

# Power Transformers & Reactive Equipment







Preparing a 138 kV 125 MVA power transformer for testing. On the right side is the three-phase variable frequency power transformer test system.



Instrument transformers for loss measuring system.



Lightning impulse testing being performed on a 16 MVA power transformer.

## Power Transformers

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The power transformer is one of the most expensive and complex components of the power system. An in-service failure of critical equipment can be catastrophic, costing millions and taking years to replace.

Manitoba Hydro International Ltd. offers full high voltage testing and related diagnostics to help you avoid expensive in-service failures.

## Full Electrical Tests

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We conduct full electrical testing of power transformers rated up to:

- 550 kVac or 500 kVdc;
- 310 MVA 3-ph or 400 MVA 1-ph;
- 375 tonnes fully assembled.

Rail line access into the HV test hall is available.

We also offer tests for qualification and maintenance purposes:

- Dielectric tests:
  - Lightning impulse (full wave and chopped wave) and switching impulse;
  - Applied direct voltage (DC) with polarity reversal within two minutes;
  - Applied alternating voltage (AC).
- Induced/low frequency tests:
  - Overvoltage at up to 200 Hz with partial discharge measurements, <10 pC background interference;
  - Core loss at 50/60 Hz;
  - Load loss and temperature rise at 50/60 Hz;
  - Temperature rise tests.

## High Stability Loss Measurement System

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The high stability loss measurement system provides precise measurements, ensuring accuracy and control without interference. Capabilities of this system include:

- Compressed gas capacitor voltage dividers for voltage measurement up to 200 kV;
- Two-stage compensated current transformers for current measurement up to 2,000 A;
- Loss measurement accuracy 0.13% error or less at 0.05 power factor.

## Substation Reactors

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Reactors play an important role in the power system for system stability, power factor correction, and filtering applications. We offer high voltage testing and type testing.

We conduct electrical testing of shunt reactors rated up to:

- 48 kV, 1-ph or 42 kV, 3-ph;
- 125 MVAR reactive power.

## Leading-Edge Equipment

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The three-phase variable frequency power transformer test system is a unique piece of equipment in the test hall, consisting of a three-level terminal bay module. The system is capable of performing induced partial discharge measurements at less than 10 pC background noise.

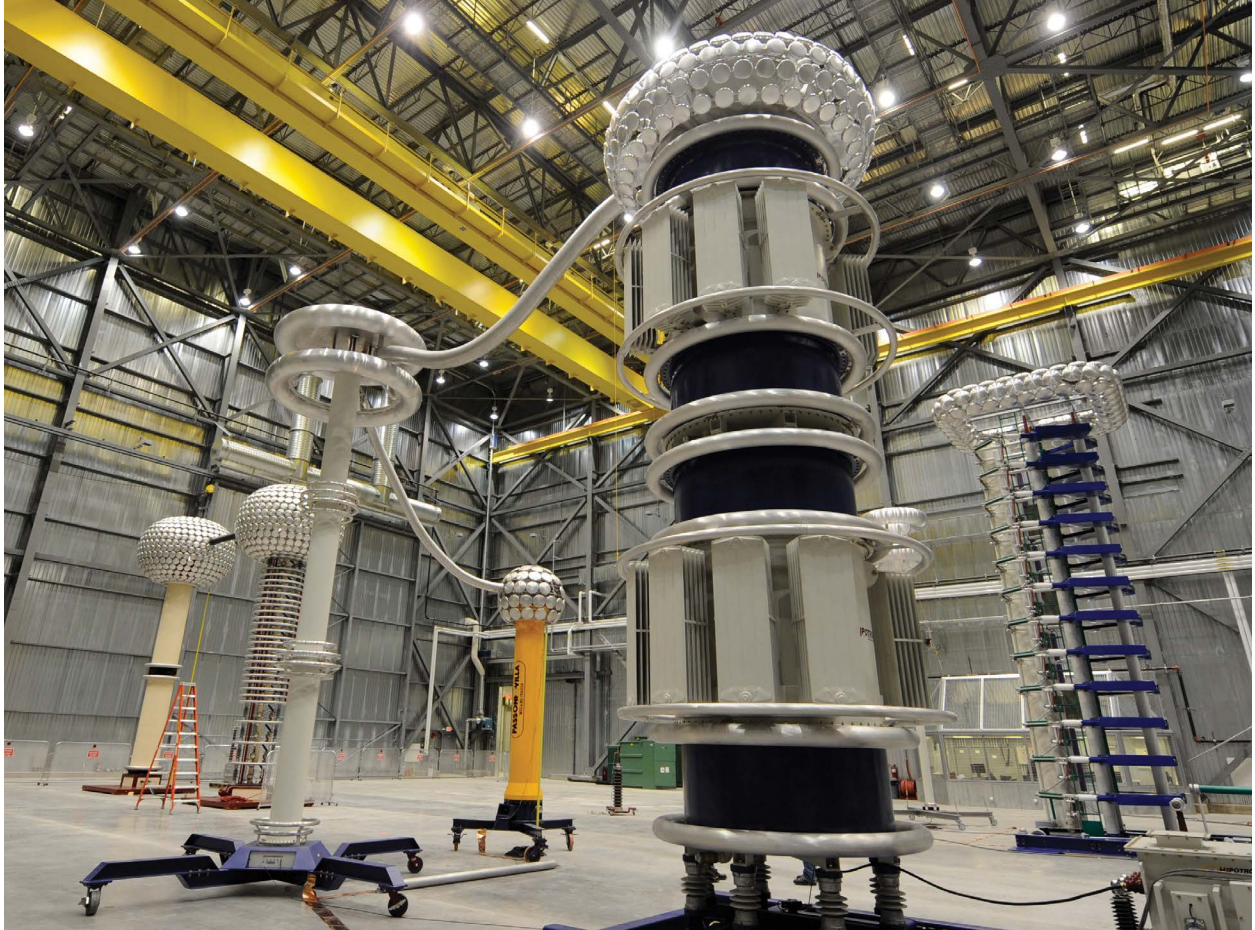
## Standards

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We offer power transformer and reactor tests compliant with the following standards:

- CAN/CSA-C88-M90 Power Transformers and Reactors;
- IEEE Standard Requirements, Terminology, and Test Code for Shunt Reactors Rated Over 500 kVA;
- IEC 60076 – Power transformers – Part 1: General;
- IEEE C57.16-2011 – IEEE Standard for Requirements, Terminology, and Test Code for Dry-Type Air-Core Series-Connected Reactors.





## High Voltage Test Services

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In partnership with Manitoba Hydro's High Voltage Test Facility, we provide commercial testing services for a wide variety of high voltage electrical equipment. All testing is performed at Manitoba Hydro's leading-edge facility, where services are tailored to meet each customer's specialized needs in accordance with IEEE, ANSI, IEC, and CSA standards.

Contact us today to discuss your testing requirements:

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**+1 (204) 480-5806**

[mhi.ca](http://mhi.ca)

Available in accessible formats upon request.

