



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

ALPHA TECHNOLOGIES SERVICES, LLC  
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CALIBRATION

Valid To: May 31, 2019

Certificate Number: 2017.01

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. Dimensional

Parameter/Equipment	Range	CMC <sup>2, 4</sup> (±)	Comments
Indicators <sup>3</sup> – Analog Digital	Up to 40 mm Up to 40 mm	(0.0051 + 0.6R) mm (0.0035 + 0.6R) mm	ASTM D3767 with gage blocks
Bore Diameter <sup>3</sup>	Up to 12.7 mm	0.0037 mm	ASTM D5099, D1238, D3835 with borescope and master ring
Extensometers <sup>3</sup>	Up to 400 mm (400 to 1000) mm	0.45 mm 0.45 mm	ASTM E83 with:  Calibrated bar  Precision ruler
Orifice <sup>3</sup> – Bore Diameter Length	(0.254 to 3.175) mm Up to 50.8 mm	0.0016 mm 0.0029 mm	ASTM D1238, D3835, D5099 with pin gage and micrometer

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Piston Tip <sup>3</sup> – Outside Diameter Linear Length	Up to 12.7 mm Up to 19 mm	0.0014 mm 0.0014 mm	ASTM D1238, D3835 with micrometers
Thickness Gauge	Up to 3 mm	0.0016 mm	Certified gauge blocks

## II. Dimensional Testing/Calibration<sup>1</sup>

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Length Standards (1D) <sup>3,5</sup>	Up to 457 mm	0.03 mm	Gage blocks with indicator, height gauge, surface plate
Diameter <sup>3,6</sup>	(0.1 to 25) mm	0.0059 mm	ASTM D3767 with caliper
Angle <sup>3</sup>	(0 to 60) °	0.0025 °	Rotary encoder measuring device

## III. Mechanical

Parameter/Equipment	Range	CMC <sup>2,4</sup> (±)	Comments
Torque – Static	(0 to 50) in·lbf (50 to 130) in·lbf	0.088 in·lbf 0.088 in·lbf	Dead weights and torque arm
Dynamic <sup>3</sup>	(0 to 50) in·lbf (50 to 130) in·lbf	0.16 in·lbf 0.17 in·lbf	Torque standard
Torque Wrenches	Up to 200 in·lbf	0.51 in·lbf	Torque wrench tester

Parameter/Equipment	Range	CMC <sup>2,4</sup> (±)	Comments
Mass	(0.1 to 10) g (> 10 to 220) g (> 220 to 500) g (> 500 to 1000) g (> 1 to 20) kg	0.0054 g 0.50 g 0.50 g 0.99 g 5.0 g	ASTM D1238, NIST HB 105-1, single substitution
Density	(1.04 to 2.0) g/cm <sup>3</sup>	0.002 g/cm <sup>3</sup>	Precision balance in air and in water
Specific Gravity	(1.04 to 2.0)	0.002 g/cm <sup>3</sup>	
Density/Specific Gravity Testers	(1.04 to 2.0) g/cm <sup>3</sup>  (1.04 to 2.0)	(0.002 g/cm <sup>3</sup> + 0.6R)  (0.002 g/cm <sup>3</sup> + 0.6R)	ASTM D792
Force and Materials Testing Machines <sup>3</sup> –			
Force – Tension and Compression Transducers	(0 to 22) lbf  (0 to 50) lbf (51 to 500) lbf (500 to 5000) lbf	0.11 % IV  0.11 % IV 0.11 % IV 0.11 % IV	ASTM E4 using deadweights ASTM E4 using load cells
Extensometer	(0 to 400) mm  (400 to 1000) mm	0.45 mm  0.45 mm	ASTME83, calibrated bar  Precision ruler
Gage Length	(0 to 100) mm	0.024 mm	ASTM E83 using caliper
Crosshead Dwell Time	(0 to 10) min	0.23 s	Digital stopwatch
Crosshead Distance	(0 to 400) mm	0.002 mm	Caliper, precision ruler
Crosshead Rate	(0.03 to 600) mm/min	0.37 %	Caliper/ruler and stop watch

Parameter/Equipment	Range	CMC <sup>2,4</sup> ( $\pm$ )	Comments
Scales and Balances <sup>3</sup>	(0.1 to 10) g (> 10 to 220) g (> 220 to 500) g (> 500 to 1000) g (> 1 to 20) kg	(0.14 + 0.6 <i>R</i> ) (0.15 + 0.6 <i>R</i> ) (0.52 + 0.6 <i>R</i> ) (1.0 + 0.6 <i>R</i> ) (5.0 + 0.6 <i>R</i> )	ASTM E898

#### IV. Thermodynamics

Parameter/Equipment	Range	CMC <sup>2</sup> ( $\pm$ )	Comments
Temperature – Temperature Measure <sup>3</sup>	Ambient to 250 °C	0.088 °C	ASTM D1646, D2084, D5289, D6204, D6601 with temperature probe and meter
Temperature Meters	Ambient to 200 °C	0.061 °C	ITS 90, oil bath with SPRT and digital readout
Barrel Temperature <sup>3</sup>	15 °C to 425 °C	0.014 °C	ASTM D1238, D3835, with Hart digital PRT

#### V. Time & Frequency

Parameter/Equipment	Range	CMC <sup>2</sup> ( $\pm$ )	Comments
Dwell Time	(0 to 24) hours	0.23 s	ASTM E898, D1646, D2084, D5289, D6204, D6601 with digital stop watch

<sup>1</sup> This laboratory offers commercial calibration and dimensional testing services and field calibration and dimensional testing services where noted.

<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> Field calibration service is available for this calibration and this laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. 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.

<sup>4</sup> In the statement of CMC, *R* is the numerical value of the resolution of the device and *IV* represents Indicated Value.

<sup>5</sup> 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 certificate.

<sup>6</sup> This test is not equivalent to a calibration.



## Accredited Laboratory

A2LA has accredited

### ALPHA TECHNOLOGIES SERVICES, LLC

*Hudson, OH*

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 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 8 January 2009).



Presented this 5<sup>th</sup> day of October 2017.

A handwritten signature in black ink, written over a horizontal line.

President and CEO  
For the Accreditation Council  
Certificate Number 2017.01  
Valid to May 31, 2019

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