Insulation Resistance Measurement at Ambient Temperature as per IEC 60502-1

Description

Procedure

This test shall be made on the sample length before any other electrical test.
All outer coverings shall be removed and the cores shall be immersed in water at ambient temperature for at least 1 h before the test. The d.c. test voltage shall be between 80 V and 500 V and shall be applied for sufficient time to reach a reasonably steady measurement, but in any case for not less than 1 min and not more than 5 min. The measurement shall be made between each conductor and the water. If requested, measurement may be confirmed at a temperature of (20 Â± 1) Â°C.

Calculations

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The volume resistivity shall be calculated from the measured insulation resistance by the following formula:

$$\rho = \frac{2 \times \pi \times l \times R}{\ln \frac{D}{d}}$$

where

ρ is the volume resistivity, in ohms · centimetres;
R is the measured insulation resistance, in ohms;
l is the length of the cable, in centimetres;
D is the outer diameter of the insulation, in millimetres;
d is the inner diameter of the insulation, in millimetres.

The â€œinsulation resistance constant K_iâ€• expressed in megohms â‹ kilometres may also be calculated, using the formula:

$$K_i = \frac{l \times R \times 10^{-11}}{\log \frac{D}{d}} = 10^{-11} \times 0{,}367 \times \rho$$

NOTE For the cores of shaped conductors, the ratio *D/d* is the ratio of the perimeter over the insulation to the perimeter over the conductor.

Requirements

The values calculated from the measurements shall be not less than those specified in Table 13.

Table 13 – Electrical type test requirements for insulating compounds

Designation of compounds (see 4.2)	**Unit**	**PVC/A**	**EPR/ HEPR**	**XLPE**
Maximum conductor temperature in normal operation (see 4.2)	**°C**	**70**	**90**	**90**
Volume resistivity ρ				
– at 20 °C (see 17.1)	Ω·cm	10^{13}	–	–
– at maximum conductor temperature in normal operation (see 17.2)	Ω·cm	10^{10}	10^{12}	10^{12}
Insulation resistance constant K_i				
– at 20 °C (see 17.1)	MΩ·km	36,7	–	–
– at maximum conductor temperature in normal operation (see 17.2)	MΩ·km	0,037	3,67	3,67

Category

1. Standards

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