CMG Technology Laboratory
19, Corporate Avenue
Rowville – 3178 AUSTRALIA
www.cmggroup.com.au

Accreditation No. 14396

INDUCTION MOTOR TESTING

CMG Technology Laboratory provides testing services for Induction Motors including Routine tests, Performance tests and Type tests. CMG's scope of testing and an explanation of each test type follow.

Scope of Testing

Single phase motors up to 2.2kW

Three phase motors up to 250kW with the following power supply options

- 0 to 500Vac , 0 to 500Aac at 50Hz commercial power supply through a variable transformer
- 0 to 500Vac, 0 to 100Aac at up to 60Hz via a motor generator supply
- 500 to 1100Vac, 0 to 120ac at 50Hz commercial supply via a step up auto transformer

Routine Test:

Routine tests comprise of the following-

1. Measurement of winding resistances.
2. Measurement of insulation resistance of each winding to frame.
3. Measurement of insulation resistance of thermistors if fitted.
4. High voltage withstand test of each winding to frame if locally rewound.
5. High voltage withstand test of thermistors to winding & frame, if fitted locally.
6. Measurement of resistance and continuity test of thermistors if fitted.
7. Measurement of resistance and continuity test of space heaters if fitted.
8. Running of motor on no load at or near its rated voltage & frequency and recording of currents and power input.

Performance Test:

Performance tests comprise all of the routine tests as above and any one or a combination of the following-

1. Full load test at or near rated voltage & frequency and recording of input current, input power, r/m, load torque and output power (Load torque and output power are derived from the separation of losses method for 3 phase motors). Values of power factor and efficiency are calculated.
2. Percentage load test at loads like 25%, 50%, 75%, 100% and 125% Full load output power with recording of input current, input power, r/m, load torque and output power for each of these load points (Load torque and output power are derived from the separation of losses method for 3 phase motors). Values of power factor and efficiency are calculated for each of these load points.
3. Locked Rotor test at or near the rated voltage & frequency and recording of locked rotor current and locked rotor torque (For large motors with locked rotor current in excess of 1000A, this test is conducted at around 200V. 250kW motor can only be tested in Y-connection at around 200V).
4. Short Circuit Performance test at a lower voltage as to get approximately full load rated current through the motor in locked rotor situation with recording of applied voltage, frequency, input current and input power.
5. Occasional Excess Current test for 3 Phase motors up to 200kW. Recording of applied voltage, frequency, input current, input power, r/m with load adjusted for 1.5 times full load current for a duration of 2 minutes.
6. Momentary Excess Torque test for motors up to 2.2kW, 1phase or 200kW, 3 phase. Recording of applied voltage, frequency, r/m and torque reading from dynamometer with load adjusted as to get 1.6 times full load rated torque for a duration of 15 seconds.
7. Pull-up Torque test for single and three phase motors up to 2.2kW. Recording of applied voltage, frequency and minimum torque value developed between zero speed and the speed that corresponds to the breakdown torque.
8. Breakdown Torque test at near rated voltage and frequency (or at reduced voltage for large motors as to limit current under 500A). Recording of applied voltage, frequency, input current, r/m and torque reading from the dynamometer.
9. Test to determine 't_E' time for increased safety motors. Estimation of the safe t_E time based on the maximum temperature reached on winding or the rotor cage at the end of locked rotor test for the duration of t_E time. THIS TEST IS ALWAYS DONE IN COJUNCTION WITH TEMPERATURE RISE TEST UNDER TYPE TESTS.
10. Overspeed test at 1.2 times the maximum rated speed for a duration of 2 minutes. Observation and recording, if any, of permanent abnormal deformations that appears at the end of test. This test can be done for motors up to 200kW.
11. Vibration test on motors running on no load at or near rated voltage & frequency. Recording of vibration velocity (or displacement amplitude if specified) at positions close to the bearings in three mutually perpendicular directions i.e., horizontal, vertical and axial. NOTE VIBRATION TEST CANNOT BE DONE ON NON-DRIVE END IF COVERED BY FAN COWL AND IF NO SPECIAL ACCESS IS PROVIDED FOR VIBRATION PICK-UP ON SUCH MOTORS.
12. Noise test to measure the noise at 3 or 4 positions around the motor at a distance of 1 meter. Recording of overall noise pressure levels at each position while the motor is running on no load at or near rated voltage & frequency and the background noise levels at the same locations soon after with the motor stopped. NOTE NOISE LEVEL CANNOT BE MEASURED AT DRIVE END IF THE AIR VELOCITY IS OVER 5m/s.

NOTE: Vibration and noise test recordings will only serve indicative purposes as test conditions cannot be set to exact requirement of standards.

Type Test

Type test comprises of all of the routine tests as above and performance tests no. 2, 3, 7 & 8 in addition to a temperature rise test to determine temperature rise of winding/s after running on full load for sufficiently long period at or near rated voltage & frequency.
NOTE THIS TEST CAN BE DONE WITH A LIMIT OF 450 A FULL LOAD CURRENT.

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Testing Service Charges

- Test service charges are based on single speed motors rated for single voltage and frequency. Consult CMG Technology Laboratory for multi-speed and multi-voltage & multi-frequency motors.
- Test service charges are based on B3 mounting and shaft extention dimensions as per IEC72 or AS1359.10 (refer our SGA and PPA motor catalogues). Consult CMG Technology Laboratory for other types of mounting and shaft extension dimensions.
- Load tests are performed by loss separation method and efficiency determined as per AS/NZS 1359.102.1
- Routine test charges to be added to the individual performance test whenever required to be conducted. Certain performance tests can be done within the limitations as brought out in the test descriptions.
- Notice time required for any test is one week. Consult CMG Technology Laboratory regarding the availability of testing time prior to placing an order.
- All charges indicated are in Australian Dollars.
- The prices indicated here are exclusive of any GST or other taxes. Taxes extra as applicable.
- This price list is effective from 1 July 2006. Consult CMG Technology Laboratory for the current price list before placing an order.

Test Description	Frame size											
	Upto 100		112- 132		160-225		250-280		315-355 (upto 220kW)		315-355 (upto 250kW)	
	NATA endorsed	NATA unendorsed	NATA endorsed	NATA unendorsed	NATA endorsed	NATA unendorsed	NATA endorsed	NATA unendorsed	NATA endorsed	NATA unendorsed	NATA endorsed	NATA unendorsed
Routine test	240	200	240	200	240	200	240	200	360	300	580	480
Full Load test	240	200	240	200	360	300	500	400	580	480	960	800
Percentage Load test	360	300	500	400	580	480	720	600	960	800	1260	1050
Locked Rotor test	240	200	240	200	360	300	500	400	720	600	-	-
Short Circuit Performance test	240	200	240	200	360	300	500	400	720	600	720	600
Occasional Excess Current test	240	200	240	200	360	300	500	400	720	600	-	-
Momentary Excess Torque test	240	200	240	200	360	300	500	400	720	600	-	-
Pull-up Torque test	240	200	-	-	-	-	-	-	-	-	-	-
Breakdown Torque test	240	200	240	200	360	300	500	400	720	600	-	-
Test to determine 't_E' time	580	480	720	600	960	800	1190	990*	-	-	-	-
Overspeed test	240	200	240	200	240	200	240	200	360	300	-	-
Vibration test	-	200	-	200	-	200	-	200	-	300	-	400
Noise test	-	200	-	200	-	200	-	200	-	300	-	400
Temperature Rise test	960	800	960	800	1190	990	1440	1200	1440	1200	2520	2100
Type test	1800	1500	1900	1580	2380	1980	2880	2400	3460	2880	4800	4000

* up to 55kW