



MOTOR EFFICIENCY

Efficiency of a motor is a measurement of the useful work performed by the motor versus the energy it consumes. The input power in watts is the product of the voltage times amps times the electrical efficiency. The power it puts out is done through the spinning motor shaft. The output power in watts is the input watts times the mechanical efficiency. The ratio of input to output is the motor efficiency. For example, a motor with 100 watts input and an output of 50 watts is 50% efficient. The watts lost are heat which needs to be dissipated from the motor.

FACT A Shaded-Pole motor is the least efficient design. It is approximately half as efficient as a PSC motor. A Shaded-Pole motor draws about twice the amps of a PSC motor of the same horsepower. For example, if a Shaded-Pole motor consumes 300 watts and is only 35% efficient, its work output would be only 165 watts but it is less costly than the PSC design.

FACT When replacing motors, it is best to match motor type. A PSC motor can be used to replace a Shaded-Pole motor; however, the reverse is not true. The PSC motor will be twice as efficient as the Shaded-Pole motor and draw about half the amps. The greater efficiency of the Permanent-Split Capacitor motor permits lower operating costs and lower temperature rise. Replacing a Permanent-Split Capacitor motor with a Shaded-Pole motor is not recommended. Increased ampere draw could cause the line fuse to trip.

FACT Multi-speed motors are less efficient than single-speed motors due to space limitations for the windings.

FACT An overloaded motor is one that is too weak for the job. Its speed will be low, its amperage draw is more than 10% above the nameplate rating, and it will have increased heat rise. Its motor life will be reduced.

FACT An underloaded motor is one too strong for the job. Using too strong a motor for a replacement is evident when its amperage draw is 25% less than the nameplate reading. Using a motor with excessive horsepower can also cause increased heat rise due to decreased efficiency. Over motoring an application increases RPM very little. In most cases RPM for a six pole motor designed to operate at 1075 would only increase by 50 RPM if the motor's power was doubled.

FACT Some energy-efficient motors will have matching horsepower but lower amps.