

Testing of power factor of transformer oil

Contribution by: C.Kaliyaperumal, Former CE/TNEB/Tamilnadu,India

Power factor tests are used to measure dielectric losses, which relate to the wetness, dryness or deterioration of electrical insulation.

Power factor is defined as the cosine of the phase angle between voltage and current whether in Power circuit or in insulating circuit. But for typical values of small power factor angles below 5%, the two numbers, viz, power factor and tan delta are virtually the same. Hence, the same tan delta test kit may be used with a special cup for checking the PF of Transformer oil.

Measuring the insulation power factor is achieved by calculating the ratio of the capacitive or "charging" current (measured in volt-amperes) to resistive or "leakage" current (measured in watts) and can be done in the Doble test kit(Tan delta test kit) itself with a special cup.

For an ideal insulation, the phase angle is 90° . In practice no insulation is ideal, instead has a certain amount of loss, and the total current leads the voltage by a phase angle less than 90°

Of course, the Doble oil power factor test setup is a field test and not as rigorously standardized as a laboratory test.

The oil power factor test is an easy and quick field test which is very much sensitive to moisture (power factor goes up when moisture goes up) for which a Karl Fischer moisture test is to be done as a Lab test.