



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, 2015

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</sup>:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
DC Voltage – Measure	(0 to 10) V (>10 to 30) V (>30 to 100) V	0.00005 % of rdg + 0.00058 V 0.00052 % of rdg + 0.00054 V 0.00095 % of rdg + 0.00041 V	Agilent 3458A DMM
(For Calibration of PV Series Only)	(0 to 1) V	0.0011 % of rdg + 0.061 mV	HP 34970A data acquisition switch unit
DC Voltage – Generate	(0 to 12) V (12 to 30) V (30 to 110) V	0.00018 % of rdg + 0.00058 V 0.00048 % of rdg + 0.00054 V 0.00089 % of rdg + 0.00042 V	Krohn-Hite 523 calibrator (To characterize product -20 to 50°C)

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
DC Current – Generate	(0 to 11) mA (>11 to 50) mA (50 to 110) mA	0.00065 % of rdg + 0.00056 mA 0.0065 % of rdg + 0.00058 mA 0.0067 % of rdg + 0.00052 mA	Krohn-Hite 523 calibrator (To characterize product -20 to 50°C)
DC Current – Measure	(0 to 10) mA (>10 to 55) mA (>55 to 100) mA	0.00090 % of rdg + 0.00056 mA 0.0038 % of rdg + 0.00065 mA 0.0040 % of rdg + 0.00059mA	Agilent 3458A DMM
Resistance – Generate Fixed Value (Four Terminal)	0.001 Ω 100 Ω 200 Ω 400 Ω	5.8 mΩ 6.2 mΩ 7.4 mΩ 11 mΩ	Company resistor box
Resistance – Measure	(0.0 to 10) Ω (>10 to 100) Ω (>100to 500) Ω	0.000044 % of rdg + 0.0058 Ω 0.00037 % of rdg + 0.0057 Ω 0.00083 % of rdg + 0.0049 Ω	Agilent 3458A DMM

## II. Mechanical

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Pressure – Gas	(0 to < 450) psi (450 to 1500) psi	0.068 psi 0.0065 % of rdg + 0.034 psi	DHI PPC3 pressure controller (to characterize product - 20 to 50 °C)
	(0 to < 900) psi (900 to 3000) psi	0.13 psi 0.013 % of rdg + 0.012 psi	DHI PPCH-G pressure controller (to characterize product - 20 to 50 °C)
	(0 to < 3000) psi (3000 to 10 000) psi	0.70 psi 0.011 % of rdg + 0.31 psi	
	(0 to <4500) psi (4500 to 15 000) psi	0.82 psi 0.012 % of rdg + 0.23 psi	

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Pressure – Gas (cont)	(-14.5 to <-13.5) psi	0.0076% of rdg + 0.00019 psi	DHI PPC4/RPM4 pressure controller (to characterize product -20 to 50 °C)
	(-13.5 to <13.5) psi	0.0012 psi	
	(13.5 to 30) psi	0.0076 % of rdg + 0.00019 psi	
	(-14.5 to <15.3) psi	0.0014 psi	
	(15.3 to 36) psi	0.0077 % of rdg + 0.00017 psi	
	(-14.5 to <30) psi	0.0063 psi	
	(30 to 100) psi	0.0057% + 0.0041 psi	
	(-14.5 to <90) psi	0.0092 psi	
	(90 to 300) psi	0.0076 % of rdg + 0.0019 psi	
	(0 to <150) psi	0.013 psi	
	(150 to 500) psi	0.0078 % of rdg + 0.0012 psi	
	(0 to <180) psi	0.016 psi	DHI RPM4 pressure controller (to characterize product -20 to 50 °C)
	(180 to 600) psi	0.0079 % of rdg + 0.0010 psi	
(0 to <300) psi	0.063 psi		
(300 to 1000) psi	0.0057 % of rdg + 0.041 psi	DHI PG7601 base with 10 kPa/kg piston (to characterize product -20 to 50 °C)	
(-14.5 to -4.8) psi	0.0064% of rdg + 0.00037 psi		
(-4.8 to 1.5) psi	0.00069 psi		
(-14.5 to -9) psi	0.0069% of rdg + 0.00033 psi		
(>-9 to 9) psi	0.00097 psi		
(>9 to 16) psi	0.0069 % of rdg + 0.00033 psi		
(-14.5 to 0) psi	0.00011 % of rdg + 0.00058 psi		
(0 to 16) psi	0.00029 % of rdg + 0.00058 psi		
(0 to 30) psi	0.00045 % of rdg + 0.00058 psi		
(0 to 36) psi	0.00051 % of rdg + 0.00058 psi		
(0 to 43.5) psi	0.00058 % of rdg + 0.00058 psi		
(0 to 55) psi	0.00066 % of rdg + 0.00058 psi	DHI PG7601 base with 100 kPa/kg piston (to characterize product -20 to 50 °C)	
(0 to 100) psi	0.0017 % of rdg + 0.00060 psi		
(0 to 300) psi	0.0011 % of rdg + 0.0058 psi		
(0 to 550) psi	0.0012 % of rdg + 0.0058 psi	DHI PG7202 base with 200 kPa/kg piston (to characterize product -20 to 50 °C)	
(0 to 1000) psi	0.00035 % of rdg + 0.058 psi		
(0 to 1450) psi	0.00049 % of rdg + 0.058 psi		
(0 to 3000) psi	0.00086 % of rdg + 0.058 psi		



Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Pressure – Gas (cont)	(0 to 3000) psi (0 to 4345) psi (0 to 5000) psi (0 to 10 000) psi (0 to 15 000) psi	0.0021 % of rdg + 0.058 psi 0.0025 % of rdg + 0.058 psi 0.0026 % of rdg + 0.058 psi 0.0010 % of rdg + 0.58 psi 0.0014 % of rdg + 0.58 psi	DHI PG7202 base with 1 MPa/kg piston (to characterize product -20 to 50 °C)

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

<sup>2</sup> 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.



American Association for Laboratory Accreditation

## Accredited Laboratory

A2LA has accredited

**CRYSTAL ENGINEERING CORPORATION, AN AMETEK INC. CORPORATION**

*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 any additional program requirements in the field of calibration. 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 8 January 2009).

Presented this 11<sup>th</sup> day of July 2013.



A handwritten signature in black ink, reading "Peter M. Meyer".

President & CEO  
For the Accreditation Council  
Certificate Number 2601.01  
Valid to September 30, 2015  
Revised February 9, 2015

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