



## Dynamometer Load Testing

### Key Motor Parameters Diagnosed with Dynamometer Load Testing:

- Rotor Bar/End-ring problems in Induction Machines, using PdMA Current Signature Analysis under full load.
- Eccentricity (stator/rotor relation) in Induction Machines, again using Current Signature Analysis
- Bearing Problems
- Core/Heating losses (heating of motor frame under full load)
- Natural Resonance of the Machine under a load (large motors may make noise because of the frame design, only noticeable under a load)
- Torque-Speed Curves (motor design letter determination)
- LRT (Locked Rotor Torque), LRC (locked rotor current) – Starting code letter determination (Induction machines)
- BDT (break down torque), PUT (Pull Up Torque) – Induction machines
- Full Load Current/Nameplate speed checking (for tandem operation of machines)
- Efficiency calculations, Equivalent Circuit (model) calculation
- DC machines full load armature current, field current, and speed monitoring, Commutation under full load conditions.
- Checking of correct orientation of series fields in compound DC machines.

### GMR Testing Procedure

Motors are fitted with one of many available drive couplers, bolted down to our 7'x14' precision machined pad situated on top of a 50 ton concrete slab, then laser aligned to the dynamometer input shaft, to ensure minimal vibration is transmitted. Three phase, low and medium voltage is then applied to the motor up to 800kW continuous/ 900kW standby power. Just as simply, DC voltage can be applied for DC machines by using the generator and a 630KW ABB DCS600 MultiDrive. Once the correct voltage is provided to the motor from our Cummins powered in-house diesel generator set, extensive reporting is carried out on the motor which is run from a no-load to full load condition using the dynamometer from our sound proof control room to ensure employee and customer safety.

Data is recorded at a high rate to ensure accuracy. Measurements taken are 3 phase voltage, 3 phase current, and all 3 phases of Power-factor, as well as Torque, Speed, both bearing RTD temperatures, and winding RTD temperatures simultaneously. From these data streams mechanical Horsepower, Input (Real [kW]) Power, Efficiency and Total power (kVA) can be computed.

Our dynamometer is setup for full commercial acceptance testing of motors and also IEEE-112B (CSA C390 equivalent) efficiency testing. EPACT (Energy Policy Act) is the latest concern in motor testing due to ever heightening energy costs all over the world. GMR is committed to providing you with important energy efficiency data which can help financial problems from arising due to costly energy prices.