



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005  
& ANSI/NCSL Z540-1-1994

CRYSTAL ENGINEERING CORPORATION, AN AMETEK INC. COMPANY  
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CALIBRATION

Valid To: September 30, 2019

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<sup>1,4</sup>:

I. Electrical – DC/Low Frequency

| Parameter/Equipment   | Range  | CMC <sup>2,6</sup> (±)   | Comments                   |
|-----------------------|--|--|----------------------------|
| DC Voltage – Measure  | (0 to 200) mV<br>(0.2 to 2) V<br>(2 to 20) V<br>(20 to 200) V    | 0.000 31 % + 0.23 μV<br>0.0003 % + 0.4 μV<br>0.0003 % + 4 μV<br>0.000 45 % + 40 μV | Fluke 8508A                |
| DC Voltage – Generate | (0 to 200) mV<br>(0.2 to 2) V<br>(2 to 20) V<br>(20 to 200) V    | 0.000 55 % + 0.25 μV<br>0.0004 % + 2.8 μV<br>0.0004 % + 28 μV<br>0.0007 % + 0.7 mV | Fluke 5522A<br>Fluke 8508A |
| DC Current – Generate | (0 to 200) μA<br>(0.2 to 2) mA<br>(2 to 20) mA<br>(20 to 200) mA | 0.0009 % + 0.8 nA<br>0.001 % + 8 nA<br>0.0011 % + 80 nA<br>0.0035 % + 0.8 μA       | Fluke 5522A<br>Fluke 8508A |
| DC Current – Measure  | (0 to 200) μA<br>(0.2 to 2) mA<br>(2 to 20) mA<br>(20 to 200) mA | 0.0008 % + 0.42 nA<br>0.0009 % + 4 nA<br>0.001 % + 50 nA<br>0.0035 % + 0.8 μA      | Fluke 8508A                |

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

## II. Mechanical

| Parameter/Equipment                 | Range                      | CMC <sup>2, 3, 5</sup> (±)               | Comments                                    |
|-------------------------------------|----------------------------|--|---|
| Pressure – Gas, Measuring Equipment | (-13.5 to 0.2) psi Gauge   | 0.002 % + 0.000 07 psi                   | PG7601-10kpa/kg piston in differential mode |
|                                     | (0.2 to 1.5) psi Gauge     | 0.001 % + 0.000 07 psi                   | PG7601-10kpa/kg piston in differential mode |
|                                     | (1.5 to 55) psi Gauge      | 0.001 % + 0.000 01 psi                   | PG7601-10kpa/kg piston in gauge mode        |
|                                     | (55 to 555) psi Gauge      | 0.002 % + 0.0001 psi                     | PG7601-100kpa/kg piston in gauge mode       |
|                                     | (555 to 3044) psi Gauge    | 0.002 % + 0.0005 psi                     | PG7202-200kpa/kg piston in gauge mode       |
|                                     | (3044 to 15 222) psi gauge | 0.003 % + 0.003 psi                      | PG7202-1Mpa/kg piston in gauge mode         |
|                                     | (0.8 to 1.5) psi Absolute  | 0.008 % + .00008 psi                     | PPC4 100kpa<br>In absolute mode             |
|                                     | (1.5 to 55) psi Absolute   | 0.001 % + 0.000 05 psi                   | PG7601-10kpa/kg piston in absolute mode     |
| (55 to 555) psi Absolute            | 0.002 % + 0.0001 psi       | PG7601-100kpa/kg piston in absolute mode |   |

| Parameter/Equipment                              | Range                           | CMC <sup>2, 3, 5</sup> (±) | Comments                                    |
|--|---------------------------------|----------------------------|---|
| Pressure – Gas,<br>Measuring<br>Equipment (cont) | (555 to 3060) psi<br>Absolute   | 0.002 % + 0.0012 psi       | PG7202-200kpa/kg<br>piston in absolute mode |
|  | (3060 to 15236) psi<br>Absolute | 0.004% + 0.0013 psi        | PG7202-1Mpa/kg piston<br>in absolute mode   |

### III. Thermodynamics

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

<sup>1</sup> This laboratory does not normally offer commercial calibration service.

<sup>2</sup> 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.

<sup>3</sup> In the statement of CMC, percentages are percentage of reading, unless otherwise indicated.

<sup>4</sup> This scope meets A2LA's *P112 Flexible Scope Policy*.

<sup>5</sup> 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.

<sup>6</sup> 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 17025:2005 *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 8<sup>th</sup> day of December 2017.

A blue ink signature of the Senior Director of Accreditation Services.

Senior Director, Accreditation Services  
For the Accreditation Council  
Certificate Number 2601.01  
Valid to September 30, 2019  
Revised July 25, 2019

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