Hellenic Accreditation System

Annex F2/10 to the Certificate No. **941**-6

SCOPE of ACCREDITATION

of the

Calibration Laboratory

of

MAIN SOLUTIONS Ltd

for the performance of calibrations

Measurand / Calibration item	Range of measurement	Calibration & Measurement Capability (k=2)*	Remarks
Mass Measurements			
Mass / Standard weights	5 kg	48 mg	According to guideline OIML R111-1: 2004. Calibration capability of standard weights up to class M1 acc. to OIML R111.
	10 kg	55 mg	
	20 kg	0,11 g	
Mass / Non-automatic weighing instruments	1 mg	1,5 µg	According to guideline EURAMET cg-18/v.04 (2015) Using standard weights of OIML R111 class: E1: 1 mg to 200g Max grouped load 611 g E2: 1mg to 20 kg Max grouped load 41722 g F1: 500 g to 5 kg Max grouped load 10,5 kg M1: 1 kg to 20 kg Max grouped load 288 kg Calibration is performed on-site.
	2 mg	1,5 µg	
	5 mg	1,5 µg	
	10 mg	1,7 µg	
	20 mg	1,9 µg	
	50 mg	2,3 µg	
	100 mg	2,8 µg	
	200 mg	3,6 µg	
	500 mg	4,5 µg	
	1 g	5,5 µg	
	2 g	7,1 µg	
	5 g	9,0 µg	
	10 g	14 µg	
	20 g	16 µg	
	50 g	19 µg	

Measurand / Calibration item	Range of measurement	Calibration & Measurement Capability (k=2)*	Remarks
	100 g	28 µg	
	200 g	55 µg	
	500 g	0,90 mg	
	1 kg	2,6 mg	
	2 kg	5,1 mg	
	5 kg	0,12 g	
	10 kg	0,25 g	
	20 kg	0,46 g	
	100 kg	2,3 g	
	150 kg	4,1 g	
	200 kg	6,5 g	
	300 kg	11 g	
Temperature measurements			
Temperature / Temperature controlled chambers, ovens, incubators, autoclaves, refrigerators, freezers with volume up to 2000l, with or without air circulation	[-80 °C to -30 ˚C)	0,30 °C	EURAMET cg 20/v.5.0 (2017) DKD-R 5-7: 09/2018 Calibration can also be performed on-site.
	[-30 °C to +140 ˚C]	0,095 °C	
	(140 °C to 250 ˚C]	0,32 °C	
	(250 °C to 350 ˚C]	0,47 °C	
Temperature / Ovens, furnaces with volume up to 2000l, with or without air circulation	200 ˚C to 500˚ C	0,5 °C to 1,3 °C	EURAMET cg 20/v.5.0 (2017) DKD-R 5-7: 09/2018, case (C) Calibration can also be performed on-site.
Temperature / Liquid baths	[-80 °C to -30 ˚C)	0,30 °C	EURAMET cg 20/v.5.0 (2017) DKD-R 5-7: 09/2018 Calibration can also be performed on-site.
	[-30 °C to +140 ˚C]	0,095 °C	
	(140 °C to 250 ˚C]	0,32 °C	
	(250 °C to 350 ˚C]	0,47 °C	
Temperature / Dissolution testers and disintegration testers	35 °C to 40 °C	0,27 °C	Internal method G.05.04 using Pt100 sensors and K-type thermocouples. Calibration can also be performed on-site.

Measurand / Calibration item	Range of measurement	Calibration & Measurement Capability (k=2)*	Remarks
Temperature / Thermal Cyclers (PCR), Block calibrators, Thermal reactors	[-30 °C to 0 °C)	0,44 °C	Internal method G.05.04 using Pt100 sensors and K-type thermocouples. Calibration can also be performed on-site.
	[0 °C to 70 °C)	0,27 °C	
	[70 °C to 100 °C)	0,36 °C	
	[100 °C to 150 °C)	0,53 °C	
	[150 °C to 200 °C]	0,92 °C	
Temperature / Digital or analogue direct reading thermometers	[-80 °C to 140 °C]	0,07 °C	Internal method G.05.01 using dry block calibrator and Pt100 sensor. Calibration can also be performed on-site.
	(140 °C to 200 °C]	0,15 °C	
	(200 °C to 350 °C]	0,20 °C	
Temperature / Temperature recorders, data loggers	[-20 °C to 0 °C)	0,37 °C	Internal method G.05.01 using Pt100 sensor and climatic chamber.
	[0 °C to 70 °C)	0,28 °C	
	[70 °C to 120 °C)	0,30 °C	
	[120 °C to 150 °C)	0,36 °C	
	[150 °C to 200 °C)	0,45 °C	
Relative Humidity measurements			
Relative humidity / Analog and digital hygrometers	[10 %rh to 50 %rh) [50 %rh to 70 %rh) [70 %rh to 90 %rh] at 25 °C	1,2 %rh 1,4 %rh 1,7 %rh	Internal method G.05.03 using reference hygrometer in climatic chamber and temperature/humidity calibrator. Calibration can also be performed on-site.
	[20 %rh to 30 %rh) [30 %rh to 50 %rh) [50 %rh to 75 %rh] at 40 °C	1,1 %rh 1,2 %rh 1,3 %rh	
Relative humidity / Climatic chambers with volume up to 2000l	20 %rh to 90 %rh at 25 °C	2,0 %rh	EURAMET cg 20/v.5.0 (2017) DKD-R 5-7: 09/2018 Calibration can also be performed on-site.
	30 %rh to 90 %rh at 40 °C	2,3 %rh	

Measurand / Calibration item	Range of measurement	Calibration & Measurement Capability (k=2)*	Remarks
Volume Measurements			
Volume / Piston type pipettes	[2 µL to 20 µL]	4,0 % to 2,5 %	EURAMET cg 19/v.3.0 (2018)
	[20 µL to 100 µL]	2,5 % to 0,3 %	
	[100 µL to 1000 µL]	0,3 % to 0,16 %	
	[1000 µL to 10 mL]	0,16 %	
Volume / Piston type burettes (dispensers, digital burettes, automatic titrators)	1 mL to 50 mL	0,16 % of nominal volume	
Volume / Burettes	[0,5 mL to 10 mL]	0,13 % of maximum volume	EURAMET cg 19/v.3.0 (2018)
	(10 mL to 100 mL]	0,1 % of maximum volume	
Volume / Volumetric flasks	5 mL	0,04 %	EURAMET cg 19/v.3.0 (2018)
	10 mL	0,05 %	
	20 mL	0,05 %	
	25 mL	0,05 %	
	50 mL	0,05 %	
	100 mL	0,05 %	
	200 mL	0,05 %	
	250 mL	0,05 %	
	500 mL	0,05 %	
Volume / Volumetric Cylinders	[0,5 mL to 50 mL]	0,6 % of nominal volume	EURAMET cg 19/v.3.0 (2018)
	(50 mL to 100 mL]	0,3 % of nominal volume	
	(100 mL to 250 mL]	0,1 % of nominal volume	
	(250 mL to 500 mL]	0,2 % of nominal volume	
Volume / Pipettes (fixed volume)	0,5 mL to 100 mL	0,05 % of nominal volume	EURAMET cg 19/v.3.0 (2018)
Volume / Pipettes (graduated)	[0,1 mL to 0,5 mL]	1,2 % of nominal volume	EURAMET cg 19/v.3.0 (2018)
	(0,5 mL to 20 mL]	0,6 % of nominal volume	
	(20 mL to 100 mL]	0,3 % of nominal volume	

Measurand / Calibration item	Range of measurement	Calibration & Measurement Capability (k=2)*	Remarks
Pressure Measurements			
Pressure / Analog and digital gauge pressure measuring instruments of direct reading	-94 kPa to 0 kPa	0,27 kPa	DKD-R 6-1 03/2014 Gas pressure medium.
	49 kPa to 4 MPa	0,4 kPa	
	[49 kPa to 4 MPa)	0,4 kPa	DKD-R 6-1 03/2014 Oil or water pressure medium.
	[4 MPa to 7 MPa)	0,8 kPa	
	[7 MPa to 68 MPa]	24 kPa	
Torque Measurements			
Torque meters / wrenches	7,5 Nm to 150 Nm	0,8 %	According to ISO 6789-1:2017 ISO 6789-2:2017 using torque calibrator. Only clockwise measurements (CW).
	150 Nm to 1500 Nm	0,4 %	
Spectrophotometric Measurements			
Absorption / Visible and ultraviolet spectrophotometers in the range: 230 nm to 650 nm	A ≤ 0,5 AU	5,0 mAU **	ASTM E 275: 2008 (Re 2022) (baseline stability, photometric accuracy and precision) Calibration is also performed on-site.
	0,5 < A ≤ 1,0 AU	6,2 mAU **	
Time / Frequency measurements			
Time / Timers, stopwatches	0 s to 20 h	0,3 s	According to NIST SP 960-12 Stopwatch and Timer Calibrations (2009 edition) using calibrated timer.
Frequency / Non-contact optical tachometers	[6 to 1000] rpm	0,06 %	Internal method G.03.02 using reference tachometer calibrator.
	(1000 to 10000] rpm	0,007 %	
	(10000 to 90000] rpm	0,002 %	
Frequency / Contact tachometers	[6 to 100] rpm	0,5 %	Internal method G.03.02 using tachometer calibrator and reference frequency meter.
	(100 to 1000] rpm	0,1 %	
	(1000 to 10000] rpm	0,02 %	
Rotation frequency / Centrifuges, Agitators, Mixers, Homogenizers, Motors	[6 to 1000] rpm	0,1 %	Internal method G.03.02 using reference frequency meter. Calibration can also be performed on-site.
	(1000 to 90000] rpm	0,01 %	

** Where uncertainty is accompanied by the corresponding unit, it is absolute, while where it is not accompanied by a unit, it is relative.*

*** Uncertainty values are estimated assuming a spectrophotometer having a resolution of 0.1mAU.*

Site of assessment: **Permanent laboratory premises, 38 Argostoliou str., 18 345 Moschato, Greece.**

Approved Signatories: **Theodoros Chilas, Serafeim Golias, Vasilios Papantinas, Nikolaos Dalakouras, Alexios Kontogeorgis, Stefanos Ramfos, Dimitrios Tampakopoulos.**

This Scope of Accreditation replaces the previous one dated 18.10.2022.
The Accreditation Certificate No. **941**-6, to ELOT EN ISO/IEC 17025: 2017, it is valid until 04.11.2027.

Athens, May 2nd, 2023

Christos Nestoras
CEO of ESYD