



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION

Valid To: November 30, 2025

Certificate Number: 1741.22

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, 8}:

I. Chemical

Parameter/Equipment	Range	CMC ² (±)	Comments
pH Meters ³	4 pH 7 pH 10 pH	0.033 pH 0.029 pH 0.031 pH	Standard pH solutions
Conductivity Meters ³	1 µS/cm 10 µS/cm 100 µS/cm 1000 µS/cm	0.11 µS/cm 0.11 µS/cm 0.79 µS/cm 4.5 µS/cm	Standard conductivity solutions

II. Dimensional

Parameter/Equipment	Range	CMC ^{2, 5} (±)	Comments
Pin Gages – Class ZZ ³	Up to 1 in	80 µin	Micrometer
Calipers ³	Up to 60 in	(4.6 + 9.8L) µin + 0.6R	Gage blocks

Parameter/Equipment	Range ⁵	CMC ^{2, 5} (±)	Comments
Micrometers ³	Up to 60 in	$(4.6 + 9.8L) \mu\text{in} + 0.6R$	Gage blocks
Linear Indicators – Dial & Test ³	Up to 4 in	$(3 + 9.4L) \mu\text{in} + 0.6R$	Gage blocks
Height Gages ³	Up to 24 in (24 to 48) in	$(38 + 8.6L) \mu\text{in} + 0.6R$ $(38 + 9.2L) \mu\text{in} + 0.6R$	Gage blocks w/surface plate
Steel Rules ³	Up to 72 in	$(1.5 + 10L) \mu\text{in} + 0.6R$	Gage blocks
Tape Measures ³	Up to 25 ft	$(1.5 + 10L) \mu\text{in} + 0.6R$	Gage blocks
Angle Indicators & Protractors ³	30°, 45°, 60°, 75°, 90°	$0.03^\circ + 0.6R$	Angle block set
Feeler/Thickness Gages ³	Up to 1 in	80 μin	Micrometer
Coating Thickness Gages – Film, Ultrasonic ³	Up to 60 mils	0.1 mils	Coating thickness standards
Surface Roughness Meters & Profilometers ³	Ra (10 to 200) μin	2.8 μin	Precision roughness standard
Optical Comparators ³ – Linear Accuracy Magnification Angle	Up to 12 in 10x to 250x (0 to 90)°	200 μin 0.014 in 0.1°	Glass scale Mag checker Angle block set

III. Dimensional Testing/Calibration⁹

Parameter/Equipment	Range ⁵	CMC ^{2, 7} (\pm)	Comments
One Dimensional – Measure ³	Up to 3 in	83 μ in	Micrometer
	Up to 6 in	0.0026 in	Caliper

IV. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 4, 6} (\pm)	Comments
DC Voltage – Measure ³	(0 to 100) mV (0.1 to 1.0) V (1 to 10) V (10 to 100) V (100 to 1000) V	7.8 μ V/V + 0.2 μ V 3.4 μ V/V + 0.3 μ V 3.4 μ V/V + 0.5 μ V 4.7 μ V/V + 30 μ V 4.8 μ V/V + 0.5 mV	Fluke 8588A
	(Up to 10) kV (10 to 100) kV	0.03 % + 0.03 V 0.05 % + 0.3 V	Vitrek 4700 w/ HVL- 100
DC Voltage – Generate ³	(0 to 330) mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (100 to 1020) V	25 μ V/V + 1 μ V 14 μ V/V + 2 μ V 15 μ V/V + 15 μ V 22 μ V/V + 150 μ V 22 μ V/V + 1.5 mV	Fluke 5522A
DC Current – Measure ³	(0 to 10) μ A (10 to 100) μ A (0.1 to 1.0) mA (1 to 10) mA (10 to 100) mA (0.1 to 1.0) A (1 to 10) A (1 to 30) A	29 μ A/A + 0.4 nA 10 μ A/A + 0.4 nA 10 μ A/A + 4 nA 15 μ A/A + 40 nA 58 μ A/A + 1 μ A 0.014 % + 0.1mA 0.024 % + 0.4 mA 0.056 % + 4.4 mA	Fluke 8588A
	(1 to 1000) A	0.32 %	Empro shunt w/ Fluke8588A

Parameter/Equipment	Range	CMC ^{2, 4, 6} (\pm)	Comments
DC Current – Generate ³	(0 to 330) μ A (0 to 3.3) mA (0 to 33) mA (0 to 330) mA (0 to 1.1) A (1.1 to 3) A (0 to 11) A (11 to 21) A	0.018 % + 0.02 μ A 0.012 % + 0.05 μ A 0.013 % + 0.25 μ A 0.015 % + 2.5 μ A 0.025 % + 40 μ A 0.046 % + 40 μ A 0.06 % + 500 μ A 0.12 % + 750 μ A	Fluke 5522A
DC Clamp-On Meters ³ –	Up to 1000 A	0.65 % + 0.5 A	Fluke 5522A w/5500 coil
DC Power – Generate ³ 33 mV to 1020 V: (0.33 to 329.99) mA (0.33 to 2.9999) A (3 to 20.5) A	(0.01 to 330) W (0.33 to 3.3) kW (3.3 to 20.5) kW	0.032 % 0.031 % 0.085 %	Fluke 5522A
Resistance – Measure ³	(0 to 1) Ω (1 to 10) Ω (10 to 100) Ω (0.1 to 1) k Ω (1 to 10) k Ω (10 to 100) k Ω (0.1 to 1) M Ω (1 to 10) M Ω (10 to 100) M Ω (0.1 to 1) G Ω (1 to 10) G Ω	19 $\mu\Omega/\Omega$ + 4.0 $\mu\Omega$ 11 $\mu\Omega/\Omega$ + 14 $\mu\Omega$ 9.6 $\mu\Omega/\Omega$ + 50 $\mu\Omega$ 9.4 $\mu\Omega/\Omega$ + 0.5 m Ω 9.4 $\mu\Omega/\Omega$ + 5.0 m Ω 9.6 $\mu\Omega/\Omega$ + 50 m Ω 11 $\mu\Omega/\Omega$ + 1 Ω 24 $\mu\Omega/\Omega$ + 100 Ω 0.013 % + 10 k Ω 0.14 % + 1 M Ω 0.14 % + 10 M Ω	Fluke 8588A
Resistance – Generate ³	Up to 11 Ω (11 to 33) Ω (33 to 110) Ω 110 Ω to 1.1 k Ω (1.1 to 11) k Ω (11 to 110) k Ω 110 k Ω to 1.1 M Ω (1.1 to 3.3) M Ω (3.3 to 11) M Ω (11 to 33) M Ω (33 to 110) M Ω (110 to 330) M Ω (330 to 1100) M Ω	49 $\mu\Omega/\Omega$ + 0.001 Ω 51 $\mu\Omega/\Omega$ + 0.0015 Ω 34 $\mu\Omega/\Omega$ + 0.0014 Ω 34 $\mu\Omega/\Omega$ + 0.002 Ω 34 $\mu\Omega/\Omega$ + 0.02 Ω 34 $\mu\Omega/\Omega$ + 0.2 Ω 39 $\mu\Omega/\Omega$ + 2 Ω 73 $\mu\Omega/\Omega$ + 30 Ω 0.014 % + 50 Ω 0.03 % + 2.5 k Ω 0.06 % + 3 k Ω 0.36 % + 100 k Ω 1.8 % + 500 k Ω	Fluke 5522A

Parameter/Equipment	Range	CMC ^{2, 4, 6} (±)	Comments
Resistance – Generate ³ (cont)			
Decade Steps	1 mΩ to 100 Ω	0.026 % + 1 mΩ	IET decade resistor 1433-19-K
	100 Ω to 10 MΩ	0.13 %	IET HRRS-F7-100
	10 MΩ to 1 GΩ	1.2 %	IET HRRS-F7-100
	(1 to 10) GΩ	1.2 %	IET HRRS-F2-100M-5kV
	(1 to 100) GΩ	1.3 %	IET HRRS-F2-1G-5kV
Insulation Resistance – Generate ³			
Fixed Points	0.1 Ω, 1 Ω, 10 Ω, 50 Ω, 100 Ω, 500 Ω, 1 kΩ, 5 kΩ, 10 kΩ, 50 kΩ,	1.3 %	Standard resistors
	1 MΩ, 10 MΩ, 100 MΩ,	1.3 %	
	1 GΩ, 10 GΩ, 100 GΩ, 1 TΩ	1.3 %	

Parameter/Equipment	Frequency	CMC ^{2, 4, 6} (±)	Comments
<p>Capacitance – Generate³</p> <p>(220 to 399.9) pF (0.4 to 1.0999) nF (1.1 to 3.2999) nF (3.3 to 10.9999) nF (11 to 109.999) nF (110 to 329.999) nF (0.33 to 1.099 99) µF (1.1 to 3.299 99) µF (3.3 to 10.9999) µF (11 to 32.9999) µF (33 to 109.999) µF (110 to 329.999) µF (0.33 to 1.099 99) mF (1.1 to 3.299 99) mF (3.3 to 10.9999) mF (11 to 32.9999) mF (33 to 110) mF</p> <p>Decade Steps</p>	<p>(10 to 10 000) Hz (10 to 10 000) Hz (10 to 3000) Hz (10 to 1000) Hz (10 to 1000) Hz (10 to 1000) Hz (10 to 600) Hz (10 to 300) Hz (10 to 150) Hz (10 to 120) Hz (10 to 80) Hz (0 to 50) Hz (0 to 20) Hz (0 to 6) Hz (0 to 2) Hz (0 to 0.6) Hz (0 to 0.2) Hz</p> <p>10 pF to 1 nF 1 nF to 100 µF</p>	<p>0.88 % + 10 pF 0.6 % + 0.01 nF 0.6 % + 0.01 nF 0.31 % + 0.1 nF 0.31 % + 0.1 nF 0.31 % + 0.3 nF 0.31 % + 1 nF 0.31 % + 3 nF 0.31 % + 10 nF 0.49 % + 30 nF 0.55 % + 100 nF 0.55 % + 300 nF 0.55 % + 1 µF 0.55 % + 3 µF 0.56 % + 10 µF 0.91 % + 30 µF 1.4 % + 100 µF</p> <p>1.4 % + 5 pF 1.3 pF</p>	<p>Fluke 5522A</p> <p>Time Electronics 1071</p>
<p>Capacitance – Measure³</p> <p>(0.1 to 1) nF (1 to 10) nF (10 to 100) nF (0.1 to 1) µF (1 to 10) µF (10 to 100) µF (0.1 to 1) mF (1 to 10) mF (10 to 100) mF</p>	<p>(50 to 60) Hz (50 to 60) Hz (50 to 60) Hz (50 to 60) Hz (50 to 60) Hz (50 to 60) Hz (50 to 60) Hz (50 to 60) Hz (50 to 60) Hz</p>	<p>0.23 % + 0.1 nF 0.13 % + 0.2 nF 0.1 % + 0.01 nF 0.1 % + 0.1nF 0.1 % + 0.1 nF 0.11 % + 0.01 µF 0.11 % + 0.1 µF 0.12 % + 1 µF 0.12 % + 0.1 mF</p>	<p>Fluke 8588A</p>

Parameter/Range	Frequency	CMC ^{2, 4, 6} (±)	Comments
AC Voltage – Generate ³			
(1 to 33) mV	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.1 % + 6 μV 0.021 % + 6 μV 0.027 % + 6 μV 0.12 % + 6 μV 0.42 % + 12 μV 0.96 % + 50 μV	Fluke 5522A
(33 to 330) mV	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.036 % + 8 μV 0.018 % + 8 μV 0.02 % + 8 μV 0.042 % + 8 μV 0.096 % + 32 μV 0.24 % + 70 μV	
330 mV to 3.3 V	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.04 % + 50 μV 0.019 % + 60 μV 0.023 % + 60 μV 0.036 % + 50 μV 0.085 % + 130 μV 0.29 % + 600 μV	
(3.3 to 33) V	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.04 % + 650 μV 0.019 % + 600 μV 0.029 % + 600 μV 0.043 % + 600 μV 0.11 % + 1.6 mV	
(33 to 330) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.024 % + 2 mV 0.025 % + 6 mV 0.03 % + 6 mV 0.038 % + 6 mV 0.25 % + 50 mV	
(330 to 1020) V	45 Hz to 10 kHz	0.037 % + 10 mV	

Parameter/Range	Frequency	CMC ^{2, 4, 6} (±)	Comments
AC Voltage – Measure ³			
(0 to 10) mV	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	0.034 % + 1.1 μV 0.041 % + 1.1 μV 0.042 % + 1.1 μV 0.031 % + 1.1 μV 1.1 % + 4 μV 2.1 % + 4 μV	Fluke 8588A
(10 to 100) mV	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	0.01 % + 0.5 μV 0.014 % + 0.4 μV 0.024 % + 1 μV 0.054 % + 5 μV 0.22 % + 30 μV 1.2 % + 0.1 mV	
(0.1 to 1) V	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	0.008 % + 5 μV 0.013 % + 5 μV 0.024 % + 10 μV 0.054 % + 50 μV 0.22 % + 0.3 mV 1.1 % + 1 mV	
(1 to 10) V	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	0.008 % + 50 μV 0.013 % + 50 μV 0.024 % + 0.1 mV 0.054 % + 0.5 mV 0.22 % + 3 mV 1.1 % + 10 mV	
(10 to 100) V	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	0.016 % + 0.5mV 0.017 % + 0.5mV 0.027 % + 1 mV 0.061 % + 5 mV 0.38 % + 50 mV 1.2 % + 0.5 V	
(100 to 1000) V	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.012 % + 25 mV 0.012 % + 25 mV 0.025 % + 25 mV 0.06 % + 0.1 V	
(1 to 10) kV (10 to 70) kV	(50 to 60) Hz (50 to 60) Hz	0.15 % + 0.1 V 0.15 % + 0.6 V	Vitrek 4700 w/transfer probe

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Clamp-On Meters ³ –			
Up to 150 A:			
Toroidal	(45 to 65) Hz (65 to 440) Hz	0.49 % + 0.025 A 1 % + 0.027 A	Fluke 5522A w/ 5500 coil
Non-Toroidal	(45 to 65) Hz (65 to 440) Hz	0.76 % + 0.25 A 1.3 % + 0.25 A	
(150 to 1025) A:			
Toroidal	(45 to 65) Hz (65 to 440) Hz	0.49 % + 0.09 A 1 % + 0.1 A	
Non-Toroidal	(45 to 65) Hz (65 to 440) Hz	0.76 % + 0.9 A 1.3 % + 0.9 A	
AC Current – Generate ³			
Up to 0.33 mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.25 % + 0.1 µA 0.18 % + 0.1 µA 0.16 % + 0.1 µA 0.37 % + 0.15 µA 0.97 % + 0.2 µA 1.9 % + 0.4 µA	Fluke 5522A
(0.33 to 3.3) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.24 % + 0.15 µA 0.15 % + 0.15 µA 0.13 % + 0.15 µA 0.25 % + 0.2 µA 0.6 % + 0.3 µA 1.2 % + 0.6 µA	
(3.3 to 33) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.22 % + 2 µA 0.11 % + 2 µA 0.05 % + 2 µA 0.1 % + 2 µA 0.25 % + 3 µA 0.49 % + 4 µA	
(33 to 330) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.22 % + 20 µA 0.11 % + 20 µA 0.05 % + 20 µA 0.13 % + 50 µA 0.25 % + 100 µA 0.49 % + 200 µA	

Parameter/Range	Frequency	CMC ^{2, 4} (±)	Comments
AC Current – Generate ³ (cont)			
(0.33 to 1.1) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.22 % + 100 µA 0.063 % + 100 µA 0.73 % + 1 mA 3 % + 5 mA	Fluke 5522A
(1.1 to 3.0) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.22 % + 100 µA 0.08 % + 100 µA 0.73 % + 1 mA 3 % + 5 mA	
(3.0 to 11) A	45 Hz to 1 kHz (1 to 5) kHz	0.13 % + 2 mA 3.6 % + 2 mA	
(11 to 20.5) A	45 Hz to 1 kHz (1 to 5) kHz	0.19 % + 5 mA 3.6 % + 5 mA	
AC Current – Measure ³			
(0 to 10) µA	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz	0.21 % + 2.5 nA 0.21 % + 2.5 nA 0.21 % + 2.5 nA	Fluke 8588A
(10 to 100) µA	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.029 % + 5 nA 0.054 % + 5 nA 0.075 % + 5 nA 0.41 % + 10 nA	
(0.1 to 1) mA	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.029 % + 50 nA 0.054 % + 50 nA 0.075 % + 50 nA 0.41 % + 0.1 µA	
(1 to 10) mA	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.029 % + 0.5 µA 0.054 % + 0.5 µA 0.075 % + 0.5 µA 0.41 % + 1 µA	
(10 to 100) mA	1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz	0.029 % + 5 µA 0.053 % + 5 µA 0.075 % + 5 µA	

Parameter/Range	Frequency	CMC ^{2,4,6} (±)	Comments
AC Current – Measure ³ (cont)			
(0.1 to 1) A	1 Hz to 2 kHz	0.031 % + 0.1 mA	Fluke 8588A
(1 to 10) A	(2 to 10) kHz	0.056 % + 0.1 mA	
(10 to 30) A	(10 to 30) kHz	0.08 % + 0.1 mA	
(10 to 30) A	10 Hz to 2 kHz	0.085 % + 0.5 mA	Fluke 287
(1 to 10) A	(2 to 10) kHz	0.085 % + 0.5 mA	
(1 to 10) A	10 Hz to 2 kHz	0.085 % + 12 mA	
(1 to 100) A	(2 to 10) kHz	0.13 % + 12 mA	Empro shunt w/DMM
(1 to 100) A	45 Hz to 1 kHz	0.13 % + 12 mA	
(1 to 100) A	60 Hz	0.32 %	

Parameter/Range	Range	CMC ^{2,4,6} (±)	Comments
AC Power – Generate ³ (45 to 65) Hz; PF=1			
(33 to 330) mV:			Fluke 5522A
(3.3 to 8.99) mA	110 μW to 3 mW	0.17 %	
(9 to 32.99) mA	(3 to 11) mW	0.12 %	
(33 to 89.99) mA	(1.1 to 30) mW	0.17 %	
(90 to 329.99) mA	(3 to 110) mW	0.12 %	
(0.33 to 0.8999) A	(11 to 300) mW	0.16 %	
(0.9 to 2.1999) A	(30 to 730) mW	0.14 %	
(2.2 to 4.4999) A	73 mW to 1.5 W	0.16 %	
(4.5 to 20.5) A	150 mW to 6.8 W	0.14 %	
330 mV to 1020 V:			
(3.3 to 8.99) mA	1.1 mW to 9 W	0.15 %	
(9 to 32.99) mA	3 mW to 33 W	0.1 %	
(33 to 89.99) mA	11 mW to 90 W	0.15 %	
(90 to 329.99) mA	30 mW to 330 W	0.1 %	
(0.33 to 0.8999) A	110 mW to 900 W	0.14 %	
(0.9 to 2.1999) A	300 mW to 2200 W	0.11 %	
(2.2 to 4.4999) A	730 mW to 4500 W	0.15 %	
(4.5 to 20.5) A	(1.5 to 20.9) kW	0.12 %	

Parameter/Equipment	Range	CMC ² (±)	Comments
Thermocouple Simulation ³ –			
Type B	(600 to 800) °C (800 to 1550) °C (1550 to 1820) °C	0.44 °C 0.36 °C 0.3 °C	Fluke 7526A
Type C	(0 to 1000) °C (1000 to 1800) °C (1800 to 2000) °C (2000 to 2316) °C	0.23 °C 0.31 °C 0.34 °C 0.44 °C	
Type E	(-250 to -200) °C (-200 to -100) °C (-100 to 0) °C (0 to 600) °C (600 to 1000) °C	0.32 °C 0.18 °C 0.15 °C 0.14 °C 0.16 °C	
Type J	(-210 to -100) °C (-100 to 800) °C (800 to 1200) °C	0.2 °C 0.15 °C 0.16 °C	
Type K	(-250 to -200) °C (-200 to -100) °C (-100 to 500) °C (500 to 800) °C (800 to 1372) °C	0.56 °C 0.22 °C 0.16 °C 0.16 °C 0.19 °C	
Type N	(-250 to 200) °C (-200 to -100) °C (-100 to 0) °C (0 to 100) °C (100 to 800) °C (800 to 1300) °C	0.89 °C 0.31 °C 0.19 °C 0.17 °C 0.18 °C 0.19 °C	
Type R	(-50 to -25) °C (-25 to 0) °C (0 to 100) °C (100 to 400) °C (400 to 600) °C (600 to 1000) °C (1000 to 1600) °C (1600 to 1767) °C	0.67 °C 0.55 °C 0.48 °C 0.36 °C 0.29 °C 0.28 °C 0.26 °C 0.31 °C	
Type S	(-50 to -25) °C (-25 to 0) °C (0 to 100) °C (100 to 400) °C (400 to 600) °C (600 to 1000) °C	0.63 °C 0.54 °C 0.48 °C 0.37 °C 0.31 °C 0.29 °C	

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Thermocouple Simulation ³ – (cont)			
Type S	(1000 to 1600) °C (1600 to 1767) °C	0.3 °C 0.34 °C	Fluke 7526A
Type T	(-250 to -200) °C (-200 to 0) °C (0 to 200) °C (200 to 400) °C	0.44 °C 0.23 °C 0.17 °C 0.17 °C	
Electrical Simulation of RTDs ³ –			
Pt 385, 100 Ω	(-200 to 800) °C	0.07 °C	Fluke 7526A
Pt 3926, 100 Ω	(-200 to 630) °C	0.07 °C	
Pt 3916, 100 Ω	(-200 to 630) °C	0.07 °C	
Pt 385, 200 Ω	(-200 to 400) °C (400 to 630) °C	0.48 °C 0.61 °C	
Pt 385, 500 Ω	(-200 to 630) °C	0.21 °C	
Pt 385, 1000 Ω	(-200 to 630) °C	0.12 °C	
Ni 120, 120 Ω	(-80 to 260) °C	0.05 °C	
Cu 427, 10 Ω	(-100 to 260) °C	0.46 °C	
YSI 400	(15 to 50) °C	0.04 °C	
RTD – Measure ³			
Pt 385, 100 Ω	(-200 to 800) °C	0.06 °C	Fluke 7526A
Pt 3926, 100 Ω	(-200 to 630) °C	0.06 °C	
Pt 3916, 100 Ω	(-200 to 630) °C	0.06 °C	
Pt 385, 200 Ω	(-200 to 400) °C (400 to 630) °C	0.1 °C 0.12 °C	

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
RTD – Measure ³ (cont)			
Pt 385, 500 Ω	(-200 to 630) °C	0.07 °C	Fluke 7526A
Pt 385, 1000 Ω	(-200 to 630) °C	0.06 °C	
Ni 120, 120 Ω	(-80 to 260) °C	0.04 °C	
Cu 427, 10 Ω	(-100 to 260) °C	0.14 °C	
YSI 400	(15 to 50) °C	0.02 °C	
Oscilloscopes ³ –			
Square Wave Signal:			Fluke 5522A w/ SC1100
50 Ω Load @ 1 kHz	1 mV to 6.6 V _{pk - pk}	0.32 % + 40 μV	
1 MΩ Load @ 1 kHz	1 mV to 130 V _{pk - pk}	0.16 % + 40 μV	
DC Volt Amplitude:			
50 Ω Load	(0 to 6.6) V	0.3 % + 40 μV	
1 MΩ Load	(0 to 130) V	0.07 % + 40 μV	
Level Sine Wave:			
Frequency	(0 to 1100) MHz	3.3 μHz/Hz	
Level Sine Wave:			
Amplitude	50 kHz Reference	2.4 % + 300 μV	
	50 kHz to 100 MHz	4.4 % + 300 μV	
	(100 to 300) MHz	4.9 % + 300 μV	
	(300 to 600) MHz	7.2 % + 300 μV	
	(300 to 1100) MHz	8.4 % + 300 μV	
Flatness (Bandwidth)	0 kHz to 100 MHz	2.1 % + 100 μV	
	(100 to 300) MHz	2.6 % + 100 μV	
	(300 to 600) MHz	4.9 % + 100 μV	
	(300 to 1100) MHz	6.1 % + 100 μV	



Parameter/Equipment	Range	CMC ² (±)	Comments
Oscilloscopes ³ – (cont)			
Time Markers:			
Into a 50 Ω Load	5 s to 50 ms 20 ms to 2 ns	(30 + 1000 <i>t</i>) μs/s 3.5 μs/s	<i>t</i> = time in seconds
Rise Time:			
1 kHz to 2 MHz (2 to 10) MHz	≤ 300 ps ≤ 350 ps	130 ps 130 ps	Fluke 5522A w/ SC1100

V. Fluid Quantities

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
Fume Hoods – Air Velocity Only ³	(20 to 200) ft/min	4.5 %	Anemometer RCC-561
Flow Meters ³ – Totalizers	Up to 50 gallons	0.7 %	Gravimetric method

VI. Mechanical

Parameter/Equipment	Range	CMC ^{2, 5, 6, 7} (±)	Comments
Force – Measuring Equipment ³	Up to 1000 lbf	0.03 % + 0.6 <i>R</i>	Class F weights
	Up to 5 lbf	0.02 lbf	Load cells w/ indicator
	(5 to 50) lbf	0.08 lbf	
	(50 to 100) lbf	0.33 %	
	(100 to 1000) lbf	0.33 %	
	Up to 12 500 lbf (12 500 to 50 000) lbf	45 lbf 0.32 %	

Parameter/Equipment	Range	CMC ^{2, 5, 6, 7} (\pm)	Comments
Scales & Balances ³	Up to 20 000 g Up to 1000 lb (1 to 500) mg Up to 5 g Up to 10 g Up to 30 g Up to 50 g Up to 100 g Up to 200 g Up to 300 g Up to 500 g Up to 1000 g (> 1 to 5) kg	0.017 % + 0.6R 0.017 % + 0.6R 0.013 mg + 0.6R 0.043 mg + 0.6R 0.062 mg + 0.6R 0.092 mg + 0.6R 0.17 mg + 0.6R 0.31 mg + 0.6R 0.63 mg + 0.6R 0.93 mg + 0.6R 1.5 mg + 0.6R 3.1 mg + 0.6R 3.1 mg per 1000 g + 0.6R	Class F weights (applied load) Class 1 weights
Torque – Measuring Equipment ³ Wrenches & Screwdrivers	5 lbf·in to 600 lbf·ft	0.65 %	CDI Suretest 5000-ST
Rotary Torque Tools ³ Pneumatic, DC, Pulse	(0.56 to 5.6) N·m (1 to 10) N·m (2 to 20) N·m (0.75 to 75) N·m (18 to 180) N·m (50 to 500) N·m	0.08 N·m 0.13 N·m 0.26 N·m 0.98 N·m 2.4 N·m 6.5 N·m	Rotary transducers w/ display
Atmospheric Pressure Vacuum ³ – Measuring Equipment	(0.01 to 28.5) inHg	0.015 inHg	Heise ST-2H w/HQS series modules
Pressure – Measuring Equipment ³ Differential	(-0.25 to 0.25) in·H ₂ O (-0.5 to 0.5) in·H ₂ O (-7.5 to 7.5) in·H ₂ O Up to 50 in·H ₂ O	0.0019 in·H ₂ O 0.002 in·H ₂ O 0.012 in·H ₂ O 0.038 in·H ₂ O	Heise ST-2H w/HQS series modules

Parameter/Equipment	Range	CMC ^{2, 7} (±)	Comments
Pressure – Measuring Equipment ³ (cont)			
Pneumatic	Up to 10 psig Up to 50 psig Up to 100 psig Up to 500 psig Up to 1500 psig (0 to 3000) psig	0.0045 psi 0.02 psi 0.044 psi 0.19 psi 0.53 psi 0.8 psi	Heise ST-2H w/ HQS series modules Fluke 2700G- BG3.5M Heise PPM Fluke 2700G-G20M
Hydraulic	(0 to 5000) psig (5 to 10 000) psig	1.3 psi 2.6 psi	Fluke 2700G-G35M Fluke 2700G-G70M
Indirect Verification of Rockwell Hardness Testers ³	HRC: Low Medium High HRBW: Low Medium High HRA: Low Medium High HREW Low Medium High HR15N Low Medium High HR30N Low Medium High HR45N Low Medium High	0.77 HRC 0.77 HRC 0.76 HRC 0.9 HRBW 0.87 HRBW 0.81 HRBW 0.79 HRA 0.77 HRA 0.76 HRA 0.76 HREW 0.77 HREW 0.76 HREW 0.81 HR15N 0.81 HR15N 0.81 HR15N 0.82 HR30N 0.82 HR30N 0.82 HR30N 0.82 HR45N 0.81 HR45N 0.82 HR45N	Indirect verification per ASTM E18

Parameter/Equipment	Range	CMC ^{2, 6, 7} (±)	Comments
Indirect Verification of Rockwell Hardness Testers ³ (cont)	HR15TW Low Medium High HR30TW Low Medium High HR45TW Low Medium High	0.81 HR15TW 0.81 HR15TW 0.82 HR15TW 0.82 HR30TW 0.81 HR30TW 0.81 HR30TW 0.81 HR45TW 0.81 HR45TW 0.81 HR45TW	Indirect verification per ASTM E18
Indirect Verification of Vickers Hardness Testers ³ Vickers < 1 kgf	HV: Low Mid High	2.9 HV 11 HV 11 HV	ASTM E384 w/ ASTM E92
Indirect Verification of Brinell Hardness Testers ³ – HBW 10mm/3000kg	HBW: Low Medium High	4.5 HBW 4.5 HBW 2.6 HBW	ASTM E10
Speed – Measure ³ Optic/Non-Contact: RPM Totalizer/Rate Meters Contact: RPM Totalizer/Rate Meters	(5 to 200 000) rpm (2 to 3300) fpm (0.5 to 12 000) rpm (2 to 3300) fpm	0.017 % 0.017 % 0.22 % 0.22 %	Monarch PLT200

Parameter/Equipment	Range	CMC ^{2, 6, 7} (±)	Comments
Speed/RPM/Rate Simulation ³	(6 to 200 000) rpm	0.003 %	Agilent 33120A
Mass – Field Check Weight Comparison ³ Load Fixtures, Hangers, Package & Check Weights	Up to 50 lbs	0.024 %	Scale w/ weights

VII. Optical Quantities

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
Light Booths ³ – Illuminance Color Temperature (CCT)	Up to 6000 Lux (1700 to 6500) K	2.6 % 60 K	Illuminance spectrophotometer

VIII. Rubber & Plastics Industry Specific Equipment

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
Extrusion Plastometers ³ –			ASTM D1238
Cylinder Bore (Section 5.2)	(8 to 10) mm	0.0015 mm	Bore micrometer
Die Orifice (Section 5.3)	(0.992 to 2.1) mm	0.000 83 mm	Go/no-go pin gages
Piston Land (Foot) Diameter (Section 5.4)	Up to 30 mm	0.0015 mm	Micrometer
Piston Rod Diameter (Section 5.4)	Up to 30 mm	0.0015 mm	
Piston Land Foot Length (Section 5.4)	Up to 30 mm	0.0015 mm	

Parameter/Equipment	Range	CMC ^{2,7} (±)	Comments
Extrusion Plastometers ³ – (cont)			
Die (Orifice) Length (Section 5.3)	Up to 30 mm	0.0015 mm	
Piston & Load Weight (Section 5.4)	Up to 5000 g	0.13 %	Bench scale w/weights
Temperature (Section 5.5)	(0 to 400) °C	0.08 °C	ASTM D1238: Digital thermometer
Timing Devices (Section 5.6)	(0 to 3600) s	0.2 s	Stopwatch

IX. Thermodynamics

Parameter/Equipment	Range	CMC ^{2,7} (±)	Comments
Relative Humidity – Measure ³	(15 to 95) % RH	1.3 % RH	Rotronic HC2A-SH
Plate Temperature – Infrared Measuring Equipment ³	35 °C (35 to 100) °C (100 to 200) °C (200 to 350) °C (350 to 500) °C	0.84 °C 1 °C 1.2 °C 1.7 °C 2.3 °C	Fluke 4181
Temperature – Measure ³	(-200 to 200) °C (200 to 420) °C (420 to 660) °C	0.046 °C 0.063 °C 0.08 °C	Fluke 1523 w/ 5615 PRT Probe Fluke 1523 w/5609 PRT
Temperature – Measuring Equipment ³	(-30 to 125) °C (50 to 660) °C	0.087 °C 0.26 °C	Fluke 7103 micro bath w/ reference probe Fluke 9144 w/reference probe

X. Time & Frequency

Parameter/Equipment	Range	CMC ^{2,6,7} (±)	Comments
Timers & Stopwatches ³	(1 to 3600) s	0.2 s	Stopwatch
Frequency – Measuring Equipment ³	0.01 Hz to 2 MHz	5.6 µHz/Hz + 5 µHz	Fluke 5522A
	Up to 15 MHz	0.003 %	HP 33120A
Frequency – Measure ³	0.1 Hz to 10 MHz (10 to 225) MHz 225 MHz to 3GHz	67 µHz/Hz 0.45 µHz/Hz 0.26 µHz/Hz	Agilent 53181A

SATELLITE

CROSS TECHNOLOGIES, INC.
 1491 Dana Dr
 Henderson, KY 42420
 Connie Foster Phone: 336 292 0511

CALIBRATION

I. Chemical

Parameter/Equipment	Range	CMC ² (±)	Comments
pH Meters	4 pH 7 pH 10 pH	0.03 pH 0.029 pH 0.036 pH	Standard pH solutions

II. Dimensional

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
Pin Gage – Class ZZ	Up to 1 in	80 μin	Micrometer
Calipers	Up to 24 in	(4.6 + 9.8L) μin + 0.6R	Gage blocks
Micrometers	Up to 24 in	(4.6 + 9.8L) μin + 0.6R	Gage blocks
Linear Indicators – Dial & Test	Up to 4 in	(3 + 9.4L) μin + 0.6R	Gage blocks
Height Gauges	Up to 24 in	(53 + 8.9L) μin + 0.6R	Gage blocks w/surface plate
Steel Rules	Up to 72 in	(1.5 + 10L) μin + 0.6R	Gage blocks
Tape Measures	Up to 25 ft	(66 + 8.8L) μin + 0.6R	Gage blocks

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
Feeler/Thickness Gages	Up to 1 in	80 μin	Micrometer
Ring Gages / Cylinder Rings	(6 to 100) mm	0.0047 mm	Tri mic set
Tri – Mics	(6 to 100) mm (100 to 200) mm	0.0023 mm 0.0034 mm	Mitutoyo ring gauges
Angle Indicators & Protractors	30°, 45°, 60°, 75°, 90°	0.03°	Angle block set
Coating Thickness Gages – Film, Ultrasonic	Up to 60 mils	0.1 mils	Coating thickness standards
Measuring Microscope	Up to 2 in	0.000 17 in	Stage micrometer

III. Dimensional Testing/Calibration⁹

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
Length – X-Axis Y-Axis Z-Axis Volumetric	Up to 47 in Up to 79 in Up to 39 in Up to 79 in	(290 + 5.4L) μin (290 + 6.8L) μin (290 + 4.8L) μin (850 + 3.9L) μin	Brown & Sharpe Xcel CMM
Weld/Braze Evaluation – 1D Length	Up to 2 in Up to 6 in	0.02 in (0.51 mm) 0.0026 in	Microscope w/stage micrometer Caliper
Paint Thickness	Up to 20 mils	1.2 mils	Coating thickness gage

IV. Fluid Quantities

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
Flow Meters Totalizers	Up to 50 gallons	0.7 %	Gravimetric method

V. Mechanical

Parameter/Equipment	Range	CMC ^{2, 5, 6, 7} (±)	Comments
Force – Measuring Equipment	Up to 500 lbf	0.03 % + 0.6R	Class F weights
Scales & Balances	Up to 500 lbs	0.017 % + 0.6R	Class F weights (applied load)
Torque – Measuring Equipment Wrenches & Screwdrivers	5 in·lbf to 600 ft·lbf	0.65 %	CDI Suretest 5000-ST
Rotary Torque Tools Pneumatic, DC, Pulse	(2 to 20) Nm (18 to 180) Nm (50 to 500) Nm (140 to 1400) Nm (300 to 3000) Nm	2.4 % 1.1 % 1.5 % 1.8 % 1.8 %	Atlas Copco torque analyzer
Atmospheric Pressure & Vacuum – Measuring Equipment	Up to 27 in·Hg	0.09 in·Hg	Druck DPI610
Pressure – Measuring Equipment Pneumatic	Up to 300 psig	0.18 psi	Druck DPI104

Parameter/Equipment	Range	CMC ^{2, 6, (±)}	Comments
Leak Testers – Fixed Points	250 sccm 50 sccm	6.7 % 6.7 %	Cincinnati test systems leak standards

Mechanical Testing

Test	Test Method(s)
Hardness – Vickers, 500 gf	Leco LV 800T
Paint Adhesion, X Cut	ASTM D3359 Reference Tape

¹ This laboratory offers commercial calibration and field calibration services, where noted.

² Calibration and Measurement Capability (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. Calibration and Measurement Capabilities 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 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.

⁵ The statement of the CMC, L is the numerical value of the nominal length of the device measured in inches, R is the numerical value of the resolution of the device. In the statement of the Range or the CMC, DL is the diagonal length of the device in inches.

⁶ In the statement of CMC, percentages are percentage of reading, unless otherwise indicated.

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.

⁸ This scope meets A2LA's *P112 Flexible Scope Policy*.

⁹ This laboratory meets R205 – Specific Requirements: Calibration Laboratory Accreditation Program for the types of dimensional tests listed above and is considered equivalent to that of a calibration.



Accredited Laboratory

A2LA has accredited

CROSS TECHNOLOGIES, INC

Evansville, IN

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 16th of November 2023.

A blue ink signature of Mr. Trace McInturff, written over a horizontal line.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1741.22
Valid to November 30, 2025
Revised August 21, 2024

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