

10.15 Scope of Accreditation

Issue No: 1/ Issue Date: 01-March-2021
File Manager: Hamza Khan

GAC



ACCREDITED
CALIBRATION
ISO/IEC 17025:2017
No. ACL 0017

Calibration Laboratory Accreditation No. ACL 0017

is accredited by the GCC Accreditation Center (GAC) in accordance with the recognized International Standard ISO/IEC 17025:2017, “General requirements for the competence of testing and calibration laboratories”

Gulf Equipment Metrology Services (GEMS) Calibration – Laboratory	
Address. 4148 Road 120 – 1st Industrial Area, Al Jubail – 35717- 8239	Contact: Jowell Liwanag Tel: +966 13 341 9451 ext. 4009 Fax: Email: jowell@gems-calibration.com Web Address: www.gems-calibration.com

Accreditation Withdrawn

Locations where calibration activities covered by the above Accreditation Standard are undertaken

1- address: 4148 Road 120 – 1st Industrial Area, Al Jubail – 35717- 8239

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For the following scope:

1.90 Acoustic measuring and calibration equipment

- .02 Sound level meters
- .05 Acoustic calibrators

1.08 Length and angle standards

- .01 Angle gauges and precision polygons
- .04 Gauge blocks and accessories
- .11 Precision linear scales

1.03 Engineering metrology equipment

- .01 Surface plates
- .22 External micrometers
- .25 Electronic indicators, dial gauges and test indicators
- .27 Electronic and vernier calipers
- .28 Electronic and vernier height and depth gauges
- .29 Feeler gauges

1.27 Ancillary mechanical testing equipment

- .21 Thickness gauges for textiles, rubber and plastics

1.09 Precision instruments

- .38 Dial gauge calibrators

1.01 Limit gauges

- .42 Micrometer setting gauges

1.38 Instrument calibrators

- .01 D.C. voltage
- .02 A.C. voltage
- .11 D.C. current
- .12 A.C. current
- .51 Resistance

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1.39 Indicating and recording instruments

- .01 D.C. voltmeters
- .02 A.C. voltmeters
- .03 D.C. ammeters
- .04 A.C. ammeters
- .05 Wattmeter
- .09 Ohmmeters
- .30 Insulation resistance test equipment

1.40 Bridges, potentiometers, test sets

- .41 High voltage test sets

1.14 Density

- .02 Density of liquids

1.17 Flow measuring devices

- .01 Anemometers
- .03 Orifice meters

1.25 Torque measuring devices

- .01 Torque wrenches
- .02 Torque transducers

1.23 Force measuring devices

- .04 Load cells
- .05 Force gauges

1.11 Masses

- .01 Mass standards

1.12 Weighing devices

- .01 Precision laboratory balances
- .02 Industrial balances

1.20 Pressure and vacuum measuring devices

- .01 Pressure gauges

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1.80 Calibration of temperature measuring equipment

- .02 Base metal thermocouples
- .05 Metallic resistance thermometers
- .13 Radiation pyrometers

1.84 Testing of controlled enclosures

- .01 Ovens and furnaces
- .02 Incubators
- .06 Baths

1.83 Hygrometry

- .10 Calibration of humidity measuring devices

1.41 Frequency and time measuring instruments and standards

- .13 Clocks and watches
- .15 Tachometers

1.91 Vibration measuring and calibrating equipment

- .02 Vibration measuring systems

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Scope:

Scope details are as follows:

Calibration field 1: Acoustic measuring and calibration equipment

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 Calibrators-- Fixed Points—	94 dB, 104 dB and 114 dB	0.36 dB	GEM-L-12-074 (2018)	Acoustic Calibrator	P
Acoustical: Sound Level Meters, Noise Dosimeters --94 dB, 104 dB and 114 dB; Octave step	(31.5 to 125) Hz (250 to 500) Hz (1 to 4) kHz 8 kHz (12.5 to 16) kHz	0.21 dB 0.16 dB 0.21 dB 0.31 dB 0.60 dB	ANSI S1.4-2014 + GEM-L-67-008 (2018)	Sound Level Meter, dosimeter	P

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Calibration field 2: 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) *
Angle	(0 to 90) °	51 arc seconds	GEM-P-25-002 (2019)	Angle measuring Instruments (Inclinometers)	P
Length External, Internal and Depth Measurements	(0.5 to 1500) mm	20 μm + 0.6R	ASME B89.1.14-2018 + GEM-P-20-002 (2019)	Digital / analog callipers	P
Length External Measurements	(0.5 to 100) mm > (100 to 500) mm > (500 to 1500) mm	1 μm + 0.6R 2 μm + 0.6R 3 μm + 0.6R Where R is the resolution	ASME B89.1.13-2013 + GEM-P-20-008 (2019) & GEM-P-20-009 (2019)	Outside Micrometer	P
Length	(0 to 2.5) mm (2.5 to 12) mm	2 μm 3 μm	ASME B89.1.10M- 2001(R2016) + GEM-P-20- 011 (2019)	Dial or digital indicators	P
Length	(0 to 75) mm	0.17 μm + 0.81 · 10 ⁻⁶ · L Where L is the Nominal length in mm	GEM-P_20-015 (2020)	Dial or digital indicator calibrator	P

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Calibration field 2: Dimensional (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) *
Length central length variation in length up to 100 mm	(0 to 100) mm	$0.08 \mu\text{m} + 0.59 \cdot 10^{-6} \cdot L$	ASME B89.1.9-2002 (2011) + GEM-P-1-20029 (2019)	Gauge Blocks made of steel or ceramic	P
	(100 to 500) mm	$0.09 \mu\text{m} + 0.72 \cdot 10^{-6} \cdot L$ For the deviations f_o and f_u from the central length $0.06 \mu\text{m}$. Where L is the Nominal length of the gauge block in mm			
Length--(linear distance)	(0 to 40) m	$0.54 \mu\text{m}/\text{m}$	ASME B89.1.7-2009(R2019) + GEM-ATE-5530 (2019)	Linear distance measuring Instruments	P and S
Coating Thickness Gage	(0 to 1500) μm	$0.80 \mu\text{m}$	GEM-P-20-020 (2019)	Coating Thickness gages Ferrous	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) *
Length Digital Dial Type	(0 to 50) mm (0 to 50) mm	0.70 μm 6.0 μm	GEM-P-20-020 (2019)	Thickness Gages Digital Dial Type	P
Surface (Parallelism only)	(0 to 0.3) m	0.10 μm	GEM-P-20-025 (2018)	Parallelism bars or Instruments with parallelism parameter (ex. optical flats)	P
Surface Plates – (Flatness only)	(0 to 3.5) m diagonal	0.33 %	ASME B89.3.7-2013(R2018)+ GEM-ATE-5530 (2019)	Surface plates	P and S
Length	(5 to 100) mm > (100 to 1000) mm	0.12 μm + 0.40 $\cdot 10^{-6} \cdot L$ 0.12 μm + 0.40 $\cdot 10^{-6} \cdot L$ Where L is Length in mm	P-20-006 (2019)	Height gages	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) *
Length Diameter – Measure, (Inside, Outside)	(5 to 100) mm	$0.58 \mu\text{m} + 0.10 \cdot 10^{-6} \cdot L$	GEM-P-20-029 (2019)	Cylindrical rings (Inside, outside)	P
	> (100 to 300) mm	$0.57 \mu\text{m} + 0.20 \cdot 10^{-6} \cdot L$			
	> (300 to 1000) mm	41 μm Where L is the length in mm			
Length standards (1D) /micrometer standards	(0 to 1500) mm	$0.60 \mu\text{m} + 0.47 \cdot 10^{-6} \cdot L$ Where L is the length in mm	GEM-ATE-5530 (2019)	Standard rods	P and S

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Calibration field 3: 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) *
DC Voltage – Source	(0 to 200) mV (0.2 to 2) V (2 to 20) V (20 to 200) V (200 to 1000) V	4.8 $\mu\text{V}/\text{V}$ + 0.01 μV 3.3 $\mu\text{V}/\text{V}$ + 0.40 μV 3.5 $\mu\text{V}/\text{V}$ + 4.0 μV 4.6 $\mu\text{V}/\text{V}$ + 40 μV 5.8 $\mu\text{V}/\text{V}$ + 0.5 mV	GEM-L-12-035 (2019)	DC voltages sourcing Instruments	P and S
DC Voltage-Measure	(1 to 200) mV (0.22 to 2.2) V (2.2 to 11) V (11 to 22) V (22 to 220) V (220 to 1000) V	7.5 $\mu\text{V}/\text{V}$ + 0.6 μV 3 $\mu\text{V}/\text{V}$ + 3.0 μV 3.5 $\mu\text{V}/\text{V}$ + 35 μV 3.5 $\mu\text{V}/\text{V}$ + 35 μV 4 $\mu\text{V}/\text{V}$ + 0.35 mV 6.5 $\mu\text{V}/\text{V}$ + 3.5 mV	Euramet cg-15(v3 2015) + GEM-L-12-035 (2019)	DC voltages measuring Instruments	P and S
DC High Voltage – Source	(1 to 200) kV	1.2 %	GEM-L-44-005 (2020)	DC High voltages sourcing Instruments	P and S
DC Current – Source	(1 to 10) μA (10 to 100) μA (0.1 to 10) mA (10 to 100) mA (0.1 to 1) A (1 to 100) A	19 $\mu\text{A}/\text{A}$ 6.1 $\mu\text{A}/\text{A}$ 5.6 $\mu\text{A}/\text{A}$ 6.3 $\mu\text{A}/\text{A}$ 24 $\mu\text{A}/\text{A}$ 35 $\mu\text{A}/\text{A}$	GEM-L-12-035 (2019)	DC current sourcing Instruments	P and 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) *
DC Current- Measure	(1 to 220) μ A (0.22 to 2.2) mA (2.2 to 22) mA (22 to 220) mA (0.22 to 2.2) A (2.2 to 11) A (11 to 20) A	40 μ A/A + 6 nA 35 μ A/A + 16 nA 35 μ A/A + 0.21 μ A 45 μ A/A + 2.2 μ A 80 μ A/A + 12 mA 0.36 mA/A + 4.5 mA 0.67 mA/A + 1.6 mA	Euramet cg-15(v3 2015) + GEM-L-12-035 (2019)	DC current measuring Instruments	P and S
DC Resistance –Measure	(1 to 10.9) Ω (10.9 to 30) Ω (30 to 109) Ω (109 to 300) Ω (0.3 to 1.09) k Ω (1.09 to 3) k Ω (3 to 10.9) k Ω (10.9 to 30) k Ω (30 to 109) k Ω (109 to 300) k Ω (0.3 to 1.09) M Ω (1.09 to 3) M Ω (3 to 10.9) M Ω (10.9 to 30) M Ω (30 to 109) M Ω (109 to 300) M Ω (300 to 1000) M Ω	46 $\mu\Omega/\Omega$ + 1.2 m Ω 35 $\mu\Omega/\Omega$ + 1.8 m Ω 32 $\mu\Omega/\Omega$ + 1.5 m Ω 32 $\mu\Omega/\Omega$ + 2.5 m Ω 32 $\mu\Omega/\Omega$ + 4.1 m Ω 32 $\mu\Omega/\Omega$ + 27 m Ω 32 $\mu\Omega/\Omega$ + 35 m Ω 32 $\mu\Omega/\Omega$ + 0.25 Ω 32 $\mu\Omega/\Omega$ + 0.68 Ω 37 $\mu\Omega/\Omega$ + 3.4 Ω 37 $\mu\Omega/\Omega$ + 24 Ω 69 $\mu\Omega/\Omega$ + 0.19 k Ω 0.015 % + 0.29 k Ω 0.03 % + 0.01 M Ω 0.06 % + 0.02 M Ω 0.35 % + 0.14 M Ω 1.7 % + 0.60 M Ω	Euramet cg-15(v3 2015) + GEM-L-12-035 (2019)	DC resistance measuring Instruments	P and S

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DC Resistance – Source	(0.1 to 2) Ω	12 μΩ/Ω + 4.9 μΩ	GEM-L-25-001 (2019)	DC resistance generating Instruments	P and S
	(2 to 20) Ω	8.2 μΩ/Ω + 22 μΩ			
	(20 to 200) Ω	8.2 μΩ/Ω + 0.16 mΩ			
	(0.2 to 2) kΩ	8.2 μΩ/Ω + 0.63 mΩ			
	(2 to 20) kΩ	8.2 μΩ/Ω + 6.1 mΩ			
	(20 to 200) kΩ	8.2 μΩ/Ω + 61 mΩ			
	(0.2 to 2) MΩ	8.2 μΩ/Ω + 1.1 Ω			
	(2 to 20) MΩ	9.9 μΩ/Ω + 1.5 Ω			
	(20 to 200) MΩ	15 μΩ/Ω + 1.5 kΩ			
	(200 to 1000) MΩ	0.046 % + 0.14 MΩ			
AC High Voltage – Source (60 Hz)	(1 to 20) kV	1.3 %	GEM-L-44-005 (2020)	AC high voltages generating Instruments	P and S
	(20 to 200) kV	1.5 %			
AC Voltage-Measure	(1 to 2.2) mV	0.028 %+0.005 mV	Euramet cg-15(v3 2015) + GEM-L-12-035 (2019)	AC voltages measuring Instruments	P and S
	(10 to 20) Hz	0.010 %+0.005 mV			
	(20 to 40) Hz	0.0092 %+0.005 mV			
	(0.04 to 20) kHz	0.023 %+0.005 mV			
	(20 to 50) kHz	0.023 %+0.005 mV			
	(50 to 100) kHz	0.058 %+0.007 mV			
	(100 to 500) kHz	0.16 %+0.02 mV			
	(0.5 to 1) MHz	0.31 %+0.03 mV			

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(continuation) AC Voltage-Measure	(2.2 to 22) mV	0.028 %+0.005 mV	Euramet cg-15(v3 2015) + GEM-L-12-035 (2019)	AC voltages measuring Instruments	P and S
	(10 to 20) Hz	0.010 %+0.005 mV			
	(20 to 40) Hz	0.0192 %+0.015 mV			
	(0.04 to 20) kHz	0.023 %+0.006 mV			
	(20 to 50) kHz	0.058 %+0.008 mV			
	(50 to 100) kHz	0.16 %+0.03 mV			
	(100 to 500) kHz	0.31 %+0.04 mV			
	(0.5 to 1) MHz				
	(22 to 220) mV	0.028 %+0.02 mV			
	(10 to 20) Hz	0.010 %+0.01 mV			
	(20 to 40) Hz	0.0066 %+0.01 mV			
	(0.04 to 20) kHz	0.014 %+ 0.01 mV			
	(20 to 50) kHz	0.036 %+0.02 mV			
	(50 to 100) kHz	0.16 %+0.06 mV			
	(100 to 500) kHz	0.31 %+0.15 mV			
	(0.5 to 1) MHz				
	(0.22 to 2.2) V	0.028 %+0.1 mV			
	(10 to 20) Hz	0.010 %+0.04 mV			
	(20 to 40) Hz	0.0049 %+0.03 mV			
	(0.04 to 20) kHz	0.0077 %+0.06 mV			
	(20 to 50) kHz	0.0098 %+0.1 mV			
	(50 to 100) kHz	0.12 %+0.4 mV			
	(100 to 500) kHz	0.20 %+1.3 mV			
	(0.5 to 1) MHz				

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(continuation) AC Voltage-Measure	(2.2 to 22) V (10 to 20) Hz (20 to 40) Hz (0.04 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (0.5 to 1) MHz (22 to 220) V (10 to 20) Hz (20 to 40) Hz (0.04 to 20) kHz (20 to 50) kHz (50 to 100) kHz (220 to 1000) V (15 to 50) Hz 50 Hz to 1 kHz	0.028 %+1 mV 0.010 %+0.4 mV 0.0049 %+0.4 mV 0.0077 %+0.7 mV 0.0098 %+1.1 mV 0.12 %+5.8 mV 0.17 %+16 mV 0.028 %+0.04 mV 0.010 %+1.5 mV 0.006 %+4.2 mV 0.0092 %+9.3 mV 0.017 %+13 mV 0.035 %+0.03 V 0.0081 %+0.01 V	Euramet cg-15(v3 2015) + GEM-L-12-035 (2019)	AC voltages measuring Instruments	P and S
AC Voltage- Source	(1 to 200) mV (10 to 40) Hz (40 to 100) Hz 100 Hz to 2kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.014 %+0.0063 mV 0.012 %+0.0064 mV 0.012 %+0.0044 mV 0.012 %+0.0081 mV 0.035 %+0.013 mV 0.081 %+0.030 mV	GEM-L-12-035 (2019)	AC voltages generating Instruments	P and S

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(continuation) AC Voltage- Source	(0.2 to 2) V		GEM-L-12-035 (2019)	AC voltages generating Instruments	P and S
	(10 to 40) Hz	0.012 %+0.038 mV			
	(40 to 100) Hz	0.0092 %+0.037 mV			
	100Hz to 2 kHz	0.0069 %+0.036 mV			
	(2 to 10) kHz	0.0092 %+0.054 mV			
	(10 to 30) kHz	0.023 %+0.079 mV			
	(30 to 100) kHz	0.058 %+0.3 mV			
	(2 to 20) V				
	(10 to 40) Hz	0.012 %+0.39 mV			
	(40 to 100) Hz	0.0092 %+0.38 mV			
	100Hz to 2kHz	0.0069 %+0.37 mV			
	(2 to 10) kHz	0.0092 %+0.55 mV			
	(10 to 30) kHz	0.023 %+0.79 mV			
	(30 to 100) kHz	0.058 %+ 3.0 mV			
	(20 to 200) V				
	(10 to 40) Hz	0.012 %+3.9 mV			
	(40 to 100) Hz	0.0092 %+3.9 mV			
	100Hz to 2 kHz	0.0069 %+3.9 mV			
(2 to 10) kHz	0.0092 %+5.5 mV				
(10 to 30) kHz	0.023 %+8.5 mV				
(30 to 100) kHz	0.058 %+ 30 mV				

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(continuation) AC Voltage- Source	(200 to 1000) V 40 Hz to 10 kHz 10 kHz to 30 kHz	0.0092 % + 0.036 V 0.028 % + 0.22 V	GEM-L-12-035 (2019)	AC voltages generating Instruments	P and S
AC Current- Measure	(10 to 220) μ A (10 to 20) Hz (20 to 40) Hz 40Hz to 1kHz (1 to 5) kHz (5 to 10) kHz	0.029 % + 0.23 μ A 0.019 % + 0.23 μ A 0.012 % + 0.23 μ A 0.032 % + 0.23 μ A 0.13 % + 0.24 μ A	Euramet cg-15(v3 2015) + GEM-L-12-035 (2019)	AC current measuring Instruments	P and S
	(0.22 to 2.2) mA (10 to 20) Hz (20 to 40) Hz 40Hz to 1kHz (1 to 5) kHz (5 to 10) kHz	0.029 % + 0.24 μ A 0.019 % + 0.24 μ A 0.012 % + 0.24 μ A 0.023 % + 0.27 μ A 0.13 % + 7.8 μ A			
	(2.2 to 22) mA (10 to 20) Hz (20 to 40) Hz 40Hz to 1kHz (1 to 5) kHz (5 to 10) kHz	0.029 % + 2.5 μ A 0.019 % + 2.5 μ A 0.012 % + 2.5 μ A 0.023 % + 2.5 μ A 0.13 % + 6.3 μ A			

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(Continuation) AC Current- Measure	(22 to 220) mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.029 %+26 μ A 0.019 %+26 μ A 0.012 %+25 μ A 0.023 %+25 μ A 0.13 %+28 μ A	Euramet cg-15(v3 2015) + GEM-L-12-035 (2019)	AC current measuring Instruments	P and S
	(0.22 to 2.2) A 10 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.028 %+0.28 mA 0.052 %+0.30 mA 0.81 %+0.34 mA			
	(2.2 to 11) A 10 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.053 %+11 mA 0.11 %+0.28 μ A 0.42 %+0.28 μ A			
	(11 to 20) A 45 Hz to 1 kHz (1 to 5) kHz	0.17 %+0.01 A 3.5 %+0.01 A			

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AC current- Clamp-on Ammeters	(20 to 110) A @ (45 to 65) Hz	0.59 %+0.06 A	GEM-L-48-065 (2019)	AC clamp on meters	P and S
	(110 to 1100) A @ (45 to 65) Hz	0.60 %+0.18 A			
	(20 to 110) A @ 60 Hz	0.59 %+0.23 A			
	(110 to 1000) A @ 60 Hz	0.60 %+0.81 A			
DC current-Clamp-on Ammeters	(20 to 110) A DC (110 to 1000) A DC	0.51 %+0.05 A 0.50 %+0.15 A	GEM-L-48-065 (2019)	DC clamp on meters	P and S
AC current- Source	10 Hz to 10 kHz (1 to 200) μ A (0.2 to 2) mA (2 to 20) mA (20 to 200) mA (0.2 to 2) A	0.029 %+0.02 μ A 0.029 %+1.7 μ A 0.029 %+15 μ A 0.029 %+0.11 mA 0.092 %+6.4 mA	GEM-L-12-035 (2019)	AC current generating Instruments	P and S
	10Hz to 2kHz (2 to 20) A	0.092 %+8 mA			
	2kHz to 10kHz (2 to 20) A	0.29 %+29 mA			

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Electrical	(10 to 80) VDC	0.7 %	IEC 60974-1 ed. 5.1 b:2019 + GEM-L-82-040 (2019)	Welding machines	P and S
	(10 to 600) ADC	1.2 %			
	(10 to 80) V AC	0.7 %			
	(10 to 600) A AC	1.2 %			

Calibration field 4: Fluid quantities

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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) *
Density (Specific Gravity)	(0 to 3) g/cm ³	0.000067 g/cm ³	ASTM E100-19 + GEM-P-40-001 (2019)	Hydrometers or Density (specific gravity) meter	P
Air Velocity	(100 to 1000) fpm (1000 to 9000) fpm	2.4 %	GEM-M-25-003 (2019)	Air velocity meters, Balometers	P
		1.2 %			
Flow (Air)	(0.23 to 2.33) SCFM	1.3 %	GEM-M-40-043 (2018)	Airflow measuring tools	P and S
	(0.85 to 8.5) SCFM	1.4 %			
	(3.79 to 37.91) SCFM	1.2 %			

10.15 Scope of Accreditation

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Calibration field 5: Force and 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	(200 to 2000) ft·lbf (20 to 200) ft·lbf (20 to 200) in·lbf	0.25 % 0.71 % 0.42 %	ASME B107.300-2010(R2016) + GEM-P-90-001 (2018)	Torque Wrenches	P
Torque	(50 to 1000) N·m	0.13 %	ASME B107.300-2010(R2016) + GEM-P-90-001 (2018)	Torque Transducers	P
Force	(1 to 1000) lbf	0.007 lbf	GEM-M-30-004 (2018) and GEM-M-65-002 (2019)	Cable Tensiometers	P
Force	(100 to 100 000) lbf	0.059%	ASTM E74-18e1 + GEM-M-65-005 (2019)	Force Proving Instruments	P

10.15 Scope of Accreditation

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Calibration field 5: Mass

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) *
Conventional Mass	50kg	80 mg	NIST SOP 3 (1986), NIST SOP 7 (2019) & NIST SOP 8 (2019), OIML R111-1 (ed. 2004) + GEM-M-35-001 (2019)	OIML Class E2 for 100g & 1kg and Class F1 for remaining masses and below Class	P
	20 kg	30 mg			
	10 kg	16 mg			
	5 kg	8 mg			
	2 kg	3 mg			
	1 kg	1.6 mg			
	500 g	0.8 mg			
	200 g	0.3 mg			
	100 g	0.16 mg			
	50 g	0.1 mg			
	20 g	0.08 mg			
	10 g	0.06 mg			
	5 g	0.05 mg			
	2 g	0.04 mg			
	1 g	0.03 mg			
	500 mg	0.025 mg			
	200 mg	0.02 mg			
	100 mg	0.016 mg			
	50 mg	0.012 mg			
	20 mg	0.01 mg			
10 mg	0.008 mg				
1 mg, 2mg, 5mg	0.006 mg				

Accreditation Withdrawn

Issue No: 1/ Issue Date: 01-March-2021
File Manager: Hamza Khan

10.15 Scope of Accreditation

Calibration field 5: Non-automatic weighing 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) *
Conventional Mass	(1 to 50) mg (50 to 500) mg 500mg to 5g (5 to 10) g (10 to 20) g (20 to 200) g (200 to 2000) g (2 to 10) kg (10 to 20) kg (20 to 40) kg (40 to 100) kg (100 to 1500) kg in 20 kg increments	0.006 mg +0.58R 0.01 mg +0.58R 0.02 mg +0.58R 0.03 mg +0.58R 0.035 mg +0.58R 0.18 mg +0.58R 1.6 mg +0.58R 3 mg +0.58R 73 mg +0.58R 80mg +0.58R 5.8 g + 0.58R 30 g + 0.58R	ASTM E898-20 + GEM-M-35-005 (2020)	Non-Automatic Weighing Instruments	S

Accreditation Withdrawn

Where R is the resolution of UUC

10.15 Scope of Accreditation

Issue No: 1/ Issue Date: 01-March-2021

File Manager: Hamza Khan

Calibration field 5: 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) *
Pressure	(7.25 to 20 000) psi	0.0035%	ASME B40-100-2013 + GEM-M-40-001 (2019)	Pressure indicating instruments/Calibrator	P
	(-13 to 30) psi	0.002 psi			
Pressure	(20 000 to 39 000) psi	8.3 psi	ASME B40-100-2013 + GEM-M-40-001 (2019)	Pressure indicating instruments/Calibrator	P and S
	(0.2 to 25) psi	0.0011 %			
	(2 to 1000) psi	0.0027 %			

Accreditation Withdrawn

10.15 Scope of Accreditation

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Calibration field 6: Thermodynamics

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) *
Temperature	-195 °C (fixed point) (-80 to 0) °C (0 to 50) °C (50 to 200) °C (200 to 500) °C (500 to 660) °C	0.017 °C 0.020 °C 0.020 °C 0.025 °C 0.036 °C 0.1 °C	IEC 60751 ed. 2 b:2008 + GEM-P-80-008 (2019)	Resistance sensors/ Resistance Thermometers with Direct Reading Devices	P
Temperature	(30 to 500) °C (500 to 1100) °C	0.3 °C 0.6 °C	ASTME145-19, GEM-P-65-010 (2019) & P-65-028 (2019)	Incubators, ovens and furnace	P and S
Temperature	(-80 to 550) °C	0.03 °C	ASTME2488 – 09 (Reapproved 2014), GEM P-80-023 (2019)	Liquid Baths	P and S

Calibration field 6: Thermodynamics (continuation)

10.15 Scope of Accreditation

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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) *
Temperature	(-45 to 50) °C (50 to 660) °C (660 to 1100) °C	0.41 °C 0.81 °C 0.91 °C	EURAMET cg-8 V3 2019 + GEM-P-80-043 (2019)	Thermocouple sensors or Thermocouples with Direct Reading Devices	P and S
Temperature – Generate	(-80 to -10) °C (-10 to 50) °C (50 to 200) °C (200 to 500) °C (500 to 550) °C	0.030 °C 0.04 °C 0.05 °C 0.1 °C 0.53 °C	ASTM E77-14e1, ASTM E1-14(2020), ASMEB40.200-2008 (R2013) + GEM-P-80- 001 (2019), P-80-011 (2020)	Bimetallic Thermometers, Liquid in glass thermometers, portable digital temperature indicators	P and S
Temperature	(50 to 100) °C (100 to 300) °C (300 to 500) °C (500 to 1100) °C	0.59 °C 0.77 °C 0.99 °C 2.0 °C	GEM-P-80-061 (2019)	IR Thermometers	P and S
Relative Humidity	(10 to 95) % RH	0.51 % RH	GEM-P-65-013 (2019) GEM-P-65-018 (2019)	Hygrometers	P

Accreditation Withdrawn

Calibration field 7: Time/Frequency

Version: 1.4

Date: 24th July 2019

Approved by: Atta Subhan

10.15 Scope of Accreditation

Issue No: 1/ Issue Date: 01-March-2021

File Manager: Hamza Khan



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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) *
Lapsed Time	(0.15 to 24) hr.	0.33 s	NIST SOP 24 (2019) + GEM-L-20-040 (2019)	Timers/Stop Watches	P and S
Rotational Speed	(5 to 14999) RPM (5 to 99 999) RPM	0.06 RPM 0.007 RPM	GEM-M-45-002 (2019)	Tachometer Contact Non-Contact	P and S
(Vibration)	(20 to 2500) Hz	5.3%	DVC8 sine/ GEM-ATE-VTS (2019)	Vibration Meter	P
Acceleration sensitivity-Frequency response	(20 to 10,000) Hz Sensitivity 10 mV/g	7.3%	DVC8 sine/ GEM-ATE-VTS (2019)	Accelerometers, Acceleration Meter	P

*: 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 of a method in this issue of the scope of accreditation.

Log of Suspended Scopes:

10.15 Scope of Accreditation

Issue No: 1/ Issue Date: 01-March-2021
File Manager: Hamza Khan

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

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

This conformity assessment body (CAB) is recorded as issuing GAC accredited certificates to organizations in the countries listed below. This list is current at the time of issue of this schedule.

United Arab Emirates	Bahrain	Saudi Arabia	Oman	Qatar	Kuwait	Yemen