SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

CROSS TECHNOLOGIES, INC dba CROSS (FORMERLY J.A. KING)
10327 Chandler Circle, Suite 100
La Vista, NE 68128
Connie Foster Phone: 800 327 7727

CALIBRATION

Valid To: September 30, 2025 Certificate Number: 1741.09

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. Chemical

Parameter/Equipment	Range	CMC[2] (±)	Comments
pH Meters[3] – Fixed Points	4 pH 7 pH 10 pH	0.027 pH 0.024 pH 0.024 pH	Standard pH solutions

II. Dimensional

Parameter/Equipment	Range	CMC[2, 4, 5] (±)	Comments
Pin Gage[3] – Class Z & Class ZZ	Up to 1.0 in	79 µin	Micrometer
Calipers[3]	Up to 40 in	$(4.1 + 9.5L)$ µin + $0.6R$	Gage blocks
Micrometers[3]	Up to 40 in	$(4.1 + 9.5L)$ µin + $0.6R$	Gage blocks
Linear Indicators[3] – Dial & Test	Up to 4 in	$(4.3 + 9.1L)$ µin + $0.6R$	Gage blocks

5202 Presidents Court, Suite 220 | Frederick, MD 21703-8515 | Phone: 301 644 3248 | Fax: 240 454 9449 | www.A2LA.org

Parameter/Equipment	Range	CMC[2, 4, 5] (±)	Comments
Height Gages[3]	Up to 48 in	(53 + 8.5*L*) µin + 0.6*R*	Gage blocks w/surface plate
Steel Rules[3]	Up to 72 in	(2.6 + 9.6*L*) µin + 0.6*R*	Gage blocks
Tape Measures[3]	Up to 25 ft	(2.6 + 9.6*L*) µin + 0.6*R*	Gage blocks
Feeler/Thickness Gages[3]	Up to 1 in	79 µin	Micrometer
Angle Indicators & Protractors[3]	30°, 45°, 60°, 75°, 90°	0.03°	Angle block set
Optical Comparator[3] –			
X-Y Linearity	Up to 12 in	150 µin	Glass master scales
Magnification	10x to 250x	0.014 in	
Angle	0° to 90°	0.1°	Angle block set
Linear Encoders[3] – (Displacement Transducers, LVDT's)	Up to 24 in	0.002 in	Height Gauge w/ multimeter

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC[2, 8] (±)	Comments
DC Voltage[3] – Generate	(0 to 120) mV 120 mV to 1.2 V (1.2 to 12) V (12 to 120) V (120 to 1020) V	12 µV/V + 0.8 µV 8 µV/V + 1 µV 8 µV/V + 10 µV 11 µV/V + 100 µV 11 µV/V + 1 mV	Fluke 5560A

Parameter/Equipment	Range	CMC[2, 8] (±)	Comments
DC Voltage – Measure[3]	(0 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1000) V (1 to 6) kV (Up to 10) kV	0.011 % 0.0057 % 0.0049 % 0.0062 % 0.0067 % 1.2 % 0.05 % + 0.03 V	Agilent 34401A Fluke 80K-6 & DMM Vitrek 4700
DC Current[3] – Generate	(0 to 120) µA (0.12 to 1.2) mA (1.2 to 12) mA (12 to 120) mA 120 mA to 1.2 A (1.2 to 3.1) A (3.1 to 12) A (12 to 30.2) A	0.012 % + 6 nA 0.01 % + 15 nA 0.011 % + 80 nA 0.011 % + 0.8 µA 0.017 % + 10 µA 0.028 % + 150 µA 0.028 % + 250 µA 0.095 % + 500 µA	Fluke 5560A
DC Current – Measure[3]	(1 to 10) mA (10 to 100) mA 100 mA to 1 A (1 to 3) A (3 to 5) A (5 to 10) A	0.039 % 0.043 % 0.1 % 0.17 % 0.35 % + 1 mA 0.35 % + 2 mA	Agilent 34401A Fluke 287

Parameter/Equipment	Frequency	CMC[2, 8] (±)	Comments
AC Voltage[3] – Generate			
(1 to 12) mV	(3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz	0.23 % + 7 µV 0.083 % + 7 µV 0.019 % + 6 µV 0.037 % + 6 µV 0.15 % + 15 µV 0.75 % + 30 µV 0.75 % + 30 µV	Fluke 5560A
(12 to 120) mV	(3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz	0.23 % + 7 µV 0.083 % + 7 µV 0.018 % + 6 µV 0.035 % + 8 µV 0.076 % + 20 µV 0.2 % + 30 µV 0.2 % + 30 µV	

Parameter/Equipment	Frequency	CMC[2, 8] (±)	Comments
AC Voltage[3] – Generate (cont.)			
120 mV to 1.2 V	(3 to 5) Hz (5 to 10) Hz (10 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz	0.23 % + 75 µV 0.083 % + 70 µV 0.018 % + 60 µV 0.018 % + 8 µV 0.03 % + 14 µV 0.066 % + 40 µV 0.18 % + 80 µV 0.18 % + 80 µV	Fluke 5560A
(1.2 to 12) V	(3 to 5) Hz (5 to 10) Hz (10 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz	0.23 % + 750 µV 0.083 % + 750 µV 0.018 % + 350 µV 0.018 % + 50 µV 0.03 % + 50 µV 0.066 % + 120 µV 0.18 % + 600 µV 0.18 % + 600 µV	
(12 to 120) V	(3 to 5) Hz (5 to 10) Hz (10 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz	0.23 % + 7.5 mV 0.083 % + 7.5 mV 0.018 % + 3.5 mV 0.018 % + 500 µV 0.03 % + 500 µV 0.15 % + 1.2 mV	
(120 to 1020) V	(3 to 5) Hz (5 to 10) Hz 10 Hz to 10 kHz	0.23 % + 75 mV 0.083 % + 75 mV 0.018 % + 80 mV	
AC Voltage – Measure[3] (Power Sources, Supplies, Hipot Testers)			
Up to 750 V	10 Hz to 20kHz (20 to 50) kHz (50 to 100) kHz	0.12 % 0.21 % 0.82 %	Agilent 34401A
(750 to 1000) V	(20 to 45) Hz (45 to 65) Hz 65 Hz to 10 kHz	1.8 % + 6.0 V 0.35 % + 2.5 V 0.47 % + 2.5 V	Fluke 287
(1 to 6) kV	(45 to 65) Hz	1.4 %	Fluke 80K-6 & DMM
(1 to 10) kV	(50 to 60) Hz	0.15 % + 0.1 V	Vitrek 4700

Parameter/Range	Frequency	CMC[2, 8] (±)	Comments
AC Current[3] – Generate			
(12 to 120) µA	(3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.024 % + 10 nA 0.024 % + 10 nA 0.024 % + 10 nA 0.15 % + 40 nA 0.47 % + 1 µA	Fluke 5560A
(0.12 to 1.2) mA	(3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.024 % + 100 nA 0.024 % + 100 nA 0.024 % + 100 nA 0.15 % + 100 nA 0.47 % + 5 µA	
(1.2 to 12) mA	(3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.024 % + 1 µA 0.024 % + 1 µA 0.024 % + 1 µA 0.15 % + 1 µA 0.47 % + 10 µA	
(12 to 120) mA	(3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.024 % + 10 µA 0.017 % + 5 µA 0.024 % + 8 µA 0.15 % + 10 µA 0.47 % + 100 µA	
120 mA to 1.2 A	(3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.024 % + 100 µA 0.024 % + 50 µA 0.024 % + 80 µA 0.23 % + 300 µA 0.47 % + 300 µA	
(1.2 to 3.1) A	(3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.036 % + 500 µA 0.029 % + 300 µA 0.036 % + 300 µA 0.23 % + 500 µA	
(3.1 to 12) A	(3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.036 % + 2 mA 0.029 % + 2 mA 0.036 % + 800 µA 0.23 % + 1 mA	
(12 to 30.2) A	(3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz	0.094 % + 10 mA 0.066 % + 8 mA 0.47 % + 8 mA	

Parameter/Range	Frequency	CMC[2, 8] (±)	Comments
AC Current – Measure[3]			
(0 to 1) A	10 Hz to 5 kHz	0.18 %	Agilent 34401A
(1 to 3) A	10 Hz to 5 kHz	0.26 %	
(3 to 5) A	45 Hz to 1 kHz	0.93 % + 2 mA	Fluke 287
(5 to 10) A	45 Hz to 1 kHz	0.93 % + 5 mA	
Capacitance[3] – Generate			
(0.2 to 1.2) nF	100 Hz to 10 kHz	0.12 % + 2 pF	Fluke 5560A
(1.2 to 3) nF	150 Hz to 5 kHz	0.12 % + 5 pF	
(3 to 12) nF	10 Hz to 5 kHz	0.12 % + 5 pF	
(12 to 30) nF	200 Hz to 1.3 kHz	0.13 % + 30 pF	
(30 to 120) nF	10 Hz to 1.3kHz	0.13 % + 30 pF	
(0.12 to 1.2) µF	(2 to 310) Hz	0.13 % + 300 pF	
(1.2 to 12) µF	(0.5 to 110) Hz	0.13 % + 3 nF	
(12 to 120) µF	(0.5 to 40) Hz	0.15 % + 25 nF	
(0.12 to 1.2) mF	(0.1 to 11) Hz	0.24 % + 250 nF	
(1.2 to 12) mF	(0.03 to 4) Hz	0.24 % + 3 µF	
(12 to 120) mF	(0.01 to 1.3) Hz	0.47 % + 30 µF	

Parameter/Range	Range	CMC[2, 8] (±)	Comments
Resistance[3] – Generate	(0 to 12) Ω	24 µΩ/Ω + 0.001 Ω	Fluke 5560A
	(12 to 120) Ω	29 µΩ/Ω + 0.001 Ω	
	(0.12 to 1.2) kΩ	23 µΩ/Ω + 0.002 Ω	
	(1.2 to 12) kΩ	23 µΩ/Ω + 0.02 Ω	
	(12 to 120) kΩ	23 µΩ/Ω + 0.2 Ω	
	(0.12 to 1.2) MΩ	23 µΩ/Ω + 2 Ω	
	(1.2 to 12) MΩ	33 µΩ/Ω + 30 Ω	
	(12 to 120) MΩ	0.04 % + 2.5 kΩ	
	(0.12 to 1.2) GΩ	0.38 % + 100 kΩ	
Resistance – Measure[3]	(0 to 100) Ω	0.013 % + 0.004 Ω	Agilent 34401A
	(0.1 to 1) kΩ	0.014 % + 0.01 Ω	
	(1 to 10) kΩ	0.013 % + 0.1 Ω	
	(10 to 100) kΩ	0.013 % + 1 Ω	
	(0.1 to 1) MΩ	0.013 % + 10 Ω	
	(1 to 10) MΩ	0.05 % + 0.1 kΩ	
	(10 to 100) MΩ	1 % + 1 kΩ	

Parameter/Equipment	Range	CMC[2, 8] (±)	Comments
Electrical Calibration of RTD Readouts[3]– Generate			
PT100 (385)	(-200 to 100) °C (100 to 800) °C	0.07 °C 0.17 °C	Fluke 754
PT1000 (385)	(-200 to 100) °C (100 to 630) °C	0.07 °C 0.17 °C	
Electrical Calibration of RTD Simulators[3]– Measure			
PT100 (385)	(-200 to 100) °C (100 to 800) °C	0.11 °C 0.26 °C	Fluke 754
PT1000 (385)	(-200 to 100) °C (100 to 630) °C	0.11 °C 0.26 °C	
Electrical Simulation of Temperature Displays & Readouts[3] –			
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.23 °C 0.13 °C 0.11 °C 0.14 °C 0.19 °C	Fluke 5560A
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.27 °C 0.13 °C 0.11 °C 0.2 °C 0.33 °C	
Type N	(-200 to -100) °C (-100 to 410) °C (410 to 1300) °C	0.34 °C 0.19 °C 0.23 °C	
Type R	(0 to 250) °C (250 to 1000) °C (1000 to 1767) °C	0.5 °C 0.3 °C 0.34 °C	
Type S	(0 to 250) °C (250 to 1400) °C (1400 to 1767) °C	0.42 °C 0.33 °C 0.41 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 400) °C	0.57 °C 0.21 °C 0.14 °C	

IV. Fluid Quantities

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Fume Hoods – Air Velocity Only[3]	(20 to 200) ft/min	4.2 %	Anemometer

V. Mechanical

Parameter/Equipment	Range	CMC[2, 4, 7] (±)	Comments
Scales & Balances[3]	Up to 500 g (500 to 20 000) g (> 20 to 5000) kg Up to 1000 lb (1000 to 120 000) lb Up to 5 mg Up to 50 mg Up to 500 mg (1 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 > 1000 g	0.024 % + 0.6*R* 0.017 % + 0.6*R* 0.017 % per 20 000 g + 0.6*R* 0.017 % + 0.6*R* 0.017 % per 20 000 lb + 0.6*R* 0.008 mg + 0.6*R* 0.015 mg + 0.6*R* 0.03 mg + 0.6*R* 0.06 mg + 0.6*R* 0.073 mg + 0.6*R* 0.099 mg + 0.6*R* 0.12 mg + 0.6*R* 0.2 mg + 0.6*R* 0.36 mg + 0.6*R* 0.56 mg + 0.6*R* 0.97 mg + 0.6*R* 2 mg + 0.6*R* 2 mg per 1000 g + 0.6*R*	Class F weights (applied load) Class E2 weights (applied load)
Force – Measuring Equipment[3]	Up to 100 lb	0.017 % + 0.6*R*	Class F weights
Torque – Measuring Equipment (Wrenches)[3]	(10 to 100) oz-in 5 lbf-in to 600 lbf-ft	0.65 % 0.65 %	CDI 1001-O-DTT CDI Suretest 5000-ST

Parameter/Equipment	Range	CMC[2, 4, 7] (±)	Comments
Pressure – Measuring Equipment[3]	(0.01 to 300) psig (0 to 3000) psig (5 to 10 000) psig	0.063 % FS 0.065 % FS 0.065 % FS	Beamex MC2-IPM20C Druck DPI-3000 Druck DPI-10K
Atmospheric Pressure (Vacuum) – Measuring Equipment[3]	(0.01 to 30) in·Hg	0.025 in·Hg	Beamex MC2-IPM2C
Indirect Verification of Rockwell Hardness Testers[3]	HRC: Low Medium High HRBW: Low Medium High HR15N: Low Medium High	 0.27 HRC 0.27 HRC 0.23 HRC 0.49 HRBW 0.4 HRBW 0.39 HRBW 0.27 HR15N 0.27 HR15N 0.23 HR15N	Indirect verification per ASTM E18

VI. Thermodynamics

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
Relative Humidity – Measure[3]	(10 to 90) % RH	1.4 % RH	Vaisala M170 w/ HMP-76
Temperature – Measure[3]	(-196 to 420) °C	0.19 °C	Fluke 754 w/ PRT
Temperature Measuring Equipment [3]	(-15 to 350) °C	0.24 °C	Fluke 9009 w/PRT

VII. Time & Frequency

Parameter/Equipment	Range	CMC[2, 5, 7] (±)	Comments
Timers & Stopwatches[3]	(1 to 3600) s	0.16 s	Stopwatch
Frequency – Measuring Equipment	0.01 Hz to 2 MHz	3.5 μHz/Hz + 0.6*R*	Fluke 5560A

[1] This laboratory offers commercial calibration and field calibration services, 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 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, FS represents "Full Scale," and the value is defined as the percentage of reading, unless otherwise noted and *R* is the resolution of the unit under test.

[5] In the statement of CMC, *L* is the numerical value of the nominal length of the device measured in inches and *R* is the resolution of the unit under test.

[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.

[8] 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.

Accredited Laboratory

A2LA has accredited

CROSS TECHNOLOGIES, INC. dba CROSS (FORMERLY J.A.KING)

La Vista, NE

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 the requirements of 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 29th day of August 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1741.09
Valid to September 30, 2025

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