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Ingenuity for life

Powerful, efficient, independent

The comprehensive portfolio of the testing laboratories at Schaltwerk Berlin

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Outstanding testing expertise and always up to date

Benefit from decades of testing laboratory experience at Schaltwerk Berlin


DAkkS
Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

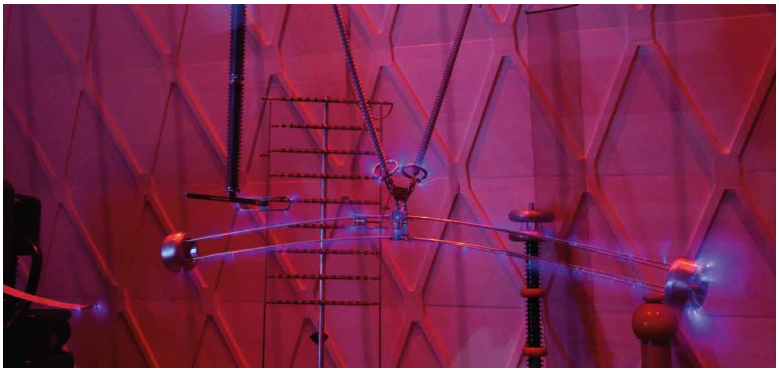
Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV
Signatory to the Multilateral Agreements of
EA, ILAC and IAF for Mutual Recognition

Accreditation

The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory

PEHLA - Gesellschaft für elektrische Hochleistungsprüfungen
Hallenweg 40, 68219 Mannheim

Standort:
PEHLA - Gesellschaft für Elektrische Hochleistungsprüfungen
PEHLA-Prüffeld Berlin-Siemensstadt



For more than 80 years, we have been testing electrotechnical equipment and developments in high and medium voltage at our test facilities at the Schaltwerk Berlin. With a high degree of expertise, decades of testing experience, and a powerful, wide-ranging testing portfolio, we ensure the product quality of power engineering equipment through type and development tests.

The testing laboratories are accredited by the Deutsche Akkreditierungsstelle GmbH (DAkkS) to perform internationally recognized type tests according to IEC 17025. Moreover, our testing and measurement equipment is subject to continuous monitoring. We are a member of PEHLA (Gesellschaft für elektrische Hochleistungsprüfungen), an association of owners of high-power testing laboratories in Germany and Switzerland, which is a member of the international Short-Circuit Testing Liaison (STL). Hence, our tests and the documents we issue comply with the highest quality standards.

As an independent testing facility we perform tests for Siemens as well as for external customers, and we guarantee neutrality and impartiality for all tests we carry out.

We provide our customers with globally recognized test documents and certificates for the tested equipment – an essential competitive advantage for the international distribution of the tested products.

Thanks to our long-standing experience in the fields of high power, high voltage, mechanics, temperature rise, and environmental properties testing, we can precisely address your individual testing requirements. We can implement testing programs that meet individual demands for standardized type and development tests as well as for experiments in the field of fundamental research. State-of-the-art testing and measurement technology that is continually kept up to speed with technological developments, as well as a high degree of automation, ensure an efficient workflow and short lead times from delivery to testing all the way to the preparation of the documentation.

We offer the following services

- Performance and supervision of type and development tests
- Additional measurements, such as high-speed imaging
- Issuing of test reports
- Monitoring of tests in external laboratories
- Consulting about standards, technical methods of testing, and technical questions
- Training

We are here for you!

Contact us to learn about the kinds of testing services we provide.
E-mail: psw-lab.energy@siemens.com

High-power tests

Reliable test results
at extreme currents and voltages

At the high-power laboratory, we test your high and medium-voltage equipment with respect to the following properties:

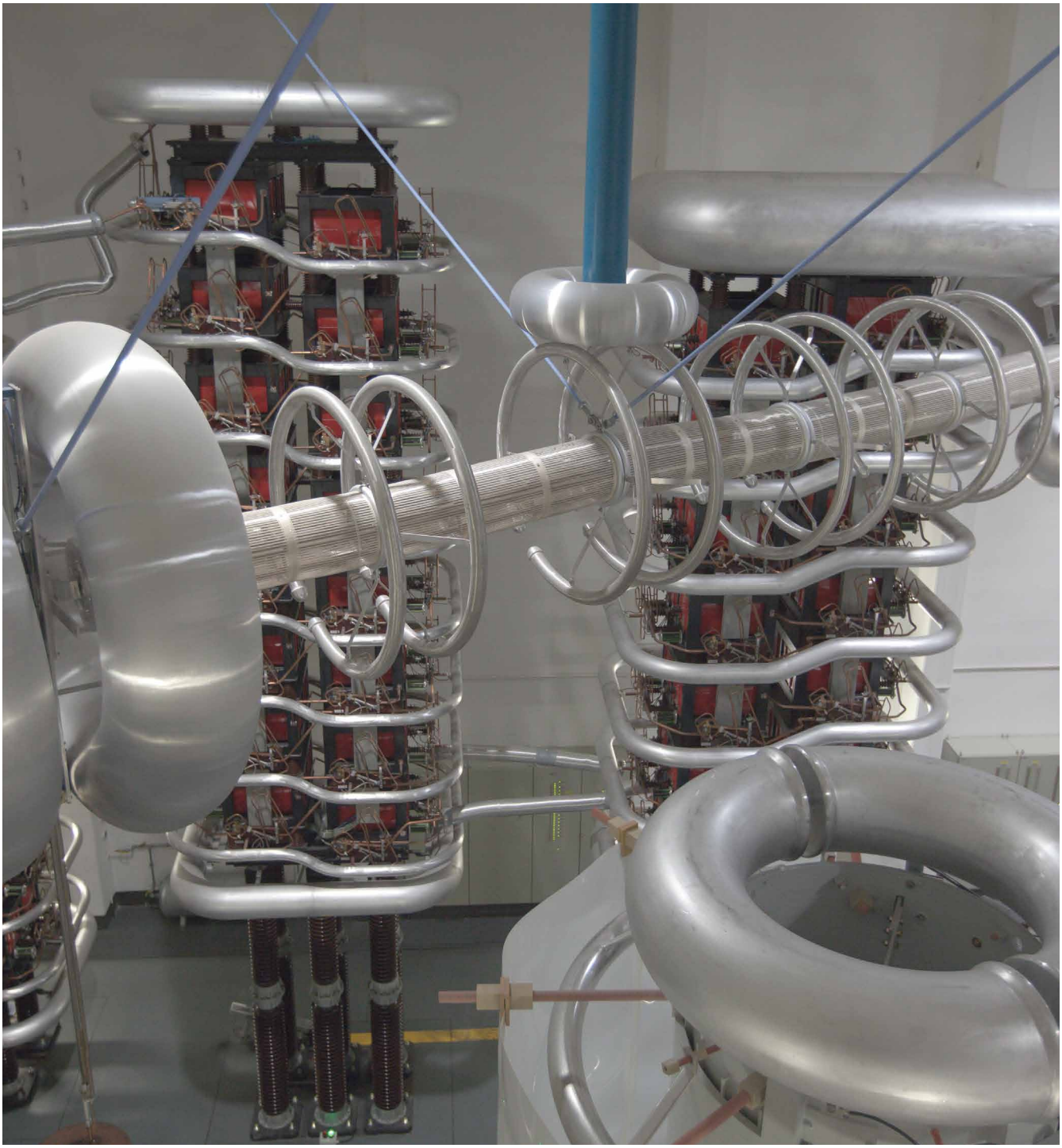
- thermal and dynamic short-circuit performance
- making/breaking and insulation capacity at short-circuit conditions
- operational behavior.

The three available short-circuit generators can be connected flexibly. Hence, several specimens can be tested in parallel, or a total short-circuit current of up to 100 kA at 20 kV can be generated for individual tests. Voltage is adjusted to the particular requirements by power transformers. For high-voltage products, synthetic tests with voltage and current injection methods are applied as well. The synthetic test circuits are arranged in a flexible manner, so that the capacitive breaking capacity can be tested at 50 and 60 Hz. We can also test bus-transfer currents according to the latest requirements of IEC 62271-102.

We also have a laboratory for basic research, where currents of up to 80 kA at 50/60 Hz can be generated by capacitor banks and synthetic voltages of up to 120 kV are available. This laboratory therefore offers an attractive and flexible alternative to tests with generators.

Performance data of the high-power testing laboratoy	
Maximum generator output	6,400 MVA
Maximum short-circuit current (single and three-phase)	100 kA/80 kA
Maximum short-time withstand current 3 s	80 kA
Maximum voltage for synthetic tests	1,150 kV
Frequency	50/60 Hz*
Characteristics of the laboratory for basic physical studies	
Maximum short-circuit current (one phase)	80 kA
Frequency	50/60 Hz
Maximum voltage for synthetic tests	120 kV

* 60 Hz to 20 kA



Did you know ...

... that we can run short-circuit and pressure relief tests including pre-failing on high- and medium-voltage surge arresters in conformance with standards?

Emulating an overload in a surge arrester in conformance with standards is a technical challenge, especially for type B arresters (without gas volume). The high power testing laboratory is one of the few facilities in the world that is able to carry out this test on all arrester types in accordance with IEC 60099-4. Two test circuits are combined into one: the pre-failing test circuit with up to 30 A at voltages up to 180 kV, and the high-current circuit, which can provide a voltage up to 35 kV and currents up to 65 kA.

High-voltage tests

Short- and long-term stress at maximum voltages

The high-voltage testing laboratory provides a wide range of dielectric tests for short and long-term stress. It has two independent testing halls, several smaller laboratories, and an open-air testing area for voltage tests. We provide:

- lightning impulse voltage tests
- alternating voltage, direct voltage, and switching impulse voltage tests
- combined voltage tests.

A separate laboratory provides testing and measuring equipment tailored specifically to the medium voltage level. In parallel with the voltage tests, other examinations can be performed, among them measurements of conventional (IEC 60270) and UHF partial discharge (PD), radio interference voltage (RIV), measurements of the dissipation factor and capacity as well as rain tests.

We can also carry out dielectric tests on post and overhead line insulators with tower and line simulation. Small laboratories are also available for testing materials and insulation.

The open-air testing area permits long-term tests of insulation materials under DC and AC to simulate aging processes. The large test halls of the high-voltage test laboratory and the medium-voltage hall are shielded. This allows sensitive PD measurements with a very low noise level of less than 1 pC. The high-voltage test laboratory also permits testing of bus-charging currents of disconnectors for gas-insulated switchgear.

Maximum test voltages	
Alternating voltage (50 Hz)	1,200 kV, open air up to 1,800 kV
Lightning impulse voltage (1.2/50 µs)	3,000 kV
Switching impulse voltage (250/2,500 µs)	1,800 kV
Direct voltage	1,200 kV
Maximum impulse currents	
Maximum lightning impulse current (8/20 µs)	40 kA
Maximum switching impulse current (30/60 µs)	3 kA
Maximum high impulse current (4/10 µs)	150 kA
Maximum rectangular impulse current (2 ms)	5 kA

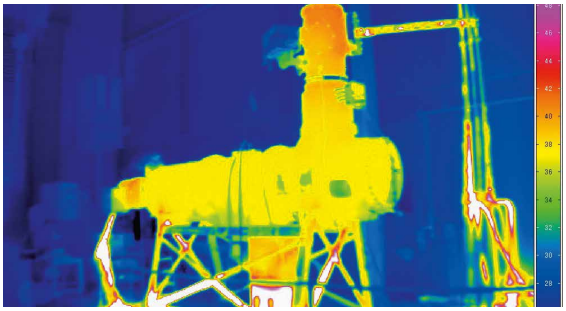
Incidentally ...

... we can also perform the technically demanding composite voltage tests in accordance with standards at our high-voltage testing laboratory in Berlin.

»Composite Voltage Tests« or Superimposition Tests involve two superimposed voltage waveforms that are decoupled from each other and are performed on a single specimen. We can run tests with up to 550 kV DC voltage and a simultaneously superimposed lightning impulse of up to 1,550 kV. As much as 1,175 kV is possible for switching impulse voltage. The tests can also be performed with a heated conductor.

Mechanical tests and temperature rise

Tests of mechanical functions, temperature rise, and environmental properties



The mechanical testing laboratory examines and analyzes mechanical functions and environmental properties. Modern measurement technology enables the precise, partially automated logging and analysis of measured data.

The mechanical test laboratory comprises a high-current facility for temperature rise tests at 50/60 Hz AC and DC. Several temperature chambers make it possible to perform climatic tests. Endurance tests are carried out in the hall, which is equipped for this purpose.

The powerful, cam- and frequency-controlled vibration test system with vertical and horizontal acceleration permits the determination of break, tension, and compression parameters, testing of the equipment's mechanical service life, and transport testing.

Comprehensive facilities with control and measuring systems allow a wide range of tests and examinations, such as:

- Lifetime tests and mechanical endurance tests
- High-current tests and temperature rise tests
- Tightness tests and pressure tests
- Low and high-temperature tests
- IP degree of protection tests
- Measurement of sound pressure level
- Foundation load measurements
- Icing tests
- X-ray examinations

We perform and supervise standard-compliant earthquake tests in external facilities approved by the testing laboratory.

Characteristics of the temperature rise testing laboratory	
Temperature rise tests AC (50/60 Hz)	to 10 kA
Temperature rise tests DC	to 10 kA
Characteristics of the environmental tests	
Temperature range of the temperature chamber (2.45 x 3 x 2.2 m)	-65 °C to +95 °C
Functional range of the temperature cabinet (1 x 1 x 1 m)	-75 °C to +200 °C
Performance data of the vibration test system	
Maximum force of the hydraulic cylinder	50/160/250 kN
Maximum stroke	±100 mm
Maximal acceleration	100 m/s²
Frequency range	0 to 200 Hz

Did you know that we also ...

... perform combined tests for the accuracy class of current and voltage transformers at high and low temperatures with rated normal current or applied phase-to-earth voltage

By connecting to the existing temperature rise system and setting up a mobile high-voltage source we can perform high- and low-temperature tests in the temperature chamber of the mechanical test area, using a rated normal current of up to 10 kA AC/DC or an applied voltage of up to 100 kV simultaneously.

Documentation, standards, and accreditations

High quality and worldwide recognition give you competitive advantages

DAkkS
Deutsche
Akkreditierungsstelle
D-PL-11055-10-00

The testing laboratory has been accredited according to DIN EN ISO/IEC 17025 by the Deutsche Akkreditierungsstelle (DAkkS)

Our high quality standards are a direct benefit to you, in terms of the test reports. In our capacity as either a Schaltwerke testing laboratory (PSW) or a PEHLA institution, we issue standard-compliant test reports that are esteemed and recognized by customers and end users of electrotechnical devices around the world. Manufacturers of successfully tested products reap the rewards of facilitated market entry: In many cases, the presentation of our test document is an essential selling point.

Moreover, we provide all of our customers with the option to individually define the nature and extent of the documentation through tests based on customer specifications.

This way, all market demands can be optimally factored in. Thanks to extensive automation of the document preparation process, we are able to deliver all test reports shortly after completion of the tests. Further documentation material, such as video documentations, high-speed images, and images from an infrared camera, can be provided on request. These media can additionally illustrate and underpin the quality and the behavior of the tested products.

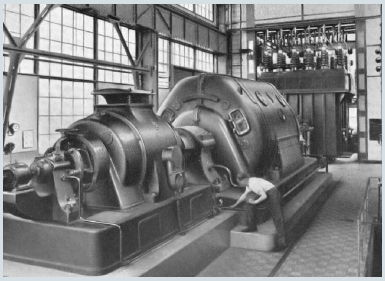
Tests are performed according to IEC, DIN, EN, VDE, ANSI, IEEE, GOST, GB, and other national and international standards or according to customer specifications.

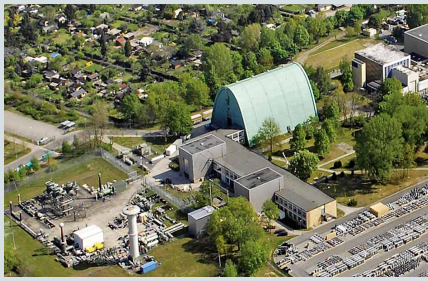
Specimen/standard	Applicable standard
High-voltage circuit breaker	IEC 62271-100
Auto-reclosers	IEC 62271-111
Metal-enclosed switchgear	IEC 62271-200
Gas-insulated metal-enclosed switchgear	IEC 62271-203
Disconnecting and earthing switches	IEC 62271-102
Circuit breakers	IEC 62271-103
High-voltage contactors and motor starters	IEC 62271-106
Surge arresters	IEC 60099-4
Current transformers	IEC 60044-1
Insulators	IEC 61109/60383/60168
Environmental testing	IEC 60068
Insulated bushings >1 kV	IEC 60137

A full overview of the standards according to which we are accredited is available on our Web site: **siemens.com/energy/psw**
Further standards on request

A tradition of top performance

Milestones in the history of the Schaltwerk Berlin testing laboratories



1928	Commissioning of the high-power and high-voltage testing laboratories
1940	Capacity upgrade of the high-power testing laboratory to 1,200 MVA
1954	Post-war reconstruction of the testing laboratories
1960	Construction of new high-voltage testing halls
1961	Co-foundation of PEHLA
1975	Commissioning of a new high-power testing laboratory with a maximum capacity of 3,200 MVA
1982	Upgrade of the open-air test area with a 5 MV impulse voltage generator
1985	Capacity upgrade of the high-power testing laboratory to a maximum of 6,400 MVA
1992	Accreditation of the testing laboratories according to ISO/IEC 17025
1994	Construction of a new temperature rise test area for 50/60 Hz up to 6,000 A
1995	Commissioning of the vibration test system
2005	Upgrade of the synthetic test circuit to a maximum voltage of 1,150 kV
2011	Extension of the mechanical testing laboratory, incorporating a new, independent mechanical endurance test hall
2015	Expansion of the temperature rise testing laboratory to 10 kA AC and DC

We will test your equipment!

Contact us to discuss your custom solution.

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