

Test report - ELP20P2G

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: 299/I/11

Frame: 256T

Type: ELP

Serial no: AC120073

MOTOR DESCRIPTION:

Manufacturer:	US Motors / FME Indukta	
Rated power:	20	[Hp]
Number of poles:	4	
Rated voltage:	575	[V]
Rated current:	18.32	[A]
Speed:	1775	[RPM]
Frequency:	60	[Hz]
Power factor:	0.88	[-]
Nominal efficiency"η":	93.0	[%]
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)

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A.7.1.2 Temperature measurement

Cold winding temperature, $t_{det\ cold}$ (°C) 22
Cold stator winding resistance, R_{cold} (W). 0.49333

A.7.1.3 Heat-run test

Stator winding resistance, R_{hr} (W). 0.56369
Stator winding temperature, $t_{es\ hr}$ (°C) 58.6
Ambient temperature, $t_{amb\ hr}$ (°C) 24.2

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_t (i), (RPM)
Stator winding temperature, $t_{et\ it}$ (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_t (i), (Hz)

A.7.1.5 Dynamometer correction test

$T_{it\ corr} =$

142	120	99	75	51	19
113.90	96.18	79.77	60.08	40.97	15.51
22.7837	19.2054	15.9473	12.113	8.3612	3.4968
25.160	21.443	18.341	14.332	10.921	7.433
1764.0	1772.0	1778.0	1783.0	1789.0	1796.0
61	61.2	60.8	60.3	60	59
25.0	25.0	25.0	25.0	25.0	25.0
575.96	574.44	575.73	574.61	575.46	574.19
60.02	60.02	60.00	60.01	59.98	60.01
No	Tdyno cf, (Nm)			0	
113.90	96.18	79.77	60.08	40.97	15.51

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, $t_{det\ nl}$ (i), (°C)
(h) frequency, f_{nl} (i), (Hz)

105	100	95	50	35	25
604.34	575.71	546.34	288.05	202.36	140.88
7.147	6.615	6.127	2.895	2.046	1.537
0.62004	0.55622	0.52177	0.23077	0.1681	0.14372
49	48.9	48.8	48.4	48.2	47.9
60.00	60.00	60.00	60.00	60.01	60.02

A 7.2 Calculation

% of full load
Power output corrected, $P_{corr\ out\ it}$ (i), (HP)
Power output corrected, $P_{corr\ out\ it}$ (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, $P_{stray-load\ it}$ (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
26.00	23.00	20.00	15.00	10.00	5.00
19.40	17.16	14.93	11.19	7.46	3.73
25.16	21.44	18.34	14.33	10.92	7.43
0.0204	0.0158	0.0122	0.0096	0.0058	0.0024
22.784	19.205	15.947	12.113	8.361	3.497
0.393	0.394	0.397	0.398	0.401	0.402
0.114	0.114	0.114	0.114	0.114	0.114
0.241	0.172	0.118	0.067	0.031	0.004
0.537	0.390	0.285	0.174	0.101	0.047
0.445	0.292	0.186	0.111	0.046	0.007
90.773	90.018	87.194	84.920	76.813	47.305
92.408	92.916	93.100	92.870	91.715	83.566
$\gamma =$					0.986

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

Date of testing: 30-Aug-11

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

Appendices:

1) List of measurement instruments used in tests.