

## What You Need to Know When Replacing a Fan Blade

In order to keep equipment working at prime condition one should make sure one selects the right replacement fan blade when it is either damaged or worn out.

The main reason that the proper fan blades might get overlooked is that they do not list the key specification on the blade itself in order to replace an existing blade. Many times one has to rely on the motor's nameplate information for assistance in selecting a fan blade. However, the motor's nameplate does not provide all the information to make an accurate decision on type of fan blade.

The purpose of a fan blade is to create air motion. When choosing a replacement fan blade, it's important that the new blade provide the same airflow performance as the original. The wrong fan blade that causes less airflow than a motor needs can contribute to improper motor cooling that can cause the motor to overheat or fail prematurely. The wrong fan blade that produces excess airflow can cause the motor to overload that will lead to a higher operating temperature that can result in shorter motor life and/or failure. In a belt-driven motor that is powered by a V-belt the motor may not be directly in the airflow of the fan; but improper fan blade can cause motor overload. Too little airflow and the motor will run hot, while too much airflow and the motor will strain and run hot.

### WHAT YOU NEED TO KNOW WHEN CHOOSING A FAN BLADE

#### 1. Blade diameter

**Even number of blades:** Distance measured from the outside tip of one blade to the outside tip across from the first blade.

**Odd number of blades:** Distance measured from the center of fan hub to the outside tip of one blade and multiplied by two.

#### 2. Number of blades

The greater the number of blades for the same pitch and diameter will provide greater airflow. It is possible to replace a three-blade fan with a four-blade fan, or vice versa, as long as the designed cubic feet per minute (cfm) is a match.

#### 3. HP and RPM

It is important to match a fan blade to a motor's horsepower and speed. Do not replace a 1,200-rpm motor with a 1,800-rpm motor using the same fan blade, as the increased speed can cause the motor to overload.

#### 4. Fan blade hub

The fan blade hub or center connects the fan blade to the drive shaft. The bore size of the hub is a

critical measurement and will need to match the motor's shaft dimensions or drive shaft dimensions in a belt-drive application.

## 5. CFM

CFM is the volume of air moved by the fan blade per minute. A small variance in cfm can exist without substantially affecting the application's performance.

## 6. Pitch

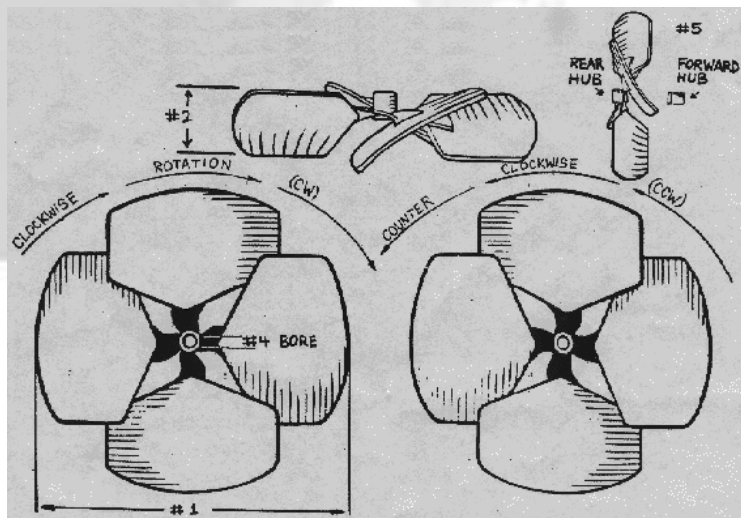
The blade's pitch is the amount of twist the blade has on the hub, and can be measured using a pitch gauge. Pitch is measured at the spider/lobe, not on the blade, and it's common for fan blades to have slightly different pitches and still achieve the same performance. For example, an 18-inch diameter blade with a 33-degree pitch will move 10 percent more air than an 18-inch blade with a 27-degree pitch.

## 7. Rotation

Clockwise or counterclockwise, facing front of the fan blade.

Note on rotation:

Fan blade rotation is determined to be either clockwise or counterclockwise when viewed from the air-discharged side. The motor's nameplate, depending on manufacturer, may contain information on direction of blade rotation.



Tech tip:

The leading edge of the blade will be covered with dirt.

## 8. Fan blade type

Free air or condenser.

When choosing a fan blade, try to make sure the meet as many of the eight items above, with the focus placed on the motor nameplate horsepower and speed. Also be sure the correct airflow over the motor for proper cooling and system performance.

Example: A 20-inch, 24-degree pitch fan blade operating at 1,140 rpm will require a 1/6 hp motor for proper motor and system performance. That same blade operating at 1,725 rpm will require a 1/2 hp rated motor. The blade is designed to work in both applications; however, the increase in operating speed has a direct impact on the hp requirements. Operating this fan blade at the higher rpm requires a minimum 1/2 hp motor. Less than 1/2 hp will most likely cause the motor to operate in an overload condition.

The specific application is important to note. If you are not sure what type of fan blade is needed consult an Electric Trading sales representation for some assistance and they will assist you.

If the application is in a hazardous location, then all replacement components must meet local and national codes for the designated location. Again, it's always best to contact your local inspector for code requirements.

## Common Terms

### Static pressure

(Inches of water): A measure of resistance to airflow caused by system obstructions. As static pressure is increased, horsepower requirements increase, and cfm decreases.

### Free air

A term used to define zero static pressure.

### Condenser fan blades

Fan blades designed to operate against a static pressure.

### Free air fan blades

Fan blades designed to operate at zero static pressure, typically found on pedestal and box fan applications.

*Note: Information was obtain from multiple sources and has been checked for suitability. However, a successful solution depends on individual accuracy, skill, and caution. For this reason, Electric Trading Company does not guarantee the result of procedure compliance or assume responsibility for personal injury or property damage to persons following these procedures.*