

Test report - ELP15P3G

Object of test: Three-phase electric squirrel-cage motor
Kind of test: Determination of efficiency acc. To CSA C390-10 - clause 5.1
Test report no: 302//11

Frame: 284T **Type:** ELP **Serial no:** AC098675

MOTOR DESCRIPTION:

Manufacturer: US Motors / FME Indukta
Rated power: 15 [Hp]
Number of poles: 6
Rated voltage: 575 [V]
Rated current: 15.6 [A]
Speed: 1185 [RPM]
Frequency: 60 [Hz]
Power factor: 0.79 [-]
Nominal efficiency" η ": 91.7 [%]
Number of phases: 3
Time rating: S1
Service factor: 1.2
NEMA design: A
KVA code: L
Insulation class: F
Max. amb. temperature: 40 [°C]

TESTING SCHEDULE

- 1) Winding resistance measurements (clause 7.1.2)
- 2) Heat-run test for S.F 1.0 (clause 7.1.3)
- 3) Load test (clause 7.1.4)
- 4) No-load test. (clause 7.1.7)
- 5) Determination of efficiency (clause 7.2.6)

Test report - ELP15P3G

Frame: 284T

Type: ELP

Serial no: AC098675

A.7.1.2 Temperature measurement

Cold winding temperature, $t_{det\ cold}$ (°C) 18.2
Cold stator winding resistance, R_{cold} (W) 0.76667

A.7.1.3 Heat-run test

Stator winding resistance, R_{hr} (W) 0.88570
Stator winding temperature, $t_{es\ hr}$ (°C) 57.4
Ambient temperature, $t_{amb\ hr}$ (°C) 21.2

A.7.1.4 Load test

% of full load
Torque output, T_{it} (i), (Nm)
Power input, $P_{in\ it}$ (i), (kW)
each line current, $I_{a\ it}(i)$, $I_{b\ it}(i)$, $I_{c\ it}(i)$ (A)
Rotational speed, n_{it} (i), (RPM)
Stator winding temperature, $t_{st\ it}$ (i), (°C)
Ambient temperature, $t_{amb\ it}$ (i), (°C)
each line-to-line voltage, $V_{a-b\ it}(i)$, $V_{b-c\ it}(i)$, $V_{c-a\ it}(i)$ (V)
Frequency, f_{it} (i), (Hz)

	142	119	100	75	50	20	
Torque output, T_{it} (i), (Nm)	127.90	107.60	90.52	67.84	45.50	18.08	
Power input, $P_{in\ it}$ (i), (kW)	17.3227	14.5623	12.2954	9.3143	6.4077	2.8691	
each line current, $I_{a\ it}(i)$, $I_{b\ it}(i)$, $I_{c\ it}(i)$ (A)	20.773	17.858	15.611	12.828	10.452	8.463	
Rotational speed, n_{it} (i), (RPM)	1179.5	1182.6	1186.1	1189.5	1193.1	1197.6	
Stator winding temperature, $t_{st\ it}$ (i), (°C)	61.7	62.1	60	58.9	58	56	
Ambient temperature, $t_{amb\ it}$ (i), (°C)	21.4	21.4	21.4	21.5	21.5	21.5	
each line-to-line voltage, $V_{a-b\ it}(i)$, $V_{b-c\ it}(i)$, $V_{c-a\ it}(i)$ (V)	575.06	575.41	575.83	574.75	575.15	575.05	
Frequency, f_{it} (i), (Hz)	60.02	60.02	60.00	60.01	59.98	60.01	
A.7.1.5 Dynamometer correction test	No					T _{dyno cf} , (Nm)	0
$T_{it\ corr} =$	127.90	107.60	90.52	67.84	45.50	18.08	

A.7.1.7 No-Load test

% of nominal voltage,
each line-to-line voltage, $V_{a-b\ nl}(i)$, $V_{b-c\ nl}(i)$, $V_{c-a\ nl}(i)$ (V)
each line current, $I_{a\ nl}(i)$, $I_{b\ nl}(i)$, $I_{c\ nl}(i)$ (A)
(c) power input, $P_{in\ nl}$ (i), (kW)
(d-1) stator winding temperature, $t_{st\ nl}$ (i), (°C)
(h) frequency, f_{nl} (i), (Hz)

	104	100	96	50	35	25
each line-to-line voltage, $V_{a-b\ nl}(i)$, $V_{b-c\ nl}(i)$, $V_{c-a\ nl}(i)$ (V)	600.25	575.18	549.44	287.96	201.95	140.94
each line current, $I_{a\ nl}(i)$, $I_{b\ nl}(i)$, $I_{c\ nl}(i)$ (A)	8.677	7.955	7.338	3.294	2.283	1.629
(c) power input, $P_{in\ nl}$ (i), (kW)	0.7028	0.5808	0.5285	0.19071	0.13196	0.09173
(d-1) stator winding temperature, $t_{st\ nl}$ (i), (°C)	48.6	49.1	48.7	47.4	46.1	45.3
(h) frequency, f_{nl} (i), (Hz)	59.99	60.01	60.01	60.01	60.02	60.00

A 7.2 Calculation

% of full load
Power output corrected, $P_{corr\ out\ lt}(i)$, (HP)
Power output corrected, $P_{corr\ out\ lt}(i)$, (kW)
Line current, $I_{avg\ it}(i)$ (A)
Slip per unit corrected, $S_{corr\ it}(i)$
Power input, $P_{in\ it}$ (i), (kW)
Core loss, $P_{core}(i)$, (kW)
Windage-friction loss $P_{wind-frict}$ (kW)
Stray-load losses, $P_{stray-load\ lt}(i)$ (kW)
Stator winding correction, $P_{corr\ stator\ it}(i)$ (kW)
Rotor winding correction, $P_{corr\ rotor\ it}(i)$ (kW)
Power Factor, $PF_{it}(i)$, (%)
Efficiency, Eff_{it} , (%)

	130	115	100	75	50	25
Power output corrected, $P_{corr\ out\ lt}(i)$, (HP)	19.50	17.25	15.00	11.25	7.50	3.75
Power output corrected, $P_{corr\ out\ lt}(i)$, (kW)	14.55	12.87	11.19	8.40	5.60	2.80
Line current, $I_{avg\ it}(i)$ (A)	20.77	17.86	15.61	12.83	10.45	8.46
Slip per unit corrected, $S_{corr\ it}(i)$	0.0175	0.0148	0.0116	0.0090	0.0055	0.0022
Power input, $P_{in\ it}$ (i), (kW)	17.323	14.562	12.295	9.314	6.408	2.869
Core loss, $P_{core}(i)$, (kW)	0.407	0.411	0.415	0.417	0.423	0.429
Windage-friction loss $P_{wind-frict}$ (kW)	0.064	0.064	0.064	0.064	0.064	0.064
Stray-load losses, $P_{stray-load\ lt}(i)$ (kW)	0.160	0.113	0.080	0.045	0.020	0.003
Stator winding correction, $P_{corr\ stator\ it}(i)$ (kW)	0.581	0.429	0.328	0.221	0.147	0.096
Rotor winding correction, $P_{corr\ rotor\ it}(i)$ (kW)	0.285	0.203	0.134	0.078	0.032	0.005
Power Factor, $PF_{it}(i)$, (%)	83.723	81.818	78.968	72.939	61.539	34.038
Efficiency, Eff_{it} , (%)	91.356	91.619	91.689	91.130	89.286	79.160
$\gamma =$						0.974

Summary: Parameters of tested motor are in compliance with requirements.

Date of testing: 6-Jul-11

Measurements made by:	D Formas	M Ptaszki	G Tlalka
Test Report written by:	T Dobosz	Approved by:	A Opitek

Appendices:

1) List of measurement instruments used in tests.