

ROMANIAN ACCREDITATION ASSOCIATION – RENAR

Bucharest, Calea Vitan no. 242, sector 3, zip code 031301

CIF RO 4311980



RENAR is EA-MLA signatory for Testing.

ACCREDITATION CERTIFICATE No. LI 004

Accreditation Association – RENAR, being recognized as National Accreditation Body by GO 23/2009, herewith attests that the organization:

NATIONAL INSTITUTE FOR RESEARCH-DEVELOPMENT AND TESTING IN ELECTRICAL ENGINEERING - ICMET CRAIOVA

Craiova, 118 A Decebal Avenue, Dolj county

through

High Power Testing Laboratory for Electrical Equipment (HPL)

fulfills the requirements of **SR EN ISO/IEC 17025:2018** and is competent to carry on **TESTING** activities, as it is detailed in the Annex of the present accreditation certificate.

This accreditation is maintained provided that the accreditation criteria established by the Romanian Accreditation Association – RENAR are met continuously.

The present certificate includes Annex no. 1/03.11.2023 (8 pages), which is an integrated part of this certificate.

The accreditation certificate is an essential accreditation document, which might be periodically revised and issued by RENAR. The most recent version of the accreditation certificate is available on the website of RENAR, www.renar.ro.

Date of initial accreditation: 22.11.2010

Date of renewal accreditation: 21.11.2022

Updated on: 03.11.2023

The accreditation is valid until: 20.11.2026

GENERAL DIRECTOR

Alina Elena TAINĂ



**PRESIDENT OF THE
ACCREDITATION COUNCIL**

PhD. Eng. Dumitru DINU

The translation of this certificate was issued today, 30.01.2024.

The accreditation certificate does not exempt CABs from the obligation to obtain all approvals and authorizations required for its operation under the law.

Partial reproduction of this certificate is forbidden.

**Annex no. 1 to Accreditation Certificate no. LI 004
Annex no. 1 Issue Date: 03.11.2023**

**NATIONAL INSTITUTE FOR RESEARCH-DEVELOPMENT AND TESTING IN
ELECTRICAL ENGINEERING – ICMET CRAIOVA**

through
HIGH POWER TESTING LABORATORY FOR ELECTRICAL EQUIPMENT (HPL)

118A Decebal Avenue, Craiova, Dolj county

A. Tests performed on permanent sites

No.	Activity area / Measurement technique / Name of the test	Material / product / test object	Reference document
A. SWITCHING CAPACITY VERIFICATION (MAKING AND BREAKING OPERATIONS)			
1.	Basic short-circuit switching test. Basic sequences: T10, T30, T60, T100s, T100a	Alternating current circuit-breakers for voltages above 1 kV	SR EN IEC 62271-100:2021, clauses 7.102 ÷ 7.106 IEC 62271-100:2021, clauses 7.102-7.106 SR EN 62271-1:2018, clause 7 IEC 62271-1:2017 clause 7 PT-03. 01
2.	Critical current switching test	Alternating current circuit-breakers for voltages above 1 kV	SR EN IEC 62271-100:2021, clause 7.107 IEC 62271-100:2021, clause 7.107 SR EN 62271-1:2018, clause 7 IEC 62271-1:2017, clause 7 PT-03. 01
3.	Single-phase and double-earth fault switching test	Alternating current circuit-breakers for voltages above 1 kV	SR EN IEC 62271-100:2021, clause 7.108 IEC 62271-100:2021, clause 7.108 PT-03. 01
4.	Out-of-phase making and breaking switching test (OP1, OP2)	Alternating current circuit-breakers for voltages above 1 kV	SR EN IEC 62271-100:2021, clause 7.110 IEC 62271-100:2021, clause 7.110 SR EN 62271-1:2018, clause 7 IEC 62271-1:2017, clause 7 PT-03. 01
5.	Capacitive current switching test (LC1, LC2), (CC1, CC2), (BC1, BC2)	Alternating current circuit-breakers for voltages above 1 kV	SR EN IEC 62271-100:2021, clause 7.111 IEC 62271-100:2021, clause 7.111 SR EN 62271-1:2018, clause 7 IEC 62271-1:2017, clause 7 PT-03. 01
6.	Electrical usage test (electrical endurance)	Alternating current circuit-breakers for voltages above 1 kV	SR EN IEC 62271-100:2021, clauses 7.102÷7.106 and 7.112 IEC 62271-100:2021, clauses 7.102÷7.106 and 7.112 PT-03. 01
7.	Induced current switching test	Alternating current disconnectors earthing switches	SR EN IEC 62271-102:2019 SR EN IEC 62271-102: 2019/A1:2022, clause 7.107 IEC 62271-102:2018 IEC 62271-102: 2018/ AMD1:2022, clause 7.107 PT-03. 02
8.	Verification of making and breaking capacities	AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV up to and including 52 kV	SR EN IEC 62271-200:2021, clause 7.101 IEC 62271-200:2021, clause 7.101 PT-03. 01
9.	Short-circuit making current test	High voltage alternating current disconnectors and earthing switches	SR EN IEC 62271-102:2019 SR EN IEC 62271-102:2019/A1:2022, clause 7.101



Annex no. 1 to Accreditation Certificate no. LI 004
Annex no. 1 Issue Date: 03.11.2023

No.	Activity area / Measurement technique / Name of the test	Material / product / test object	Reference document
			IEC 62271-102:2018 IEC 62271-102: 2018/AMD1:2022, clause 7.101 PT-03. 02
10.	Mainly active load switching test	Switches for rated voltages above 1 kV up to and including 52 kV (Mechanical disconnectors for rated voltage above 1 kV up to and including 52 kV)	SR EN 62271-103:2012, clause 6.101 IEC 62271-103:2021 clause 7.101 PT-03. 02
11.	Closed loop switching test	Alternating current switches for rated voltages above 1 kV up to and including 52 kV (Mechanical disconnectors for rated voltage above 1 kV up to and including 52 kV)	SR EN 62271-103:2012, clause 6.101 IEC 62271-103:2021, clause 7.101 PT-03. 02
12.	Capacitive current switching test (no-load cables and lines)	Alternating current switches for rated voltages above 1 kV up to and including 52 kV (Mechanical disconnectors for rated voltage above 1 kV up to and including 52 kV)	SR EN 62271-103/2012, clause 6.101 IEC 62271-103:2021, clause 7.101 PT-03. 02
13.	Short-circuit making current test	Alternating current switches for rated voltages above 1 kV up to and including 52 kV (Mechanical disconnectors for rated voltage above 1 kV up to and including 52 kV)	SR EN IEC 62271-102:2019 SR EN IEC 62271-102:2019/A1:2022, clause 7.101 IEC 62271-102:2018 IEC 62271-102: 2018/AMD1:2022, clause 7.101 SR EN 62271-103:2012, clause 6.101 IEC 62271-103:2021, clause 7.101 PT-03. 02
14.	Switching test on earthing fault current	Alternating current switches for rated voltages above 1 kV up to and including 52 kV (Mechanical disconnectors for rated voltage above 1 kV up to and including 52 kV)	SR EN 62271-103: 2012, clause 6.101 IEC 62271-103:2021, clause 7.101 PT-03. 02
15.	No-load cables and lines switching current test under earth fault conditions	Alternating current switches for rated voltages above 1 kV up to and including 52 kV (Mechanical disconnectors for rated voltage above 1 kV up to and including 52 kV)	SR EN 62271-103:2012, clause 6.101 IEC 62271-103:2021, clause 7.101 PT-03. 02
16.	Making and breaking test at the rated short-circuit current (TD_{Isc})	Alternating current mechanical switch-fuse combinations	SR EN 62271-105:2013, clause 6.101. IEC 62271-105:2021, clause 7.101 PT-03. 02
17.	Making and breaking test at the maximum breaking (TD_{Iwmax})	Alternating current mechanical switch-fuse combinations	SR EN 62271-105:2013, clause 6.101. IEC 62271-105:2021, clause 7.101 PT-03. 02
18.	Making and breaking test at the rated transfer current ($TD_{Itransfer}$)	Alternating current mechanical switch-fuse combinations	SR EN 62271-105:2013, clause 6.101. IEC 62271-105:2021, clause 7.101 PT-03. 02
19.	Verification of the breaking capacity	a) High-voltage current limiting exceeding 1kV fuses	SR EN 60282-1:2020 clause 7.6 IEC 60282-1:2020, clause 7.6



Annex no. 1 to Accreditation Certificate no. LI 004
Annex no. 1 Issue Date: 03.11.2023

No.	Activity area / Measurement technique / Name of the test	Material / product / test object	Reference document
		b) High-voltage expulsion fuses	IEC 60282-2:2008, clause 8.6 PT-03. 03
		c) Low-voltage fuses	SR EN 60269-1:2008 SR EN 60269-1: 2008/A1:2010 SR EN 60269-1:2008 / A2: 2015, clause 8.5 IEC 60269-1:2006+Amd.1:2009+ Amd.2: 2014 CSV, clause 8.5 PT-03. 03
20.	Test for verifying time - current characteristics	High-voltage current limiting exceeding 1kV fuses	SR EN 60282-1:2020, clause 7.7 IEC 60282-1:2020, clause 7.7 PT-03. 30
B. SHORT-TIME WITHSTAND CURRENT BEHAVIOR (SHORT-CIRCUIT)			
21.	Short-time withstand current test and peak withstand current tests	a) Alternating- current circuit-breakers exceeding 1 kV	SR EN IEC 62271-100:2021, clause 7.6 IEC 62271-100:2021, clause 7.6 SR EN 62271-1:2018, clause 7.6 IEC 62271-1:2017, clause 7.6 PT-03. 04
		b) Alternating current switches for rated voltages above 1 kV up to and including 52 kV (Mechanical disconnectors for rated voltage above 1 kV up to and including 52 kV)	SR EN 62271-1:2018, clause 7.6 IEC 62271-1:2017, clause 7.6 SR EN 62271-103:2012, clause 6.6 IEC 62271-103:2021, clause 7.6 PT-03. 04
		c) High voltage alternating current disconnectors and earthing switches	SR EN 62271-1:2018, clause 7.6 IEC 62271-1:2017, clause 7.6 SR EN IEC 62271-102:2019 SR EN IEC 62271-102:2019/A1:2022, clause 7.6 IEC 62271-102:2018 IEC 62271-102: 2018/AMD1:2022, clause 7.6 PT-03. 04
		d) AC metal enclosed switchgear and controlgear for rated voltages above 1 kV up to and including 52 kV	SR EN IEC 62271-200:2021, clause 7.6 IEC 62271-200:2021, clause 7.6 PT-03. 04
		e) Current switches and fuse switch combination units	SR EN 62271-105:2013, clause 6.6 IEC 62271-105:2021, clause 7.6 PT-03. 04
		f) Busbars and low-voltage switchgear and controlgear assemblies (distributing boxes, measuring and protection units)	SR EN 61439-1:2021, clause 10.11 IEC 61439-1:2020, clause 10.11 PT-03. 04
		g) Bushings	SR EN 60137:2018, SR EN 60137:2018/AC:2018 clause 8.9 IEC 60137:2017 IEC 60137:2017/COR1: 2018, clause 8.9 PT-03. 04
		h) Prefabricated substations	SR EN IEC 62271-202:2022, clause 7.6 IEC 62271-202:2022, 7.6 PT-03. 04



Annex no. 1 to Accreditation Certificate no. LI 004
Annex no. 1 Issue Date: 03.11.2023

No.	Activity area / Measurement technique / Name of the test	Material / product / test object	Reference document
		i) Current transformers	SR EN 61869-2:2013, clause 7.2.201 IEC 61869-2:2012, clause 7.2.201 PT-03. 04
		j) Low voltage busbar trunking systems (busways)	SR EN 61439-6:2013, clause 10.11.1 IEC 61439-6:2012, clause 10.11.1 PT-03. 04
22.	Short-circuit withstand capability test	a) Inductive voltage transformers	SR EN 61869-3:2012, clause 7.2.301 IEC 61869-3:2011, clause 7.2.301 PT-03. 11
		b) Capacitive voltage transformers	SR EN 61869-5:2012 SR EN 61869-5: 2012/AC:2015, clause 7.2.502 IEC 61869-5:2011 IEC 61869-5:2011/ Cor.1:2015 clause 7.2.502 PT-03. 11
23.	Short-circuit current test	Tap changers	SR EN 60214-1:2015, clause 7.2.3 IEC 60214-1:2014, clause 7.2.3 PT-03. 21
24.	Short-circuit current test (temperature and dynamic stability)	Portable equipment for earthing or earthing and short-circuiting	SR EN 61230:2009, clause 5.7 IEC 61230:2008, clause 5.7 PT-03. 12
25.	Ability to withstand short-circuit	a) Power transformers: - oil immersed - dry	SR EN 60076-5:2006, clause 4.2 IEC 60076-5:2006, clause 4.2 SR EN 60076-11:2019 SR EN IEC 60076-11: 2019/AC:2019 clause 14.4.3 IEC 60076-11: 2018 clause 14.4.3 PT-03. 05
		b) Current limiting reactors	SR EN 60076-6:2009, clause 8.9.13 IEC 60076-6:2007, clause 8.9.13 PT-03. 05
		c) Line traps for alternating current power systems	IEC 60353:1989 IEC 60353:1989/ A1: 2002, clause 19.4 PT-03. 14
		d) Filter, damping and discharge reactors associated with capacitors	SR EN 60076-6:2009, clause 9.5 IEC 60076-6:2007 clause 9.5 PT-03. 05
		e) Earthing transformers (neutral couplers)	SR EN 60076-6:2009, clause 10.5 IEC 60076-6:2007, clause 10.5 PT-03. 05
26.	Short-circuit tests	Surge arresters	SR EN 60099-4:2015, clause 8.10 IEC 60099-4:2014, clause 8.10 PT-03. 09
C. INTERNAL ARC TEST			
27.	Internal arc fault test	a) AC metal enclosed switchgear and controlgear for rated voltages above 1 kV up to and including 52 kV	SR EN IEC 62271-200:2021, Annex A IEC 62271-200:2021, Annex A PT-03. 08



Annex no. 1 to Accreditation Certificate no. LI 004
Annex no. 1 Issue Date: 03.11.2023

No.	Activity area / Measurement technique / Name of the test	Material / product / test object	Reference document
		b) Prefabricated substations	SR EN IEC 62271-202:2022, clause 7.102 IEC 62271-202:2022, clause 7.102 PT-03. 08
		c) Current transformers	SR EN 61869-1:2010, clause 7.4.6 IEC 61869-1:2023, clause 7.4.3 SR EN 61869-2:2013, clause 7.4.6 IEC 61869-2:2012, clause 7.4.6 PT-03. 08
		d) Voltage transformers	SR EN 61869-1 :2010, clause 7.4.6 IEC 61869-1:2023, clause 7.4.3 SR EN 61869-3:2012, clause 7.4.6 IEC 61869-3:2011, clause 7.4.6 PT-03. 08
		e) Low-voltage switchgear and controlgear assemblies	IEC TR 61641:2014, clause 8 PT-03. 08
		f) Metal enclosed pole-mounted switchgear and controlgear for rated voltages above 1 kV up to and including 52 kV	SR EN IEC 62271-214:2020 IEC 62271-214:2019 PT-03. 08
28.	AC power arc tests	Insulators for overhead lines with a nominal voltage above 1000 V	SR EN 61467:2009, clause 8 IEC 61467:2008, clause 8 PT-03. 15
29.	Tests using a constrained and directed arc	Protective clothing against the thermal hazards of an electric arc	SR EN 61482-1-1:2020 IEC 61482-1-1: 2019 SR EN 61482-1-2: 2015 IEC 61482-1-2: 2014 SR IEC 61482-2: 2020 IEC 61482-2:2018 PT-03. 22
D. TEMPERATURE-RISE TESTS			
30.	Temperature-rise test	a) Circuit-breakers for rated voltages above 1 kV	SR EN 62271-1:2018, clause 7.5 IEC 62271-1:2017, clause 7.5 SR EN IEC 62271-100:2021, clause 7.5 IEC 62271-100:2021, clause 7.5 PT-03. 06
		b) Switches for rated voltages above 1 kV up to and including 52 kV (Mechanical disconnectors for rated voltage above 1 kV up to and including 52 kV)	SR EN 62271-103:2012, clause 6.5 IEC 62271-103:2021, clause 7.5 SR EN IEC 62271-102:2019 SR EN IEC 62271-102:2019/A1:2022, clause 7.5 IEC 62271-102:2018 IEC 62271-102: 2018/AMD1:2022, clause 7.5 PT-03. 06
		c) High-voltage current-limiting fuses	SR EN 60282-1:2020, clause 7.5 IEC 60282-1:2020, clause 7.5 IEC 60282-2:2008, clause 8.5 PT-03. 06
		d) Low voltage fuses	SR EN 60269-1:2008 SR EN 60269-1: 2008 / A1:2010 SR EN 60269-1:2008 / A2: 2015, clause 8.3



Annex no. 1 to Accreditation Certificate no. LI 004
Annex no. 1 Issue Date: 03.11.2023

No.	Activity area / Measurement technique / Name of the test	Material / product / test object	Reference document
			IEC 60269-1:2006+Amd.1:2009+ Amd.2:2014 CSV, clause 8.3 SR HD 60269-2:2015, clause 8.3 IEC 60269-2:2013 + Amd.1:2016, clause 8.3 PT-03. 06
		e) Disconnectors for rated voltages above 1 kV peste 1 kV	SR EN IEC 62271-102:2019 SR EN IEC 62271-102:2019/A1:2022, clause 7.5 IEC 62271-102:2018 IEC 62271-102: 2018/AMD1:2022, clause 7.5 PT-03. 06
		f) Bushings	SR EN 60137:2008 SR EN 60137:2008/ C91: 2012, clause 8.8 IEC 60137:2017, IEC 60137:2017/COR1:2018, clause 8.8 PT-03. 06
		g) Current transformers	SR EN 61869-1:2010, clause 7.2.2 IEC 61869-1:2023, clause 7.2.2 SR EN 61869-2:2013, clause 7.2.2 IEC 61869-2:2012, clause 7.2.2 PT-03. 16
		h) Tap-changers	SR EN 60214-1:2015, clause 7.2.2 IEC 60214-1:2014, clause 7.2.2 PT-03. 06
		i) Inductive voltage transformers	SR EN 61869-1:2010, clause 7.2.2 IEC 61869-1:2023, 7.2.2 SR EN 61869-3:2012, clause 7.2.7 IEC 61869-3:2011, clause 7.2.7 PT-03. 16
		j) Capacitive voltage transformers	SR EN 61869-5:2012 SR EN 61869-5: 2012 / AC:2015, clause 7.2.2 IEC 61869-5:2011 IEC 61869-5:2011/ Cor.1: 2015, clause 7.2.2 PT-03. 16
		k) Power transformers - oil immersed - dry	SR EN 60076-2:2011, clause 7 IEC 60076-2:2011, clause 7 IEC 60076-7:2018, clause 8 SR EN 60076-11:2019 SR EN IEC 60076-11:2019/AC:2019, clause 14.3.2 IEC 60076-11: 2018, clause 14.3.2 PT-03. 10
		l) Prefabricated substations	SR EN IEC 62271-202:2022, clauses 7.4 & 7.5 IEC 62271-202:2022, clause 7.4 & 7.5 PT-03. 10s



Annex no. 1 to Accreditation Certificate no. LI 004
Annex no. 1 Issue Date: 03.11.2023

No.	Activity area / Measurement technique / Name of the test	Material / product / test object	Reference document
		m) Alternating current switch-fuse combinations	SR EN 62271-105:2013, clause 6.5 IEC 62271-105:2021, clause 7.5 PT-03. 06
		n) AC metal enclosed switchgear and controlgear for rated voltages above 1 kV up to and including 52 kV	SR EN IEC 62271-200:2021, clause 7.5 IEC 62271-200:2021, clause 7.5 PT-03. 06
		o) Busbars and low-voltage switchgear and controlgear assemblies (distributing boxes, measuring and protection units)	SR EN IEC 61439-1:2021, clause 10.10 IEC 61439-1:2020, clause 10.10 PT-03. 06
		p) Low voltage busbar trunking systems (busways)	SR EN 61439-6:2013, clause 10.10 IEC 61439-6:2012, clause 10.10 PT-03. 06
		r) Earthing transformers (neutral couplers)	SR EN 60076-6:2009, clause 10.6 IEC 60076-6:2007, clause 10.6 PT-03. 06
E. MECHANICAL TESTS			
31.	Mechanical endurance tests	a) Circuit-breakers for a.c voltages above 1 kV	SR EN IEC 62271-100:2021, clause 7.101 IEC 62271-100:2021, clause 7.101 PT-03. 07
		b) Alternating current disconnectors above 1 kV	SR EN 62271-103:2012, clause 6.102 IEC 62271-103:2021, clause 7.102 SR EN IEC 62271-102:2019 SR EN IEC 62271-102:2019/A1:2022, clause 7.102 IEC 62271-102:2018 IEC 62271-102: 2018/AMD1:2022, clause 7.102 PT-03. 07
		c) Alternating current switches for rated voltages above 1 kV	SR EN 62271-102:2019, clause 7.102 SR EN IEC 62271-102:2019 SR EN IEC 62271-102: 2019/A1:2022, clause 7.102 IEC 62271-102:2018 IEC 62271-102: 2018/AMD1:2022, clause 7.102 SR EN 62271-103:2012, clause 6.102 IEC 62271-103:2021, clause 7.102 PT-03. 07
32.	Switching devices and removable parts verification	AC metal enclosed switchgear and controlgear for rated voltages above 1 kV up to and including 52 kV	SR EN IEC 62271-200:2021, clause 7.102 IEC 62271-200:2021, clause 7.102 PT-03. 07
33.	Interlocks verification	AC metal enclosed switchgear and controlgear for rated voltages above 1 kV up to and including 52 kV	SR EN IEC 62271-200:2021, clause 7.102. IEC 62271-200:2021, clause 7.102 PT-03. 07
F. SOUND LEVEL DETERMINATION			
34.	Sound levels determination	a) Power transformers - oil immersed - dry	SR EN 60076-10: 2017 IEC 60076-10:2016 IEC 60076-10-1:2016 PT-03. 13
		b) Prefabricated substations	SR EN IEC 62271-202:2022, clause 7.102, Annex B



Annex no. 1 to Accreditation Certificate no. LI 004
Annex no. 1 Issue Date: 03.11.2023

No.	Activity area / Measurement technique / Name of the test	Material / product / test object	Reference document
			IEC 62271-202:2022, 7.102, Annex B SR EN 60076-10: 2017 IEC 60076-10:2016 IEC 60076-10-1:2016 PT-03. 13
G. MAIN AND AUXILIARY CIRCUIT RESISTANCE MEASURING			
35	Main and auxiliary circuit resistance measuring	a) Alternating current circuit-breaker for rated voltages above 1 kV	SR EN IEC 62271-100:2021, clause 7.4 IEC 62271-100:2021, clause 7.4 SR EN 62271-1:2018, clause 7.4 IEC 62271-1:2017, clause 7.4 PT-03. 20
		b) AC metal enclosed switchgear and controlgear for rated voltages above 1 kV up to and including 52 kV	SR EN IEC 62271-200:2021, clause 7.4 IEC 62271-200:2021, clause 7.4 PT-03. 20
		c) Alternating current switches for rated voltages above 1 kV up to and including 52 kV, mechanical disconnectors (switches) for rated voltage above 1 kV up to and including 52 kV	SR EN 62271-103:2012, clause 6.4 IEC 62271-103:2021, clause 7.4 SR EN IEC 62271-102:2019 SR EN IEC 62271-102: 2019/A1:2022, clause 7.4 IEC 62271-102:2018 IEC 62271-102: 2018/AMD1:2022, clause 7.4 PT-03. 20
		d) Alternating current switch-fuse combinations	SR EN 62271-105:2013, clause 6.4 IEC 62271-105:2021, clause 7.4 PT-03. 20
H. INDIVIDUAL TESTS			
36.	Measurement of winding resistance	Power transformers	SR EN 60076-1:2012, clause 11.2 IEC 60076-1:2011, clause 11.2 PT-03. 10
37.	Measurement of voltage ratio and check of phase displacement	Power transformers	SR EN 60076-1:2012, clause 11.3 IEC 60076-1:2011, clause 11.3 PT-03. 10
38.	Measurement of short-circuit impedance and load loss	Power transformers	SR EN 60076-1:2012, clause 11.4 IEC 60076-1:2011, clause 11.4 PT-03. 10
39.	Measurement of no-load loss and current	Power transformers	SR EN 60076-1:2012, clause 11.5 IEC 60076-1:2011, clause 11.5 PT-03. 10

End of document

GENERAL DIRECTOR
Alina Elena TAINĂ

