

## MOTOR MAINTENANCE

### An effective maintenance program affects reliability, performance and productivity.

The purpose of maintenance is to keep equipment from failing prematurely, ensure optimum performance and minimize unscheduled downtime. Well-maintained machinery is also more energy-efficient and exhibits lower frictional losses and decreased operating temperatures. The following sections cover major motor maintenance issues and make recommendations on servicing and testing.

#### Causes of Motor Failure:

Contamination	26%
Overload	25%
Moisture	17%
Bearing	12%
Single phasing	10%
Aging	5%
Misc	5%

#### Cleaning

Dirt attacks the insulation of a motor through abrasion and/or absorption. It can contaminate lubricants and damage bearings. Dirt buildup on the motor housing, fan and inlet openings increases the motor's temperature, which reduces efficiency and shortens motor life.

#### Lubrication

Larger motors require periodic bearing greasing. One problem is over-greasing, which causes increased friction, leading to failure. Excess grease can be forced onto the windings, also causing failure. Clean the fittings before injecting grease in order to avoid contamination.

#### Vibration

A noticeable increase or change in motor vibration is an indication of a bearing problem, load imbalance, a bent shaft, a coupling misalignment or electrical irregularities. Incorrect belt tension and alignment can increase power consumption and decrease motor life.

#### Voltage Testing

Motors that operate outside a design range of plus or minus 10% of nominal voltage operate at decreased efficiency and have a shorter motor life. Unequal phase voltage can cause extremely large rotor currents, resulting in higher temperatures and dramatically increased motor losses. Measure and log the voltage at the motor's terminals while the machine is loaded. Comparing measurements against established norms can help identify problems.

#### Insulation Testing

Resistance testing of critical motors on a routine basis is an important predictive test that can reveal degradation of insulation. Readings should be taken once or twice a year. Long-term trending provides a good picture of winding quality. Shown here are measured insulation resistance readings (upper graph), which are corrected to a common temperature base (lower graph), providing an accurate basis for comparison. In this case a significant downward trend occurs at the four-year mark. This motor should be removed from service and sent for a cleaning and "dip and bake" servicing, avoiding a full rewind and at about one third of the cost.

Reference:

[http://www.oeo.nrcan.gc.ca/infosource/pdfs/M92-165\\_1999E.pdf](http://www.oeo.nrcan.gc.ca/infosource/pdfs/M92-165_1999E.pdf)