

Turkish Journal of Electrical Engineering & Computer Sciences

Turkish Journal

of

Insulation Condition Assessment of Power Transformers Using Accelerated Ageing Tests

Electrical Engineering &
Computer Sciences

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 [Keywords](#)
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Abstract: Thermal stress due to losses and environment temperature causes degradation to paper/oil insulation systems in transformers, even at operating temperature. Experience indicates that thermal ageing of oil and paper in power transformers leads to the change of some insulation characteristics. In this paper, insulating papers immersed in oil have been acceleratory aged at 140, 150, and 160 ° C under laboratory conditions. Some of the oil properties, such as water content, breakdown voltage, acidity, together with the aged insulating paper properties such as electric strength, dielectric dissipation factor and tensile strength were measured and analyzed. Also, insulation system conditions under thermal stress have been evaluated by electrical/distinctive techniques like recovery voltage, polarization and depolarization currents. Correlations between these parameters have been investigated. Finally, paper tensile strength has been used as a criterion to estimation of insulating paper life time.

Key Words: Transformer, insulation assessment, monitoring, polarization, recovery voltage

Turk. J. Elec. Eng. & Comp. Sci., 17, (2009), 39-54.

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