

2. Multiblade wheel with forward curved blades.
3. Multiblade wheel with radial blades.
4. Multiblade wheel with partially backward curved blades.
5. High speed fans with fully backward curved blades in the wheels.

CHARACTERISTIC CURVES

Characteristic curves are shown in Figs. 1 to 5, illustrating the performance of each type fan. Reference is made to the Standard Test Code for Disc, Propeller and Centrifugal Fans and Blowers, as adopted

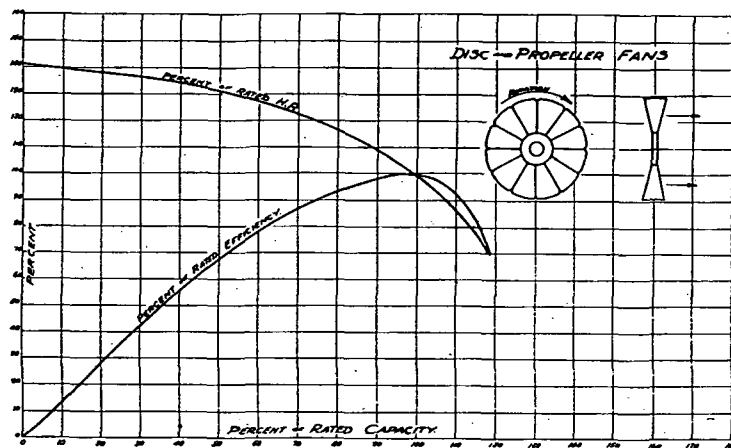


FIG. 1. CHARACTERISTICS OF DISC AND PROPELLER FANS

by the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS and the *National Association of Fan Manufacturers*. Capacity tables usually list capacities between the dotted vertical range lines. All 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

Application

Fans of this type are best adapted for free air delivery, or for operation against slight resistances. Disc fans when properly designed have a satisfactory efficiency at low resistance, being equal in this respect to good centrifugal fans or blowers. Under these conditions they excel in low cost and economy of operation. They are particularly desirable for use in the types of unit heaters which have low-resistance heating elements and for moving large volumes of air with little or no duct work. Although these fans 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.

Characteristics

The curves (Fig. 1) show the rapid reduction in capacity and increase in power as the resistance increases. The low efficiency when overcoming heavy resistance is due to the low speed of the blades near the hub as compared to the relatively high-peripheral or tip speed. The air driven by the blade area near the rim can pass back through the less-effective blade area at the hub more easily than it can overcome the duct resistance. The power required for fans of this type at increased speed, increases as the cube of the speed.

Drive

Disc and propeller fans lend themselves to direct connected motive power, as the speeds of sizes commonly used are high enough for standard

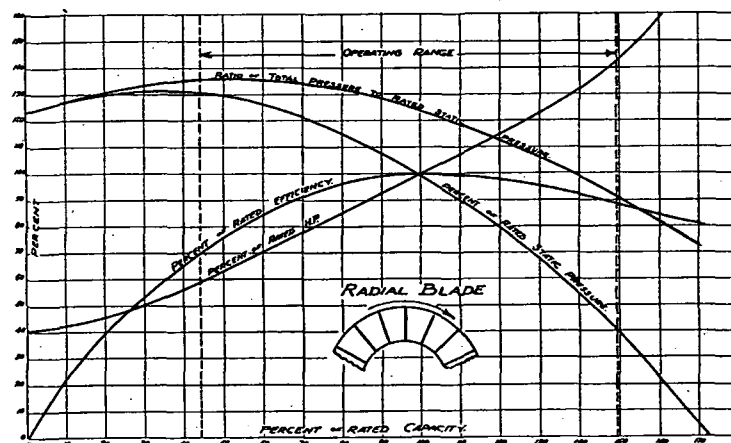


FIG. 2. CHARACTERISTICS OF PADDLE WHEEL FANS

electric motor speeds. In specifying direct connected electric motors it must be remembered that motors may be subject to dust, corrosive fumes, or high temperature gases. Enclosed and special cooled motors are available for this service. The fan wheel usually is suspended on the motor shaft. Horizontal fans (for vertical running), require motors of vertical type fitted with special bearings to take the thrust load.

Large size disc and propeller type fans usually are arranged for belt, multiple rope, or chain drive on account of the low shaft speed.

CENTRIFUGAL FANS AND BLOWERS

Application

With *centrifugal fans and blowers*, when the resistance is increased (at constant speed) the power and capacity decreases. The efficient operating range covers a considerable latitude of capacities and occurs when the static pressures produced are highest, making the centrifugal type fan preferred in any system having considerable resistance to overcome. The fan should be selected at or near the point of maximum efficiency.