

1 High Voltage Lab

High voltage testing and diagnostics

Tests in connection with power equipment, which in use can be exposed to high electric voltages or currents. Applied voltages are AC, DC or impulses in order to simulate real conditions, including lightning and other overvoltages.



Applications

Component design, modeling and verification

- ▶ Wind turbine technology
- ▶ Power frequency, harmonics + transients
- ▶ Electrical machines with less rare earth materials
- ▶ Permanent magnet motors and generators
- ▶ Superconducting generators
- ▶ Broad band modeling of grid components
- ▶ Lightning protection
- ▶ Losses, load ability
- ▶ Temperature tests

Applications

High voltage testing and diagnostics

- ▶ Hipot component testing
- ▶ Cables, transformers, breakers
- ▶ Wind turbine lightning protection
- ▶ Capacitors, reactors, insulators
- ▶ EMC testing of control and communication equipment
- ▶ High power aging tests, insulation degradation
- ▶ PD + loss measurements, space charges
- ▶ Frequency response analyses
- ▶ Dielectric and magnetics, properties + diagnostics
- ▶ High voltage, impulse test

TEST AGAINST STANDARDS:

PowerLabDK facilities are suitable for R&D related tests of electrical power components and systems against a wide range of relevant standards. Including IEC and CENELEC standards.

PowerLabDK secretariat

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2 High Voltage Lab

Investigations of power components and subsystems under high voltage and high current conditions.

Component performance in interaction with complex electric energy systems and other environmental factors.

MODELING

The exposure of components in the future power system requires far more detailed knowledge to their characteristics than the traditional 50 Hz approach suitable for load flow calculations. Broad band models have to be developed for implementation in future grid models.

DESIGN

Research and development of electrical technologies for new design and design optimization of power components. This includes all types of components, with present focus mainly on wind turbine equipment and rotating machines.

TESTING

Experimental investigations on power components with respect to performance, reliability and broad band modeling. Tests are carried out on models and full size components with advanced test technologies for online and offline use. This includes diagnostic measurement systems for condition assessment of power components.

FACILITIES

AC	2 x 400 kV, 45 - 60Hz
DC	Up to 300 kV +/-
Impulse voltage	Up to 1200 kV +/-, pulse shape i.e. 1.2/50 μ s, 250/2500 μ s
Impulse current	Up to 100 kA +/-, pulse shape i.e. 8/20 μ s
Other facilities	<ul style="list-style-type: none">- EMC shielded room- Material lab for sample preparation- Dielectric analyses- Tan measurements- Space charge formation in cables and dielectrics- Partial discharge measurements- Transient measurements- Aging tests, tracking resistance- Insulation withstand voltage

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