

TEST REPORT

REPORT No. (29/2011)

- **CLIENT:** Energya Specialty Cables Elsewedy.
- **Report Date:** 2 / 3 / 2011
- **Place:**
 - Laboratories of Extra High Voltage Research Center.
 - Internal code : TO - AC - 11 - 01 - 09 - 03
- **Requirements:**
 - Electrical type tests according to IEC 60502-1.
- **Standard Specification:**
 - IEC 60502-1 " Power cables with extruded insulation and their accessories for rated voltages from 1 kV ($U_m = 1.2$ kV) up to 30 kV ($U_m = 36$ kV). Part 1: Cables for rated voltages of 1 kV ($U_m = 1.2$ kV) and 3 kV ($U_m = 3.6$ kV)
- **Description of the Specimens:**
 - 1- 0.6/1 kV power cable with the following specifications:
 - Manufacturer : Energya Specialty Cables Elsewedy.
 - Type : CU / PVC / CT / CW / PVC .
 - Year of Manufacture : 2010
 - No. of Cores : 37
 - Insulation material : PVC
 - Conductors Material : Copper
 - Conductors cross-section : 2.5 mm²
- **Description of the Test Equipment:**
 - Two voltage transformers – Type: UZGT10 - Serial No. (929130/65) and (925007/65).
 - Insulation resistance apparatus (MEGGAR) - Serial No.(32772-2).
- **Test Samples:**
 - Test sample was chosen under the responsibility of the client.



• Tests:

1- Electrical Type Tests:

- 1.1 Insulation resistance measurement at ambient temperature.
- 1.2 Insulation resistance measurement at maximum conductor temperature in normal operation.
- 1.3 Voltage test for 4h.

• Test Method and Results:

1. Electrical Type Tests:

Insulation resistance measurement at ambient temperature.

- The insulation resistance of the cable was measured in accordance with clause 17.1 of IEC 60502-1. The cores of cable sample were immersed in water at ambient temperature for 1 h before the test. 500 V d. c. test voltage was applied for 1 min. and the measurement of insulation resistance was carried out between each conductor and the water.
- The volume resistivity was calculated from the measured insulation resistance and the result of sample is shown in the following table.

test	Requirement	Determined value (average)
Volume resistivity at 20°C (Ω.cm)	$\geq 10^{13}$	3.8×10^{14}

- The test results met the requirements.

Insulation resistance measurement at maximum conductor temperature in normal operation:

- The insulation resistance of the cable was measured in accordance with clause 17.2 of IEC 60502-1. The cores of cable sample were immersed in water at a temperature of 90°C for 1 h before the test. 500 V d. c. test voltage was applied for 1 min. and the measurement of insulation resistance was measured between each conductor and the water.
- The volume resistivity was calculated from the measured insulation resistance and the result of sample is shown in the following table.



test	Requirement	Determined value (average)
Volume resistivity at 90°C ($\Omega \cdot \text{cm}$)	$\geq 10^{10}$	5.3×10^{10}

- The test results met the requirements.

Voltage test for 4h:

- The voltage test was carried out in accordance with clause 17.3 of IEC 60502-1. The cores of cable sample were immersed in water at ambient temperature for 1 h before the test. The power frequency voltage equal to $4U_0$ (2.4 kV) was applied and maintained continuously for 4 h between each conductor and the water. The result of test is shown in the following table.

Applied a. c. Voltage (kV)	Frequency (Hz)	Duration (hour)	Requirement
2.4	50	4	No breakdown

- The test results met the requirements.

▪ Conclusion:

- The 0.6/1 kV power cable CU / PVC / CT /CW/ PVC – (37x2.5) mm² manufactured by Energysa Specialty Cables Elsewedy fulfilled the results of tests mentioned in this report according to IEC 60502-1. The user must be sure of performing remaining tests which not mentioned in this report.

▪ Notes:

- Tests were carried out on the above specimens only without any responsibility concerning other untested specimens.
- The tests were carried out without any obligation on Egyptian Electricity Holding Company.
- This test report shall not be reproduced except in full, without written approval of EHVRC.

▪ TEST ENGINEERS:

