# Test report - ELP32P2D

**Object of test:** Three-phase electric squirell-cage motor
**Kind of test:** Determination of efficiency acc. To CSA C390-10 - clause 5.1
**Test report no:** 134/I/11

**Frame:** 145T **Type:** ELP **Serial no:** AC060991

**MOTOR DESCRIPTION:**

| | | |
|---|---|---|
| **Manufacturer:** | US Motors / FME Indukta S.A. | |
| **Rated power:** | 1.5 | [Hp] |
| **Number of poles:** | 4 | |
| **Rated voitage:** | 460 | [V] |
| **Rated current:** | 2.1 | [A] |
| **Speed:** | 1750 | [RPM] |
| **Frequency:** | 60 | [Hz] |
| **Power factor:** | 0.79 | [-] |
| **Nominal efficiency"f":** | 86.5 | [%] |
| **Number of phases:** | 3 | |
| **Time rating:** | S1 | |
| **Service factor:** | 1.4 | |
| **NEMA design:** | B | |
| **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)

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**Frame:** 145T **Type:** ELP **Serial no:** AC060991

**A.7.1.2 Temperature measurement**

| | |
|---|---|
| Cold winding temperature, tdet cold (°C) | 25.2 |
| Cold stator winding resistance, Rcold (W). | 10.88827 |

**A.7.1.3 Heat-run test**

| | |
|---|---|
| Stator winding resistance, Rhr, (W). | 11.92150 |
| Stator winding temperature, tres hr, (°C) | 49.8 |
| Ambient temperature, tamb hr, °C) | 27 |

**A.7.1.4 Load test**

| | | | | | | |
|---|---|---|---|---|---|---|
| % of full load | 144 | 121 | 99 | 76 | 48 | 17 |
| Torque output, Tlt (i), (Nm) | 8.77 | 7.42 | 6.04 | 4.67 | 2.91 | 1.04 |
| Power input, Pin lt (i), (kW) | 1.8527 | 1.5603 | 1.2722 | 0.9916 | 0.6416 | 0.2778 |
| each line current, Ia lt(i), Ib lt(i), Ic lt(i) (A) | 2.646 | 2.291 | 1.980 | 1.684 | 1.368 | 1.159 |
| Rotational speed, nlt (i), (RPM) | 1741.0 | 1752.0 | 1762.0 | 1771.0 | 1782.0 | 1794.0 |
| Stator winding temperature, tdet lt (i), (°C) | 50.7 | 51.4 | 50.9 | 50.2 | 49.7 | 48.6 |
| Ambient temperature, tamb lt (i), (°C) | 27.0 | 27.0 | 27.0 | 27.0 | 27.0 | 27.0 |
| each line-to-line voltage, Va-b lt(i), Vb-c lt(i), Vc-a lt(i) (V) | 459.93 | 459.87 | 460.57 | 460.50 | 460.10 | 460.20 |
| Frequency, flt (i), (Hz) | 60.01 | 60.01 | 60.01 | 60.01 | 60.01 | 60.02 |

**A.7.1.5 Dynamometer correction test**

| | | | | | | |
|---|---|---|---|---|---|---|
| No | | | | Tdyno cf, (Nm) | 0 | |
| Tlt corr = | 8.77 | 7.42 | 6.04 | 4.67 | 2.91 | 1.04 |

**A.7.1.7 No-Load test**

| | | | | | | |
|---|---|---|---|---|---|---|
| % of nominal voltage, | 105 | 100 | 95 | 50 | 35 | 25 |
| each line-to-line voltage, Va-b lt(i), Vb-c lt(i), Vc-a lt(i) (V) | 483.01 | 460.37 | 437.40 | 229.90 | 161.63 | 112.73 |
| each line current, Ia lt(i), Ib lt(i), Ic lt(i) (A) | 1.219 | 1.127 | 1.045 | 0.484 | 0.338 | 0.249 |
| (c) power input, Pin nl (i), (kW) | 0.1029 | 0.0909 | 0.08097 | 0.036466 | 0.02491 | 0.0193 |
| (d-1) stator winding temperature, tdet nl (i), (°C) | 40 | 40 | 39.7 | 39.2 | 38.5 | 37.8 |
| (h) frequency, fnl (i), (Hz) | 60.02 | 60.02 | 60.02 | 60.02 | 60.02 | 60.02 |

**A 7.2 Calculation**

| | | | | | | |
|---|---|---|---|---|---|---|
| % of full load | 130 | 115 | 100 | 75 | 50 | 25 |
| Power output corrected, Pcorr out lt(I), (HP) | 1.95 | 1.73 | 1.50 | 1.13 | 0.75 | 0.38 |
| Power output corrected, Pcorr out lt(I), (kW) | 1.46 | 1.29 | 1.12 | 0.84 | 0.56 | 0.28 |
| Line current, Iavg lt(i) (A) | 2.65 | 2.29 | 1.98 | 1.68 | 1.37 | 1.16 |
| Slip per unit corrected, Scorr lt(i) | 0.0325 | 0.0264 | 0.0210 | 0.0162 | 0.0101 | 0.0036 |
| Power input, Pin lt (i), (kW) | 1.853 | 1.560 | 1.272 | 0.992 | 0.642 | 0.278 |
| Core loss, Pcore(i), (kW) | 0.048 | 0.049 | 0.050 | 0.051 | 0.053 | 0.054 |
| Windage-friction loss Pwind-frict, (kW) | 0.014 | 0.014 | 0.014 | 0.014 | 0.014 | 0.014 |
| Stray-load losses, Pstray-load lt(i) (kW) | 0.021 | 0.015 | 0.010 | 0.006 | 0.002 | 0.000 |
| Stator winding correction, Pcorr stator lt(i) (kW) | 0.124 | 0.093 | 0.070 | 0.050 | 0.033 | 0.024 |
| Rotor winding correction, Pcorr rotor lt(i) (kW) | 0.055 | 0.037 | 0.024 | 0.014 | 0.006 | 0.001 |
| Power Factor, PF lt(i), (%) | 87.894 | 85.492 | 80.558 | 73.840 | 58.838 | 30.071 |
| Efficiency, Eff lt, (%) | 85.866 | 86.635 | 86.808 | 86.311 | 83.247 | 66.642 |
| | | | | | γ = | 0.998 |

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

**Date of testing:** 6-Aug-11

| | | | |
|---|---|---|---|
| **Measurements made dy:** | D Formas | M Ptaszkis | G Tlałka |
| **Test Report written by:** | T Dobosz | **Approved by:** | A Opitek |

**Appendices:**

1) List of measurement instruments used in tests.