MOTOR BEARINGS

The motor bearing allows the motor to turn freely while it supports the shaft, the rotor, and the load such as a fan blade, blower wheel, or pulley.

The most common bearings used in small FHP electric motors are sleeve bearings. For loads below 1/5 horsepower, these bearings are usually self-aligning. For loads above 1/5 horsepower, the bearings are usually babbitt-lined, steel-backed sleeve bearings, pressed into the end shield.

FACT A unit bearing is a single sleeve extending into and supporting the rotor/shaft assembly. They are limited to use in low horsepower motors where light load capacity is required. They are popular in commercial refrigeration evaporators.

FACT Self-aligning spherical bearings are quiet, inexpensive and have a long-life capability. They are generally used on motors that have diameters less than 5". They are designed for relatively light loads. These bearings are made of sintered bronze or iron. They are spherical shaped and sit in cups formed in the motor end shields. They are held in the cups using retainers.

FACT Ball bearings are made with hardened steel balls, held in place between grooved inner and outer steel races. Ball bearings are used when heavy radial (side) thrust loads are encountered such as a belt driven application. They are also used where the bearings must endure high temperature due to ambient or heat conducted along the shaft. They are noisier than sleeve bearings. Therefore, they are rarely used for residential applications. They are also used in applications where the RPM can fall well below 500 RPM. Sleeve bearings can actually lose their oil because it will actually seep out of between the shaft and bearing when a shaft spins very slow.

FACT Babbitt-lined, steel-backed sleeve bearings are quiet, long life bearings capable of operating heavier direct drive air-moving loads. They are most frequently used in motors with diameters exceeding 5". These bearings are pressed into die-cast aluminum end shields. Due to the solid contact with the end shield, they dissipate heat better than self-aligning bearings. At speeds below 500 RPM, oil can seep out of between the shaft and bearing causing severe loss of lubricant. At speeds higher than approximately 500 RPM, the oil will be returned to the wicking where it again will be circulated through the system. This slow speed condition is usually caused by what is known as wind-milling. Windmilling is a situation where, for example, a ware-house side wall ventilator, while shut off, slowly spins due to outside wind blowing through it.

FACT You can substitute ball bearing motors for sleeve-bearing motors if noise is not a concern. However, if the defective motor is of the ball bearing type, you should use a ball bearing motor as a replacement.

FACT Sleeve bearings, under normal operating conditions, will last as long or longer than ball bearings.

FACT Bearing temperatures are a major factor in determining the useful life of a motor. The following are some typical expected life hours at various bearing temperatures.
See Chart Below.

Sleeve Bearing		
Bearing Temperature		**Expected Motor Life (single oiling)**
104°F	40°C	100,000 hrs.
120°F	49°C	50,000 hrs.
140°F	60°C	40,000 hrs.
160°F	71°C	30,000 hrs.
180°F	82°C	20,000 hrs.

Ball Bearing		
Bearing Temperature		**Expected Motor Life**
104°F	40°C	80,000 hrs.
120°F	49°C	40,000 hrs.
140°F	60°C	20,000 hrs.
160°F	71°C	10,000 hrs.
180°F	82°C	6,000 hrs.
200°F	94°C	4,000 hrs.
212°F	100°C	3,000 hrs.

NOTE:

- Do not substitute ball bearing motors for sleeve-bearing motors if noise will be a problem.
- Ball bearing motors in the Fasco catalog have a dot after the model number.
- Use ball bearing motors in high temperature applications.
- If the fan will windmill, use a ball bearing motor.