22-03-2026 22:24:02

Electrical Engineering Institute Nikola Tesla Laboratory for testing and calibration

Scientific field (Frascati Manual)

Organic chemistry

Analytical chemistry

Electrical and electronic engineering

Communication engineering and systems

Other engineering and technologies

Brief description of expertise

Laboratory for testing and calibration is dedicated to obtain the highest quality and competent service to the clients according to SRPS ISO IEC 17025:2006 standards requirements. Laboratory for testing and calibration in Electrical Engineering Institute Nikola Tesla is accredited by the Accreditation Body of Serbia (ATS). This means that we are certified to perform 144 different types of testing and calibrations. Some of our Laboratory's work specialties and the main areas of expertise are as follows: 1. MEASUREMENTS AND TESTINGS OF GROUNDING SYSTEMS, LOWVOLTAGE ELECTRICAL INSTALLATIONS AND LIGHTNING PROTECTION SYSTEMS 2. TESTING OF ELECTRICAL EQUIPMENT, APPLIANCES, MATERIALS AND PROTECTIVE DEVICES 3. THERMOGRAPHIC INSPECTION 4. INSULATING OIL AND PAPER 5. ELECTRICAL INSULATION SYSTEM TESTING AND DIAGNOSTICS 6. POWER QUALITY 7. CALIBRATION AND TESTING OF ELECTRICAL MEASURINGINSTRUMENTS The implementation procedures of all the testing and calibration methods are guarantees that the services and projects we are delivering meets not only the safety standards and technical regulations, but will be completed successfully, in scheduled (agreed) time period. The main principles of laboratory for testing and calibration are: following up and satisfying customers demands, continuous updating all relevant standards, technical recommendations and regulations; planning of all activities with continuous service improvement; constant improvement of tests methods and service quality; consistent and permanent incorporation of innovative technologies into our practice so that our customer get assured that their projects are in the very best hands; data protection; continuous staff training and education; stimulation performing of interlaboratory cooperation and comparisons in order to verify our test methods, exchange and improvement of knowledge

Keywords

Testing , Calibration , Measurement , Electrical quantities, Non -electrical quantities, Standard Methods, Proficiency Testing Schemes, Interlaboratory comparisons, SRPS ISO 17025, Acreditation

Commercial services

MEASUREMENTS AND TESTINGS OF GROUNDING SYSTEMS, LOW VOLTAGE ELECTRICAL INSTALLATIONS AND LIGHTNING PROTECTION SYSTEMS large grounding systems in electric power facilities: ground impedance, touch and step voltages, earth resistivity; low voltage electrical installations: earth loop impedance, insulation resistance,continuity; lightning protection systems: grounding resistance, equipotentiality; electromagnetic compatibility.

TESTING OF ELECTRICAL EQUIPMENT, APPLIANCES, MATERIALS AND PROTECTIVE DEVICES switchgears (dielectric and thermal characteristics); surge arresters (determination of the lightning impulse sparkover voltage test,power frequency sparkover voltage test, power frequency withstand test, AC and DC leakage current measurements, 5 kV insulation resistance test, a non-standard current impulse test, and finally the partial discharge voltage measurements; low voltage and high voltage circuit breakers (thermal characteristics, power frequency voltage withstand test, lightning impulse voltage withstand test);

electrical power cables and appliances (dielectric and thermal characteristics); protective equipment (insulation gloves and boots, insulation benches, voltage detectors, insulation sticks).

THERMOGRAPHIC INSPECTION inspection of electrical equipment in power system installations at all voltage levels (detection and analysis of irregularities manifested through increased heating); stator core imperfection detection on power generators using rated induction method.

INSULATING OIL AND PAPER Chemical laboratory actively contribute to the work in IEC TC 10 and CIGRE SC A2 and SC D1. In the scope of the work it performs analysis of new mineral insulating oils according to IEC 60296 spec., analysis transformer oils in service in electrical equipment, power and instrument transformers, OLTC, switchgears, analysis of new and aged insulating paper. Condition Based Monitoring (CBM) of electrical equipment is derived from oil analysis and has been performed in the Institute during last 4 decades. It includes following measurements: • Dissolved gas analysis (DGA) and free gas analysis according to IEC 60567 and IEC 60599 • Determination of water content in the oil using Karl Fisher according to IEC 60814 • Determination of furan compounds in the oil according to IEC 61198 • Determination of physical, chemical and electrical oil properties according to IEC 60422 • Determination of antioxidants and metal passivators in the oil according to IEC 60666 • Determination of particles in the oil according to IEC 60970 and ISO 4406 • Determination of oil oxidation stability according to IEC 61125 • Determination of corrosive sulphur in the oil according to IEC 62535, DIN 51353 and ASTM 1275 • Determination of DBDS according to IEC 62697 • Determination of aromatic content in the oil according to IEC 60590 • Determination of PCB in insulating oils according IEC 61619. Condition based assessment of power transformers is performed in synergy with results on electrical measurements. Other tests on oil and paper insulation, laboratory simulations for optimization of on site processes: • Laboratory simulation of oil reclamation for optimization of on*site process, determination of optimum process parameters: temperature, number of cycles, type and mass of sorbent needed, expected oil results after reclamation, quantity of antioxidant needed for reinhibition. • Laboratory simulation of addition of metal passivators in power transformers • Determination of optimum metal passivator quantity needed for complete inhibition of copper sulphide formation • Simulation of service behavior, related to potential side effects (stray gassing and changed equilibrium of furans) • Transformers factory Inspection, post-mortem and failure investigation for evaluation of consumed and remaining life of paper insulation of power transformers: Determination of paper insulation water content according to IEC 60814 and degree of polymerization (Dp) according to IEC 60450, SEM/EDX analysis of insulating paper, Copper content in the paper using AAS technique.

ELECTRICAL INSULATION SYSTEM TESTING AND DIAGNOSTICS - according to relevant domestic/IEC/IEEE standards and technical recomendations (CIGRE etc.). Rotating machines: Off-line stator electrical insulation system and winding testing - Insulation resistance measurement, DC HiPot test up to 50kV, Capacitance and dissipation factor test, Off-line Partial discharge measurement and analysis test, AC HiPot test up to 40kV, Stator Surge test, Winding resistance measurement etc. Off-line rotor electrical insulation system and winding testing - Insulation resistance measurement, Rotor winding impedance, Rotor RSO and Surge test at standstill as well as on rotor in rotation, Rotor winding resistance measurement, Sailent pole rotor impednace and resistance distiribution, etc. Power Transformers: Power transformer preventive testing - Insulation resistance measurement, Capacitance and dissipation factor test, HV Bushing Insulation System testing, Leakage Inductance measurement, Transformer windnig frequency response measurement (SFRA), Dielectric Frequency Response (DFR), Dielectric Recovery Voltage Measurement, Turn ratio measurement, Winding resistance measurement etc. HV Current and Voltage instrument transformers: HV Current and Voltage instrument transformers preventive testing on site under EM interference -Insulation resistance measurement, Capacitance and dissipation factor test. On line acoustic (ultrasonic) partial discharge detection, etc.

POWER QUALITY Electrical and power quality measurements and analysis according to EU standard EN50160

CALIBRATION AND TESTING OF ELECTRICAL MEASURING INSTRUMENTS: DC voltage measuring instruments: digital and analogue voltmeters, DC voltage supplies, multifunction instruments (multimeters, calibrators), null indicators, accessories (voltage dividers, probes); DC current measuring instruments: digital and analogue ammeters, multifunction measuring instruments (multimeters, calibrators), accessories (shunts, dc current clamps), DC current suppliers; AC voltage measuring instruments: digital and analogue voltmeters, AC voltage supplies, multifunction instruments (multimeters, calibrators), null indicators, accessories (voltage dividers, probes); AC current measuring instruments: digital and analogue ammeters, multifunction measuring instruments (multimeters, calibrators), accessories (shunts, current clamps), AC current suppliers; Resistance measuring instruments: resistors, analogue and digital ohmmeters, analogue and digital conductor meters, resistance decades, resistance measuring bridges (according to Wheatstone and according to Thomson), multifunction instruments, insulation resistance test equipment, ground/earth resistance test equipment.

Industry group (according to "Gazette RS", No. 54/10)

Research and experimental development on natural sciences and engineering

Other professional, scientific and technical activities n.e.c.

Accredited laboratories

Title	Contact person
Laboratory for testing and calibration	Dragan Kovačević

Staff list within the unit

Name	Last name	Teaching/scientific title
Dragan	Kovaćevic	Principal Research Fellow
Aleksandar	Nikolić	Research Associate
Nenad	Kartalović	Research Associate
Srđan	Milosavljević	Research Assistant
Jelena	Lukić	Research Assistant
Jelena	Lazić	Research Assistant
Nikola	Ilić	Research Assistant
Dragana	Naumović Vuković	Research Assistant
Valentina	Vasović	Research Assistant
Draginja	Mihajlović	Research Assistant
Maja	Grbić	Research Assistant
Vojin	Kostić	Research Assistant
Ljubiša	Čičkarić	Research Assistant
Ninoslav	Simić	Research Assistant
Jovan	Mrvić	Research Assistant
Radoslav	Antić	Research Assistant
Đorđe	Jovanović	Junior Researcher
Denis	Ilić	Junior Researcher
Jelena	Ponoćko	Junior Researcher
Ivana	Krstić	Junior Researcher
Neda	Kovačević	Junior Researcher