



مركز الاعتماد الخليجي
GCC Accreditation Center



ASIA PACIFIC
ACCREDITATION COOPERATION
GAC is APAC signatory for ISO/IEC 17025

CERTIFICATE OF ACCREDITATION

Arabian Calibration Devices. Rep. Co. LLC (ARABCAL)

Industrial Area 13, Near Rameez Hyper Market, Along E311 Road, Sharjah, UAE PO Box: 24650
Calibration Laboratory – Accreditation No. ACL 0014

This is to testify that the above stated conformity assessment body (CAB) is accredited by the GCC Accreditation Center (GAC) and has fulfilled the accreditation requirements in accordance with the recognized International Standard ISO/IEC 17025:2017, “General requirements for the competence of testing and calibration laboratories”

This is a digitally issued certificate and does not require a physical signature. The accreditation is subject to continued compliance with GAC requirements. The current accreditation status and certificate authenticity can be verified on the official GAC website:

GAC website <https://gac.org.sa/>

Accreditation Certificate Issue Date: 23rd November 2025

Notes:

Internal project number: AC0215-2

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File Manager: Hamza Khan

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Scope particulars:

Scope Issue No:	04	Scope Issued Date:	23 rd November 2025
Details of scope updates (if any)			
Locations where scope activities are covered by under this accreditation:			
Location-1	Industrial Area 13, Near Rameez Hyper Market, Along E311 Road, Sharjah, UAE		

Scope:

Scope details are as follows:

1. Calibration

1.25 Torque measuring devices

- .01 Torque Wrenches
- .02 Torque transducers

1.26 Testing machines

- .01 Tension and universal machines in tension
- .02 Compression and universal machines in compression
- .11 Vickers hardness machines
- .12 Rockwell hardness machines
- .13 Brinell hardness machines

1.23 Force measuring devices

- .05 Force gauges

1.20 Pressure and vacuum measuring devices

- .01 Pressure gauges
- .02 Vacuum gauges (bourdon tube)

1.03 Engineering metrology equipment

- .01 Surface plates

Version: 2.0

Date: 21st August 2025

Approved by: Atta Subhan

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- .06 Bevel protractors
- .13 Thread measuring accessories
- .21 Micrometer heads
- .22 External micrometers
- .24 Depth micrometers
- .25 Electronic indicators, dial gauges and test indicators
- .26 Bore gauges
- .27 Electronic and Vernier calipers
- .28 Electronic and Vernier height and depth gauges
- .29 Feeler gauges
- .31 Steel rules and measuring tapes
- 1.08 Length and Angle Standards
 - .04 Gauge Blocks
 - 1.17 Flow measuring devices
 - .01 Anemometers
- 1.40 Bridges, Potentiometers, Test Sets
 - .31 Current Transformer Testing Sets
 - .33 Partial Discharge Test Equipment
 - .41 High Voltage Test Sets
- 1.58 Calibration of irradiance measuring instruments
 - .07 Calibration of ultraviolet radiometers
- 1.63 Luminance
 - .02 Calibration of Luminance Meters
- 1.90 Acoustic measuring and calibration equipment
 - .02 Sound level meters
- 1.91 Vibration measuring and calibrating equipment
 - .02 Vibration measuring systems
- 1.38 Instrument calibrators
- 1.39 Indicating and recording instruments.
- 1.41 Frequency and time measuring instruments and standards.
- 1.80 Calibration of temperature measuring equipment
- 1.40 Bridges, Potentiometers, Test Sets
- 1.35 Current Transformer
- 1.43 .03 Modulation characteristics
- 1.47 .05 Impedance and reflection measuring equipment
- 1.17 Flow measuring devices
- 1.14 Density

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- 1.13 Volumetric equipment
- 1.69 Spectrophotometry
 - .01 Spectral transmittance
 - .04 Calibration of spectrophotometers

- 1. 01 Limit gauges
 - .01 Plain plug gauges
 - .02 Plain ring gauges
 - .04 Taper plug gauges
 - .05 Taper ring gauges

Scope details are as follows:

Calibration field 1: (Torque)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Torque Measuring Devices (Clockwise and anti-clockwise)	0.04 Nm to 0.79 Nm	0.5 %	BS 7882:2017+ CI/06/TT1	Torque Testers/Transducers	P
	>0.79 Nm to 338.95 Nm	0.5 %			
	> 338.95 Nm to 813.49 Nm	0.5 %			
	> 813.49 Nm to 2711.63 Nm	0.5 %			
Torque Tools (Clockwise and Anti-clockwise)	0.5 Nm to 10 kNm	0.8 %	ISO 6789-1 & 2: 2017+ CI/06/T1	Torque wrench, Torque meter, Hydraulic/Pneumatic Type, Multiplier	P
	>10 kNm to 100 kNm	1.0%			

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Calibration field 2: (Force)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Force Measurement (Compression/Tension)	50 N to 4 kN	0.2 %	VDI/VDE 2624 part 2.1:2008 + Internal Procedure - CI/04/FG1	Push pull Gauge/Force Gauge	P
Testing Machines (Compression/Tension)	4 kN to 45 kN	0.4 %	ISO 7500:2018 + Internal procédure - CI/09/TTM1	Universal Testing Machine	S
	> 45 kN to 245 kN	0.5 %			
	>245 kN to 1000 kN	1%			
Testing Machine (Compression)	> 1000 kN to 3000 kN	1%	ISO 7500-1:2018 + Internal Procedure - CI/09/TTM1	Compression machines	S
Force Measuring Instruments (Dynamometers)	50 N to 4 kN	0.2 %	Internal procédure - CI/09/L1	Dynamometers	S
	4 kN to 45 kN	0.4 %			
	> 45 kN to 245 kN	0.5 %			
Cable Tensiometers	0.5 N to 1.5 kN	0.2 %	Manufacturer procedure using standard weights and load cell + Internal procédure - CI/09/CTSM1	Cable Tensiometers	P
	>1.5 kN to 8.9 kN	0.5 %			
Force-Measuring Instruments	0.45 N to 0.45 kN	0.40 %	VDI/VDE 2624:2008 part 2.1 + Internal procédure - CI/04/FG1	Force-Measuring Instruments	P
Hydraulic Jack	Up to 245 kN	1%	Internal Procedure CI/09/HJ1	Hydraulic Jack	P
	>245 kN to 990 kN	2.5%			
Extensometer	0 – 25 mm	2 µm	ISO 9513, ASTM E83 + Internal Procédure - CI/05/EXM1	Extensometer	P/S
	0 – 500 mm	5 µm			

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Calibration field 3: (Pressure)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *	
Absolute pressure	0 to 1.2 bar	0.5 mbar	DKD-R 6-1:2014+ Internal Procedure CI/02/PI2 (Using Pressure Modules and station)	Indicators, Transducers, Transmitters, switches	P	
	> 1.2 bar to 3.2 bar	0.7 mbar				
Gauge pressure -Pneumatic	2.5 Pa to 25000 Pa	0.02%	DKD-R 6-1:2014+ Internal Procedure CI/02/PI2 (Using Pneumatic Pressure balance)		P	
	-2000 Pa to +2000 Pa	0.15%	DKD-R 6-1:2014+ Internal Procedure CI/02/PI2 (Using Pneumatic Pressure controller)			
	- 25 mbar to 25 mbar	0.02 mbar	DKD-R 6-1:2014+ CI/02/PI2 (Using High Precision Controllers, Pressure Modules, portable controllers)		P	
	-1 bar to 2 bar	0.30 mbar			P	
	> 2 bar to 20 bar	9 mbar			P	
	> 20 bar to 210 bar	25 mbar			P	
	-1 bar to 2.5 bar	1 mbar			S	
	> 2.5 bar to 200 bar	30 mbar			S	
	>200 bar to 350 bar	0.3 bar		P/S		
Gauge Pressure -Hydraulic	1 bar to 60 bar	0.03%		DKD-R 6-1:2014+ CI/02/PI2 (Using Dead weight Tester)	Indicators, Transducers, Transmitters, switches	P
	> 60 bar to 1200 bar	0.04%				

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Gauge Pressure -Hydraulic	1 bar to 700 bar	0.1 bar	DKD-R 6-1:2014+ CI/02/PI2 (Using Pressure Modules, portable controllers, Reference Indicators)	Indicators, Transducers, Transmitters, switches	P/S
Absolute Pressure	0.05 bar to 1.35 bar	0.03 mbar	DKD-R 6-1:2014+ Internal Procedure CI/02/PI2	Pressure indicators, Transmitters, Switches	P
	0.05 bar to 3.5 bar	0.03%			

Calibration field 4: (Dimensional)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Calipers (All Types) LC: 0.01 mm	0.5 mm to 300 mm	20 µm	ISO 13385-1:2019 + Internal Procedure CI/05/V3	Vernier, Dial, Digital calipers	P
	> 300 mm to 600 mm	30 µm			
	> 600 mm to 1000 mm	40 µm			
	>1000 mm to 1500 mm	45 µm			
	>1500 mm to 2000 mm	57 µm			
Outside Micro-meter LC: 0.001 mm	0.5 mm to 100 mm	2 µm	ISO 3611:2023 + CI/05/O2	Analogue, Digital micrometer	P
	>100 mm to 200 mm	2.5 µm			
	>200 mm to 300 mm	3.3 µm			
LC: 0.01 mm	> 300 mm to 400 mm	10 µm			
	> 400 mm to 600 mm	10 µm			
	> 600 mm to 1000 mm	20 µm			
Dial Indicators (Type A, Type B, Type C) LC:0.001mm	0.001 mm to 100 mm	3 µm	BS 907:2008, ANSI B89.1.10M:2001 and BS 2795:1981 + CI/05/D6	Plunger, Lever type Dial Indicators	P
Micro-meter heads LC:0.001 mm	0.5 mm to 50 mm	1.7 µm	IS 9483:1993+ CI/05/MH1	Analogue, Digital micrometer heads	P
Digital/Dial Thickness gauge LC: 0.001 mm	0.5 mm to 50 mm	3 µm	CI/09/CTG1	Thickness Gauge	P
Ultrasonic thickness gauge L.C: 0.01 mm	0.5 mm to 300 mm	4.0 µm	CI/09/CTG1	Ultrasonic thickness gauge	P

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Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
LC: 0.1 mm	0.5 mm to 300 mm	10 µm			
Depth Micro-meter LC:0.001 mm	0.5 mm to 300 mm	7 µm	BS 6468:2008+ CI/05/DMM1	Analogue, Digital Depth micrometer	P
LC:0.01 mm	0.5 mm to 300 mm	10 µm			
Depth Gauge/Caliper LC:0.01mm	0.5 mm to 400 mm	10 µm	BS 6365:2008 + CI/05/DV1	Depth Gauge/Caliper	P
Electronic/Dial/Vernier-Height Gauge LC:0.001 mm	0.5 mm to 600 mm	4 µm	IS 2921:2016 (ISO 13225 : 2012) + CI/05/HG1	Electronic/Dial/Vernier-Height Gauge	P
	0.5 mm to 1000 mm	7 µm			
LC:0.001 mm	0.5 mm to 600 mm	6 µm	IS 2921:2016(ISO 13225 : 2012) + CI/05/HG1	Electronic/Dial/Vernier-Height Gauge	P
LC:0.01 mm	0.5 mm to 1000 mm	10 µm			
Setting Rods	0 mm to 300 mm	3.5 µm	CI/05/O2	Setting Rods	P
	>300 mm to 600 mm	5 µm			
Feeler Gauge set	0.025 mm to 2 mm	2.0 µm	BS 957:2008+ CI/01/FGE1	Feeler Gauge	P
Coating thickness gauge	(0 to 500) µm, (0 to 1500) µm, (0 to 5) mm, (0 to 30) mm	2.0 µm	DeFelsko Guideline:2017+ CI/09/CTG1	Coating thickness gauge	P
Test Foils	0 µm to 2000 µm	2.0 µm	DeFelsko Guideline:2017+ CI/09/CTG1	Test Foils	P
Dial Indicator calibrator LC:0.0002 mm	0.5 mm to 25 mm	1.0 µm	CI/05/D6	Dial Indicator calibrator	P/S
	>25 mm to 50 mm	1.9 µm			
Cylindrical Measuring Pin / Thread Measuring Wire Pin	0.4 mm to 15 mm	1.5 µm	EURAMET cg-06: 2024 + CI/05/PG1	Pin Gauge (Go-No Go Gauge)	P
Plain / Setting Plug Gauges	0.5 mm Ø 100 mm	1.8 µm	EURAMET cg-06: 2024 +	Plug Gauge	P

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	Above \varnothing 100 mm to 200 mm	2.8 μ m	CI/05/PG1		
	Above \varnothing 200 mm to 300 mm	3.2 μ m			
Radius Gauge	0.6 mm to 25 mm	7.0 μ m	IS 5273:2013 + CI/05/RADG1	Radius Gauge	P
Bevel Protractor LC: 0.01°	(0, 30, 45, 90) °	2.0 minutes of arc	IS 4239: 2023 + CI/05/BPR1	Bevel Protractor	P
Surface plate	160mm x 100mm to 1600mm x 1000mm	6 μ m	BS 817:2008+ CI/05/CST1	Granite surface plate/cast iron plate	P
Test Sieve	0.032 mm to 5.00 mm (Wiremesh)	6.3 μ m	IS 460-1 & 2 : 2020 + CI/05/TS1	Test Sieve	P
	5.00 mm to 50 mm (Wiremesh)	40 μ m			
	1 mm to 125 mm (Perforated)	41 μ m			
Tape / Scale Calibrators L.C.: 0.001 mm	Upto 1000 mm	20 μ m	Manufacturer procedure+ CI/05/M1	Tape / Scale Calibrators	P/S
Optical Comparator	Magnification error: 10X to 100X	0.80%	JIS B 7184: 2021+ CI/01/OC1	Optical Comparator/Profile Projectors	P/S
	Linear Measurement X-Axis :140 mm. Y axis: 80mm	2 μ m			
	Angle measurement: 1 to 360°	2 minutes of arc			
Measuring Tape LC: 1 mm	0.001 m to 5 m > 5 m to 30 m	0.25 mm/m 5 mm	IS 1269:1997 + CI/05/M1	Measuring Tape/Pie Tape	P
Steel Rule LC 0.5 mm	0.0005 m to 1 m	20 μ m	IS 1269: 1997 + CI/05/M1	Steel Rule	P
Inside micro-meter L.C.: 0.01 mm	0 to 25 mm	1.8 μ m	BS 959:2008+ CI/05/IM2	Inside micro-meter (Stick/Tubular)	P
	25 mm to 50 mm	2.0 μ m			
	>50 mm to 75 mm	2.5 μ m			
	>75 mm to 100 mm	2.8 μ m			

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	>100 mm to 150 mm	3.0 μm			
	>150 mm to 300 mm	5.0 μm			
	>300 mm to 400 mm	6.8 μm			
	>400 mm to 600 mm	9 μm			
	>600 mm to 1000 mm	16 μm			
Inside Micro-meter (Caliper type) LC: 001 mm	0 mm to 250 mm	5 μm	BS 959:2008+ CI/05/IM2	Inside Micro-meter (Caliper type)	P
Three-point micro-meter LC: 001 mm	0 mm to 250 mm	5.0 μm	CI/05/IM2	Three Point Micrometer	P
Bore Gauge (Transmission error only) Span Dia. Upto 400 mm LC 0.001 mm	0.01 mm 2 mm	2.4 μm	JIS B 7515:1982+ CI/05/BG1	Telescopic Gauge, Bore Gauge	P
Cylindrical Setting Standard	1 mm to 100 mm	1 μm	ANSI B89.1.6: 2002 + CI/05/RG1	Ring Gauge	P
	>100 mm to 250 mm	2.5 μm			
Gauge block set Inch (Steel, Tungsten Carbide, Ceramic)	0.01 inch to 0.4 inch	3 μ inches	BS 4311-1:2007, Gauge block comparator, using Grade K Steel gauge blocks + CI/05/GB1	Gauge Block	P
	0.4 inch to 1 inch	4 μ inches			P
	>1 inch to 2 inch	5 μ inches			P
	>2 inch to 3 inch	6 μ inches			P
	>3 inch to 4 inch	7 μ inches			P
Gauge block comparator	0.5mm to 100 mm	0.05 μm	EURAMET cg-2: 2023, Using Grade K tungsten carbide gauge blocks + CI/05/GBC1	Gauge block comparator	P/S
Universal Length Measuring machine (Mic-Trac)	(0.5 to 50) mm	0.2 μm	Using Grade K Tungsten carbide gauge blocks + CI/05/ULM1	Mic trac	P/S
	(>50 to 100) mm	0.8 μm			
Laser Distance meter	(0.001 to 20) m (>20 to 40) m	2 mm 3 mm	Comparison using Reference laser distance meter + CI/09/LDM1	Laser Distance meter	P

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Surface Roughness Tester, Ra	3 μm	4%	Using Reference roughness standards + CI/05/SRT1	Surface Roughness Tester	P/S
Microscope X axis Linearity Y axis Linearity	(0.001 to 1) mm	0.005 mm	Direct Measurement using Stage Micrometer Scale JIS B 7153:1995 + CI/05/MCP1	Microscopes	P/S
Measurement using Profile Projector- Linear	X axis- 250mm; Y-Axis- 150 mm	3 μm	Internal Procedure- CI/05/OC1	Any linear measurement	P
Measurement using Profile Projector-Angle	0 to 360°	3 minutes of arc		Any angle measurement	P
Gauge Block Set Tungsten Carbide/Steel/Ceramic	0.5 mm to 10 mm	0.08 μm	ISO 3650:1998+ Internal Procedure-CI/05/GB1	Gauge Blocks/Slip Gauges	P
	>10 mm to 25 mm	0.1 μm			
	>25 mm to 50 mm	0.12 μm			
	>50 mm to 75 mm	0.15 μm			
	>75 mm to 100 mm	0.18 μm			
Crimping tool- GO NOGO (Die Check)	0.011 inch to 0.250 inch	0.0002 inch	Manufacture Manual+ Internal Procedure- CI/05/CT1	Crimping tool- GO NOGO (Die Check) Pull out test	P
	0.4 mm to 15 mm	0.005 mm			
Crimping tool - Pull out test	up to 220 lbf	0.5 lbf			
Thread Plug Gauge	Pitch diameter: Up to 200 mm	4 μm	IS 2334:2001 + Internal Procedure-CI/05/TPG1	Thread Plug Gauge	P
	Major diameter: Up to 200 mm	4 μm			
	Angle: up to 70°	0.6"			
Thread Ring gauge	Pitch diameter:M13 mm to M90 mm	9 μm	ULM 9000C Manual + Internal Procedure- CI/05/TRG1	Thread Ring gauge	P
	Minor Diameter:13 mm to 90 mm	9 μm			
Measurement using 2D Height gauge	0.5 mm to 1000 mm	8 μm	Direct measurement using 2D height gauge + Internal Procedure CI/05/CDC1	Caliper checker, Depth checker	P
Taper plain plug gauge	Taper half angle- 0 to 30°	0.6"	Using ULM, IS 9475, IS 2251 + Internal procedure	Taper plain plug gauge	P
Taper plain plug gauge: Pitch	Up to 100 mm	5 μm			

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diameter	>100 mm to 600 mm	15 µm	CI/05/TPG1		
Taper plain ring gauge	Pitch diameter: 3mm to 100 mm	5 µm	Using ULM, IS 9475, IS 2251 + Internal procedure CI/05/TRG1	Taper plain ring gauge	P
Taper thread plug gauge	Pitch diameter: and Major diameter: 3mm to 100 mm	10 µm	Using ULM, IS 9475, IS 2251 + Internal procedure CI/05/TRG1 Taper thread plug gauge	Taper thread plug gauge	P
	Flank angle: up to 60 °	0.04 °			
Taper Thread ring gauge	3 mm to 100 mm	15 µm	Using ULM, IS 9475, IS 2251 + Internal procedure CI/05/TRG1	Taper thread plug gauge	P
Precision levels, bubble levels, electronic level (Vial sensitivity)	Sensitivity up to 0.01 mm/m; Range up to 5mm/m	0.005 mm/m	Using electronic level (comparison method); IS 5706 & IS 1632	Precision levels, bubble levels, electronic level (Vial sensitivity)	P
Gloss meters @ 20°, 60°, 85°	100 GU	0.8 GU	BS EN ISO 2813:2014; GU-Gloss units	Gloss meters	P
Linear Measurement using Universal length machine (Direct Measurement)	0.5 mm to 100 mm	1.5 µm	Using ULM, Gauge Block comparator + Internal procedure CI/05/ULM1	Any work piece or instrument that can be measured in ULM	P
Linear Measurement using Universal length machine (Comparison Measurement)	>100 mm to 300 mm	2.2 µm			
	>300 mm to 600 mm	4.0 µm			

Calibration field 5: (Acoustics)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Sound Level meters	94 dB & 114 dB	0.32 dB	BS 7580-1:1997+ CI/05/SLM1	Sound Level Meters	P/S
Sound Level calibrators	94 dB & 114 dB @ 1kHz	0.30 dB	Comparison with Acoustic calibrator + Internal procedure CI/09/SLMC1	Sound Level calibrators	P

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Calibration field 6: (Electrical)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Oscilloscope (50Ω and 1MΩ) Amplitude	2 mV to 50 V	0.3%	CI/01/OSE1 Based on EURAMET cg-7:2011	Multiproduct Calibrator	P/S
Time Base	2 ns to 5 s	0.5%			
Bandwidth	50 kHz to 1 GHz	4.5%			
DC Power	33 mV to 1000 V		CI/01/M1 Based on EURAMET cg-15:2015	Multiproduct Calibrator	P/S
0.33 mA to 2.999 A	10.9 μW to 2.9 kW	0.04%			
3 A to 20 A	99 mW to 20 kW	0.12%			
AC Power @ UPF	33 mV to 1000 V (45 Hz to 65 Hz)		CI/01/M1	Multiproduct Calibrator	P/S
3.3 mA to 8.999 mA	0.11 mW to 2.97 mW	0.20%			
	2.97 mW to 8.99 W	0.23%			
9 mA to 32.99 mA	0.29 mW to 11 mW	0.17%			
	11 mW to 32.99 W	0.17%			
33 mA to 89.99mA	1.1 mW to 29.7 mW	0.20%			
	29.7 mW to 89.9 W	0.24%			
90 mA to 329.99 mA	2.97 mW to 109.9 mW	0.13%			
	109.9 mW to 329.99 W	0.17%			

Calibration field 6: (Electrical)(Continuation)

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Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
0.33 A to 0.8999 A	10.9 mW to 297 mW	0.18%	CI/01/M1	Multiproduct Calibrator	P/S
	297 mW to 899.9 W	0.21%			
0.9 A to 2.1999 A	2.97 mW to 725 mW	0.18%			
	725 mW to 2.1 kW	0.18%			
2.2 A to 4.4999 A	72.6 mW to 1.485 W	0.20%			
	1.485 W to 4.4 kW	0.22%			
4.5 A to 20 A	148.5 mW to 6.6 W	0.17%			
	6.6 W to 20 kW	0.19%			
Phase angle	Voltage to current				
0-90°	10 Hz to 65 Hz	0.2°	CI/01/M1	Multiproduct Calibrator	P/S
	65 Hz to 500 Hz	0.4°			
	0.5 kHz to 1kHz	0.8°			
>90° to 360°	50 Hz	0.4°			

Calibration field 6: (Electrical)(Continuation)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Active & Reactive Energy	40 - 65 Hz; 30 - 500 V PF= 1 to 0.5 (Lead and Lag) Current: 1 mA to 12 A	0.07%	CI/01/EM1 Based on EN50470:2018	Energy Meter Standard-Emsyst	P/S

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	40 - 65 Hz; 30 - 500 V PF= 1 to 0.5 (Lead and Lag) Current: 10 mA to 120 A	0.08%			
Generation - Resistance	10 $\mu\Omega$	1.5%	Cl/01/M1 Based on EURAMET cg-15:2015	Standard Resistance(s) Multiproduct Calibrator	P/S
	50 $\mu\Omega$	1.2%			
	200 $\mu\Omega$	0.07%			
	500 $\mu\Omega$	0.06%			
	1 m Ω	0.06%			
	2 m Ω	0.08%			
	5 m Ω	0.06%			
	50 m Ω	0.06%			
	100 m Ω	0.02%			

Calibration field 6: (Electrical)(Continuation)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Generation - Resistance	200 m Ω	0.04%	Cl/01/M1 Based on EURAMET cg-15:2015	Multiproduct Calibrator Standard Resistance(s)	P/S
	500 m Ω	0.02%			
	1 Ω	0.02%			
	>1 Ω - 10 Ω	0.006%			
	>10 Ω - 100 Ω	0.005%			
	>100 Ω - 1M Ω	0.004%			
	>1 M Ω - 3.3 M Ω	0.007%			

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	>3.3 MΩ - 11 MΩ	0.02%			
	>11 MΩ - 33 MΩ	0.03%			
	>33 MΩ - 110 MΩ	0.06%			
	>110 MΩ - 330 MΩ	0.3%			
	>330 MΩ - 1 GΩ	1.7%			

Calibration field 6: (Electrical)(Continuation)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Generation - Capacitance	100 pF – 1 nF	4.7% to 1.5%	CI/01/M1	Standard Capacitance Box	P/S
	1 nF - 10 μF	1.2% to 1.5%			
	0.19 nF to 0.3999 nF	6.7%	CI/01/M1	Multiproduct Calibrator	P/S
	0.4 nF to 1.0999 nF	3.9%			
	(1.1 to 3.2999) nF	2.5%			
	(3.3 to 10.9999) nF	0.5%			
	(11 to 32.9999) nF	0.9%			
	(33 to 109.999) nF	0.5%			
	(110 to 329.999) nF	0.5%			
	(0.33 to 1.09999) μF	0.5%			
	(1.1 to 3.29999) μF	0.5%			
	(3.3 to 10.9999) μF	0.5%			
	(11 to 32.9999) μF	0.7%			

Calibration field 6: (Electrical)(Continuation)

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Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Generation - Capacitance	(33 to 109.999) μ F	0.7%	CI/01/M1	Multiproduct Calibrator	P/S
	(110 to 329.999) μ F	0.7%			
	(0.33 to 1.09999) mF	0.9%			
	(1.1 to 3.29999) mF	0.7%			
	(3.3 to 10.9999) mF	0.7%			
	(11 to 32.9999) mF	1.0%			
	(33 to 110) mF	1.4%			
Generation - Inductance	1 mH to 10 H	1%	CI/01/M1	Multiproduct Calibrator Standard Capacitance Box	P/S
Measurement-Resistance	1 m Ω to 100 M Ω	300 n Ω - 230 ppm	CI/01/EC1	Master LCR Meter	P/S
Measurement-Capacitance	1 pF to 1 F	20 ppm - 90 ppm			
Measurement- Inductance	10 nH to 100 kH	0.10%			
Earth Bond Resistance	36 m Ω to 1 Ω	5 m Ω to 11 m Ω	CI/01/SA1 Based on Transmille 3200 Manual	Electrical Test equipment Calibrator	P
	5 Ω	29 m Ω			
	10 Ω	58 m Ω			
	100 Ω	580 m Ω			
	1000 Ω	5.8 Ω			
Earth bond current @ 0.1 Ω load @ 50 Hz	100 mA	9 mA	CI/01/SA1 Based on Transmille 3200 Manual	Electrical Test Equipment Calibrator	P
	4 A - 25 A	0.5 A			
PAT Leakage current @ 240 V	2.2 mA	40 μ A	CI/01/SA1 Based on Transmille 3200 Manual	Electrical Test equipment Calibrator	P
	4.7 mA	80 μ A			
	7.7 mA	140 μ A			
Load for PAT @ UAE Mains	0.13 kVA	6%	CI/01/SA1 Based on Transmille 3200 Manual	Electrical Test Equipment Calibrator	P
Continuity Resistance	0.2 Ω - 2 Ω	30 m Ω	CI/01/SA1 Based on Transmille 3200 Manual	Electrical Test equipment Calibrator	P
	2 Ω - 10 Ω	40 m Ω - 58 m Ω			
	10 Ω - 20 Ω	58 m Ω - 90 m Ω			

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Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
	100 Ω	0.32 Ω	CI/01/SA1 Based on Transmille 3200 Manual	Electrical Test Equipment Calibrator	P
	1 kΩ	3 Ω	CI/01/SA1 Based on Transmille 3200 Manual	Electrical Test equipment Calibrator	P
Loop impedance	0.51 Ω	43 mΩ	CI/01/SA1 Based on Transmille 3200 Manual	Electrical Test equipment Calibrator	P
	1 Ω	44 mΩ			
	5 Ω	56 mΩ			
	10 Ω	80 mΩ			
	99 Ω	590 mΩ			
	994 Ω	5.8 Ω			
IACS Conductivity (International Annealed Copper Standard)	1.929 % IACS	0.04% rel	ASTM E1004-23 + Internal Procedure CI/01/ECCM1	Electrical Conductivity meters	P/S
	25.26 % IACS	0.3% rel			
	63.08 % IACS	0.56% rel			
	101.76 % IACS	0.76% rel			
AC/DC Electromagnetic Yoke	Lifting capacity 4.5 kg & 18 kg	+ 1.2 % of rdg	ASME Section V Article 7, Measurement using standard weight + Internal procedure CI/04/EMY1	AC/DC Yokes	P/S
Electrical Parameter - Measure (using Oscilloscope) – RMS Voltage	0 to 150 Vrms	0.5%	Direct measurement using Oscilloscope with 10x Probe + CI/01/OSC1	Any instrument with output that can be measured using an Oscilloscope	P/S
Peak voltage	0 to 400 V peak	0.5%			
Time period	200 ps to 10 s	0.7%			
Frequency	Up to 100 MHz	4.7%			

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Calibration Field 6: (Electrical -High Voltage)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
DC Voltage – Calibration of meters	0 kV to 100 kV	1 %	IEC 60060:2010 + Internal Procedure- CI/01/HV1	DC Voltage - Meters	P
AC Voltage – Calibration of meters (0.01 Hz to 50 Hz/60 Hz)	0.1 kV to 100 kV	1.5 %	IEC 60060:2010 + Internal Procedure- CI/01/HV1	AC Voltage – Meters	P
DC Voltage – Calibration of sources	0 kV to 100 kV	1 %	IEC 60060:2010 + Internal Procedure- CI/01/HV1	DC Voltage – Sourcing instruments	P/S
AC Voltage - Calibration of sources (Up to 400 Hz)	0.1 kV to 100 kV	1.5 %	IEC 60060:2010 + Internal Procedure- CI/01/HV1	AC Voltage – Sourcing (up to 400 Hz)	P/S
AC Voltage - Calibration of sources (Frequency: 50 Hz/60 Hz)	>100 kV to 200 kV	2 %	IEC 60060:2010 + Internal Procedure- CI/01/HV1	AC Voltage – Sourcing (up to 400 Hz)	P/S
DC High Current - Calibration of sources	20 A to 1000 A	3 mA/A	Direct Method Using Shunt + Internal Procedure- CI/01/HC1	DC High Current - Sourcing instruments	P/S
DC High Current - Calibration of sources	1000 A to 12000 A	3 %	Direct Method Using current probe + Internal Procedure- CI/01/HC1	DC High Current - Sourcing instruments	P/S
AC High Current - Calibration of sources (@ 50 Hz to 400 Hz)	20 A to 1000 A	6 mA/A	Direct Method Using Current Transformer + Internal Procedure- CI/01/HC1	AC High Current - Sourcing instruments	P/S
AC High Current - Calibration of sources (@ 50 Hz to 400 Hz)	>1000 A to 2000 A	5 mA/A	Direct Method Using Current Transformer + Internal Procedure- CI/01/HC1	AC High Current - Sourcing instruments	P/S

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AC High Current - Calibration of sources	>2000 A to 12000 A	3%	Direct Method Using Current probe + Internal Procedure-CI/01/HC1	AC High Current - Sourcing instruments	P/S
Current Ratio Error/Phase Error-CT Analyzers	CT Ratio: 5000 A/5 A to 150 A/5 A	0.10 %	Direct Method using Reference current Transformer	CT Analyzers-Meters	P/S
	Phase Error	3.0 min	Internal Procedure-CI/01/CT1		
Current Ratio Error/Phase Error-Current Transformer	Ratio: 0.8/1 to 10000/1	0.2 %	IEC 61869-2:2012, Direct Method using CT tester + Internal Procedure-CI/01/CT1	Current Transformer	P/S
	Phase Error: 0 to 180°	0.1 %			
Transformer Turns ratio (Test Voltage: Up to 200 V, Frequency: 50 ~ 60 Hz)	Ratio: 0.8 to 2000	0.3 %	Direct Method using Ratio Standard + Internal Procedure-CI/01/TTRM1	Transformer Turns ratio meter	P/S
Oil Break-down Voltage (BDV) Tester	Voltage :1 kV to 100 kV	2 %	Manufacturer Manual (Using Oil Test set calibration meter) + Internal Procedure-CI/01/HV1	Oil BDV Test Kit (Megger products only)	P/S
Dissipation factor (Tan-delta- 17 set points) @ 99.1 pF, 10 kV (Fixed Values)	7.3 · 10 ⁻⁶ 1.06 · 10 ⁻⁴	3.2·10 ⁻⁵ (absolute)	Direct method using Standard capacitance bridge + Internal Procedure-CI/01/TD1	Tan-Delta Test set	P/S
Dissipation factor (Tan-delta- 17 set points) @ 99.1 pF, 10 kV (Fixed Values)	2.05 · 10 ⁻⁴ 3.04 · 10 ⁻⁴ 5.04 · 10 ⁻⁴ 8.05 · 10 ⁻⁴ 9.98 · 10 ⁻⁴	2.2·10 ⁻⁵ (absolute)	Direct method using Standard capacitance bridge + Internal Procedure-CI/01/TD1	Tan-Delta Test set	P/S

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Dissipation factor (Tan-delta- 17 set points) @ 99.1 pF, 10 kV (Fixed Values)	1.99 · 10 ⁻³	2.8·10 ⁻⁴ (absolute)	Direct method using Standard capacitance bridge + Internal Procedure-CI/01/TD1	Tan-Delta Test set	P/S
	2.98 · 10 ⁻³				
	4.97 · 10 ⁻³				
	7.93 · 10 ⁻³				
	9.97 · 10 ⁻³				
Dissipation factor (Tan-delta- 17 set points) @ 99.1 pF, 10 kV (Fixed Values)	1.97 · 10 ⁻²	1.3·10 ⁻³ (absolute)	Direct method using Standard capacitance bridge + Internal Procedure-CI/01/TD1	Tan-Delta Test set	P/S
	2.96 · 10 ⁻²				
	4.95 · 10 ⁻²				
	7.91 · 10 ⁻²				
	9.86 · 10 ⁻²				
Welding Machine	Current: 0 A to 800 A (AC and DC)	0.5% of rdg	IEC 60974-14:2018, Direct method using Welding validator + Internal Procedure CI/01/W4	Welding machines(Arc Welding Equipment)	P/S
	Voltage : 0 V to 100 V (AC and DC)	0.5% of rdg			
	Wire feed speed: 0 m/min to 50 m/min	0.5% of rdg			
Impulse Voltage (Pulsed Voltage)	0 kV to 40 kV	1%	Using HV probe and Oscilloscope, Internal Procedure CI/01/HV1	Holiday detectors, surge testers	P/S

Calibration Field 6: Electrical -Radio Frequency (RF)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Generation Frequency	100 kHz to 4 GHz	0.001 kHz to 1.5 kHz	Internal procedure: CI/14/SPA1	Meter-Frequency	P
	>4 GHz to 20 GHz	2.6 kHz to 13 kHz	Based on OEM manual; Using Signal Generator, Sweeper.		
Generation Power Level (Absolute Power)	50 MHz to 1 GHz, -30 dBm to 20 dBm	1.4 dB	Internal procedure: CI/14/RFS1	Power meters	P

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	10 GHz to 18 GHz, -30 dBm to 13 dBm	1.6 dB	Based on OEM manual; Using Sweeper		
Generation Amplitude Modulation (AM) (Mod Rate 1 kHz)	AM Frequency: 10 MHz to 4 GHz		Internal procedure: CI/14/SPA1 Based on OEM manual; Using Signal Generator	Meters-AM	P
	Depth: 10 %	1.7 %			
	Depth: 30 %	3.0 %			
	Depth: 50 %	4.3 %			
	Depth: 70 %	5.6 %			
	Depth: 80 %	6.3 %			
Generation Frequency Modulation (FM) (Mod Rate 1 kHz) FM Frequency: 10 MHz to 1 GHz	Deviation: 1 kHz	0.04 kHz	Internal procedure: CI/14/SPA1 Based on OEM manual; Using Signal Generator	Meters-FM	P
	Deviation: 50 kHz	2 kHz			
	Deviation: 100 kHz	4 kHz			
Generation Reflection Coefficient (from 0.3 MHz to 10 GHz, N connector)	0.501 & 0.1 (from 0.3 MHz to 10 GHz)	0.03	Internal procedure: CI/14/RFM1 Based on OEM manual; Using 6 dB and 20 dB Return Loss standards	Meters-Return loss	P
Measure Frequency	10 kHz- 20 GHz	0.0015 kHz to 8.5 kHz	Internal procedure: CI/14/SG1 Based on OEM manual; Using Counter	Sources-Frequency	P
Measure Power Level (Absolute Power)	10 MHz to 18 GHz		Internal procedure: CI/14/SG1 Based on OEM manual; Using power meter with sensor and spectrum analyzer	Sources-Absolute Power	P
	-30 dBm	0.8 dB			
	-25 dBm to 13 dBm	0.5 dB			
	10 MHz to 6 GHz				
	-60 dBm to -30 dBm	1.8 dB			
	>6 GHz to 18 GHz				
	-60 dBm to -30 dBm	2.4 dB			

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Measure AM Modulation (Mod Rate- 1kHz)	10 MHz to 1GHz		Internal procedure: CI/14/SG1 Based on OEM manual; Using Measuring Receiver.	Sources-AM	P
	Depth: 1 %	0.08 %			
	Depth: 10 %	0.4 %			
	Depth: 50 %	1.0 %			
	Depth: 90 %	1.4 %			
Measure FM Modulation (Mod Rate- 1kHz)	1 MHz to 10 MHz		Internal procedure: CI/14/SG1 Based on OEM manual; Using Measuring Receiver	Sources-FM	P
	Deviation: 1 kHz to 40 kHz	0.03 kHz to 0.94 kHz			
	Deviation: >40 kHz to 100 kHz	0.52 kHz to 1.3 kHz			
	>0.01 GHz to 1 GHz				
	Deviation:1 kHz to 100 kHz	0.15 kHz to 1.4 kHz			
Measure Reflection Coefficient 0.2 to 0.501 (2 MHz to 4 GHz)	2 MHz to 3.5 GHz	0.16 rho	Internal procedure: CI/14/RFM1 Based on OEM manual; Using RF Analyzer	Sources-Return loss	P
	> 3.5 GHz to 4 GHz	0.36 rho			

Calibration Field 6 : (Electrical)

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Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Calibration of Ultrasonic Flaw Detector- (Transmitter & Receiver)					
Pulse Voltage	50 V to 450 V	5.5% reading	Internal Procedure CI/11/UF1 based on ISO 22232-1:2020	Flaw detectors	P
Transmitter Rise Time	5 ns to 50 ns	5% reading			
Transmitter Reverberation	50 V to 450 V	0.2% reading			
Pulse Duration	25 ns to 5 µs	0.3% reading			
Frequency response	40 kHz to 26.2 MHz	1.7% reading			
Center Frequency	up to 17.8 MHz	4% reading			
Equivalent Input Noise	10 V/VHz to 100 V/VHz	0.52 V/Hz			
Internal Attenuator Gain	10 dB to 80 dB	0.6 dB			
Vertical Linearity	Up to 100% FSH	0.3% FSH			
Time Base	Up to 100% FSW	0.3% FSW			

Calibration Field 7 : (Optical Quantities)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Source: Optical Laser @ Wavelength 850 nm to 1650 nm)	-50 dBm to +10 dBm	0.25 dB	Internal procedure CI/14/OPM1 Based on IS 14976	Laser sources	P
Measure: Optical Power Meter @ wavelength 650 nm to 1650 nm	-10 dBm, -20 dBm	0.25 dB	Internal procedure CI/14/OPM1 Based on IS 14976	Optical power meters	P

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Optical Time Domain Reflectometer (OTDR) Multimode @ 850nm and 1300nm	150m	0.34 m	Internal procedure CI/14/OTDR1, Distance measurement using reference cable reel	OTDR	P
Optical Time Domain Reflectometer (OTDR) Single mode @ 1310nm and 1550nm	1000m	0.34 m	Distance measurement using reference cable reel + Internal procedure CI/14/OTDR1	OTDR	P

Calibration field 8: (Time & Frequency)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Time Interval	5 s to 86400 s	0.3 s	CI/05/SW1 Based on NIST 960-12:2009	Signal Generator, universal Frequency counter	P/S
Rotational Speed-Generation	30 rpm to 200000 rpm	0.02%	CI/01/TCM1 Based on SANAS TR-45-02:2017	Multi Product Calibrator, Frequency Generator	P/S
Rotational Speed-Measure	30 rpm to 60000 rpm	1 rpm	CI/05/CFG1 Based on SANAS TR-45-02:2017	Master Tachometer	P/S

Calibration field 9: (Photometry and Radiometry)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Illuminance	(150 to 20000) lux	4%	Comparison Method + Internal Procedure- CI/05/LUM1	Lux Meter	P
Luminance	(10 to 1900) cd/m ²	4%	Comparison Method +	Illuminance Meter	P

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	>1900 to 5000 cd/m ²	8%	Internal Procedure- CI/05/LUM1		
Ultraviolet meter (UV-A)	(0.3 to 16) mW/cm ²	7%	Comparison Method + Internal Procedure- CI/09/UVM1	Ultraviolet meter	P
Optical Density (Transmission Density)	0.16 D to 5.00 D	0.025 D	ASTM E1079-21, using Step wedge film + Internal procedure CI/09/UVM1	Densitometers	P/S
UV/Vis Absorbance (Photometric Accuracy)	0.243 Abs	0.006 Abs	ASTM E275-08, Using Standard filters+ Internal Procedure CI/09/SPM1(Transmittanc e can be calibrated)	Spectrophotometer	P/S
	0.5 Abs	0.005 Abs			
	0.7 Abs	0.005 Abs			
	1.0 Abs	0.005 Abs			
UV/Vis Wavelength Accuracy	241 nm to 876 nm	0.3 nm			
Refractometer (Brix)	5 %Brix	0.21 %Brix	OIML R142:2008, Using certified Brix sugar solutions + Internal Procedure CI/09/REFM1	Refractometer(Refractiv e index Can be calibrated)	P/S
	25 %Brix	0.21 %Brix			
	40 %Brix	0.21 %Brix			
	60 %Brix	0.21 %Brix			

Calibration field 10: (Vibration Measurements)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Vibration Meter-Acceleration @ Frequency - 15.92 Hz, 40 Hz, 80 Hz, 159.2 Hz, 320 Hz, 640 Hz, 1280 Hz	1 m/s ² , 2 m/s ² , 5 m/s ² , 10 m/s ² , 20 m/s ²	5 %	ISO 16063-21:2003+ Internal Procedure- CI/05/VM1:2021 Note: Velocity and Displacement can be calculated	Vibration Meters	P

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Calibration field 11: (Magnetic Quantity)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Gauss Meter	0 G to 30 G	0.4 G	Comparison Method using Reference gauss meter and Helmholtz coil + Internal Procedure- CI/05/GM2:2025	Gauss Meter (Magnetometers, Meters with axial or Transverse probes)	P
	> 30 G to 200 G	1.4 G			

Calibration field 12: (Chemical Quantity)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Concentration of Carbon Monoxide CO	0.002 %	10 % relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S
	0.01 %	10 % relative			
	0.1 %	10 % relative			
	0.5 %	10 % relative			
	0.0005 %	6% relative			
Concentration of Methane CH ₄	50 %	10 % relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S
	0.005 %	6% relative			
	0.01 %	6% relative			
	2.5 %	6% relative			
Concentration of Hydrogen Sulphide H ₂ S	0.0020 %	10 % relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S
	0.0025 %	10 % relative			
	0.001 %	6% relative			

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Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
	0.005 %	6% relative			
Concentration of Oxygen O ₂	2 %	4% relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S
	5 %	2.5% relative			
	10 %	2.5% relative			
	15 %	10 % relative			
	18 %	10 % relative			
	20.9 %	10 % relative			
	100 %	10 % relative			
Concentration of Isobutylene C ₄ H ₈	0.01 %	10 % relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S
Concentration of Carbon Dioxide CO ₂	0.5 %	10 % relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S
	0.05 %	6 % relative			
Concentration of N-Pentane C ₅ H ₁₂	0.7 %	10 % relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S
Concentration of Nitric Oxide NO	0.1 %	10 % relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S
	0.01 %	6 % relative			
	0.001 %	6 % relative			
Concentration of Sulphur Dioxide SO ₂	0.1 %	10 % relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S
Concentration of Nitrogen Dioxide NO ₂	0.1 %	10 % relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S
Concentration of Hydrogen H ₂	0.1 %	10 % relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S

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Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Concentration of Ethanol C ₂ H ₆ O	0.0781 %	10 % relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S
Concentration of Ammonia NH ₃	0.0025 %	6 % relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S
	0.0050 %	6 % relative			
Propane C ₃ H ₈	0.1 %	2.3 % relative			
Formaldehyde, CH ₂ O	0.0005 %	6 % relative			
Chlorine, Cl ₂	0.0005 %	6 % relative			
Phosphine, PH ₃	0.0025 %	6 % relative	Internal Procedure- CI/07/MG1:2021	Gas detection meter	P / S
pH value	(1, 4, 7, 10, 12) pH	0.04 pH	Internal Procedure- CI/07/MG1:2021	Ph Meters/ ORP Meters	P/S
Oxidation-Reduction Potential (ORP)	240 mV	20 mV			
Conductivity	1 µS/cm	0.1 µS/cm	Internal Procedure- CI/07/C1:20212025	Conductivity Meters	P/S
	5 µS/cm	0.3 µS/cm			
	10 µS/cm	0.5 µS/cm			
	84 µS/cm	3 µS/cm			
	1413 µS/cm	11 µS/cm			
	12.85 mS/cm	0.11 mS/cm			
Total Dissolved Solids TDS	11 mg/L	0.12 mg/L	Internal Procedure- CI/07/C1:20212025	TDS meter	P / S
	116 mg/L	1.2 mg/L			
	478 mg/L	4.9 mg/L			
	1382 mg/L	5.4 mg/L			
	12.41 g/L	0.31 g/L			
Turbidity	20 NTU	2.4%	Internal Procedure CI/07/TM1:2021	Turbidity Meter	P / S

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Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
	100 NTU 500 NTU 1000 NTU (Nephelometric Turbidity unit NTU)				

Calibration field 13: (Mass/Volume Quantities)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Volume	(0-20) m3 @ (35 to 800) l/min	1%	Internal Procedure CI/09/FM1:2021	Totalizer Diesel flow meter	P
Density	0 to 3 g/cm ³ (0 to 40°C)	0.002 g/cm ³	Direct method using standard solution and comparison using Reference meter + CI/09/DENM1	Density Meter	P
Viscosity @ 25°C	70 cP, 700 cP, 3500 cP, 6000 cP	0.3 %	ASTM D4402-06, Direct method using standard solution + Internal Procedure CI/09/VISM1	Viscosity Meter	P
Viscosity	10000 cP (@ -15°C), 13900 cP (@ -18°C), 17400 cP (@ -20°C)	0.5 %	ASTM D4402-06, Direct method using standard solution + Internal Procedure CI/09/VISM1	Viscosity Meter	P

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Viscosity	70 cP, 700 cP, 3500 cP, 6000 cP	0.5%	ASTM D5125, Direct method using standard solution + Internal Procedure CI/09/VISM1	Viscosity flow cups	P
Aircraft Weighing scale	1 kg to 91000 kg	0.5%	Internal Procedure CI/04/AW1	Aircraft Weighing scale	P

Calibration field 14: (Flow Quantities)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Liquid flow	(380 to 1850) l/min	1 %	Internal procedure CI/01/F1:2021	Liquid flow meter, using Ultrasonic flowmeter For flow meter of pipe size from 12.4 mm up to 6 m and temperature of liquid from -30°C to 90°C	P / S
Liquid flow (medium: water)	(1 to 10) l/min	0.8%	Comparison measurement using Coriolis meter as reference + CI/09/FM1	Liquid flow meter (1/2" to 3")	P

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	(>10 to 100) l/min	0.8%			
	(>100 to 750) l/min	0.8%			
Gas flow	(0 to 1000) l/min	3 %	Internal procedure CI/09/MFM1:2021	Gas flow meter	P/S
Air Velocity	2.5 m/s, 5m/s, 10 m/s, 15 m/s	0.43 m/s	ASTM D5096 – 02:2017 + Internal procedure- CI/09/P20:2021	Hot Wire, Vane Type and Pitot Tube Anemometer	P
Volume Flow Rate (Air Flow)	0 to 120 lpm	8% rdg	Using Anemometer +Internal procedure CI/09/AS3	Air samplers	P

Calibration field 15: (Medical Instruments)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Defibrillator Analyzer - Energy	1 Joule to 360 Joule	2%	Using Defibrillator Unit and Oscilloscope + CI/09/DFIBA	Defibrillator Analyzer	P
Discharge Time	0.1 s to 100 s	0.3 s	Using Time Interval Meter + CI/09/DFIBA	Defibrillator Analyzer	P
Patient Monitor Simulator – ECG Frequency/Heart rate	- 0.5 Hz to 5 Hz (30 to 300 BPM)	1.4%	Using Oscilloscope by Direct Method + CI/09/PSIM	Patient Monitor Simulator, Defibrillator Analyzer	P

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Temperature Simulation	(0 to 42°C)	1.1%	Using 6.5 DMM by Direct Method + CI/09/PSIM	Patient Monitor Simulator, Defibrillator Analyzer	P
ECG Amplitude	0.5mV to 5.5 mV	1.8%	Using 6.5 DMM by Direct Method + CI/09/PSIM	Patient Monitor Simulator, Defibrillator Analyzer	P
ECG Frequency	0.5 Hz to 150 Hz	1.2%	Using Oscilloscope by Direct Method + CI/09/PSIM	Patient Monitor Simulator, Defibrillator Analyzer	P
Heart Rate	0.5 Hz to 5 Hz (30 to 300 BPM)	1.4%	Using Oscilloscope by Direct Method + CI/09/PSIM	Patient Monitor Simulator, Defibrillator Analyzer	P
<u>Infusion Device Analyser</u> - Flow rate	1 ml/h to 1000 ml/h	0.5%	Using Syringe Pump & Electronic Balance & stopwatch by Gravimetric Method + CI/09/IPA1	Infusion Device Analyzer	P
Volume	1 ml to 1000 ml	0.5 %	Using Syringe Pump & Electronic Balance & stopwatch by Gravimetric Method + CI/09/IPA1	Infusion Device Analyzer	P
Occlusion Pressure	(0 to 45) psi	0.5 psi	Direct Method using Pressure controller + CI/09/IPA1	Infusion Device Analyzer	P
<u>Electrosurgical Analyzer</u> – Voltage (pk-pk):	(0 to 10) kV	10%	Using HV probe and Oscilloscope + CI/09/ESAA	Electrosurgical Analyzer	P
Load Resistance:	(0.1 to 5200) Ω	0.5%	Using reference Multimeter + CI/09/ESAA	Electrosurgical Analyzer	P
<u>Infusion Pump/Syringe Pump</u> – Flow rate:	1 ml/h to 1000 ml/h	0.5%	Electronic Balance & stopwatch by Gravimetric Method + CI/09/IPA1	Infusion Pump/Syringe Pump	P
Volume:	1 ml to 400 ml	0.5 %	Electronic Balance & stopwatch by Gravimetric Method + CI/09/IPA1	Infusion Pump/Syringe Pump	P

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Defibrillator – Output Energy	1 Joules to 360 Joules	3%	Using Defibrillator Analyzer by Direct Method + CI/09/DFIBA	Defibrillator	P
Discharge Time:	0.1 s to 100 s	0.3 s	Using Defibrillator Analyzer by Direct Method + CI/09/DFIBA	Defibrillator	P
Patient Monitor - NIBP (Dynamic)	15 mmHg to 300 mmHg	1.5%	Using Patient monitor simulator by Direct Method + CI/09/PSIM	Patient Monitor	P
Respiration Rate	(35,47,80) Brpm	6%	Using Patient monitor simulator by Direct Method + CI/09/PSIM	Patient Monitor	P
Temperature	30 °C to 42 °C	1.5 °C	Using Patient monitor simulator or Resistance Box + CI/09/PSIM	Defibrillator Patient Monitor	P
Heart Rate	30 bpm to 300 bpm	1.5%	Using Patient monitor simulator by Direct Method + CI/09/PSIM	Defibrillator Patient Monitor	P
SpO ₂ Simulator	80 %SpO ₂	5.8 %SpO ₂	Using SpO ₂ Simulator and Patient monitor + Internal procedure CI/10/SP02	SpO ₂ Simulator	P/S
	85 %SpO ₂	5.8 %SpO ₂			
	90 %SpO ₂	4.8 %SpO ₂			
	95 %SpO ₂	4.8 %SpO ₂			
	99 %SpO ₂	4.8 %SpO ₂			

Calibration field 16: (Hardness Quantities)

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *
Hardness - Rockwell scale A	31 HRA	0.4 HRA			
	49 HRA	0.5 HRA			

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	73 HRA	0.5 HRA	ISO 6508-2, Indirect verification using test blocks + CI/05/PHT1	Hardness testers	P/S
Rockwell scale B	7 HRBW	0.5 HRBW			
	43 HRBW	0.7 HRBW			
	82 HRBW	1.2 HRBW			
Rockwell scale C	28 HRC	0.4 HRC			
	55 HRC	0.5 HRC			
	64 HRC	0.5 HRC			
Brinell, 750 kgf	190 HBW	5.0 HBW			
	381 HBW	7.6 HBW			
Brinell, 3000 kgf	196 HBW	5.5 HBW			
	285 HBW	6.5 HBW			
	456 HBW	9.9 HBW			
Vickers, 0.1 kgf	146 HV	15 HV			
	358 HV	17 HV			
	722 HV	35 HV			
Vickers, 0.3 kgf	105 HV	3.2 HV			
	348 HV	15 HV			
	727 HV	23 HV			
Vickers, 0.5 kgf	127 HV	4.5 HV			
	495 HV	16 HV			
	723 HV	22 HV			
Vickers, 1 kgf	99.4 HV	3.3 HV			
	312 HV	9.6 HV			
	721 HV	21 HV			
Vickers, 5 kgf	106 HV	2.7 HV			
	364 HV	9.8 HV			
	721 HV	17.5 HV			
Vickers, 10 kgf	108 HV	2.8 HV			
	292 HV	7.7 HV			
	633 HV	16 HV			
Shore A Hardness	50 A	2 A	Indirect verification using test blocks + CI/05/PHT1	Shore A, Shore D hardness testers	P/S
	70 A	2 A			
Shore D Hardness	73.4 D	3 D			

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Leeb hardness, 150 kgf	700 HLD to 790 HLD	0.5%	Indirect verification, ASTM A956-17a, ASTM E384-17 + CI/05/PHT1	Leeb Hardness Testers	P/S
Durometer Calibration – Type A, B, C, D, DO, E, M, O, OO, OOO					
• Indentor Extension and shape - Diameter	Up to 1.5 mm	0.01 mm	ASTM D2240 + Internal Procedure CI/05/DH1	Shore A, Shore D hardness testers	P
• Radius	Up to 1.5 mm	0.01 mm			
• Contact Angle	Up to 40°	0.12°			
• Extension Height	Up to 2.5 mm	0.01 mm			
• Indenter display	(0 and 100) Duro units	0.5 Duro units			
• Spring force	Up to 5000 gf	0.06 gf			
Direct Verification of Knoop & Vickers Hardness Testers					
• Verification of the Test Force	(0 to 150) kgf	0.3%			
• Verification of the Device for Measuring Indentation Diameters	0 to 1.8 mm	0.002 mm			
• Time measurement	0 to 15 s	0.3 s			
Direct Verification of Brinell Hardness Testers			Direct verification method per ASTM E10, ISO 6506	Brinell Hardness Testers	S
• Verification of the Test Force	HBW (1 to 3000) kgf	0.5%			
• Verification of the Device for Measuring Indentation Diameters	(0 to 1.8) mm	0.002 mm			
• Time measurement	0 to 15 s	0.3 s			
Direct Verification of Rockwell Hardness Testers			Direct verification method per ASTM E18, ISO 6508	Rockwell Hardness Testers	S
• Verification of the Test Force- Rockwell	(10 to 150) kgf	0.3%			
• Rockwell Superficial	(3 to 45) kgf	0.3%			
• Verification of the Depth Measuring Device - Rockwell	(0 to 260) μm	0.3 μm			

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• Verification of the Depth Measuring Device – Rockwell superficial	(0 to 140) μm	0.3 μm			
• Verification of the Machine Hysteresis	(100 & 130) HR	0.18 HR			
• Time measurement	0 to 15 s	0.3 s			

*: Put only 'P', 'S' or 'P and S'

**Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMC's represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

Note: the text in blue indicates the new scope OR update in the Edition/Version/Year number of a calibration method/standard/SOP in this issue of the scope of accreditation

Log of Suspended Scopes:

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty ($k = 2$) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *	Date Suspended	Date Reinstated

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Log of Withdrawn Scopes:

Measurand	Measuring Range	CMC Expressed as an Expanded Uncertainty (k = 2) **	Method (standard/guide + internal procedure)	Type of Instrument or Material	Permanent lab (P) / Client-site (S) *	Date Withdrawn

END

Status of this accreditation can be checked in the GAC's website to confirm the validity of this accreditation - <https://www.gac.org.sa/en/>