

## **TEST REPORT**

### **REPORT No. (28/2011)**

- **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 - 02
- **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 : 24
    - Insulation material : PVC
    - Conductors Material : Copper
    - Conductors cross-section :  $2.5 \text{ mm}^2$
- **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 ( $\Omega \cdot \text{cm}$ )	$\geq 10^{15}$	$6.7 \times 10^{15}$

- 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 ( $\Omega \cdot \text{cm}$ )	$\geq 10^{10}$	$9.1 \times 10^{11}$

- 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 – (24x2.5) mm<sup>2</sup> manufactured by Energys 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 EHVR.

#### ▪ TEST ENGINEERS:



GENERAL MANGER

F. Attia  
6.3.2011