

Defining the Limits of No Load Test Parameters at Over Excitation to Ensure No Over-Fluxing of Core Based on a Case Study: A Perspective From Utilities

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Abstract : Power Transformers are one of the most critical and failure prone entities in an electrical power system. It is an established practice that each design of a power transformer has to undergo numerous type tests for design validation and routine tests are performed on each and every power transformer before dispatch from manufacturer's works. Different countries follow different standards for testing the transformers. Most common and widely followed standard for Power Transformers is IEC 60076 series. Though these standards put up a strict testing requirements for power transformers, however, few aspects of transformer characteristics and guaranteed parameters can be ensured by some additional tests. Based on certain observations during routine test of a transformer and analyzing the data of a large fleet of transformers, three propositions have been discussed and put forward to be included in test schedules and standards. The observations in the routine test raised questions on design flux density of transformer. In order to ensure that flux density in any part of the core & yoke does not exceed 1.9 tesla at 1.1 pu as well, following propositions need to be followed during testing: □ From the data studied, it was evident that generally NLC at 1.1 pu is approx. 3 times of No Load Current at 1 pu voltage. □ During testing the power factor at 1.1 pu excitation, it must be comparable to calculated values from the Cold Rolled Grain Oriented steel material curves, including building factor. □ A limit of 3 % to be extended for higher than rated voltages on difference in Vavg and Vrms, during no load testing. □ Extended over excitation test to be done in case above propositions are observed to be violated during testing.

Keywords : power transformers, no load current, DGA, power factor

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