

Reliable testing and diagnostics of high-voltage equipment

ACRF RESONANCE TESTING

The Milan Vidmar Electric Power Research Institute has more than 60 years of experience in the field of high-voltage testing. We are the only organization in Slovenia with advanced technological equipment that allows testing and measurement of equipment at voltage levels up to 400 kV within an accredited high-voltage laboratory and several mobile units.



Over 60 years of experience in testing HV equipment and devices.



Measurements and tests of GIS switchgear, cables and transformers in accordance with international standards.



A mobile ACRF system and extensive domestic and international experience.

An important upgrade to our services is the advanced mobile measurement system, which allows testing of high-voltage devices using the resonance method. The mobile unit is designed for high AC voltage on-site testing. The ACRF method provides test conditions that are identical to those in operation.

USE OF THE ADVANCED ACRF RESONANCE METHOD

- Testing and measurements on medium and high-voltage cables in accordance with international standards:
 - IEC 60840, IEC 62067,
 - SIST EN 60502-2,
 - SIST HD 620 S2, SIST HD 632 S3, and
 - IEEE for medium- and high-voltage cables.
- Testing and measurement of GIS switchgear:
 - IEC 62271, IEC 60270.
- Transformer testing (IEC 60076).
- Diagnosis and fault repair of high-voltage equipment.

ENSURING THE RELIABILITY OF THE POWER GRID

Ensuring operational reliability is the most important task for system operators and power grid owners. This is affected by the condition of all components of the power grid system.

Defects or damage often occur during manufacture, installation or assembly, most of which cannot be detected except by standardised increased voltage testing. This is the only way of testing to prove that the insulation will withstand any overvoltages that may occur during normal operation.

Only the minimum standard test requirements, such as a 24-hour trial connection to the voltage, which the standard allows for cables as a last resort, are not sufficient in this context.

TOP EXPERTISE AND PROFESSIONAL EQUIPMENT

The ACRF resonance testing system allows us to test any high-voltage equipment, including longer cable runs, at the site of device.

Our services include complete solutions for testing cables, GIS devices, air-insulated substation components on high-voltage devices in power plants, etc.

We also provide quality validation of devices using standard diagnostic high-voltage measurement methods, including:

- dielectric loss factor ($\text{tg}\delta$) and capacitance measurements, and
- Partial Discharge (PD) measurements.

Significant importance of the first reference measurements, which should preferably be carried out after the construction of the devices or after the installation of the cables, should be stressed. The results of such measurements are an indispensable basis for evaluating the results of subsequent periodic or emergency measurements and a prerequisite for reliably determining ageing trends and the remaining lifetime of the devices.



Our scientific research approach and state-of-the-art mobile equipment enable reliable, internationally standardised procedures that demonstrate the health and operational reliability of power grids.



CHECKING THE QUALITY OF NEWLY-BUILT DEVICES THROUGH TESTS

The essential advantage of the ACRF variable frequency resonant power supply system is that it allows tests and measurements with selected high voltages at frequencies between 20 and 300 Hz. This allows us to create test conditions that are identical to those in operation, including those that occur when over voltages occur on the grid. Other methods, such as DC testing, very low frequency testing or even 24-hour connection to the operating voltage do not guarantee such conditions, although some standards allow them as an exception.

EFFICIENT DIAGNOSTICS FOR RELIABLE OPERATION

By carrying out preventive maintenance that encompasses systematic use of test procedures and diagnostic methods for monitoring the condition of the main cable insulation, we provide the foundation for a timely and appropriate selection of maintenance measures.

Reference measurements on new equipment confirm the quality of construction and, together with regular periodic testing, form the basis for successful diagnostics of the condition of the equipment. As such, they are a necessary part of a modern RCM (Reliability Centred Maintenance) strategy and a prerequisite for effective asset management.



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