

Centrifugal fans or blowers are usually housed, though certain types operate fairly well without housing. These fans or blowers can further be classified according to the type of wheel as follows:

- Paddle wheel or steel plate type with radial blades.
- Multiblade with forward curved blades.
- Multiblade with radial blades.
- Multiblade with partially backward curved blades.
- High-speed fans with fully backward curved blades.

CHARACTERISTIC CURVES

Characteristic curves of each type of fan are shown, illustrating the performances of each type. Reference is made to The Standard Test

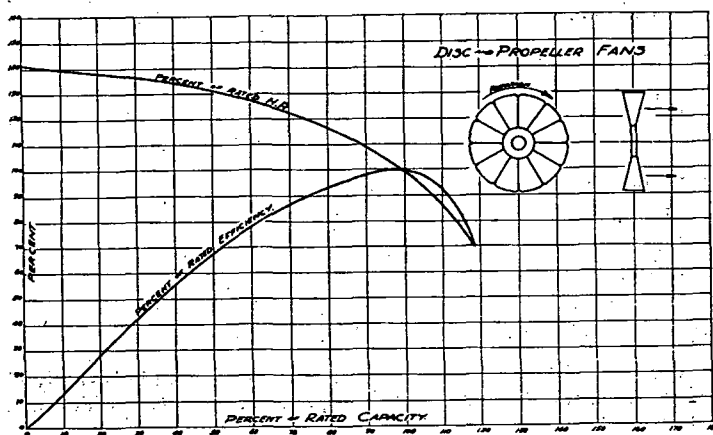


FIG. 1. CHARACTERISTICS OF DISC AND PROPELLER FANS

Code for Disc Fans, Propeller Fans, Centrifugal Fans and Blowers as adopted by the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS and the *National Association of Fan Manufacturers*. Manufacturers' capacity tables ordinarily list capacities between the dotted vertical range lines. All characteristic curves are for constant speed. The contour of performance curves will vary with different makes and designs, but all fans of a similar type have the same general characteristics.

DISC AND PROPELLER FANS

Disc and propeller fans are best adapted for free air delivery, or operation against slight resistances, as the characteristic curve of these fans shows their rapid reduction in capacity and increase in power as the resistance increases. (See Fig. 1.)

Disc fans properly designed have a satisfactory efficiency at low resistance, being equal in this respect to a good centrifugal fan or blower. Under these conditions, they excel in low first cost and economy of

operation, and are particularly desirable for use in types of unit heaters having low resistance heating elements and in moving large volumes of air with little or no duct work. While this type can operate against considerable resistance, the power increases rapidly and the noise often becomes objectionable, so that they do not always compare favorably with centrifugal fans for such service.

CENTRIFUGAL FANS AND BLOWERS

With centrifugal fans and blowers, when the resistance is increased (at constant speed) the power and capacity decrease. The efficient operating range covers a considerable latitude of capacities and occurs when the static pressures produced are highest, making this type preferred in any system having considerable resistance to overcome.

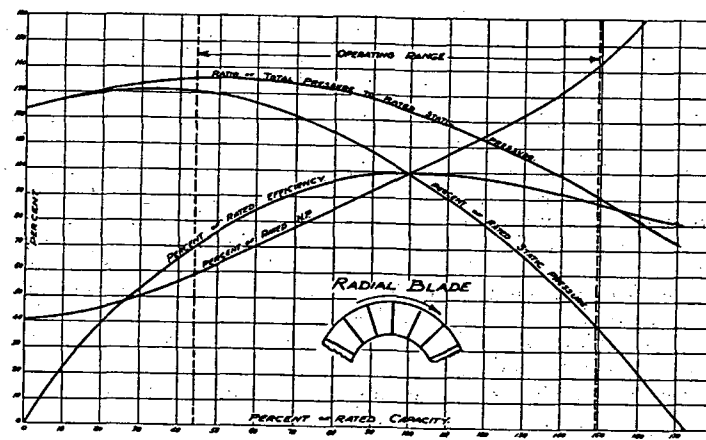


FIG. 2. CHARACTERISTICS OF PADDLE WHEEL FANS

A fan of any type should be chosen at or fairly near the point of maximum efficiency. Selecting a fan beyond this point results in higher capacity, higher outlet velocity, lower efficiency and tendency to create noise.

The paddle wheel type of fan is practically obsolete for ventilation where large volumes of air are to be moved efficiently. Their use is largely confined to such application as conveyors, where quantities of material are to be carried, or to handling air or gases containing foreign materials, as the open construction and flat blades do not allow this material to collect as readily as do other types.

Fig. 2 shows that over the entire useful range the static and total pressure decreases as the capacity increases. The horsepower curve is practically a straight diagonal line increasing from no delivery to full open delivery. A larger size fan is required for a given capacity in comparison with multiblade fans.

The forward curved multiblade fan is the type most commonly used