

9 ● At what point should a fan be selected for operation, and why?

At its point of maximum efficiency because the cost of operation and the noise produced will be least.

10 ● In Fig. 3, a static pressure of 85 per cent of blocked tight pressure corresponds to three different volumes, namely 11 per cent, 30 per cent and 48 per cent of wide open volume. What will determine which volume the fan delivers?

The fan can operate only at the intersection of its pressure-volume curve and the system characteristic. The type of system, together with the specification of the volume at a certain static pressure, completely defines the system characteristic.

As illustrated in Fig. 5, a given system characteristic will intersect the fan curve in only one point.

If the 85 per cent value for static pressure is specified for the 48 per cent value of volume, it is at once obvious that the same system will not have the same resistance at any other volume.

Chapter 28

AIR DISTRIBUTION

Definitions, Grille Locations, Standards for Satisfactory Conditions, Factors Affecting Distribution for Cooling and Heating, Air Outlet Noises, Selection of Supply Outlets, Balancing System

CORRECT air distribution contributes as much or more to the success of a forced air heating, ventilating, cooling or air conditioning system as does any other single factor. Supplying the proper amount of air is one problem; properly distributing it from the point where it leaves the fan is another. The distribution problem may be further divided into: (a) distribution to the various spaces served by the system, (b) distribution in these spaces. This discussion is primarily limited to division (b), reference being made to the duct system only insofar as it affects the performance of the air distribution outlets.

Definitions

In this discussion, the term *air outlets* or *outlets* will be used to designate a cover for an opening, whether it is a grille or a register.

A *register* is defined as an outlet with a damper, and a *grille* is defined as an outlet without a damper.

The perpendicular distance over which the air will satisfactorily carry measured between the face of the outlet and the opposite wall is the *throw*. In the case of directional flow outlets, this may be less than the actual carry of the air.

The *core area* of the outlet is the area of that portion of the grille inside the frame through which the air can flow.

The ratio of width to height of the core area is termed the *aspect ratio*.

GRILLE LOCATIONS

The location of supply and exhaust outlets is extremely important if a satisfactory installation is to be secured. Very frequently, however, the room or building is planned and constructed with practically no consideration of this problem. The engineer of today is more likely than not to have as his problem a building that was constructed long before any consideration whatever was given to air conditioning it. Consequently, the room shapes, the location of columns and beams, and other details of architecture frequently make it difficult to properly locate the outlets. In general, for a cooling installation, the grilles should be located high enough from the floor to prevent the discharge of air directly upon the occupants of the room, and far enough down from the ceiling to minimize