

Test report - ELP7P3G

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: 296//11

Frame: 254T **Type:** ELP **Serial no:** AC092632

MOTOR DESCRIPTION:

Manufacturer: US Motors / FME Indukta
Rated power: 7.5 [Hp]
Number of poles: 6
Rated voltage: 575 [V]
Rated current: 8.32 [A]
Speed: 1185 [RPM]
Frequency: 60 [Hz]
Power factor: 0.74 [-]
Nominal efficiency" η ": 91.0 [%]
Number of phases: 3
Time rating: S1
Service factor: 1.3
NEMA design: A
KVA code: K
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 - ELP7P3G

Frame: 254T

Type: ELP

Serial no: AC092632

A.7.1.2 Temperature measurement

Cold winding temperature, $t_{det\ cold}$ (°C) 24
Cold stator winding resistance, R_{cold} (W) 1.51330

A.7.1.3 Heat-run test

Stator winding resistance, R_{hr} (W) 1.66561
Stator winding temperature, $t_{es\ hr}$ (°C) 50.0
Ambient temperature, $t_{amb\ hr}$ (°C) 28.2

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)

	136	120	101	75	51	19	
Torque output, T_{it} (i), (Nm)	61.38	53.90	45.39	33.89	22.82	8.71	
Power input, $P_{in\ it}$ (i), (kW)	8.3483	7.3255	6.1791	4.676	3.22111	1.40127	
each line current, $I_{a\ it}(i)$, $I_{b\ it}(i)$, $I_{c\ it}(i)$ (A)	10.956	9.644	8.534	7.220	6.152	5.274	
Rotational speed, n_{it} (i), (RPM)	1175.0	1178.0	1182.0	1187.0	1192.0	1197.0	
Stator winding temperature, $t_{st\ it}$ (i), (°C)	50.9	51.2	51.1	50.8	50.4	50	
Ambient temperature, $t_{amb\ it}$ (i), (°C)	27.8	27.8	27.8	27.8	27.8	27.8	
each line-to-line voltage, $V_{a-b\ it}(i)$, $V_{b-c\ it}(i)$, $V_{c-a\ it}(i)$ (V)	574.59	574.47	574.65	575.40	574.93	575.12	
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
$T_{it\ corr} =$	61.38	53.90	45.39	33.89	22.82	8.71	

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)

	105	100	95	50	35	24
each line-to-line voltage, $V_{a-b\ nl}(i)$, $V_{b-c\ nl}(i)$, $V_{c-a\ nl}(i)$ (V)	604.45	575.93	546.58	288.56	202.37	140.35
each line current, $I_{a\ nl}(i)$, $I_{b\ nl}(i)$, $I_{c\ nl}(i)$ (A)	5.558	5.137	4.755	2.269	1.575	1.125
(c) power input, $P_{in\ nl}$ (i), (kW)	0.35834	0.31742	0.28118	0.12314	0.07922	0.07163
(d-1) stator winding temperature, $t_{st\ nl}$ (i), (°C)	43.2	43.1	43	42.6	42.2	41.8
(h) frequency, f_{nl} (i), (Hz)	60.02	60.02	60.02	60.02	60.02	60.01

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)	9.75	8.63	7.50	5.63	3.75	1.88	
Power output corrected, $P_{corr\ out\ lt}(i)$, (kW)	7.28	6.44	5.60	4.20	2.80	1.40	
Line current, $I_{avg\ it}(i)$ (A)	10.96	9.64	8.53	7.22	6.15	5.27	
Slip per unit corrected, $S_{corr\ it}(i)$	0.0209	0.0184	0.0148	0.0109	0.0063	0.0026	
Power input, $P_{in\ it}$ (i), (kW)	8.348	7.326	6.179	4.676	3.221	1.401	
Core loss, $P_{core}(i)$, (kW)	0.189	0.191	0.192	0.195	0.197	0.200	
Windage-friction loss $P_{wind-frict}$ (kW)	0.051	0.051	0.051	0.051	0.051	0.051	
Stray-load losses, $P_{stray-load\ lt}(i)$ (kW)	0.097	0.075	0.053	0.029	0.013	0.002	
Stator winding correction, $P_{corr\ stator\ it}(i)$ (kW)	0.297	0.230	0.180	0.129	0.093	0.069	
Rotor winding correction, $P_{corr\ rotor\ it}(i)$ (kW)	0.165	0.127	0.086	0.047	0.018	0.003	
Power Factor, $PF_{it}(i)$, (%)	76.566	76.340	72.747	64.984	52.582	26.671	
Efficiency, Eff_{it} , (%)	90.440	90.817	90.906	90.343	88.423	76.878	
						$\gamma =$	0.976

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

Date of testing: 1-Jul-11

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

Appendices:

1) List of measurement instruments used in tests.