SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

UNIVERSITY OF DAYTON RESEARCH INSTITUTE
STRUCTURE AND COMPONENT CHARACTERIZATION GROUP
1031 Irving Avenue
Dayton, OH 45469
Steve Fuchs Phone: 937 229 2718

CALIBRATION

Valid To: July 31, 2025 Certificate Number: 3790.01

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. Dimensional

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Displacement – Indicator	Up to 1 in	120 µin	Digital micrometer, head block
Displacement[3] – Sensor	Up to 1 in Up to 10 in	(120 + 180*L*) µin 0.0016 in	Digital micrometer digital micrometer, gage blocks
Micrometers	Up to 12 in	(52 + 6*L*) µin	Gage blocks
Calipers	Up to 12 in	(280 + 6*L*) µin	Gage blocks

II. Dimensional Testing

Parameter/Equipment	Range	CMC[2, 7] (±)	Comments
Geometric Dimension[4] – Measure X, Y, Z Axis – Volumetric Accuracy	(1000 x 625 x 500) mm	0.013 mm	CMM

5202 Presidents Court, Suite 220 | Frederick, MD 21703-8398 | Phone: 301 644 3248 | Fax: 240 454 9449 | www.A2LA.org

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC[2, 8] (±)	Comments
Electrical Simulation of Thermocouples[3]			
Type J	(-200 to 1200) °C	0.5 ºC	Fluke 701
Type K	(-200 to 1370) °C	0.5 ºC	
Type T	(-250 to -200) °C (-200 to 400) °C	0.8 ºC 0.5 ºC	
DC Voltage[3] – Measure	Up to 2 V Up to 20 V	0.000 12 V + 0.022 % 0.0012 V + 0.022 %	DMM

IV. Fluid Quantities

Parameter/Equipment	Range	CMC[2, 5, 7] (±)	Comments
Viscosity – Measuring Equipment			
Ford Cup	No. 4	1 %	Viscosity standard time/temperature
Zahn Cup	No. 2	2 %	

V. Mechanical

Parameter/Equipment	Range	CMC[2, 5, 7] (±)	Comments
Force (Linear)[3] – Measuring Equipment			
Tension or Compression	Up to 500 lbf	0.044 lbf + 0.011 %	Dead weights
	Up to 500 lbf	0.28 lbf + 0.06 %	Load cell using DC supply & 2-channel nano-voltmeter
	(500 to 10 000) lbf (2000 to 50 000) lbf	0.28 lbf + 0.036 % 10 lbf + 0.04 %	

Parameter/Equipment	Range	CMC[2, 5, 7] (±)	Comments
Force (Torsional)[3] – Measuring Equipment			
Tension or Compression	Up to 2000 lbf·ft	0.22 lbf·ft + 0.1 %	Lever arm & dead weights
	(50 to 1900) lbf·ft	0.5 lbf·ft + 0.1 %	Torque cell using DC supply & 2-channel nano-voltmeter
Pressure[3] – Measuring Equipment	(-13.5 to 50) psig (50 to 250) psig (100 to 1000) psig (250 to 2500) psig	0.05 psig 0.04 psig + 0.02 % 0.44 psig + 0.005 % 0.74 psig + 0.007 %	Pressure indicator
Scales & Balances[3]	1 mg to 50 g 50 g to 6.1 kg (6.1 to 32) kg	0.002 mg/g + 0.01 mg + 0.8*R* 0.001 mg/g + 0.8*R* 0.0005 mg/g + 0.8*R*	NIST Class S & S[1] mass pieces
Mass – Measure	(1 to 220) g (220 to 410) g 410 g to 4.1 kg (4.1 to 32) kg	0.0007 mg/g + 0.15 mg 1.2 mg 12 mg 120 mg	NIST Class S & S[1] mass pieces

VI. Thermodynamics

Parameter/Equipment	Range	CMC[2, 5, 7] (±)	Comments
Relative Humidity[3] – Measure	(10 to 95) % RH		Vaisala MI70 & HMP77
	@ (-40 to -20) ºC @ (-20 to 40) ºC @ (40 to 180) ºC	(1.1 + 1.1 %) RH (0.9 + 0.6 %) RH (1.1 + 1.1 %) RH	

Parameter/Equipment	Range	CMC[2, 5, 7] (±)	Comments
Temperature[3] – Measure	(-70 to -20) ºC (-20 to 180) ºC	0.2 ºC + 0.22 % 0.12 ºC + 0.16 %	Vaisala MI70 & HMP77
Ovens & Chambers	(-80 to 260) ºC	0.85 ºC	Thermocouple zone system
	(-80 to 350) °C	0.5 ºC	Channel with polynomial correction
Temperature[3] – Measuring Equipment & Indicating Devices	(-80 to 260) °C 0 °C	0.05 °C 0.025 °C	PRT & indicator, temperature baths
	(25 to 650) °C	0.0016 °C/°C + 0.22 °C	Jofra dry block
Temperature – Measure	(-200 to -130) °C (-130 to 450) °C (450 to 660) °C	0.0077 °C 0.000 02 °C/°C + 0.013 °C 0.000 02 °C/°C + 0.018 °C	SPRT & HP 3458A

VII. Time & Frequency

Parameter/Equipment	Range	CMC[2, 5, 7] (±)	Comments
Timers & Counters[3] – Measuring Equipment	Up to 86 400 s	800 ms	Electronic stop watch
Speed (Rotation)[3] – Measure	Up to 120 000 RPM	0.2 %	Oscilloscope by comparison
		0.01 %	Counter timer by comparison

[1] This laboratory offers commercial dimensional testing and calibration service.

[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] 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.

[5] In the statement of CMC, percent is defined as percent of reading. *L* is the numerical value of the length of the device measured in inches. *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

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Dayton, OH

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 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 21st day of August 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3790.01
Valid to July 31, 2025

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