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Production Testing Information for Series H

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HPS Dry-Type Transformers are approved, listed, recognized or comply with the following Regulatory Standards. The reference files are:

UL1561 and UL1562
ANSI C57.12.51

CSA C9-M and CSA C22.2-M
NEMA TR-1 and ST-1

IEC 76

HPS dry-type transformers can be built to comply with the following engineering standards:

- UL 1561: Dry-Type General Purpose and Power Transformers
- UL 1562 : Transformers, Distribution, Dry-Type over 600 volts
- IEEE-C57.12.01: General Requirements for Dry-Type Distribution and Power Transformers NEMA ST-20: Dry-Type Transformers for General Applications
- ANSI-C57.12.51: Requirements for Ventilated Dry-Type
- ANSI-C57.12.70: Terminal Markings & Connections for Distribution & Power Transformers ANSI-C57.12.91: Test Code for Dry-Type Distribution and Power Transformers
- ANSI-C57.12.90: Guide for Short Circuit Testing of Distribution and Power Transformers NEMA 250: Enclosures for Electrical Equipment
- CSA-C22.2 No. 47: Air-Cooled (Dry-Type) Transformers
- CSA-C9-M: Dry-Type Transformers
- CSA C802.2 and DOE 10 CFR Part 431: Energy Efficiency Standards

Transformer Test Standards

All transformers are tested at the manufacturing facility prior to shipment. Transformers must meet very specific criteria to be certified acceptable for release. Tests are categorized as "Production Tests" and "Type Tests". Production Tests are typically applied to every transformer, where Type Tests are required either to qualify a new product or to further certify a production product. Type tests are optional and are available at an additional cost.

Production Tests

D.C. Resistance Measurement

Current from a D.C. resistance bridge is applied to the transformers windings to determine the D.C. resistance of the coils. This test is important for the calculation of 12R for use in the winding temperature test and as base data for future assessment in the field. (Note: This is a standard test. Data retained on units over 500kVA only).

Polarity and Phase-Relation Test

Polarity and phase-relation tests are made to determine angular displacement and relative phase sequence to facilitate connections in a transformer. Determining polarity is also essential when paralleling or banking two or more transformers. (Note: This is a standard test. Data retained on units over 500kVA only).

Production Tests continued

No-Load and Excitation Current Test

No-load losses (excitation losses) are the core losses of a transformer that are "excited" at rated voltage and frequency, but which do not supply load. No-load losses include core loss, dielectric loss and losses in the windings due to exciting current.

The transformer is excited at rated voltage with all other windings open circuited. The exciting current and no load loss is then measured.

(Note: This is a standard test to determine that energy efficiency requirements are met. Data retained on units over 500kVA only).

Voltage Ratio (turns ratio)

To confirm the voltage ratio of a transformer, the ratio of the number of turns in the high-voltage winding with respect to the number of turns in the low-voltage winding is measured.

(Note: This is a standard test. Data retained on units over 500kVA only).

Applied Potential Test

A normal power frequency, such as 60 Hz, is applied to each winding for one minute with all other windings and core grounded. These tests are in accordance with UL 1561.

Induced Voltage Test

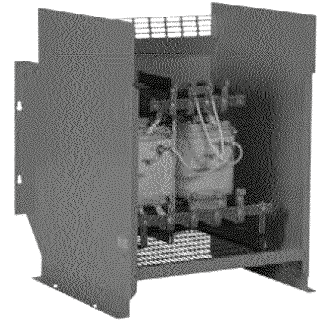
The induced voltage test is applied for 7200 cycles. The voltage applied is twice the operating voltage and confirms the integrity of the insulation.

Impedance Voltage and Load Loss Test

The voltage required to circulate the rated current under short-circuit conditions when connected on the rated voltage tap is the impedance voltage.

Rated current is circulated through the windings with the secondary short circuited. The impedance voltage and load loss is then measured. They are corrected to rise +20°C reference temperature.

(Note: This is a standard test only on units over 500kV A. It will only be carried out on lower kVA units when specifically requested. Extra charges apply below 500kVA).



Type Tests

Type tests are required either to qualify a new product or to further certify a standard product line. The following is a list of type tests performed on HPS Transformers.

(Note: Available at an additional charge)

- Temperature Rise Test
- Sound Level Test
- Partial Discharge (corona)
- Basic Impulse Insulation Level (BIL) Short-Circuit Test
- Insulation Resistance Test

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Siemens Industry, Inc.
5400 Triangle Parkway
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Siemens Technical Support: 1-800-333-7421
info.us@siemens.com

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