

The sum of these values equals $0.2 + 0.25 + 0.09 + 0.10 + 0.35 + 0.12 + 0.25 + 0.1 = 1.46$ in. which is the static pressure against which the system must operate.

Fans and Control

The selection of fans and motors may be based on data contained in Chapter 17. Because centrifugal fans reach their maximum efficiency when working against the resistance offered by the average central fan heating system, they are well adapted to such systems and are generally used. Information on temperature control for central fan systems is given in Chapter 14.

Chapter 23

MECHANICAL WARM AIR AND FAN FURNACE SYSTEMS

Fan Furnaces, Fans and Motors, Elimination of Noise, Air Washers and Filters, Cooling Methods, Duct Design, Controls, Selecting the Furnace, Selecting the Fan, Provision for Cooling System, Heavy Duty Fan Furnaces

MECCHANICAL warm air or fan furnace heating systems, which are a special type of central fan systems, are particularly adapted to residences, small office buildings, stores, banks, schools, and churches. Circulation of air is effected by motor-driven fans instead of by the difference in weight between the heated air leaving the top of the casing and the cooled air entering its bottom, as in gravity systems described in Chapter 24. The advantages of mechanical systems, as compared with gravity systems, are as follows:

1. Furnace can be installed in a corner of the basement, leaving more basement room available for other purposes.
2. Basement distribution piping can be made smaller and can be so installed as to give full head room in all parts of the average basement, or be completely concealed from view except in the furnace room.
3. Circulation of air is positive, and in a properly designed system can be balanced in such a way as to give a greater uniformity of temperature distribution.
4. Humidity control is more readily attained.
5. The air may be cleaned by air washers or filters, or both.
6. Some cooling effect in summer will result from the installation of a properly designed system.
7. The fan and duct equipment may be utilized for a complete cooling and dehumidifying system for summer, using either ice, mechanical refrigeration, or low temperature water for cooling and dehumidifying, or adsorbers for dehumidifying.
8. The use of the fan increases the volume of air which can be handled, thereby increasing the rate of heat extraction from a given amount of heating surface and insuring sufficient air volume to obtain proper distribution in a large room.

Much of the equipment used in central fan systems is the subject matter of other chapters. It is the purpose of this chapter to discuss the coordinated design and to deal in detail only with problems not covered elsewhere which refer particularly to the whole problem of fan warm air furnace heating and air conditioning.

FAN FURNACES

Furnaces for mechanical warm air systems may be made of cast-iron, steel, or alloy. Cast-iron furnaces are usually made in sections and must be assembled and cemented or bolted together on the job. Steel furnaces