

OPTION CHECKLIST NO. 1: ELECTRIC MOTORS

<ul style="list-style-type: none">• Maintain supply voltage level: Voltage at the motor should be kept as close to the nameplate value as possible, with a maximum deviation of 5%. Although motors are designed to operate within 10% of nameplate voltage, large variations significantly reduce efficiency, power factor, and service life
<ul style="list-style-type: none">• Minimize Phase Unbalance: The voltage of each phase in a three-phase system should be of equal magnitude, symmetrical, and separated by 120°. Phase balance should be within 1% to avoid derating of the motor and voiding of manufacturers' warranties. Several factors can affect voltage balance: single-phase loads on any one phase, different cable sizing, or faulty circuits. An unbalanced system increases distribution system losses and reduces motor efficiency.
<ul style="list-style-type: none">• Maintain High Power factor: Low power factor reduces the efficiency of the electrical distribution system both within and outside of your facility. Low power factor results when induction motors are operated at less than full load. Many utilities charge a penalty if power factor dips below 95%. Installing single capacitors or banks of capacitors either at the motor or the motor control centers addresses this problem.
<ul style="list-style-type: none">• Maintain Good Power Quality: Motors are designed to operate using power with a frequency of 50 or 60 hertz and a sinusoidal wave form. Using power with distorted wave forms will degrade motor efficiency.
<ul style="list-style-type: none">• Select Proper Size of the Motor: Under sizing of a motor will significantly reduce the efficiency and result in poor power factor. Ensure good loading i.e. more than 60% on the motor.
<ul style="list-style-type: none">• Adopt proper maintenance strategy: Preventive and Predictive maintenance strategies should be adopted in order to have efficient operation.
<ul style="list-style-type: none">• Identify & Eliminate Distribution System Losses: Regularly check for bad connections, poor grounding, and shorts to ground. Such problems are common sources of energy losses, hazardous, and reduce system reliability.
<ul style="list-style-type: none">• Minimize Distribution System Resistance: Power cables that supply motors running near full load for many hours should be oversized in new construction or during rewiring. This practice minimizes line losses and voltage drops.
<ul style="list-style-type: none">• Use Variable Speed Drives(VSD) or Two Speed System wherever applicable : When loads vary, VSDs or two-speed motors can reduce electrical energy consumption in centrifugal pumping and fan applications—often by 50% or more.
<ul style="list-style-type: none">• Choose a replacement before a motor fail: Develop a replacement plan for all critical motors. Decide which motors should be replaced with an energy efficient or smaller sized model upon failure. Then, contact motor distributors to determine whether the energy efficient motor model you want will be available. If not, consider purchasing critical replacement motors now as backups.
<ul style="list-style-type: none">• Choose Energy Efficient Motors: Select the most efficient motor possible within your price range. An energy-efficient motor that costs up to 20% more than a standard model is typically cost effective if used more than the number of annual hours.

<ul style="list-style-type: none"> • Minimize Rewind Loss: Always use a qualified rewind shop. Look for an ISO 9000 or Electrical Apparatus Service Association EASAQ based quality assurance program, cleanliness, good record keeping, and evidence of frequent equipment calibration. A quality rewind can maintain the original motor efficiency. However, if a motor core has been damaged or the rewind shop is careless, significant losses can occur.
<ul style="list-style-type: none"> • Motors less than 40 hp in size and more than 15 years old (especially previously rewound motors) often have efficiencies significantly lower than currently available energy-efficient models. It is usually best to replace them. It is almost always best to replace non-specialty motors under 15 hp.
<ul style="list-style-type: none"> • If the rewind cost exceeds 50% to 65% of a new energy-efficient motor price, buy the new motor. Increased reliability and efficiency should quickly recover the price premium.
<ul style="list-style-type: none"> • Adopt Optimum Transmission Efficiency: Transmission equipment including shafts, belts, chains, and gears should be properly installed and maintained.
<ul style="list-style-type: none"> • Control Ambient Temperature: Keep motors cool because high temperatures reduce insulation life and motor reliability. Make certain motors are shaded from the sun, located in well-ventilated areas, and kept clean, since dirt acts as an insulator.
<ul style="list-style-type: none"> • Lubricate the motor properly: Lubricate motors according to manufacturers' specifications. Apply high-quality greases or oils carefully to prevent contamination by dirt or water.