- That the pump operates on its original design curve.
- Excessive heating of the motor.
- Unusual sound like a higher bearing-noise level
- Excessive vibration
- Any change in the ampere or voltage load to the pump
- Any cracking or uneven settling of the floor around the pump
- Sand in the pumped water

Once a problem is recognized, maintenance is required. Pump maintenance procedures will vary depending on the pump type. It is important that the Tubewell is designed to allow easy retrieval of the pump system for maintenance should it be required.

3.12.3 Maintenance of Motors

Preventative and predictive maintenance programs for motors are effective practices in manufacturing plants. These maintenance procedures involve a sequence of steps plant personnel use to pro-long motor life or foresee a motor failure. The technicians use a series of diagnostics such as motor temperature and motor vibration as key pieces of information in learning about the motors. One way a technician can use these diagnostics is to compare the vibration signature found in the motor with the failure mode to determine the cause of the failure. Often failures occur well before the expected design life span of the motor and studies have shown that mechanical failures are the prime cause of premature electrical failures. Preventative maintenance takes steps to improve motor performance and to extend its life. Common preventative tasks include routine lubrication, allowing adequate ventilation, and ensuring the motor is not undergoing any type of unbalanced voltage situation.

The goal of predictive maintenance programs is to reduce maintenance costs by detecting problems early, which allows for better maintenance planning and less unexpected failures. Predictive maintenance programs for motors observe the temperatures, vibrations, and other data to determine a time for an overhaul or replacement of the motor.

Consult each motor's instructions for maintenance guidelines. Motors are not all the same. Be careful not to think that what is good for one is good for all. For example, some motors require a periodic greasing of the bearings and some do not.

a) General Requirements for Safe and Efficiency Motor Operation

i. Motors, properly selected and installed, are capable of operating for many years with a reasonably small amount of maintenance.
ii. Before servicing a motor and motor-operated equipment, disconnect the power supply from motors and accessories. Use safe working practices during servicing of the equipment.
iii. Clean motor surfaces and ventilation openings periodically, preferably with a vacuum cleaner. Heavy accumulations of dust and lint will result in overheating and premature motor failure.
iv. Facility managers should inventory all motors in their facilities, beginning with the largest and those with the longest run-times. This inventory enables facility managers to make informed choices about replacement either before or after motor failure. Field testing motors prior to failure enables the facility manager to properly size replacements to match the actual driven load. The software mentioned below can help with this inventory.

b) Diagnostic Tools