

## Test report - ELP7P2G

**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:** 293//11

**Frame:** 213T                      **Type:** ELP                      **Serial no:** AC145051

### MOTOR DESCRIPTION:

**Manufacturer:** US Motors / FME Indukta  
**Rated power:** 7.5 [Hp]  
**Number of poles:** 4  
**Rated voltage:** 575 [V]  
**Rated current:** 7.44 [A]  
**Speed:** 1765 [RPM]  
**Frequency:** 60 [Hz]  
**Power factor:** 0.82 [-]  
**Nominal efficiency" $\eta$ ":** 91.7 [%]  
**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) 22.6  
Cold stator winding resistance,  $R_{cold}$  (W) 2.05330

**A.7.1.3 Heat-run test**

Stator winding resistance,  $R_{st}$  (W) 2.35262  
Stator winding temperature,  $t_{es\ hr}$  (°C) 60.1  
Ambient temperature,  $t_{amb\ hr}$  (°C) 24.5

**A.7.1.4 Load test**

% of full load  
Torque output,  $T_{it}$  (i), (Nm)  
Power input,  $P_{n\ it}$  (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)

	139	121	100	74	51	18	
Torque output, $T_{it}$ (i), (Nm)	41.96	36.58	30.43	22.49	15.40	5.47	
Power input, $P_{n\ it}$ (i), (kW)	8.601	7.497	6.262	4.6789	3.2853	1.369	
each line current, $I_{a\ it}(i)$ , $I_{b\ it}(i)$ , $I_{c\ it}(i)$ (A)	10.027	8.759	7.573	6.194	5.143	3.926	
Rotational speed, $n_{it}$ (i), (RPM)	1756.0	1764.0	1770.0	1779.0	1786.0	1796.0	
Stator winding temperature, $t_{st\ it}$ (i), (°C)	61.2	62.7	62.6	60.7	59.3	57.7	
Ambient temperature, $t_{amb\ it}$ (i), (°C)	24.2	24.2	24.2	24.2	24.2	24.2	
each line-to-line voltage, $V_{a-b\ it}(i)$ , $V_{b-c\ it}(i)$ , $V_{c-a\ it}(i)$ (V)	575.50	574.38	574.10	574.88	575.00	575.46	
Frequency, $f_{it}$ (i), (Hz)	60.02	60.02	60.00	60.01	59.98	60.01	
<b>A.7.1.5 Dynamometer correction test</b>	No					T <sub>dyno cf</sub> , (Nm)	0
$T_{it\ corr} =$	41.96	36.58	30.43	22.49	15.40	5.47	

**A.7.1.7 No-Load test**

% of nominal voltage,  
each line-to-line voltage,  $V_{a-b\ it}(i)$ ,  $V_{b-c\ it}(i)$ ,  $V_{c-a\ it}(i)$  (V)  
each line current,  $I_{a\ it}(i)$ ,  $I_{b\ it}(i)$ ,  $I_{c\ it}(i)$  (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, $V_{a-b\ it}(i)$ , $V_{b-c\ it}(i)$ , $V_{c-a\ it}(i)$ (V)	605.13	575.21	547.00	287.71	201.17	140.58
each line current, $I_{a\ it}(i)$ , $I_{b\ it}(i)$ , $I_{c\ it}(i)$ (A)	4.162	3.835	3.567	1.685	1.169	0.857
(c) power input, $P_{in\ nl}$ (i), (kW)	0.2888	0.26126	0.23005	0.0905	0.0632	0.047174
(d-1) stator winding temperature, $t_{st\ nl}$ (i), (°C)	45.1	45.3	45.6	44.3	43.6	42.7
(h) frequency, $f_{nl}$ (i), (Hz)	60.01	60.01	60.01	60.01	60.01	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,  $P_{n\ it}$  (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)	10.03	8.76	7.57	6.19	5.14	3.93	
Slip per unit corrected, $S_{corr\ it}(i)$	0.0249	0.0203	0.0167	0.0119	0.0075	0.0024	
Power input, $P_{n\ it}$ (i), (kW)	8.601	7.497	6.262	4.679	3.285	1.369	
Core loss, $P_{core}(i)$ , (kW)	0.163	0.164	0.166	0.170	0.172	0.176	
Windage-friction loss $P_{wind-frict}$ (kW)	0.034	0.034	0.034	0.034	0.034	0.034	
Stray-load losses, $P_{stray-load\ lt}(i)$ (kW)	0.062	0.047	0.033	0.018	0.008	0.001	
Stator winding correction, $P_{corr\ stator\ it}(i)$ (kW)	0.355	0.271	0.203	0.136	0.093	0.054	
Rotor winding correction, $P_{corr\ rotor\ it}(i)$ (kW)	0.201	0.143	0.098	0.052	0.023	0.003	
Power Factor, $PF_{it}(i)$ , (%)	86.050	86.030	83.157	75.863	64.146	34.984	
Efficiency, $Eff_{it}$ , (%)	90.503	91.192	91.471	91.247	89.919	80.395	
						$\gamma =$	0.967

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

**Date of testing:** 13-Oct-11

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

**Appendices:**

1) List of measurement instruments used in tests.