



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

AL BADER NUCLEAR GAUGE & EQUIPMENT SERVICE CENTRE
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CALIBRATION

Valid To: March 31, 2025

Certificate Number: 5666.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1,6}:

I. Acoustics

Parameter/Equipment	Range	CMC ² (±)	Comments
Sound Level Meters (at 1 kHz)	94 dB and 114 dB	0.6 dB	Sound level calibrator
Sound Level Calibrators (at 1 kHz)	94 dB and 114 dB	1.3 dB	Sound level meter class 1
Ultrasonic Tester	26.0 µs	0.076 µs	V-Meter calibration bar

II. Chemical Quantities

Parameter/Equipment	Range	CMC ^{2,7} (±)	Comments
pH – Measuring Equipment	4.0 pH 7.0 pH 10.2 pH	0.03 pH 0.03 pH 0.03 pH	Traceable buffer solutions

Parameter/Equipment	Range	CMC ^{2,4,7} (±)	Comments
Conductivity – Measuring Equipment	5 µS/cm to 500 mS/cm	0.75 %	Traceable conductivity solutions
Gas Detector/Analyzer Calibration ³ – CO O ₂ Cl ₂ H ₂ S LEL CO ₂ SO ₂ VOC (iso- Butane) NH ₃ NO NO ₂	100 parts in 10 ⁶ 18.0 % 10 parts in 10 ⁶ 25 parts in 10 ⁶ 50 % 0.50 % 20 parts in 10 ⁶ 100 parts in 10 ⁶ 25 parts in 10 ⁶ 50 parts in 10 ⁶ 10 parts in 10 ⁶	2.2 % 2.1 % 2 parts in 10 ⁶ 0.71 parts in 10 ⁶ 2.2 % 2.1 parts in 10 ⁶ 0.61 parts in 10 ⁶ 1.7 parts in 10 ⁶ 0.10 parts in 10 ⁶ 1.4 parts in 10 ⁶ 0.21 parts in 10 ⁶	Using standard reference gas and calibration docking system
Turbidity – Measure	< 0.1 NTU 25 NTU 50 NTU 100 NTU 175 NTU 750 NTU	0.0076 NTU 0.37 NTU 0.76 NTU 2.5 NTU 2.8 NTU 11.6 NTU	Turbidity solutions

III. Dimensional

Parameter/Equipment	Range	CMC ² (±)	Comments
Micrometer (Digital and Mechanical)	Up to 150 mm (150 to 300) mm (300 to 600) mm	1.4 µm 6.8 µm 7.8 µm	Optical flat, optical parallel, slip gauge set, length bars
Setting Masters for Micrometer (End Standards)	Up to 150 mm	2.7 µm	Digital micrometer

Parameter/Equipment	Range	CMC ² (±)	Comments
Inside Micrometer – Sticks Head	Up to 600 mm 25 mm travel	12 µm 7 µm	Internal micro checker, digital micrometer
Caliper (Vernier, Dial, Digital) – Outside Inside Height/Depth	Up to 300 mm (300 to 600) mm Up to 300 mm Up to 300 mm	6.1 µm 13 µm 8 µm 5.9 µm	Internal micro checker, slip gauge set (gage blocks), length bars Slip gauge set (gage blocks), length bars Slip gauge set (gage blocks), length bars
Steel Ruler and Steel Tapes	Up to 1000 mm (> 1000 to 2000) mm (> 2000 to 3000) mm (> 3000 to 4000) mm (> 4000 to 5000) mm	0.29 mm 0.58 mm 0.87 mm 1.2 mm 1.4 mm	Tape and scale measuring machine
Internal Diameter Components	(125 to 150) mm	18 µm	Three point bore gauge
Height Gauge (Vernier, Dial, Digital)	Up to 300 mm (300 to 600) mm	12 µm 13 µm	Slip gauge (gage blocks), optical flat, length bars, surface plate
Dial Indicator/Gauge	Up to 10 mm Up to 25 mm	4 µm 6 µm	Dial calibration tester
Electronic Dial Indicator/Gauge – Resolution: 0.001 mm Resolution: 0.01 mm	Up to 25 mm Up to 25 mm	2 µm 8 µm	Digital calibration tester with display and probe (resolution 0.0001 mm)

Parameter/Equipment	Range	CMC ² (±)	Comments
Pin Gauge	Up to 10 mm	3.2 µm	Digital micrometer
Plain Plug Gauge	Up to 150 mm	3.5 µm	Digital micrometer
Feeler Gauge	Up to 2 mm	3.3 µm	Digital micrometer
Thickness Gauge (Mechanical and Electronic)	Up to 50 mm	7 µm	Slip gauges (gage blocks)
Bore Gauge (Transmission Only, Mechanism Checks)	Up to 2 mm	7 µm	Dial calibration tester
Dial Calibration Tester	Up to 25 mm	1.3 µm	Slip gauge set (gage blocks), optical flat
Test Sieve	(38 to 45) µm 63 µm to 2 mm (2.0 to 125) mm (2 to 125) mm	6.1 % of nominal sieve size 1.4 % of nominal sieve size 0.4 % of nominal sieve size 0.10 % of nominal sieve size	Imaging probe, master sieve, digital caliper Automatic Imaging Measuring Instrument (AIMI), digital caliper
Straight Edge	Straightness Over 3 m span	14 µm	Feeler gauge set, gauge block set, digital indicator and granite surface plate
Compression/Tension Machine Platens	Flatness Over 300 mm x 300 mm	11 µm	Straightedge, feeler gauge set, gauge block set

Parameter/Equipment	Range	CMC ² (±)	Comments
Angle (Bevel Protector, Combination Set, Tri Square, Right Angle, Etc.)	Up to 360°	0.049°	Using imaging probe
Radius Gauge	(0.5 to 50) mm	0.5 mm	Measuring machine
Digital or Level Protractor	(0 to 60)°	0.11°	Sine bar and gauge blocks
Coating Thickness Gauges – Ferrous Non-Ferrous	Up to 1507.15 µm Up to 1503.50 µm	1.4 µm 1 µm	Coating thickness standards
Travelling Beam Apparatus	Up to 25 mm	2.5 mm	Granite surface plate 3 m by 1.9 m, gauge blocks
Non-Contact Speed Cross Head/Position Transducer Speed ³	Up to 600 mm	0.066 mm	Caliper, stopwatch, laser distance meter, steel rule; ASTM E2309, ASTM E2658
Roughness Tester	Ra (0.025 to 100) µm	0.013 µm	Roughness standards
Surface Roughness	Ra (0.8 to 1.6) Ra (1.6 to 6.3) Ra (6.3 to 12.5) Ra (0.05 to 15) µm	0.19 µm 0.73 µm 1.4 µm 0.024 µm	Roughness tester

Parameter/Equipment	Range	CMC ² (±)	Comments
Concrete Cover Meter Depth	(15 to 50) mm	0.82 mm	Calibration block
Extensometer	Up to 50 mm	4.9 µm	Extensometer calibrator ASTM E83
Electronic Dial Indicator/Gauge, Linear Transducer – Resolution: 0.01 mm Resolution: 0.001 mm	Up to 50 mm Up to 50 mm	7.5 µm 1.4 µm	Digital calibration tester with micrometer Head display (resolution 0.001 mm) and gauge block
Laser Distance Meter – Resolution: 0.1 mm Resolution: 1 mm	Up to 1000 mm Up to 1000 mm	0.058 mm 0.58 mm	Using length bar and setting pieces and laser distance meter 0.1 mm resolution
Surface Plates –Local Area Flatness Only	Up to 1900 x 3000 mm	0.66 µm	Repeat-O-Meter

IV. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,4,5} (±)	Comments
AC Current – Measure @ 50 Hz	(1 to 100) µA (0.01 to 1) mA (0.1 to 10) mA (1 to 100) mA (0.01 to 1) A (0.03 to 3) A (0.1 to 10) A	0.05 % 4.6 % 0.46 % 0.05 % 4.6 % 2.3 % 0.69 %	Fluke 8846 A digital multimeter

Parameter/Equipment	Range	CMC ^{2, 4, 5} (±)	Comments
AC Voltage – Measure @ 50 Hz	(1.0 to 100) mV (0.01 to 1) V (0.1 to 10) V (1 to 100) V (10 to 1000) V	0.12 % 0.10 % 0.10 % 0.10 % 0.02 %	Fluke 8846 A digital multimeter
DC Current – Measure	(0.01 to 100) µA (0.507 to 1) mA (2.007 to 10) mA (4.01 to 100) mA (0.0005 to 1) A (0.0035 to 3) A (0.018 to 10) A	0.03 % 0.58 % 0.23 % 0.01 % 2.3 % 0.77 % 0.09 %	Fluke 8846 A digital multimeter
DC Voltage – Measure	(30.003 to 100) mV (0.006 to 1) V (0.004 to 10) V (0.006 to 100) V (0.006 to 1000) V	0.0038 % 0.0035 % 0.0052 % 0.0082 % 0.0060 %	Fluke 8846 A digital Multimeter
DC Resistance – Measure	(0.003 to 10) Ω (3.003 to 100) Ω (0.05 to 1) kΩ (0.05 to 10) kΩ (0.05 to 100) kΩ (0.01 to 1) MΩ (0.01 to 10) MΩ (0.4 to 100) MΩ (0.01 to 1) GΩ	0.35 % 0.0074 % 0.0015 % 0.0019 % 0.0014 % 0.0012 % 0.0019 % 0.0002 % 0.0043 %	Fluke 8846 A digital multimeter

Parameter/Range	Frequency	CMC ^{2,4,5} (±)	Comments
AC Current – Generate (29.00 to 329.999) µA (0.33 to 3.299 99) mA (3.3 to 32.9999) mA (33 to 329.999) mA (1.1 to 2.9999) A	10 Hz to 30 kHz 10 Hz to 30 kHz 10 Hz to 30 kHz 10 Hz to 30 kHz 10 Hz to 10 kHz	0.57 % 0.0014 % 0.0005 % 0.0012 % 3.1 %	Fluke 5522A multi-product calibrator
AC Voltage – Generate (1.0 to 32.999) mV (33 to 329.999) mV (0.33 to 3.299 99) V (3.3 to 32.9999) V (33 to 329.999) V (330 to 1020) V	10 Hz to 500 kHz 10 Hz to 500 kHz 10 Hz to 500 kHz 10 Hz to 100 kHz 45 Hz to 100 kHz 45 Hz to 10 kHz	0.029 % 0.002 % 0.11 % 0.017 % 0.019 % 0.004 %	Fluke 5522A multi-product calibrator

Parameter/Equipment	Range	CMC ^{2,4,5} (±)	Comments
DC Current – Generate	(0.002 to 329.999) µA (0.000 02 to 3.299 99) mA (0.0002 to 32.9999) mA (0.002 to 329.999) mA (0.000 02 to 1.099 99) A (1.1 to 2.999 99) A (0.0002 to 10.9999) A	0.0004 % 0.0036 % 0.0004 % 0.004 % 0.028 % 0.025 % 0.017 %	Fluke 5522A multi-product calibrator
DC Voltage – Generate	(0.001 to 329.9999) mV (0.000 01 to 3.299 999) V (0.0001 to 32.999 99) V (30 to 329.9999) V (100 to 1020.000) V	0.000 59 % 0.000 65 % 0.000 50 % 0.000 43 % 0.000 40 %	Fluke 5522A multi-product calibrator
DC High Voltage – Generate	(0.5 to 70) kV	58 V	Precision high voltage meter and precision high voltage probe

Parameter/Equipment	Range	CMC ^{2,4,5} (±)	Comments
DC Resistance – Generate	(0.001 to 10.9999) Ω (11 to 32.9999) Ω (33 to 109.9999) Ω (110 to 329.9999) Ω 330 Ω to 1.099 999 kΩ (1.1 to 3.299 999) kΩ (3.3 to 10.999 99) kΩ (11 to 32.999 99) kΩ (33 to 109.9999) kΩ (110 to 329.9999) kΩ 330 kΩ to 1.099 999 MΩ (1.1 to 3.299 999) MΩ (3.3 to 10.999 99) MΩ (11 to 32.999 99) MΩ (33 to 109.9999) MΩ (110 to 329.9999) MΩ (330 to 1100) MΩ	0.0025 % 0.0012 % 0.0007 % 0.0006 % 0.0004 % 0.0007 % 0.0006 % 0.0004 % 0.0004 % 0.0005 % 0.0009 % 0.0012 % 0.0014 % 0.010 % 0.014 % 0.061 % 0.11 %	Fluke 5522A multi-product calibrator
Simulated Temperature (Temperature Controller/Indicator / Recorder/Scanner) – Thermocouples Type B Type C, G, D Type E Type J Type K Type L Type N Type R Type S Type T Type U RTDs Pt50 and Pt100 Ni100 Ni120 Cu10	(600 to 1820) °C (0 to 2315) °C (-270 to 1000) °C (-210 to 1200) °C (-270 to 1372) °C (-200 to 900) °C (-270 to 1300) °C (-50 to 1768) °C (-50 to 1768) °C (-270 to 400) °C (-200 to 600) °C (-200 to 850) °C (-60 to 180) °C (-80 to 260) °C (-200 to 260) °C	0.29 °C 0.32 °C 0.26 °C 0.26 °C 0.26 °C 0.26 °C 0.26 °C 0.29 °C 0.29 °C 0.24 °C 0.25 °C 0.50 °C 0.50 °C 0.50 °C 0.50 °C	Fluke 5522A multiproduct calibrator, temperature sensor or thermocouple not attached

V. Fluid Quantities

Parameter/Range	Range	CMC ^{2, 4, 7} (±)	Comments
Volume – Measure and Measuring Equipment	(5 to 1000) µL (1 to 500) mL (500 to 2000) mL	3.1 µL 0.24 mL 5.7 mL	Balance and E-2 Class weights, gravimetric method
	(0 to 20) µL (20 to 1000) µL (1 to 20) mL (20 to 50) mL (50 to 100) mL (100 to 500) mL (500 to 2000) mL	0.037 µL 0.000 16 ml 0.000 80 ml 0.0020 ml 0.0039 ml 0.020 ml 0.085 ml	Micro Balance and E-1 Class weights, gravimetric method
Air Flow Meter for Laminar Flow	(0.6 to 10) SLPM	0.1 SLPM	Flow calibration system FCS-8
Air Velocity – Hot Wire, Vane Type, and Pitot Tube Anemometer	2.5 m/s to 15 m/s (Vane Anemometer) (Pitot)	1.3 m/s	Bench top mini wind tunnel, Reference anemometer and reference pitot tube
Air/Mass Flow Meter	0.1 to 30 LPM	0.051 %	Bench top mini wind tunnel, Volumetric flow calibration system
Water Flow – Measure ³ 12.7 mm to 7.6 Meter Pipe Size Flow Velocity	1500 LPM	1.2 %	Digital ultrasonic flow meter

VI. Ionizing Radiation & Radioactivity

Parameter/Range	Range	CMC ² (±)	Comments
Nuclear Density Gauge – Contamination Leak Test	0.01205 µCi (445.9 Bq)	0.000 032 µCi	Alpha beta counter, ISO 9978:1992
	0.01618 µCi (598.7 Bq)	0.000 032 µCi	

Parameter/Range	Range	CMC ^{2,4} (±)	Comments
Survey Meter Calibration – Dose Dose Rate	(5 to 61 000) µsv (5 to 61 000) µsv/hour	8.4 % of reading	NIST traceable Cs-137 source; ANSI N323AB-2013 ANSI N322-1997
Survey Meter Energy Calibration Contamination per Unit Area	Cl-36, 2.69 kBq Am-241, 3.81 kBq C-14, 2.42 kBq Sr-90, 2.86 kBq	3.3 % 3.3 % 3.3 % 3.3 %	Radiation sources: Beta Chlorine Cl-36, Alpha Americium Am-241, Beta Carbon C-14 and Beta Strontium Sr-90

VII. Mechanical

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Nuclear Density Gauge – Density	1775.4 kg/m ³ 2101.5 kg/m ³ 2143.1 kg/m ³ 2174.3 kg/m ³ 2179.1 kg/m ³ 2188.8 kg/m ³ 2226.8 kg/m ³ 2685.7 kg/m ³	0.3 % 1.3 % 1.1 % 1 % 1.2 % 1 % 0.3 % 0.3 %	Using validator, ASTM D6938, density blocks ASTM D7759
Nuclear Density Gauge – Moisture	531.2 kg/m ³ 546.5 kg/m ³ 549.5 kg/m ³ 564.3 kg/m ³ 566.9 kg/m ³ 592.5 kg/m ³	4.0 % 4.5 % 4.0 % 1.3 % 4.9 % 4.1 %	Using validator, ASTM D6938, moisture block, ASTM D7759
Master Density Blocks	(1120 to 2723) kg/m ³	0.24 %	Caliper, balance, digital Tape F1 Class weights, master gauge InstronTek 3500, ASTM D7759

Parameter/Equipment	Range	CMC ^{2,4,7} (±)	Comments
Master Moisture Blocks	(16 to 800) kg/m ³	0.23 %	Caliper, balance, digital tape F1 Class weights, master gauge InstroTek 3500, ASTM D7759
Force (Compression) – Measuring Equipment ³	(0.1 to 3336) kN	0.66 %	Standard load cell
Compression Machine ³ – Stability Compression	(1 to 2000) kN (0.1 to 3000) kN	0.16 % 0.17 %	AEP transducers. reference load cells
Proving Ring – Tension Compression	(0.01 to 50) kN (0.001 to 200) kN	0.25 % 0.27 %	Reference load cells
Torque Wrench	(0 to 500) N·m	0.6 %	Torque wrench calibrator
Pressure – Measuring Equipment ⁵	(-1 to 2) bar Up to 70 bar Up to 700 bar Up to 2500 bar (-0.9 to 40) bar	0.07 % 0.09 % 0.11 % 0.12 % full scale 0.03 %	Digital pressure gauge and ultrahigh hydraulic comparator Automatic pressure calibrator
Pull Off Adhesion Tester	(0 to 3500) psi	5 psi	Adhesion tester calibrator
Moisture Tester	(0 to 20) psi	0.85 psi	Moisture calibrator
Air Content Meter	Up to 15 %	0.18 %	Concrete air meter calibrator with three 5 % cylinders

Parameter/Equipment	Range	CMC ^{2,7} (±)	Comments
Balance ³	(0 to 220) g	0.16 mg	E-1 Class Weights (in lab/onsite)
	(0 to 420) g	0.60 mg	
	(0 to 510) g	0.70 mg	
	(0 to 4200) g	8 mg	
	(0 to 12 000) g	10 mg	
	(0 to 110) kg	35 g	
	(0 to 31) kg	0.1 g	
	(0 to 32) kg	0.04g	
	(32 to 60) kg	0.14g	
	(0 to 200) g	0.61 mg	
(200 to 500) g	3.1 mg		
500 g to 1 kg	6.1 mg		
(1 to 5) kg	0.11 g		
(5 to 50) kg	0.81 g	E-2 Class Weights and F1 class weights (in lab/onsite)	
(60 to 150) kg	0.003 kg		
Electronic Balance ³	(0 to 300) kg	0.13 kg	F1 class weights
Batching Plant ³	(0 to 3000) kg	1.7 kg	Class F1 weights
	(0 to 5000) kg	3.1 kg	
Mass – Reference Weights (Analytical and Bullion)	(0 to 1000) mg	1 mg	Balance and E-2 Class weights
	(1 to 1000) g	1.2 mg	
	(1 to 20) kg	0.34 g	
Mass – Reference Weights Measure	1 mg	0.05 mg	Balance and E-1 Class weights
	20 mg	0.05 mg	
	50 mg	0.05 mg	
	500 mg	0.05 mg	
	1 g	0.06 mg	
	20 g	0.065 mg	
	50 g	0.07 mg	
	200 g	0.23 mg	
	1 kg	1.6 mg	
	2 kg	1.8 mg	
	10 kg	0.03 g	
	20 kg	0.18 g	
	50 kg	0.2 g	

Parameter/Equipment	Range	CMC ² (±)	Comments
Indirect Verification of Rockwell Hardness Reference Blocks ³	(0 to 100) HRA	0.9 HRA	ASTM E18
	(0 to 100) HRC	1.0 HRC	Digital Brinell, Vickers & Rockwell hardness tester
	(0 to 100) HRBW	0.9 HRBW	
	(17.9 to 69.5) HRC	1 HRC	Portable hardness tester
Vickers Hardness	(0 to 100) HV	6.7 HV	
Brinell Hardness	(0 to 100) HBW	1.6 HBW	
Indirect Verification of Rockwell Hardness Testers	HRC: Low Medium	1.4 HRC 0.8 HRC	Indirect verification per ASTM E18
Indirect Verification of Rubber Hardness Reference Blocks –			
Type A	Up to 100 RHD	1.7 RHD	Durometer (Type A)
Type D	Up to 100 RHD	2 RHD	Durometer (Type D)
Leeb (Type D)	(170 to 960) HLD	6 HLD	Portable hardness tester
Leeb Hardness Tester ³	(500 to 900) HLD	1.8 HLD	Certified Leeb hardness block

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Durometer Calibration – Type A and D ³			ASTM D2240
Indenter Extension and Shape – Diameter	Up to 1.4 mm	0.0035 mm	Micrometer
Radius	Up to 1.2 mm	0.5 mm	Video measuring system
Angle	Up to 35°	0.049°	Video measuring system
Extension	Up to 2.5 mm		Slip gauges
Indenter Display (0 to 100) Duro Units	(0 and 2.5) mm	0.4 %	Durometer stand, slip gages
Spring Calibration – Force	Up to 4600 gf	0.03 gf	Electronic balance
Impact Hammer for Concrete Hardness	(10 to 100) RN	1.1 RN	ASTM C805/BSEN12504-2, test anvil
Wheel Tracker ³ Parameters –			
Static Load	158 lb	0.05 lb	Hamburg verification and calibration device
Temperature	Ambient to 100 °C	0.2 °C	
Displacement	Up to 45 mm	0.001 mm	
Shaker/Vibration Table Vibration –			
Acceleration	200 m/s ²	2.5 m/s ²	Using digital vibration meter with probe; ISO2954
Velocity	200 m/s	3 mm/s	
Gyratory Compactor ³ –			
Pressure	(200 to 1000) kPa	12 kPa	Load cell
Angle	(0 to 1.5) °	0.017°	Dynamic/pine angle validator
Height	114.38 mm	27 µm	Height standard

VIII. Optical Quantities

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Lux Meter	(100 to 10 000) cd	1.0 %	Standard of illuminance radiometer, luxmeter & lamp

IX. Thermodynamics

Parameter/Equipment	Range	CMC ² (±)	Comments
Humidity Cabinet/Chamber ³	(0.1 to 95) % RH	1.5 % RH	Vaisala HMP77
Oven, Temperature Bath ³	(0 to 650) °C	0.08 °C	Master sensors, digital indicator
Water Bath ³	(0 to 100) °C	0.07 °C	Master sensors, digital indicator
Incubator ³	(0 to 100) °C	0.07 °C	Master sensors, digital indicator
Muffle Furnace, Temperature Bath ³	(0 to 1200) °C	0.75 °C	Master sensors, temperature/electrical calibrator
Freezer ³	(-40 to 40) °C	0.08 °C	Master sensors, digital indicator

Parameter/Equipment	Range	CMC ² (±)	Comments
Temperature Indicator, Controller with Sensor (Pt100, Cu53), Temperature Gauge (Analog and Digital), Thermometer (Stick Type, Glass, Digital), RTDs, Thermocouple (Types B, E, J, K, R, S and T)	(-20 to 150) °C (-40 to 650) °C (650 to 1000) °C (> 1000 to 1200) °C	0.06 °C 0.06 °C 0.41 °C 1.0 °C	Liquid bath and solid bath set with digital indicator and sensor Dry block set with digital indicator and sensor
Contact Type Thermometer	(0 to 100) °C	0.05 °C	High precision digital thermometer
Non-Contact Surface Temperature/IR Thermometer	(-60 to 200) °C (200 to 500) °C	1 °C 1.5 °C	IR calibrator/thermal imager
Infrared Thermometer	(-15 to 500) °C	0.64 °C	IR calibrators
Oven Profiling ³ – Temperature Deviation Time Constant Rate of Ventilation per Hour	(-80 to 550) °C 5 s to 60 min (2 to 300) Air changes/hour	0.98 °C 0.8 s 3/h	Thermocouples, multiplexer and DAQ scanner; ASTM E145, ASTM D5374, ASTM D5423

Parameter/Equipment	Range	CMC ² (±)	Comments
Hygrometer	(0 to 50) °C (10 to 90) % RH	0.5 °C 2.1 % RH	Humidity chamber
Hydrometer	(0.7 to 2) SG	0.12 SG	Reference hydrometers

X. Time & Frequency

Parameter/Equipment	Range	CMC ^{2, 4, 7} (±)	Comments
Frequency – Measure	(5 to 10) Hz 40 Hz to 300 kHz 300 kHz to 1 MHz	0.58 % 0.32 % 0.48 %	Fluke 8846A digital multimeter
Timers and Stopwatches ³	5 sec to 9.000 hrs (> 9 to < 24) hrs	0.035 sec 0.3 sec	Digital stopwatch
Non-Contact Tachometer	(3 to 99) rpm (100 to 999) rpm (1000 to 9999) rpm (10 000 to 99 999) rpm	0.4 rpm 1.5 rpm 4 rpm 13 rpm	Tachometer calibrator
Rotational Speed ³ – Measure	(1 to < 10 000) rpm (10 000 to < 11 000) rpm	0.18 rpm 1.4 rpm	Tachometer

ENVIRONMENTAL TESTING

Test

Test Method

OSL Dosimetry Badges

BSEN 62387:2016; ANSI/HPS N13.11-2009

¹ This laboratory offers commercial calibration service and field calibration service where noted.

² 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. CMCs 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.

- ³ Field calibration service is available for these calibrations. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.
- ⁴ In the statement of CMC, percentages are percentage of reading, unless otherwise indicated.
- ⁵ The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMC's are expressed as either a specific value that covers the full range or as a percent or fraction of the reading plus a fixed floor specification.
- ⁶ This scope meets A2LA's *P112 Flexible Scope Policy*.
- ⁷ The type of instrument or material being calibrated is defined by the parameter. This indicates the laboratory is capable of calibrating instruments that measure or generate the values in the ranges indicated for the listed measurement parameter



Accredited Laboratory

A2LA has accredited

AL BADER NUCLEAR GAUGE & EQUIPMENT SERVICE CENTRE

Doha, QATAR

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets R205 – Specific Requirements: Calibration Laboratory Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 21ST day of April 2023.

A blue ink signature of the Vice President of Accreditation Services.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 5666.01
Valid to March 31, 2025

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.