

Test report - ELP20P3D

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: 439/P/10

Frame: 286T

Type: ELP

Serial no: 10/P/057

MOTOR DESCRIPTION:

Manufacturer: US Motors / FME Indukta S.A.
Rated power: 20 [Hp]
Number of poles: 6
Rated voltage: 460 [V]
Rated current: 25.5 [A]
Speed: 1185 [RPM]
Frequency: 60 [Hz]
Power factor: 0.8 [-]
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)

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A.7.1.2 Temperature measurement

Cold winding temperature, $t_{det\ cold}$ (°C) 19
Cold stator winding resistance, R_{cold} (W). 0.39033

A.7.1.3 Heat-run test

Stator winding resistance, R_{hr} (W). 0.46143
Stator winding temperature, $t_{res\ hr}$ (°C) 65.2
Ambient temperature, $t_{amb\ hr}$ (°C) 23

A.7.1.4 Load test

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

137	118	99	74	50	19
164.60	142.00	119.20	89.34	60.53	22.64
22.283	19.2041	16.1346	12.2062	8.4655	3.5379
33.340	29.264	25.424	20.817	16.980	13.509
1179.3	1182.0	1186.1	1190.2	1193.4	1197.6
70.7	71.4	71	69.9	68.2	67.2
23.0	23.0	23.0	23.0	23.0	23.0
460.39	460.72	459.93	460.68	459.63	460.17
59.99	59.99	60.00	60.02	60.03	60.00
Yes	T _{dyno cf} , (Nm)			#DIV/0!	
164.60	142.00	119.20	89.34	60.53	22.64

A.7.1.5 Dynamometer correction test

Tlt corr =

A.7.1.7 No-Load test

% of nominal voltage,
each line-to-line voltage, V_{a-b} lt(i), V_{b-c} lt(i), V_{c-a} lt(i) (V)
each line current, I_a lt(i), I_b lt(i), I_c lt(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	24
483.49	460.52	437.02	230.01	161.05	112.25
14.701	13.099	11.834	5.334	3.736	2.677
0.8907	0.7599	0.6656	0.24734	0.15691	0.10505
39.2	39.2	39.3	39.2	38.7	38.2
60.01	60.03	60.00	60.00	60.01	60.03

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, $I_{avg\ lt}$ (i) (A)
Slip per unit corrected, $S_{corr\ lt}$ (i)
Power input, $P_{in\ lt}$ (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, $P_{corr\ stator\ lt}$ (i) (kW)
Rotor winding correction, $P_{corr\ rotor\ lt}$ (i) (kW)
Power Factor, $PF\ lt$ (i), (%)
Efficiency, $Eff\ lt$, (%)

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
33.34	29.26	25.42	20.82	16.98	13.51
0.0172	0.0148	0.0117	0.0086	0.0060	0.0020
22.283	19.204	16.135	12.206	8.466	3.538
0.551	0.557	0.559	0.568	0.571	0.582
0.063	0.063	0.063	0.063	0.063	0.063
0.262	0.195	0.137	0.077	0.035	0.005
0.774	0.597	0.450	0.302	0.201	0.127
0.361	0.268	0.176	0.097	0.046	0.006
83.816	82.235	79.665	73.485	62.626	32.857
90.977	91.258	91.411	90.929	89.176	77.883
					$\gamma =$ 0.986

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

Date of testing: 13-Dec-10

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

Appendices:

1) List of measurement instruments used in tests.