

Investigation of temperature dependence of dc diagnostic tests on LV PVC insulated cables

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The temperature dependence of the insulation resistance measurement on PVC insulated cables is well known. Several standards and recommendations describe this relationship and provide correction factors to normalize the results of measurements at different temperatures. The insulation resistance test measures the sum of the currents of conductive and polarization processes therefore these temperature correction factors characterize the sum of these two processes.

Previous studies have revealed that the temperature dependence of conductive and polarization processes is different and it is also dependent on the thermal degradation of the PVC insulation [1, 2]. The results of previous studies suggest that the temperature correction factors are not independent of the degradation of insulation therefore the correction factors cannot be used for all cases.

In this study, the conductive and polarization processes were investigated by voltage response measurement because this technique enables to examine the conductive and polarization processes separately. The measurements were carried out on new and thermally aged LV PVC insulated cable samples and the temperature dependence of conductive and polarization processes were investigated. Comparing of the results of the measurements on new and aged cables more precise temperature correction factors are recommended for dc diagnostic tests.

[1] Z. Á. Tamus, N. Szedenik, "Investigation of temperature dependence of dielectric processes in thermally aged PVC insulation", *Journal of Electrostatics* vol. 71. (3), pp. 462-466. 2013.

[2] G. M. Csányi, Z. Á. Tamus, "Temperature dependence of conductive and polarization processes of PVC cable", *IEEE Electrical Insulation Conference*, 2014, 9-11 June 2014. pp. 299-302.