



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017
& ANSI/NCSL Z540-1-1994

CRYSTAL ENGINEERING CORPORATION, AN AMETEK INC. COMPANY

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CALIBRATION

Valid To: September 30, 2025

Certificate Number: 2601.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1, 4}:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 6} ($\pm$)	Comments
DC Voltage – Measure	(0 to 200) mV (0.2 to 2) V (2 to 20) V (20 to 200) V	0.000 31 % + 0.23 μ V 0.0003 % + 0.4 μ V 0.0003 % + 4 μ V 0.000 45 % + 40 μ V	Fluke 8508A
DC Voltage – Generate	(0 to 200) mV (0.2 to 2) V (2 to 20) V (20 to 200) V	0.000 55 % + 0.25 μ V 0.0004 % + 2.8 μ V 0.0004 % + 28 μ V 0.0007 % + 0.7 mV	Fluke 5522A, Fluke 8508A
DC Current – Generate	(0 to 200) μ A (0.2 to 2) mA (2 to 20) mA (20 to 200) mA	0.0009 % + 0.8 nA 0.001 % + 8 nA 0.0011 % + 80 nA 0.0035 % + 0.8 μ A	Fluke 5522A, Fluke 8508A
DC Current – Measure	(0 to 199) μ A (0.2 to 1.9) mA (2 to 19) mA (20 to 110) mA (111 to 199) mA	0.0013 % + 0.4 nA 0.0010 % + 0.3 nA 0.000 95 % + 0.5 nA 0.000 94 % + 10 nA 0.0037 % + 0.38 μ A	Fluke 8508A Fluke 8508A Khron-Hite PCR100 Fluke 8508A

Parameter/Equipment	Range	CMC ^{2,3,6} (±)	Comments
Resistance – Generate	(0 to 100) Ω (100 to 400) Ω (400 to 2000) Ω (2 to 20) kΩ (20 to 200) kΩ (200 to 2000) kΩ	0.000 72 % + 10 μΩ 0.000 71 % 0.000 64 % + 2.5 mΩ 0.000 73 % + 8 mΩ 0.000 78 % + 60 mΩ 0.001 % + 1 Ω	Fluke 1595A Fluke 8508A Fluke 5522A
Resistance – Measure	(0 to 100) Ω (100 to 400) Ω (400 to 2000) Ω (2 to 20) kΩ (20 to 200) kΩ (200 to 2000) kΩ	0.000 72 % + 10 μΩ 0.0007 % 0.000 66 % + 2 mΩ 0.000 75 % + 6 mΩ 0.000 78 % + 50 mΩ 0.000 95 % + 1 Ω	Fluke 1595A

II. Mechanical

Parameter/Equipment	Range	CMC ^{2,3,5} (±)	Comments
Pressure – Measuring Equipment	(-13.5 to 0.2) psi Gauge	0.0018 % + 0.000 074 psi	PG7601-10kPa/kg piston in differential mode
	(0.2 to 1.44) psi Gauge	0.0015 % + 0.000 067 psi	PG7601-10kPa/kg piston in differential mode
	(1.45 to 55) psi Gauge	0.0012 % + 0.000 014 psi	PG7601-10kPa/kg piston in gauge mode
	(55 to 555) psi Gauge	0.0018 % + 0.000 11 psi	PG7601-100kPa/kg piston in gauge mode
	(555 to 3044) psi Gauge	0.0019 % + 0.000 68 psi	PG7202-200kPa/kg piston in gauge mode
	(3044 to 15 222) psi Gauge	0.0035 % + 0.006 psi	PG7202-1MPa/kg piston in gauge mode
	(0.8 to 1.44) psia Absolute	0.0072 % + 0.000 086 psia	PPC4 100kPa in absolute mode
	(1.45 to 55) psia Absolute	0.0012 % + 0.000 012 psia	PG7601-10kPa/kg piston in absolute mode
	(55 to 555) psia Absolute	0.0018 % + 0.000 11 psia	PG7601-100kPa/kg piston in absolute mode

Parameter/Equipment	Range	CMC ^{2, 3, 5} (±)	Comments
Pressure – Measuring Equipment (cont)	(555 to 3060) psia Absolute	0.0019 % + 0.0019 psia	PG7202-200kPa/kg piston in absolute Mode
	(3060 to 15 236) psia Absolute	0.0035 % + 0.007 psia	PG7202-1MPa/kg piston in absolute mode

III. Thermodynamics

Parameter/Equipment	Range	CMC ^{2, 3, 5} (±)	Comments
Temperature – Measure	(-100 to 0) °C (0 to 155) °C	0.017 °C 0.018 °C	Rosemount CE162, Fluke 1595A, Wika CER6000
	(155 to 400) °C (400 to 660) °C	0.002 % + 0.015 °C 0.028 °C	Rosemount CE162, Fluke 1595A, Wika CER6000
	(660 to 700) °C (700 to 1000) °C (1000 to 1205) °C	0.55 °C 0.57 °C 0.75 °C	Ametek TC-R, Fluke 8508
Temperature – Measuring Equipment	(-100 to 155) °C	0.018 °C	Rosemount CE162, Fluke 1595A, Wika CER6000, RTC-159, DLC-159
	(155 to 425) °C (425 to 660) °C	0.0015 % + 0.022 °C 0.0072 %	Rosemount CE162, Fluke 1595A, Wika CER6000, Ametek RTC-700, Ametek DLC-700
	(660 to 700) °C	0.57 °C	Ametek TC-R, Fluke 8508, Ametek RTC-700, Ametek DLC-700

¹ This laboratory offers limited commercial calibration services.

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

⁴ This scope meets A2LA's *P112 Flexible Scope Policy*.

⁵ 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.

⁶ 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.



Accredited Laboratory

A2LA has accredited

CRYSTAL ENGINEERING CORPORATION, AN AMETEK INC.

COMPANY

San Luis Obispo, CA

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 ANSI/NCSL Z540-1-1994 and 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 13th day of June 2023.



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

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2601.01
Valid to September 30, 2025

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