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The Electrical Properties of Polyester Materials as Outdoor Insulators

Authors : R. M. EL-Sharkawy, L. S. Nasrat, K. B. Ewiss

Abstract : This work presents a study of flashover voltage for outdoor polyester and composite insulators under dry, ultra-violet and contaminated conditions. Cylindrical of polyester composite samples (with different lengths) have been prepared after incorporated with different concentration of inorganic filler e.g. Magnesium Hydroxide [Mg(OH)2] to improve the electrical and thermal properties in addition to maximize surface flashover voltage and decrease tracking phenomena. Results showed that flashover voltage reaches to 46 kV for samples without filler and 52.6 kV for samples containing 40% of [Mg(OH)2] filler in dry condition. A comparison between different concentrations of filler under various environmental conditions (dry and contaminated conditions) showed higher flashover voltage values for samples containing filler with ratio 40% [Mg(OH)2] and length 3cm than that of samples containing filler [Mg(OH)2] with ratios 20%, 30% and lengths 0.5cm, 1cm, 2cm and 2.5cm. Flashover voltage decreases by adding [Mg(OH)2] filler for polyester samples under ultra-violet condition; as the ratio of filler increases, the value of flashover voltage decreases Also, in this study, the effect of thermal performance with respect to surface of the sample under test have been investigated in details.

Keywords : flashover voltage, filler, polymers, ultra-violet radiation
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