volume decreases. The return air duct or connection could come from a return-air fan. All the air passes through filters which must have ample room on both sides of the filters for servicing. The filters may be of a mechanically-cleaned type, a replaceable cell type, or may be electronic as described in Chapter 33.

The cleaned air passes to the equipment that changes its temperature