SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: May 31, 2026 Certificate Number: 3708.01

In recognition of the successful completion of the A2LA evaluation process (including an assessment of the organization's compliance with A2LA's Calibration Program Requirements), accreditation is granted to this laboratory to perform the following calibrations[1, 6]:

I. Acoustics

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
Microphones – Measuring Equipment			
Sensitivity (-100 to 6) dB, re 1 V/Pa	250 Hz 1000 Hz	0.07 dB 0.07 dB	Comparison to ½ inch microphone
Electrostatic Response – Amplitude Range (10 to -40) dB	(20 to 30) Hz 30 Hz to 20 kHz (20 to 80) kHz (80 to 100) kHz (100 to 200) kHz	0.12 dB 0.15 dB 0.24 dB 0.36 dB 0.70 dB	Brüel & Kjaer analyzer
Acoustic Level – Measuring Equipment			
(94 to 114) dB, re 2 x 10-5 Pa	31.5 Hz 63 Hz to 2 kHz (4, 8) kHz 12.5 kHz 16 kHz	0.08 dB 0.07 dB 0.08 dB 0.09 dB 0.11 dB	Brüel & Kjaer sound level calibrator
124 dB, re 2 x 10-5 Pa	250 Hz	0.07 dB	Pistonphone

Parameter/Equipment	Range	CMC[2] (±)	Comments
Calibration of Acoustic Calibrators (74 to 134) dB, re 2 x 10-5 Pa	31.5 Hz 63 Hz to 2 kHz (4, 8) kHz 12.5 kHz 16 kHz	0.08 dB 0.07 dB 0.08 dB 0.09 dB 0.11 dB	½ inch microphone & Brüel & Kjaer analyzer
Simulated Sound Pressure & Calibration of Microphone Preamplifier & Sound Level Meters (20 to 134) dB, re 2 x 10-5 Pa	10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz (100 to 200) kHz	0.0093 dB 0.0094 dB 0.010 dB 0.027 dB	Function generator with voltmeter

II. Dimensional

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Indicators	Up to 1 in	60 µin	Gage block
Calipers	Up to 16 in (> 16 to 40) in Up to 500 mm (> 500 to 1000) mm	430 µin (1.3L + 410) µin (0.0006L + 8.5) µm (0.0017L + 7.9) µm	Gage block
Height Gage	Up to 12 in (> 12 to 40) in Up to 300 mm (> 300 to 1000) mm	(1.8L + 62) µin (4.1L + 32) µin (0.0021L + 1.5) µm (0.0039L + 0.8) µm	Gage block

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Micrometers			
Outside	Up to 8 in (> 8 to 40) in	(2.3*L* + 34) µin (4.3*L* + 15) µin	Gage block
	Up to 200 mm (> 200 to 1000) mm	(0.0025*L* + 0.7) µm (0.0043*L* + 0.28) µm	
Inside	Up to 8 in (> 8 to 40) in	(1.6*L* + 56) µin (4.1*L* + 31) µin	
	Up to 200 mm (> 200 to 1000) mm	(0.002*L* + 1) µm (0.004*L* + 0.6) µm	
Depth	Up to 12 in	120 µin	
	Up to 300 mm	1.7 µm	
Gage Block	Up to 1 in (> 1 to 20) in	(2.5*L* + 8.2) µin (3.8*L* + 5) µin	Comparison with gage block grade 0
Plug Gage, Pin Gage	Up to 1 in (> 1 to 16) in	(1.8*L* + 8) µin (3.7*L* + 6) µin	Universal length machine
Plain Ring Gage	Up to 1 in (> 1 to 16) in	(1.8*L* + 8) µin (3.7*L* + 6) µin	Universal length machine
60° Thread Plug –			
Pitch Diameter	(1 to 6) in	(1.6*L* + 63) µin	Universal length machine & thread measuring wire
Major Diameter	Up to 1 in (> 1 to 6) in	(5.6*L* + 15) µin (3.5*L* + 16) µin	
60° Adjustable Thread Ring Gage – Pitch Diameter Only	Up to 1 in (> 1 to 4) in (> 4 to 6) in	(40 + *W*) µin (50 + *W*) µin (60 + *W*) µin	Universal length machine, thread measuring wire & thread setting plug, where *W*: set plug tolerance.
Thread Wires	Up to 0.150 in	12 µin	Universal length machine

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Length Standards			
Master Height Gage, Step Gage Ruler & Measuring Tape	Up to 12 in (> 12 to 24) in Up to 48 in	(2.3*L* + 20) µin (3.4*L* + 5) µin 0.0066 in	Gage block
Setting Rods	Up to 12 in (> 12 to 40) in	(3.2*L* + 22) µin (4.6*L* + 4.3) µin	Gage block
Bore Gage	Up to 4 in	82 µin	Cylindrical ring gage
Square	Up to 18 in	(1.9*L* + 48) µin	Master angle plate, gage block
Level	Up to 12 in	150 µin	Gage block
Thickness Gage, Feeler Gage	Up to 1 in	51 µin	Universal length machine

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
DC Voltage – Generate[3]	(> 0 to 330) mV (0.33 to 3.3) V (3.3 to 33) V (33 to 330) V (330 to 1000) V	0.0020 % + 1.0 µV 0.0011 % + 2.0 µV 0.0012 % + 20 µV 0.0018 % + 150 µV 0.0018 % + 1.5 mV	Multi-function calibrator
DC Voltage – Measure[3]	(> 0 to 200) mV (0.2 to 2) V (2 to 20) V (20 to 200) V (200 to 1000) V	0.0006 % + 120 nV 0.0004 % + 500 nV 0.0004 % + 5 µV 0.0006 % + 50 µV 0.0006 % + 1.2 mV	Reference multimeter

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
DC High Voltage – Measure[3]	(1 to 100) kV	0.06 % + 0.50 V	High accuracy voltage divider
DC Current – Generate[3]	(> 0 to 330) µA (0.3 to 3.3) mA (3.3 to 33) mA (33 to 330) mA (0.33 to 1.1) A (1.1 to 3) A (3 to 11) A (11 to 20) A (10 to 16.5) A (16.5 to 150) A (150 to 1025) A	0.015 % + 20 nA 0.01 % + 50 nA 0.01 % + 250 nA 0.01 % + 2.5 µA 0.02 % + 40 µA 0.038 % + 40 µA 0.05 % + 500 µA 0.10 % + 750 µA 0.50 % + 20 mA 0.50 % + 140 mA 0.50 % + 500 mA	Multi-function calibrator Multi-function calibrator & 50 turn coil
DC Current – Measure[3]	(> 0 to 200) µA (0.2 to 2) mA (2 to 20) mA (20 to 200) mA (0.2 to 2) A (2 to 20) A	0.0015 % + 0.40 nA 0.0015 % + 4.0 nA 0.0016 % + 40 nA 0.0045 % + 0.80 µA 0.021 % + 16 µA 0.046 % + 0.40 mA	Reference multimeter

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
AC Voltage – Generate[3]			
(1 to 33) mV	(10 to 45) Hz (0.045 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.080 % + 6 µV 0.015 % + 6 µV 0.020 % + 6 µV 0.10 % + 6 µV 0.35 % + 12 µV 0.80 % + 50 µV	Multi-function calibrator
(33 to 330) mV	(10 to 45) Hz (0.045 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.030 % + 8 µV 0.015 % + 8 µV 0.016 % + 8 µV 0.035 % + 8 µV 0.080 % + 32 µV 0.20 % + 70 µV	

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
AC Voltage – Generate[3] (cont)			
(0.33 to 3.3) V	(10 to 45) Hz (0.045 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.030 % + 50 µV 0.015 % + 60 µV 0.019 % + 60 µV 0.030 % + 50 µV 0.070 % + 130 µV 0.24 % + 600 µV	Multi-function calibrator
(3.3 to 33) V	(10 to 45) Hz (0.045 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.030 % + 650 µV 0.015 % + 600 µV 0.024 % + 600 µV 0.035 % + 600 µV 0.090 % + 1.6 mV	
(33 to 330) V	(0.045 to 1) kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.019 % + 2 mV 0.020 % + 6 mV 0.025 % + 6 mV 0.030 % + 6 mV 0.20 % + 50 mV	
(330 to 1020) V	(0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz	0.030 % + 10 mV 0.025 % + 10 mV 0.030 % + 10 mV	
AC Voltage – Measure[3]			
(> 0 to 200) mV	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.020 % + 16 µV 0.015 % + 5 µV 0.013 % + 5 µV 0.013 % + 2.4 µV 0.013 % + 5 µV 0.035 % + 10 µV 0.076 % + 24 µV	Reference multimeter
(0.2 to 2) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	0.018 % + 140 µV 0.012 % + 24 µV 0.0095 % + 24 µV 0.0075 % + 24 µV 0.0095 % + 24 µV 0.025 % + 50 µV 0.056 % + 240 µV 0.30 % + 2.4 mV 1.0 % + 24 mV	

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
AC Voltage – Measure[3] (cont)			
(2 to 20) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	0.018 % + 1.4 mV 0.012 % + 240 µV 0.0095 % + 240 µV 0.0075 % + 240 µV 0.0095 % + 240 µV 0.025 % + 500 µV 0.056 % + 2.4 mV 0.30 % + 24 mV 1.0 % + 240 mV	Reference multimeter
(20 to 200) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	0.018 % + 14 mV 0.012 % + 2.4 mV 0.01 % + 2.4 mV 0.008 % + 2.4 mV 0.01 % + 2.4 mV 0.025 % + 5.0 mV 0.056 % + 24 mV 0.30 % + 240 mV 1.0 % + 2.4 V	
(200 to 1050) V	(1 to 10) Hz (10 to 40) Hz (0.040 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.018 % + 160 mV 0.014 % + 50 mV 0.011 % + 50 mV 0.025 % + 100 mV 0.062 % + 500 mV	
AC High Voltage – Measure[3]			
(1 to 50) kV	60 Hz	0.60 % + 0.80 V	High accuracy voltage divider

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
AC Current – Generate[3]			
(29 to 330) µA	(10 to 20) Hz (20 to 45) Hz (0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.20 % + 100 nA 0.15 % + 100 nA 0.13 % + 100 nA 0.30 % + 150 nA 0.80 % + 200 nA 1.6 % + 400 nA	Multi-function calibrator
(0.33 to 3.3) mA	(10 to 20) Hz (20 to 45) Hz (0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.20 % + 150 nA 0.13 % + 150 nA 0.10 % + 150 nA 0.20 % + 200 nA 0.50 % + 300 nA 1.0 % + 600 nA	
(3.3 to 33) mA	(10 to 20) Hz (20 to 45) Hz (0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.18 % + 2 µA 0.09 % + 2 µA 0.04 % + 2 µA 0.08 % + 2 µA 0.20 % + 3 µA 0.40 % + 4 µA	
(33 to 330) mA	(10 to 20) Hz (20 to 45) Hz (0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.18 % + 20 µA 0.09 % + 20 µA 0.04 % + 20 µA 0.10 % + 50 µA 0.20 % + 100 µA 0.40 % + 200 µA	
(0.33 to 1.1) A	(10 to 45) Hz (0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz	0.18 % + 100 µA 0.05 % + 100 µA 0.60 % + 1 mA 2.5 % + 5 mA	
(1.1 to 3) A	(10 to 45) Hz (0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz	0.18 % + 100 µA 0.06 % + 100 µA 0.60 % + 1 mA 2.5 % + 5 mA	

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
AC Current – Generate[3] (cont)			
(3 to 11) A	(45 to 100) Hz (0.1 to 1) kHz (1 to 5) kHz	0.06 % + 2 mA 0.10 % + 2 mA 3.0 % + 2 mA	Multi-function calibrator
(11 to 20) A	(45 to 100) Hz (0.1 to 1) kHz (1 to 5) kHz	0.12 % + 5 mA 0.15 % + 5 mA 3.0 % + 5 mA	
Toroidal Clamp:			
(10 to 16.5) A	(45 to 65) Hz (65 to 440) Hz	0.28 % + 3.0 mA 0.79 % + 3.0 mA	Multi-function calibrator & 50 turn coil
(16.5 to 150) A	(45 to 65) Hz (65 to 440) Hz	0.28 % + 25 mA 0.79 % + 27 mA	
(150 to 1025) A	(45 to 65) Hz (65 to 440) Hz	0.28 % + 90 mA 0.79 % + 100 mA	
Non-Toroidal Clamp:			
(10 to 16.5) A	(45 to 65) Hz (65 to 440) Hz	0.56 % + 30 mA 1.0 % + 30 mA	Multi-function calibrator & 50 turn coil
(16.5 to 150) A	(45 to 65) Hz (65 to 440) Hz	0.56 % + 250 mA 1.0 % + 250 mA	
(150 to 1025) A	(45 to 65) Hz (65 to 440) Hz	0.56 % + 900 mA 1.0 % + 900 mA	
AC Phase – Generate[3]			
Dual Output	60 Hz 400 Hz	0.12 ° 0.29 °	Multi-function calibrator
AC Power Factor – Generate[3]			
Dual Output	60 Hz 400 Hz	0.0015 Power Factor 0.0033 Power Factor	Multi-function calibrator

Parameter/Range	Frequency	CMC[2, 5] (±)	Comments
AC Current – Measure[3]			
(> 0 to 200) µA	1 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.059 % + 24 nA 0.078 % + 24 nA 0.40 % + 24 nA	Reference multimeter
(0.2 to 2) mA	(1 to 10) Hz (0.01 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.038 % + 0.24 µA 0.034 % + 0.24 µA 0.078 % + 0.24 µA 0.40 % + 0.24 µA	
(2 to 20) mA	(1 to 10) Hz (0.01 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.038 % + 2.4 µA 0.034 % + 2.4 µA 0.078 % + 2.4 µA 0.40 % + 2.4 µA	
(20 to 200) mA	(0.001 to 2) kHz (2 to 10) kHz (10 to 30) kHz	0.038 % + 24 µA 0.031 % + 24 µA 0.070 % + 24 µA	
(0.2 to 2) A	(0.01 to 2) kHz (2 to 10) kHz (10 to 30) kHz	0.071 % + 240 µA 0.082 % + 240 µA 0.30 % + 240 µA	
(2 to 20) A	(0.01 to 2) kHz (2 to 10) kHz	0.09 % + 2.4 mA 0.25 % + 2.4 mA	

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Resistance – Generate[3]	(> 0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (0.11 to 1.1) kΩ (1.1 to 11) kΩ (11 to 110) kΩ (0.11 to 1.1) MΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ (0.33 to 1.1) GΩ	0.004 % + 1 mΩ 0.003 % + 1.5 mΩ 0.0028 % + 1.4 mΩ 0.0028 % + 2 mΩ 0.0028 % + 20 mΩ 0.0028 % + 200 mΩ 0.0032 % + 2 Ω 0.006 % + 30 Ω 0.013 % + 50 Ω 0.025 % + 2.5 kΩ 0.05 % + 3 kΩ 0.30 % + 100 kΩ 1.5 % + 500 kΩ	Multi-function calibrator

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Resistance – Measure[3]	(> 0 to 2) Ω (2 to 20) Ω (20 to 200) Ω (0.2 to 2) kΩ (2 to 20) kΩ (20 to 200) kΩ (0.2 to 2) MΩ (2 to 20) MΩ (20 to 200) MΩ (0.2 to 2) GΩ (2 to 20) GΩ	0.0019 % + 5 μΩ 0.0012 % + 18 μΩ 0.001 % + 60 μΩ 0.001 % + 600 μΩ 0.001 % + 6 mΩ 0.001 % + 60 mΩ 0.0011 % + 1.2 Ω 0.002 % + 120 Ω 0.0075 % + 12 kΩ 0.068 % + 1.2 MΩ 0.068 % + 12 MΩ	Reference multimeter
Capacitance – Generate[3]	(0.22 to 3.3) nF (3.3 to 11) nF (11 to 110) nF (110 to 330) nF (0.33 to 1.1) μF (1.1 to 3.3) μF (3.3 to 11) μF (11 to 33) μF (33 to 110) μF (110 to 330) μF (0.33 to 1.1) mF (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	0.50 % + 10 pF 0.25 % + 10 pF 0.25 % + 0.1 nF 0.25 % + 0.3 nF 0.25 % + 1 nF 0.25 % + 3 nF 0.25 % + 10 nF 0.40 % + 30 nF 0.45 % + 100 nF 0.45 % + 300 nF 0.45 % + 1 μF 0.45 % + 3 μF 0.45 % + 10 μF 0.75 % + 30 μF 1.1 % + 100 μF	Multi-function calibrator

Parameter/Range	Frequency	CMC[2, 4, 5] (±)	Comments
Capacitance – Measure[3]			
(0.5 to 50) μF	(20 to 100) Hz	0.13 %	Precision LCR meter
(0.005 to 10) μF	(0.1 to 1) kHz	0.08 %	
(0.0025 to 2.5) μF	(1 to 10) kHz	0.08 %	
(2.5 to 500) nF	(10 to 100) kHz	0.08 %	
(0.25 to 75) nF	(0.1 to 1) MHz	0.08 %	

Parameter/Range	Frequency	CMC[2, 4, 5] (±)	Comments
Inductance – Measure[3]			
(0.5 to 100) H (0.005 to 50) H (0.0005 to 5) H (0.0005 to 1) H (0.005 to 10) mH	(20 to 100) Hz (0.1 to 1) kHz (1 to 10) kHz (10 to 100) kHz (0.1 to 1) MHz	0.13 % 0.08 % 0.08 % 0.08 % 0.08 %	Precision LCR meter

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of Thermocouple & Thermocouple Indicating Devices – Measure & Generate[3] –			
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.44 °C 0.34 °C 0.30 °C 0.33 °C	Multi-function calibrator
Type C	(> 0 to 150) °C (150 to 650) °C (650 to 1000) °C (1000 to 1800) °C (1800 to 2316) °C	0.30 °C 0.26 °C 0.31 °C 0.50 °C 0.84 °C	
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (250 to 650) °C (650 to 1000) °C	0.50 °C 0.16 °C 0.14 °C 0.16 °C 0.21 °C	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of Thermocouple & Thermocouple Indicating Devices – Measure & Generate[3] (cont)			
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.27 °C 0.16 °C 0.14 °C 0.17 °C 0.23 °C	Multi-function calibrator
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.33 °C 0.18 °C 0.16 °C 0.26 °C 0.40 °C	
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.40 °C 0.22 °C 0.19 °C 0.18 °C 0.27 °C	
Type R	(> 0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.57 °C 0.35 °C 0.33 °C 0.40 °C	
Type S	(> 0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1000 to 1767) °C	0.47 °C 0.36 °C 0.37 °C 0.46 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (> 0 to 120) °C (120 to 400) °C	0.63 °C 0.24 °C 0.16 °C 0.14 °C	
Type U	(-200 to 0) °C (> 0 to 600) °C	0.56 °C 0.27 °C	

Parameter/Equipment	Range	CMC[2] (±)	Comments
Electrical Simulation of RTD Indicating Devices – Generate[3]			
Pt 385, 100 Ω	(-200 to 0) °C (> 0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C	0.05 °C 0.07 °C 0.09 °C 0.10 °C 0.12 °C 0.23 °C	Multi-function calibrator
Pt 3926, 100 Ω	(-200 to 0) °C (> 0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.05 °C 0.07 °C 0.09 °C 0.10 °C 0.12 °C	
Pt 3916, 100 Ω	(-200 to -190) °C (-190 to -80) °C (-80 to 0) °C (> 0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.25 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.08 °C 0.09 °C 0.10 °C 0.23 °C	
Pt 385, 200 Ω	(-200 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.04 °C 0.05 °C 0.12 °C 0.13 °C 0.14 °C 0.16 °C	
Pt 385, 500 Ω	(-200 to -80) °C (-80 to 100) °C (100 to 260) °C (260 to 400) °C (400 to 600) °C (600 to 630) °C	0.04 °C 0.05 °C 0.06 °C 0.08 °C 0.09 °C 0.11 °C	
Pt 385, 1000 Ω	(-200 to 0) °C (> 0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 600) °C (600 to 630) °C	0.03 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.23 °C	

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Electrical Simulation of RTD Indicating Devices – Generate[3] (cont)			
PtNi 385, 120 Ω	(-80 to 100) °C (100 to 260) °C	0.08 °C 0.14 °C	Multi-function calibrator
Cu 427, 10 Ω	(-100 to 260) °C	0.30 °C	
Oscilloscope[3] –			
Square Wave – Amplitude Voltage – Vpp	Vpp:		
(0.01 to 10) kHz			
Into 50 Ω Into 1 MΩ	(0.001 to 6.6) V (0.001 to 130) V	0.25 % + 40 µV 0.10 % + 40 µV	Multi-function calibrator
Level Sine Wave – Vpp Amplitude Reference	Vpp:		
(0.05 to 10) MHz	(0.005 to 5.5) V	2.0 % of Output + 300 µV	
Amplitude Flatness – Vpp Relative to 50 kHz	Vpp:		
(0.05 to 100) MHz	(0.005 to 5.5) V	1.5 % of Output + 100 µV	
(100 to 300) MHz	(0.005 to 5.5) V	2.0 % of Output + 100 µV	
(300 to 600) MHz	(0.005 to 5.5) V	4.0 % of Output + 100 µV	
(600 to 1100) MHz	(0.005 to 5.5) V	5.0 % of Output + 100 µV	
Level Sine Wave Frequency	(0.05 to 1100) MHz	0.000 25 %	
Leading Edge Risetime	≤ 300 ps	+0 ps / -100 ps	
Time Markers	1 ns to 20 ms 50 ms 0.1 s 0.2 s 0.5 s 1 s 2 s 5 s	0.000 25 % 0.0075 % 0.013 % 0.023 % 0.053 % 0.10 % 0.20 % 0.50 %	

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Magnetic Flux Density – Measure	Up to 50 G (> 50 to 300) G (> 300 to 3000) G (> 3000 to 4500) G	0.17 G (0.077 % + 0.13) G (0.095 % + 0.47) G (0.086 % + 4.8) G	Gauss meter with transverse or axial probe

IV. Electrical – Radio Frequency

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
RF Power Absolute – Measure 100 kHz to 2.6 GHz	 (20 to 30) dBm (-20 to 20) dBm	 0.11 dB 0.08 dB	Measuring receiver Power sensor
RF Power Absolute – Measure 10 MHz to 18 GHz	 (-20 to 20) dBm (-30 to -20) dBm	 0.08 dB 0.11 dB	Measuring receiver Power sensor
Tuned RF Power – Absolute – Measure (2.5 to 1300) MHz	(-30 to 10) dBm (-60 to -31) dBm (-90 to -61) dBm (-100 to -91) dBm (-120 to -101) dBm (-127 to -121) dBm	0.18 dB 0.21 dB 0.27 dB 0.29 dB 0.32 dB 0.43 dB	Measuring receiver Power sensor
Tuned RF Power – Relative – Measure (2.5 to 1300) MHz	 (-30 to 10) dBm (-60 to -31) dBm (-90 to -61) dBm (-100 to -91) dBm (-120 to -101) dBm (-127 to -121) dBm	 0.09 dB 0.15 dB 0.23 dB 0.25 dB 0.28 dB 0.41 dB	Measuring receiver Power sensor

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
AM Depth – Measure (0.15 to 10) MHz Carrier (10 to 1300) MHz Carrier	Depth: (5 to < 99) %	2.3 % reading + 0.2 % 1.2 % reading + 1.0 %	Measuring receiver Power sensor
Phase Deviation – Measure (0.15 to 10) MHz Carrier (10 to 1300) MHz Carrier	Deviation (4 to 40) rad (4 to 400) rad	4.8 % reading + 0.009 rad 3.6 % reading + 0.006 rad	Measuring receiver Power sensor
FM Deviation – Measure (0.25 to 10) MHz Carrier (10 to 1300) MHz Carrier	(0 to 40) kHz dev. (0 to 400) kHz	2.3 % + 0.0017 kHz 1.2 % + 0.0016 kHz	Measuring receiver Power sensor
Distortion – Measure (-80 to 0) dB	(20 Hz to < 20) kHz (20 kHz to 100) kHz	1.3 dB 2.4 dB	Audio analyzer

V. Fluid Quantities

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Mass Flow Meters[3]	Up to 50 l/min (50 to 150) l/min (150 to 500) l/min	0.48 % + 0.14 l/min 0.44 % + 0.8 l/min 0.46 % + 1.5 l/min	Portable calibration flow meter

VI. Mechanical

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Pressure[3] – Pressure Gauge	(> 0 to 10) in H_2O	0.0023 in H_2O	Pressure transducer
	(0.5 to < 8) psia	0.0036 psia	
	(8 to 17) psia	(0.01 % + 0.000 08) psia	
	(> 17 to 30) psia	0.0036 psia	
	(-1 to 5) psi	0.0007 psi	
	(> 5 to 30) psi	0.0036 psi	
	(> 30 to 100) psi	0.012 psi	
	(> 100 to 400) psi	0.059 psi	
	(> 400 to 1000) psi	(0.01 % + 0.014) psi	
	(> 1000 to 3000) psi	(0.0008 % + 0.34) psi	
	(> 3000 to 6000) psi	(0.01 % + 0.0033) psi	
	(> 0 to 3000) psi	(0.02 % + 0.0024) psi	Electronic deadweight tester
	(> 3000 to 30 000) psi	(0.02 % + 0.0009) psi	
Torque Wrenches & Screwdrivers[3] –			
Clockwise & Counter-Clockwise	(Up to 10) lbf-in	0.56 % + 0.01 lbf-in	Electronic torque & angle transducer & indicator
	(> 10 to 100) lbf-in	0.54 % + 0.06 lbf-in	
	(> 8 to 100) lbf-ft	0.51 % + 0.09 lbf-ft	
	(> 100 to 1000) lbf-ft	0.55 % + 0.39 lbf-ft	
Angle of Rotation[3] –			
Direct Measure Angle Measuring Systems	(0 to 360) °	1.2 °	
Laboratory Scales & Balances[3]	1 mg to 10 g	0.03 mg	Using ASTM Class 1 & ASTM Class 0 weights
	(> 10 to 100) g	0.20 mg	
	> 100 g to 1 kg	1.9 mg	
	(> 1 to 5) kg	14 mg	
	(> 5 to 10) kg	33 mg	
	(> 10 to 20) kg	61 mg	
	(> 20 to 80) kg	130 mg	

Parameter/Equipment	Range	CMC[2, 4, 7] (±)	Comments
Force Measuring Equipment[3] –			
Tension & Compression	(1 to 4) lbf (> 4 to 7) lbf (> 7 to 10) lbf	0.0011 lbf 0.0013 lbf 0.0014 lbf	Using ASTM Class 6 weights
	(5 to 50) lbf	0.018 lbf + 0.025 % of reading	Using load cell ASTM E74 load cell class A & indicator
	(> 50 to 250) lbf	0.05 % of reading	
	(> 250 to 2000) lbf	0.05 % of reading	
	(> 2000 to 10 000) lbf	0.06 % of reading	
Indirect Verification of Rockwell Hardness Testers	HRC Low Middle High	 0.41 HRC 0.41 HRC 0.37 HRC	Indirect verification according to ASTM E18 hardness standards
	HRBW Low Middle High	 0.71 HRBW 0.72 HRBW 0.61 HRBW	

VI. Thermodynamics

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
Temperature – Measure & Measuring Equipment	(-80 to 150) °C (150 to 250) °C (250 to 420) °C (421 to 600) °C (601 to 962) °C (963 to 1250) °C	0.034 °C 0.05 °C 0.28 °C 0.76 °C 1.4 °C 2.3 °C	ASTM E644, ASTM E220, ASTM E230 Temperature baths, dry well, calibration furnace, SPRT

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
Relative Humidity – Measuring Equipment	(10 to 98) % RH	0.52 % of reading	Automated "Two-Pressure" humidity generation system & PRT probe
Frost/Dew Point – Measuring Equipment	(-20 to 70) °C	0.063 °C	Automated "Two-Pressure" humidity generation system & PRT probe
Temperature – Measuring Equipment	(-10 to 72) °C	0.06 °C	Automated "Two-Pressure" humidity generation system & PRT probe
Infrared Thermometers[3]	35 °C (> 35 to 100) °C (> 100 to 250) °C (> 250 to 350) °C (> 350 to 500) °C	0.46 °C 0.70 °C 1.2 °C 1.8 °C 2.4 °C	Precision infrared temperature calibrator $\varepsilon = 0.95$, λ = (8 to 14) µm

VII. Time & Frequency

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
Frequency – Measure[3]	Up to 6 GHz	71 pHz/Hz	Frequency standard, counter
Frequency – Measuring Equipment[3]	(1 to 10) Hz (10 to 100) Hz (100 to 1000) Hz 1 kHz to 100 MHz (100 to 1000) MHz (1 to 4) GHz	580 nHz/Hz 58 nHz/Hz 5.8 nHz/Hz 0.58 nHz/Hz 71 pHz/Hz 41 pHz/Hz	Frequency standard, signal generators
Timers & Stopwatches[3]	≤ 24 h	38 ms	Universal frequency counter/timer, waveform generators

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
Tachometers[3] – Non-Contact	(0.6 to 100 000) rpm	0.000 25 % + 300 µrpm	Multi-function calibrator
Pulse Width – Measure	5 ns to 50 µs 50 µs to 0.5 s	1.6E-03x + 7.8E-10 s 1.6E-03x se	Frequency counter
Rise & Fall Time – Measure	(5 to 500) ns > 500 ns to 500 µs	0.000 82x + 1.5E-9 s 0.0026x s	Frequency counter

[1] This laboratory offers commercial calibration service and field calibration service.

[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 this calibration. 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 actual 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, L is the numerical value of the nominal length of the device measured in inches. In the statement of CMC, percent is defined as percent of reading unless otherwise noted. In the statement of CMC, x is defined as the torque or mass flow applied.

[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. CMCs 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

INSTRUMENTATION DYNATHERM INC.

Saint-Laurent, QC, CANADA

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 5th day of August 2024.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3708.01
Valid to May 31, 2026

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