ICMET – *National Institute for Research, Development and Testing in Electrical Engineering*

An European Mark in Testing, Calibration & Certification of Electric & Electronic Equipment

Bd. Decebal, no. 118A, 200746 Craiova, ROMANIA

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Geographical position
Asia
Africa
Arctic Circle
NORWAY
SWEDEN
FINLAND
RUSSIA
North Sea
Baltic Sea
ESTONIA
LATVIA
LITHUANIA
SCOTLAND
IRELAND
ENGLAND
NETH.
DENMARK
BELGIUM
GERMANY
POLAND
BELARUS
CZECH REPUBLIC
UKRAINE
Atlantic Ocean
FRANCE
AUSTRIA
HUNGARY
MOLDOVA
ROMANIA
KAZAKHSTAN
SLOVAKIA
SLOVENIA
CROATIA
SERBIA
BULGARIA
Black Sea
ITALY
CORSICA
SARDINIA
SPAIN
PORTUGAL
GREECE
TURKEY
GEORGIA
ARMENIA
AZERBAIJAN
Caspian Sea
UZBEKISTAN
KYRGYZSTAN
TURKMENISTAN
TAJIKISTAN
TUNISIA
Mediterranean Sea
CYPRUS
LEBANON
SYRIA
IRAQ
IRAN
AFGHANISTAN
ISRAEL
JORDAN
KUWAIT
PAKISTAN
MOROCCO
ALGERIA
LIBYA
EGYPT
WESTERN SAHARA (MOR.)
0 500 mi
0 800 km
Red Sea
SAUDI ARABIA
BAHRAIN
QATAR
U.A.E.
INDIA
MAURITANIA
MALI
NIGER
CHAD
SUDAN
OMAN
Arabian Sea
YEMEN
SENEGAL
GAMBIA
GUINEA-BISSAU
GUINEA
BURKINA FASO
GHANA
BENIN
TOGO
NIGERIA
ERITREA
DJIBOUTI
ETHIOPIA
SOMALIA
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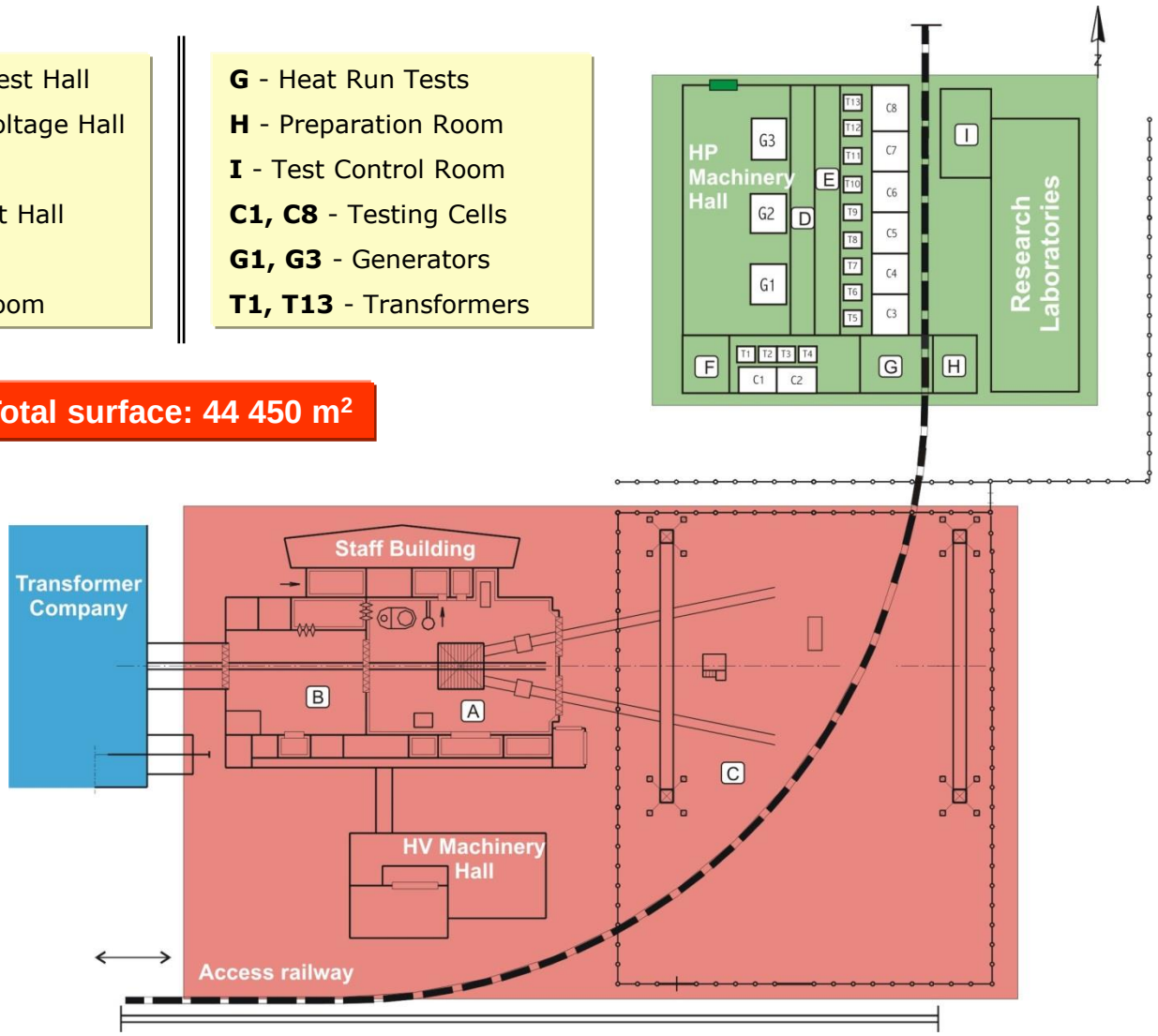
Ukraine
Ukraine
Moldova
Hungary
Romania
Serbia
Bulgaria
Black Sea
Tisza River
Somes R.
Bistrita R.
Dnestr R.
Prut R.
Siret R.
Mures R.
Olt R.
Arges R.
Danube R.
Tisa R.
Satu Mare
Baia Mare
Suceava
Iasi
Chisinău
Piatra Neamt
Oradea
Cluj-Napoca
Tirgu Mures
Bacau
Miercurea Ciuc
Arad
Alba Iulia
Deva
Timisoara
Sibiu
Brasov
Focsani
Galati
Braila
Tulcea
Rîmnicu Vîlcea
Tirgu Jiu
Tirgoviste
Ploiesti
Drobeta-Turnu Severin
Pitesti
Slobozia
CRAIOVA
Slatina
Bucharest
Calarasi
Constanta
Alexandria
Giurgiu
21°
27°
45°

HV & HP Laboratories Campus

A - High Voltage Type Test Hall
B - Routine Test High Voltage Hall
C - Open Area Test Site
D - Switching Equipment Hall
E - Reactances Hall
F - Generator Control Room

G - Heat Run Tests
H - Preparation Room
I - Test Control Room
C1, C8 - Testing Cells
G1, G3 - Generators
T1, T13 - Transformers

Total surface: 44 450 m²



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ICMET – Romanian Research & Development and Testing National Institute for Electrical Engineering - one of the largest independent test laboratories in Europe and in the world, for certain facilities being ranked among the leaders (e.g. 7500 MVA short circuit power).

42 years of experience (founded 1974)
ICMET state-own R&D Institute

Three main fields of activity:

1. **Test and calibrations (acting as international independent laboratories)**
2. **R&D and production of specialized equipment**
3. **Auditing and certifications**

Modernized under European Union financing

- **Certifications:**
  - **EN ISO/IEC 17025/2005,** certified by **RENAR (**Romanian/EU National Certification Office **- ILAC** member**)**

- **Membership:**
  - **CIGRE**
  - **STL** (Short Circuit Testing Liaison) – participant

Main laboratories:

- ***High Voltage Test Laboratory for HV equipment:***
  - power/ instrument transformers, cables, switchgear, GIS, etc.;
  - inside the Electromagnetic Screened Hall;
  - with voltage impulse test up to 4200kV;
  - applied voltage test up to 800 kV;
  - d.c. voltage tests up to 1200 kV

- **High Power Laboratory for Direct Testing Circuit**

(short circuit power 7500 MVA;)

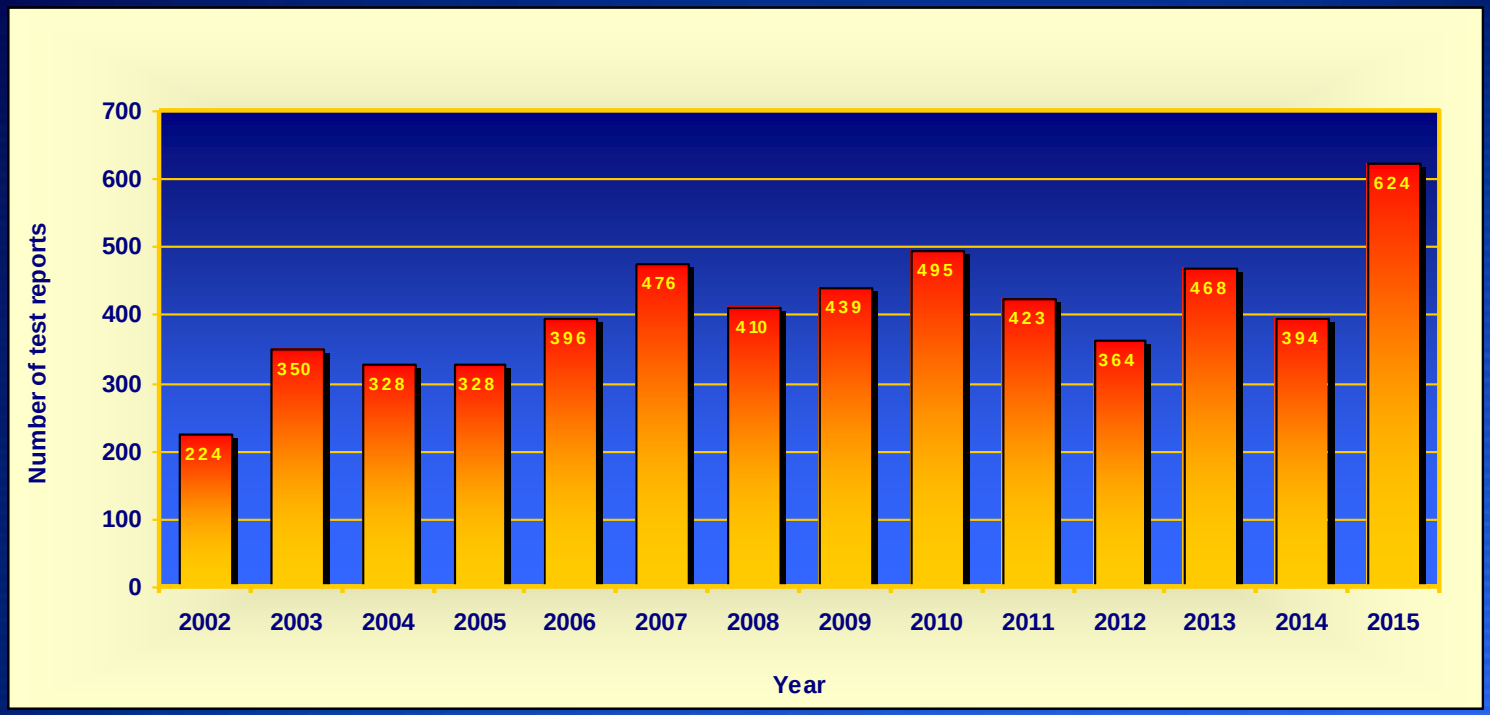
  - for LV, MV and HV electric equipment
  - short-time withstand current up to 135 kAeff; peak withstand current up to 350 kA peak; temperature rise tests up to 10 kA a.c;
    AC Power Arc Test installation for insulator sets of 420kV, 50 kA.

- **Calibrations Laboratory**
  - for DC, AC, LI, SI dividers and PD calibrators; shunts; Rogowski coils; HF electric fields strength meters; magnetic flux density meters; large force transducers.

- ***Electrical Material Laboratory***
- ***Electromagnetic Compatibility Laboratory (EMC)***
- ***IP Test Laboratory***

High Voltage Testing Laboratory

Tests Performed by High Voltage Testing Laboratory



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High Power Testing Laboratory

Tests Performed by High Power Testing Laboratory

Main Endowments

- 3 pcs Short Circuit Generators – 3 x 2500 MVA/120kA/0.5s
- 6 pcs Three-phase units of Circuit Breakers – 12kV/120kA
- 3 pcs Single-phase units of Making-Switches
- 9 pcs Single-phase Step-up Transformers 600 MVA
- 4 pcs Single-phase Step-down Transformer 40 MVA
- HV Disconnector type Pantograph Test Installation 525 kV, 60 kA/1s
- 24,000 sqm of technical halls and laboratories
- 4,000 sqm Electromagnetic Screened Hall
- 25,000 sqm of yards and auxiliary facilities

Number of employees: 181 out of which 74 engineers

Annual number of test: over 800 tests per year

Main foreign clients:

AREVA; ABB; SCHENEIDER; SIEMENS; EFACEC Portugal; G&W USA; MINEL Serbia; KONCAR Croatia; INDUSTRIE TRANSFORMATORY NEWTON, SEA Italy; HYUNDAY; ULUSOY, ELIMSAN ELECTRIK Turkey; AL SAFINA Iraq; PHINNER Switzerland/Brasil; PHISTERER Switzerland; and many other from UE, South and North America, Asia, Africa

International Cooperation

PTB Germany 1991 - 2007	Support of ICMET Craiova
IEH Karlsruhe Germany 1991 - 2004	EMC, Transients Phenomena in Power Transformers, Seismic Capability Analysis of High Voltage Electrical Equipment used in Romania, Diagnosis & Monitoring
NTUA Athens, Greece 1996 - 1998	Improvement of Testing Methods in VH Engineering
TU Eindhoven, Netherlands 1996 - 1998	High Power Measuring Technique, Synthetic Tests
HUT Helsinki, Finland 1999 - 2003	Traceability and Mutual Recognition of Impulse Voltage Measurement
ECOLINKS 2001	Efficient use of energy, minimal climatic changes
TU Berlin, Germany 2004	On line Partial Discharge Measurement, Clamping Forces in Transformers
IEH Karlsruhe, Germany 2004 - 2006	Method for on/site Testing of Transformers. Experimental data processing
FP V - COST 261 1998 - 2002	EMC in complex and extended systems
IPH Berlin, Germany 2004 - 2006	Development of Methods for on-site PD Measurement at Power and Instrument transformers
ARC Seibersdorf, Austria 2007 - 2008	Cooperation in EMC services
COST BM 0704 2008 - 2009	Emerging EMF – Technologies and Health Risk Management
ELIRI, Republic of Moldova 2008 - 2012	Research Cooperation in the field of DC & AC High Voltage Dividers

Participation in intercomparison schemes

Project name	Participants	Project supported by:
Calibration of HV Measuring Systems for Mutual Recognition of HV Test results in Eastern and Western Europe	- High Volt Prüftechnik Dresden, Germany (coordinator) - Megavolt Metrology Moscow, Russia - Physikalisch Technische Bundesanstalt - Braunschweig, Germany - EGU Prague, Czech Republic - ICMET Craiova, Romania - Technical University of Dresden, Germany	EU COPERNICUS Programme *ERBCIPACT 940-137* 1994-1997
Traceability and Mutual Recognition of Impulse Voltage Measurements	- Helsinki University of Technology, Finland (coordinator) - Worldwide intercomparison	EU Standard, Measurement and Testing Programme *EU-SMT4-CT98-2270* 1999-2003
Intercomparison Measurements between DKD Laboratories for DC, AC and LI voltages	- Physikalisch Technische Bundesanstalt, - Germany (coordinator) - ICMET Craiova, Romania - FGH Engineering & Test Mannheim, Germany - High Volt Prüftechnik Dresden, Germany - Haefely Test Basel, Switzerland - ICPE Bucharest - Electroputere Craiova	German Ministry of Cooperation and Romanian Ministry of Education and Research 2001-2003
Measurement Intercomparison: Spectrum of Pulse Generators in accordance with CISPR 16-1-1	- METAS, Switzerland (coordinator) - PTB, Germany - DKD-Lab, K-16101 Rhode & Schwarz, Germany - Scwarzbeck-Electronic, Germany - DKD-Lab, K-002001 Rhode & Schwarz, Germany - ICMET Craiova, Romania	EURAMET PROJECT 2008 – 2009
Test and Intercomparison in the Field of Radio Frequency and Human Exposure to EMF	- SICOM Test srl, Italy - ICMET Craiova	SICOM Trieste, Italy 2009 - 2013
Worldwide Shunts Intercomparison	- CESI TEST, ESEF, KEMA, PEHLA, ABB, ICMET, NETFA, PALTS, ZKUSEBNICTVI, CPRI, HPTL, KERI, JSTC	STL (IPH + JSTC) 2006 – 2010

Reports and Certificates

- Test Reports
- Accredited Test Reports
- Calibration Certificates
- Type Test Certificates
- Report of Performance
- Product Certificate

Reports and Certificates

- Type Test Certificates presents the results of a complete electrical type test that is performed in an accredited laboratory using the accepted interpretations to IEC standards.
- Report of Performance presents results of tests performed in an accredited laboratory using the the accepted interpretations of IEC standards
- Product Certificate can be issued when the STL requirements are fulfilled

Climatic tests offered by ICMET in colaboration with INCERC Institute IASI

Climatic chamber dimensions: 4.3m x 10m x 10m(height)
Able to be used for test up to 400kV rated voltage.

Reference Standard : IEC 62271-102 High-Voltage switchgear and controlgear –AC disconectors and earthing switches

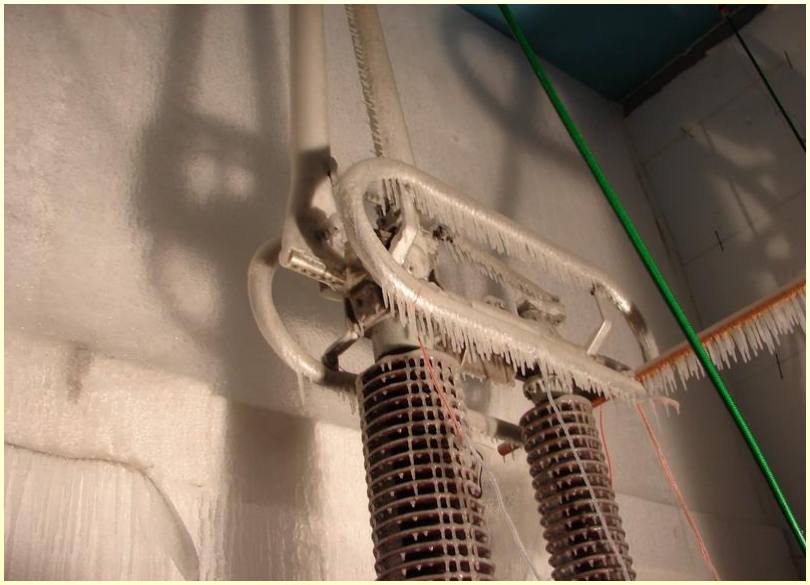
IEC 62271-102 / 6.103 Operation under severe ice conditions

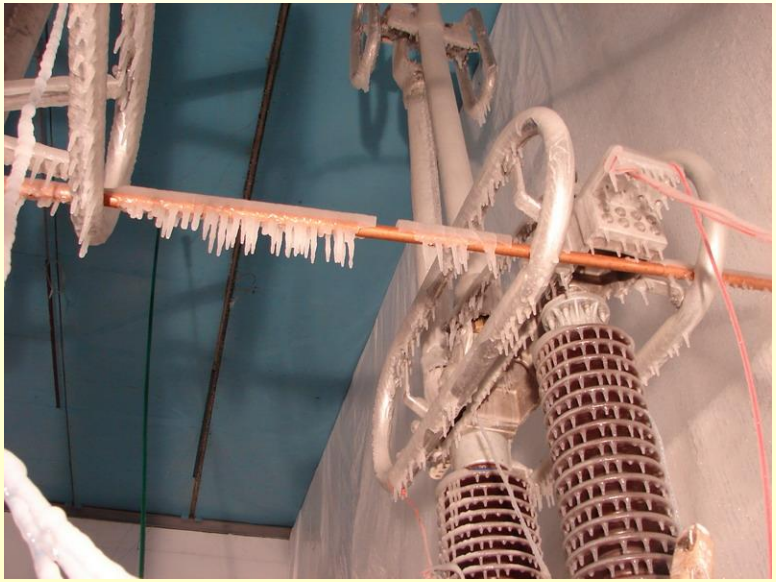
-class 1, class 10, class 20

IEC 62271-102 / 6.104 Operation at the temperature limits

-6.104.1 Operation at minimum ambient air temperature …-40ºC

-6.104.2 Operation at ambient air minimum temperature …+70ºC





INSTRUMENT TRANSFORMERS CALIBRATION LABORATORY

Instrument Transformers Calibration Laboratory performs accuracy test of current transformers (classical & non-conventional), in laboratory and on-site.

Accuracy test for voltage transformers in progress.

Accuracy Class for primary currents from 5 to 2000 A:
0.1 - 0.2 - 0.5 -1 - 3 - 5
0.2S - 0.5 S - 1S - 3S - 5S

Laboratory Equipment

- Standard Current Transformer:
  5; 10; 12.5; 25; 50; 100; 125; 250; 500; 1000; 2000 A / 5 A

- Current Source:
  0 up to 4000 A, 0 up to 2 V

- Standard Burden for Current Transformer:
  1;1.25;1.5;2;2.5;3.75 VA with cos φ = 1 and
  5;6.25;7.5;10;11.25;15;20;25;30;45;60 VA with cos φ = 0.8

- Instrument Transformer Measurement System
  MIT 300 (PTB Calibrated)

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LOW VOLTAGE TESTING LABORATORY

ACCREDITED TESTS:

Insulation tests:
- insulation resistance
- dielectric strength
- leakage currents
- clearances and creepage distances

Earth bond test (PE)
Mechanical impact tests

DEVICES TO BE TESTED

Low voltage assemblies (EN 60439)
Low voltage switchgear and controlgear (EN 60947)
Electrical equipment of machinery (EN 60204)
Household appliances (EN 60335)
Hand-held electric tools (EN 61029, EN 50144)
Audio, video apparatus (EN 60065)
Information technology equipment (EN 60950)

RENAR Accredited LI 529

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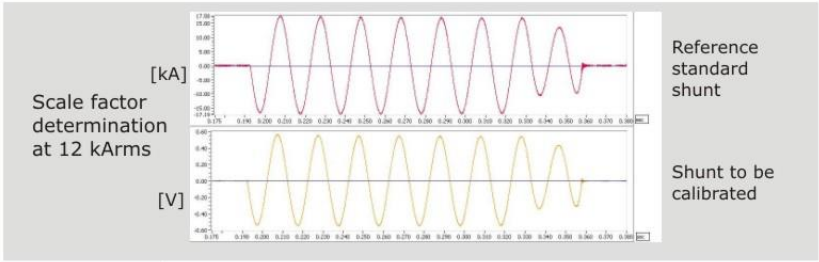
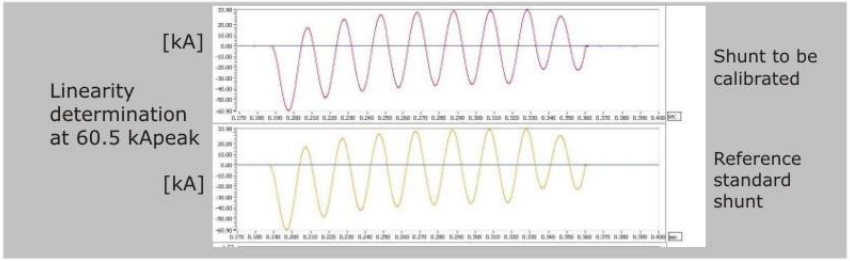
HIGH CURRENTS CALIBRATION LABORATORY

The Laboratory offers calibrations for: Shunts & Rogowski coils.

CALIBRATION TESTS

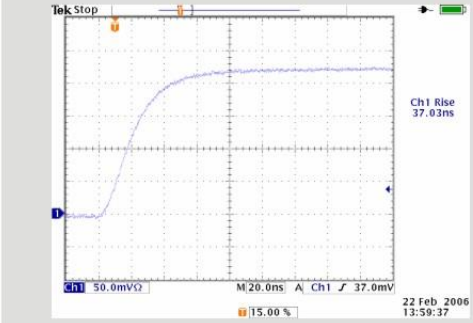
- Scale factor tests (symmetrical current)
- Linearity tests (asymmetrical current)
- Step response
- Ohmic resistance measurements





List of the measurands

Measured quantity/ Calibration item	Range	Measurement conditions/ procedure	Best measurement capability
AC current/ shunt and Rogowski coil	100 A rms up to 60 kA rms 250 A peak up to 150 kA peak	50 Hz/ IEC 62475	1.0 %
Time parameter – rise time T_N/ shunt	24 ns ÷ 1 μs	IEC 62475	0.5 %
DC resistance measuring/ shunt	4 μΩ ÷ 200 mΩ	temperature: (22±2) °C humidity: (35±10) % rH	0.5 %



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UNIUNEA EUROPEANĂ

GUVERNUL ROMÂNIEI

Instrumente Structurale 2007 - 2013

"HIGH POWER LABORATORY MODERNIZATION"

C R A I O V A

Project co-funded by: European Regional Development Fund

Sectoral operational program: "Increase of Economic Competitiveness"
Priority axis 2

"Investments for your future"

Project value: EUR 3.7 million
Completion term: 36 months
Deadline for performing the works: March 1st, 2012

Project beneficiary: Research, Development and Testing
National Institute for Electrical Engineering ICMET Craiova

Contracting Authority: National Authority for Scientific Research

ICMETs accreditation proves that:

- we are independent, third party laboratory
- we have high technical competence
- we perform tests according to international standards with **STL** interpretations
- we perform complete package of tests (electrical/mechanical/seismic/climatic)
- we are one stop testing & calibration provider