MGM TRANSFORMERS BY FORGENT

TRANSFORMER TEST PLAN FOR LIQUID FILLED TRANSFORMER

The transformer shall be tested in accordance with the latest version of the following ANSI/IEEE and CSA standards as applicable.

C57.12.90 test code for liquid filled transformers

Performance qualification shall be judged in accordance with ANSI/IEEE C57.12.00 for liquid filled transformers.

The test results will be tabulated in MGM Transformer Company's standard Certified Test Report Form.

The following tests will be conducted on the unit:

1. Winding resistance: Resistance of each Primary and Secondary windings shall be measured with digital micro ohmmeter.

2. Turn Ratio: The transformer shall be tested for turn ratio of each coil's primary to secondary turns on all the taps connections by transformer turn Ratio Bridge.

3. Polarity and phase relation test: The polarity / phase relation shall be checked simultaneously with the turn ratio test.

4. No load losses and Exciting current: This shall be tested at 100% rated voltage and at other specified voltage(s) at rated taps connection using digital or analog meters. The measurements will be made at the Primary or secondary terminals with other winding(s) open circuited.

5. Impedance and Load loss test: The test shall be made by single phase voltage method. One winding, preferably lower voltage winding will be short circuited with negligible load impedance shorting bars. Single phase voltage shall be applied and adjusted to circulate full load rated current on each pair of the open winding in turn and the readings will be recorded. For three winding transformers the test shall be conducted between each pair of the windings at the lower of its rated KVA rating.

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The percentage impedance and load losses will be calculated from the readings noted using digital or analog instruments and converted to the operating temperature of the transformer.

6. Applied potential test: The test shall be done at 60 Hz. Applicable test voltage shall be applied on each primary and secondary windings in turn with all other windings and parts connected to ground and the return circuit of the test transformer. Duration of the test shall be 1 minute.

7. Induced potential test: The test shall be conducted at 400 hz for 18 seconds. Twice the rated voltage shall be applied at the lower voltage winding with other winding(s) open circuited.

8. Impulse test (*): The test will be done applying 1.2 x 50 microsecond impulse wave of negative polarity on liquid filled transformers.
The test shall consist of one reduced (50 to 70 % of full) voltage and current wave followed by two chopped voltage waves and one of each full voltage and current wave. The values shall be as per transformer specifications.

The test waves shall be recorded from the oscilloscope connected to the resistance divider of the impulse generator.

9. Temperature rise test (*): For liquid filled units, the test shall be conducted by short circuiting lower voltage terminals and applying 3 phase voltage to the higher voltage terminals circulating the applicable load current in the windings in accordance with the standards.

The temperatures of the various spots on the unit will be monitored and recorded every hour by attaching thermocouple at those spots.
The transformer will be kept under load until all the temperatures are stabilized. The power to unit shall be shut down thereafter and the hot resistance will be measured at the intervals of 30 seconds for up to 6 minutes after shut down. A graph will be plotted for time vs. hot resistance and extrapolated to zero time for determining the hot resistance at the time of shut down. The temperature rise shall be calculated from the hot resistance at the time of shut down.

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10. Audible Sound Level Test (*): Sound level will be measured using A-weighting characteristics with a portable sound level meter confirming to ANSI S1.4-1971, type 2.

The measurements shall be made at 1 foot to the surface of the unit all around at an interval of 3 feet from each other. The ambient sound level shall be kept as low as possible during the measurements and will be at least 5 dB lower than the combined average sound level of the transformer.

11. Insulation Power Factor Test: Insulation power factor is done with the test bridge.

12. Operation test of all devices: Operation test of the devices are done.

13. Dissolved gasses in oil analysis: This test is done when ordered by the customer.

14. Leak: Leak test is done by pressurizing tank after the transformer construction is completed.

GENERAL

The above test plan is the general outline of the methods or procedures used for the tests being conducted at the MGM Transformer Company plant.
The full details are omitted and shall be in accordance with the applicable standards for the procedures specified. All the tests except identified by (*) are routine tests. Others are design or prototype tests.