

CASE STUDY:

Municipal Utility District Prevents Motor Failure and Avoids Down Time by Testing Motors Prior to Receipt and Installation



The Companies

Since 2008, a Municipal Utility District (MUD) in Texas has worked with Less Watts, Inc., a company that specializes in motor reliability and power quality testing for the water and wastewater industry. Less Watts, Inc. supports Metropolitan Utility Districts by providing motor acceptance testing, commissioning, and condition monitoring services. When one of the booster stations managed by the Harris County MUD was upgrading its pumps and motors, Stephen Hogue from Less Watts, Inc. was asked to perform acceptance testing.

The Application

Located in Houston, Texas, this Municipal Utility District's main booster station is responsible for pumping domestic water to surrounding residences and commercial properties. The water is pumped from the booster station into static tanks that are then pressurized to push drinking water throughout the Municipal Water District. The MUD had scheduled an upgrade to their Well-1 booster station in 2017 and ordered four booster pumps with 75-horsepower motors.

Acceptance Testing Reveals Problems with a Brand New Motor

Each pump system (pump, motor, and drive) had been mounted on individual skids. Hogue brought his hand-held ALL-TEST PRO 33 IND™ to the pump suppliers' warehouse to check the condition of the new motors before they could be officially accepted by the MUD. The AT33 IND™, which is used for de-energized Motor Circuit Analysis (MCA™), is specifically designed for troubleshooting motors and commissioning new and rebuilt motors before installation. The AT33 IND™ enables the operator to identify motor conditions that include winding contamination, stator and rotor unbalance, changes in rotor and stator condition, resistance in windings, contamination, and insulation-to-ground issues.

Hogue connected the AT33 IND™ to the motor box leads and performed a static and dynamic tests. He generated reports for each of the motors, with one report showing test results consistent with a developing winding fault in Phase 3-2.

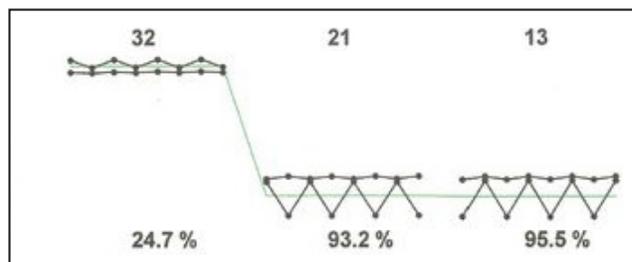
“It is important to perform acceptance testing for new and repaired motors.”



Test Results

Hogue discussed the test results with the MUD, explaining why his acceptance report showed one motor should not be accepted / approved for installation. Even though the motor was brand new, the AT33 IND™ showed a defect and provided an alert to the potential of a motor failure. The MUD requested the questionable motor be returned to the vendor and replaced with another unit. A new motor was delivered a week later, and Hogue returned to the pump suppliers' warehouse with his AT33 IND™ hand-held testing instrument to test the replacement motor. This time, the new motor passed the acceptance test.

Resistance	✓ OK	83.87 mohm	84.10 mohm	84.27 mohm
Stator	✗ Bad	Reference value 33.62 Test value 33.62 (dev 0.00%)		
Rotor	✓ OK			
Contamination	✓ OK	1.23 %	25.61 nF	
Insulation	✓ OK	936 Mohm		



In August 2017, the fully assembled skids were installed at the main booster station. Hogue once again tested the installed motors prior to start-up to make sure all motors were operating as designed. The commissioning went smoothly and the motors have been operating well since start-up.

Hogue continues to collect operating data on a monthly basis as part of the MUD's condition monitoring program. He shared his thoughts on the experience:

“Testing your motors before installing them gives you confirmation that the equipment will operate as designed. When you install a new or repaired motor, it is better to have the equipment commissioned prior to paying for delivery and installation. Finding out there is a problem with a motor after start-up or even after a short period of run-time can result in additional maintenance costs, system downtime, and possible challenges in obtaining warranty satisfaction.”

Lessons Learned

Don't accept a motor if there is proof that it's not operating as intended.

The proactive testing initiated by this MUD prior to delivery and installation of the motors helped them avoid additional project costs.

Equipment owners can avoid un-scheduled downtime, and even failure, by testing their equipment prior to receipt and installation.

Even though motors may be brand new, they should be tested prior to acceptance and installation. As shown in this case, one of the four motors had a serious stator warning indicating it would have performed differently than the other three. If it had failed within the first year of operation, the standard parts and labor would likely be under warranty; while the vendor would have been responsible for the materials and replacement. However, if this motor had passed the warranty period, the owner would have had to cover the entire expense.

Mistakes in the manufacturing or repair process can be detected when sophisticated testing instruments are used.

This is a perfect example of how ALL-TEST Pro de-energized and energized motor testing instruments can be used to test incoming motors - whether they are brand new or being returned from a motor repair shop. Learn about Motor Circuit Analysis, Electrical Signature Analysis, and the other ways you can check the condition of your motors with the support of ALL-TEST Pro. “The really great thing about ALL-TEST Pro is that they are always there to support you,” declares Hogue. “I have never seen anything like the technical support ALL-TEST Pro delivers.”

About All-TEST Pro, LLC.

ALL-TEST Pro delivers on the promise of true motor maintenance and troubleshooting, with innovative diagnostic tools, software, and support that enable you to keep your business running.

About Less Watts, Inc.

Less Watts, Inc. provides dynamic electric motor reliability and power quality testing services in Texas.

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