

Annex to the accreditation certificate: N° 2/003 According to standard ISO/IEC 17025:2017 For a calibration laboratory

Version 02 of the technical annex from 26 January 2023
Valid until 13 December 2026

Accredited organisation:

Creos Luxembourg SA
Laboratoire d'étalonnage
9, rue Edmond Reuter
L-5326 Contern

Contact person:

Laurent Hoffmann
Phone: +352 26 24 42 24
Email: laurent.hoffmann@creos.net

Document approved by:

Dominique Ferrand
Head of OLAS department

Objects submitted to calibration	Characteristics or properties measured	Calibration methods	Measuring range	Calibration and Measurement Capability (CMC)										
		(e.g. published, adapted, internally validated)		Relative enlarged uncertainty (k=2)										
General domain: CAL1 – Electricity														
Technical domain: CAL1.1 – Voltage (V)														
CAL1.1.1 – Voltage measurers – Direct current (DCV)	Difference in DC potential	Comparison to reference voltage of 1,018 V	1,018 V	$9 * 10^{-6}$										
CAL1.1.2 – Voltage measurers – Alternative current (ACV)	Difference in AC potential	Comparison to comparator type : COM 3003 $45 \text{ Hz} \leq f \leq 60 \text{ Hz}$	60 V 120 V 240 V	$85 * 10^{-6}$										
CAL1.1.3 – Single phase alternative current energy counters	Electrical energy in single-phase alternating current	Comparison to reference energy counter type : EPZ 303-5 SRS400.3 $t = 100 \text{ s}$ $U = 60 \text{ V}, 120 \text{ V}, 240 \text{ V}, 480 \text{ V}$ $I = 0,005 \text{ A}, 0,01 \text{ A}, 0,02 \text{ A}, 0,05 \text{ A}, 0,1 \text{ A}, 0,2 \text{ A}, 0,5 \text{ A}, 1 \text{ A}, 2 \text{ A}, 5 \text{ A}, 10 \text{ A}, 50 \text{ A}, 100 \text{ A}$	100 V 240 V Base current: 1 A, 5 A, 10 A, 20 A	$3 * 10^{-4}$										
CAL1.1.4 – Three-phase alternative current energy counters	Electrical energy in three-phase alternating current	Comparison to reference energy counter type : EPZ 303-5 SRS400.3 $t = 100 \text{ s}$ $U = 60 \text{ V}, 120 \text{ V}, 240 \text{ V}, 480 \text{ V}$ $I = 0,005 \text{ A}, 0,01 \text{ A}, 0,02 \text{ A}, 0,05 \text{ A}, 0,1 \text{ A}, 0,2 \text{ A}, 0,5 \text{ A}, 1 \text{ A}, 2 \text{ A}, 5 \text{ A}, 10 \text{ A}, 50 \text{ A}, 100 \text{ A}$	$3 * 100 \text{ V}$ $3 * 240 \text{ V}$ Base current: 1 A, 5 A, 10 A, 20 A	$3 * 10^{-4}$										
CAL1.1.7 – Voltage measuring transformers	transformation ratio	Comparison to reference voltage transformer type : NVOD 30 $45 \text{ Hz} \leq f \leq 60 \text{ Hz}$	<table border="1"> <thead> <tr> <th>Primary voltage</th> <th>Secondary voltage</th> </tr> </thead> <tbody> <tr> <td>6 kV</td> <td></td> </tr> <tr> <td>10 kV</td> <td>100 V</td> </tr> <tr> <td>15 kV</td> <td>110 V</td> </tr> <tr> <td>20 kV</td> <td></td> </tr> </tbody> </table>	Primary voltage	Secondary voltage	6 kV		10 kV	100 V	15 kV	110 V	20 kV		$4,1 * 10^{-4}$ 1,6 min for the phase-shift angle
Primary voltage	Secondary voltage													
6 kV														
10 kV	100 V													
15 kV	110 V													
20 kV														
Technical domain: CAL1.2 – Amperage (A)														
CAL1.2.2 – Current measurers – Alternative current (ACI)	Electrical current intensity in alternating current	Comparison to comparator type : COM 3003 $45 \text{ Hz} \leq f \leq 60 \text{ Hz}$	50 mA 100 mA	$110 * 10^{-6}$										

Objects submitted to calibration	Characteristics or properties measured	Calibration methods	Measuring range	Calibration and Measurement Capability (CMC)																																																		
			250 mA 500 mA 1 A 2,5 A 5 A 10 A 25 A 50 A	$95 * 10^{-6}$																																																		
CAL1.2.3 – Current measuring transformers (A)	transformation ratio	Comparison to reference current transformer type : SCM 2000-120 $45 \text{ Hz} \leq f \leq 60 \text{ Hz}$	<table border="1"> <thead> <tr> <th>Primary Current</th> <th>Secondary Current</th> </tr> </thead> <tbody> <tr><td>5 A</td><td></td></tr> <tr><td>10 A</td><td></td></tr> <tr><td>20 A</td><td></td></tr> <tr><td>40 A</td><td></td></tr> <tr><td>50 A</td><td></td></tr> <tr><td>60 A</td><td></td></tr> <tr><td>75 A</td><td></td></tr> <tr><td>80 A</td><td></td></tr> <tr><td>100 A</td><td></td></tr> <tr><td>125 A</td><td></td></tr> <tr><td>150 A</td><td></td></tr> <tr><td>200 A</td><td>1A</td></tr> <tr><td>250 A</td><td>5A</td></tr> <tr><td>300 A</td><td></td></tr> <tr><td>400 A</td><td></td></tr> <tr><td>500 A</td><td></td></tr> <tr><td>600 A</td><td></td></tr> <tr><td>750 A</td><td></td></tr> <tr><td>800 A</td><td></td></tr> <tr><td>1000 A</td><td></td></tr> <tr><td>1200 A</td><td></td></tr> <tr><td>1250 A</td><td></td></tr> <tr><td>1600 A</td><td></td></tr> <tr><td>2000 A</td><td></td></tr> </tbody> </table>	Primary Current	Secondary Current	5 A		10 A		20 A		40 A		50 A		60 A		75 A		80 A		100 A		125 A		150 A		200 A	1A	250 A	5A	300 A		400 A		500 A		600 A		750 A		800 A		1000 A		1200 A		1250 A		1600 A		2000 A		$5,2 * 10^{-4}$ 1,6 min for the phase-shift angle
Primary Current	Secondary Current																																																					
5 A																																																						
10 A																																																						
20 A																																																						
40 A																																																						
50 A																																																						
60 A																																																						
75 A																																																						
80 A																																																						
100 A																																																						
125 A																																																						
150 A																																																						
200 A	1A																																																					
250 A	5A																																																					
300 A																																																						
400 A																																																						
500 A																																																						
600 A																																																						
750 A																																																						
800 A																																																						
1000 A																																																						
1200 A																																																						
1250 A																																																						
1600 A																																																						
2000 A																																																						
Technical domain: CAL1.4 – Power (W)																																																						
Power	Electrical current power in single-phase alternating current	Comparison to comparator type: COM 3003 $45 \text{ Hz} \leq f \leq 60 \text{ Hz}$ $0,25 < \cos(\varphi) < 1$ $U = 60 \text{ V}, 120 \text{ V}, 240 \text{ V}$ $I = 50 \text{ mA}, 100 \text{ mA}, 250 \text{ mA}, 500 \text{ mA}, 1 \text{ A}, 2,5 \text{ A}, 5 \text{ A}, 10 \text{ A}, 25 \text{ A}, 50 \text{ A}, 100 \text{ A}$	3 W à 24 kW	$140 * 10^{-6}$ relative to the apparent power																																																		
Technical domain: CAL1.5 – Energy (Ws)																																																						
Energy	Electrical energy in single-phase alternating current	Comparison to comparator type: COM 3003 $45 \text{ Hz} \leq f \leq 60 \text{ Hz}$ $0,25 < \cos(\varphi) < 1$ $0,25 < \sin(\varphi) < 1$	0,30 kW to 0,66 kWh	$140 * 10^{-6}$ relative to the apparent power																																																		

Objects submitted to calibration	Characteristics or properties measured	Calibration methods	Measuring range	Calibration and Measurement Capability (CMC)
		t = 100 s U = 60 V, 120 V, 240 V I = 50 mA, 100 mA, 250 mA, 500 mA, 1 A, 2,5 A, 5 A, 10 A, 25 A, 50 A, 100 A		
General domain: CAL5 – Flow rate				
Technical domain: CAL5.1 – Volume conversion device				
Volume conversion device (in laboratory and on site)	Conversion factor	Comparison to reference temperature and pressure -10°C to 60°C 0,7 bar to 20 bar	0,6 to 23	$13 * 10^{-4}$
Technical domain: CAL5.2 – Gas flow rate				
Gas meter	Flow rate	Venturi-nozzle in critical mode	0,04 m ³ /h – 1 m ³ /h > 1 m ³ /h – 40 m ³ /h	$54 * 10^{-4}$ $37 * 10^{-4}$