

## Test report - ELP10P3D

**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:** 110/P/11

**Frame:** 256T

**Type:** ELP

**Serial no:** 09/P/090

### MOTOR DESCRIPTION:

**Manufacturer:** US Motors / FME Indukta S.A.  
**Rated power:** 10 [Hp]  
**Number of poles:** 6  
**Rated voltage:** 460 [V]  
**Rated current:** 13.4 [A]  
**Speed:** 1180 [RPM]  
**Frequency:** 60 [Hz]  
**Power factor:** 0.77 [-]  
**Nominal efficiency "f":** 91.0 [%]  
**Number of phases:** 3  
**Time rating:** S1  
**Service factor:** 1.3  
**NEMA design:** A  
**KVA code:** J  
**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) 22.9  
Cold stator winding resistance,  $R_{cold}$  (W) 0.77080

**A.7.1.3 Heat-run test**

Stator winding resistance,  $R_{hr}$  (W) 0.83730  
Stator winding temperature,  $t_{res\ hr}$  (°C) 45.1  
Ambient temperature,  $t_{amb\ hr}$  (°C) 22

**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)

	142	121	100	74	51	17	
Torque output, $T_{lt(i)}$ (Nm)	85.84	72.79	60.32	44.80	31.09	10.15	
Power input, $P_{in\ lt(i)}$ (kW)	11.672	9.828	8.141	6.07	4.284	1.6061	
each line current, $I_a\ lt(i)$ , $I_b\ lt(i)$ , $I_c\ lt(i)$ (A)	17.773	15.350	13.260	10.940	9.210	7.583	
Rotational speed, $n_{lt(i)}$ (RPM)	1172.1	1177.6	1181.1	1187.1	1190.8	1197.4	
Stator winding temperature, $t_{det\ lt(i)}$ (°C)	48.9	49.1	48.7	48.4	47.8	46.9	
Ambient temperature, $t_{amb\ lt(i)}$ (°C)	22.0	22.0	22.0	22.0	22.0	22.0	
each line-to-line voltage, $V_{a-b\ lt(i)}$ , $V_{b-c\ lt(i)}$ , $V_{c-a\ lt(i)}$ (V)	460.70	460.07	460.50	459.90	459.47	460.13	
Frequency, $f_{lt(i)}$ (Hz)	59.99	60.03	59.98	60.02	60.00	60.02	
<b>A.7.1.5 Dynamometer correction test</b>	No					Tdyno cf, (Nm)	0
Tlt corr =	85.84	72.79	60.32	44.80	31.09	10.15	

**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)

	104	100	96	50	35	24
each line-to-line voltage, $V_{a-b\ lt(i)}$ , $V_{b-c\ lt(i)}$ , $V_{c-a\ lt(i)}$ (V)	480.43	459.63	439.80	230.20	161.93	112.50
each line current, $I_a\ lt(i)$ , $I_b\ lt(i)$ , $I_c\ lt(i)$ (A)	8.010	7.420	6.917	3.266	2.272	1.612
(c) power input, $P_{in\ nl(i)}$ (kW)	0.39773	0.35883	0.32022	0.11823	0.0822	0.058376
(d-1) stator winding temperature, $t_{det\ nl(i)}$ (°C)	37.2	37.1	37	36.7	36.2	36.1
(h) frequency, $f_{nl(i)}$ (Hz)	60.00	60.00	60.02	60.00	59.98	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,  $I_{avg\ lt(i)}$  (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,  $Eff\ lt(i)$  (%)

	130	115	100	75	50	25	
Power output corrected, $P_{corr\ out\ lt(i)}$ (HP)	13.00	11.50	10.00	7.50	5.00	2.50	
Power output corrected, $P_{corr\ out\ lt(i)}$ (kW)	9.70	8.58	7.46	5.60	3.73	1.87	
Line current, $I_{avg\ lt(i)}$ (A)	17.77	15.35	13.26	10.94	9.21	7.58	
Slip per unit corrected, $S_{corr\ lt(i)}$	0.0234	0.0193	0.0156	0.0113	0.0077	0.0026	
Power input, $P_{in\ lt(i)}$ (kW)	11.672	9.828	8.141	6.070	4.284	1.606	
Core loss, $P_{core(i)}$ (kW)	0.237	0.238	0.241	0.243	0.245	0.249	
Windage-friction loss $P_{wind-frict}$ (kW)	0.041	0.041	0.041	0.041	0.041	0.041	
Stray-load losses, $P_{stray-load\ lt(i)}$ (kW)	0.234	0.168	0.116	0.064	0.031	0.003	
Stator winding correction, $P_{corr\ stator\ lt(i)}$ (kW)	0.401	0.299	0.223	0.152	0.108	0.073	
Rotor winding correction, $P_{corr\ rotor\ lt(i)}$ (kW)	0.258	0.179	0.120	0.064	0.030	0.003	
Power Factor, $PF\ lt(i)$ (%)	82.300	80.348	76.974	69.654	58.449	26.575	
Efficiency, $Eff\ lt(i)$ (%)	89.969	90.574	90.898	90.707	89.381	76.941	
						$\gamma =$	0.984

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

**Date of testing:** 31-Mar-11

<b>Measurements made by:</b>	D Formas	M Ptaszki	G Tiaika
<b>Test Report written by:</b>	T Dobosz	<b>Approved by:</b>	A Opitek

**Appendices:**

1) List of measurement instruments used in tests.