SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

ZWICKROELL, LP
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CALIBRATION

Valid To: January 31, 2023 Certificate Number: 1891.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations[1, 5]:

I. Dimensional

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Diameter & Length[3] (Mechanical & Material Test Machines)			ASTM E83, ASTM D1238, ISO 1133-1&2, ISO 9513 (CMU), ASTM D6458, ASTM D1525, ISO 306, ISO 75
	Up to 10 mm	0.023 mm	Micrometer, caliper
	Up to 60 mm	0.15 %	Gage blocks
Displacement[3] – Travel (Mechanical & Material Test Machines/Crosshead)			ASTM E83, ASTM 2309, ASTM 2658, ISO 9513, ISO 1133, ASTM D1238
	(0.02 to 60) mm (50 to 990) mm	0.15 % 0.15 %	Linear glass scale, magnetic scale (class C)
Gage Length[3]			ISO 9513, ASTM E83
	(10 to 200) mm	0.03 mm	Digital calipers

II. Mechanical

Parameter/Equipment	Range	CMC[2, 4, 6] (±)	Comments
Force[3] – Measure			ASTM E4, ASTM D1238, ISO 1133, ASTM D648, ASTM D1525, ISO 306, ISO 7500-1, ISO 75
	>400 kN to 2 MN 40 N to 400 kN (3 to 250) N (0.01 to 200) N	0.25 % 0.17 % 0.17 % 0.10 %	Load cells, deadweights
Durometer Calibration Type A, B, C, D –			ASTM D2240; ISO 868 (part 6)
Indenter Extension and Shape –			
Diameter	1.27 mm	0.04 mm	Optical inspection under 62.5 % magnification
Radius Type A, Type B, Type C, Type D	0.79 mm 0.1 mm	0.03 mm 0.012 mm	
Angle	30°	0.02°	
Extension	2.5 mm	0.04 mm	Gage ring
Indenter Display	Up to 100 Duro Units	0.1 Division of the Reading	
Spring Calibration Force –			
Type A	(0 to 100) Duro Units	0.70 Duro Units	The durometer spring is verified with lever arm with weights
Type D	(0 to 100) Duro Units	1.2 Duro Units	
Pendulum Impact Testing Machines[3] – Charpy, Izod, Tensile Impact Testing			ISO 13802, ISO EN 10045-2, DIN 51222, ISO 8256, ASTM E23
Energy	Up to 10 J (10 to 100) J (100 to 300) J (300 to 450) J (450 to 750) J	0.0068 J 0.026 J 0.054 J 0.075 J 0.13 J	

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Pendulum Impact Testing Machines[3] – Charpy, Izod, Tensile Impact Testing (cont)			ISO 13802, ISO EN 10045-2, DIN 51222, ISO 8256, ASTM E23
Force	(0 to 50) N	0.011 N	Digital protractor
Impact Angle	(0 to 180)º	0.06º	
Impact True Level –			
Impact	----	0.000 045 in/in	
Dimensional	Up to 1 m	0.003 mm	
Test Machines[3] –			
Alignment	Up to 2500 microstrain	25 microstrain	ASTM E-1012
Crosshead Speed	Up to 1000 mm/min	0.15 %	ASTM E-2658, linear magnetic scale or magnetic scale position sensor

III. Thermodynamics

Parameter/Equipment	Range	CMC[2, 6] (±)	Comments
Temperature – Measure			ASTM D1238, ISO 1133-1&2, ASTM D648, ASTM D1525, ISO 306, ISO 75
	Up to 350 °C	0.2 °C	Instrulab/Almemo RTD,

IV. Time & Frequency

Parameter/Equipment	Range	CMC[2] (±)	Comments
Stopwatches & Timers	Up to 240 s	0.016 s	ASTM 2658, ASTM D1238, ISO 1133-1&2

[1] Commercial calibration service and field calibration service is available from this laboratory.

[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] This laboratory performs field calibration activities for these parameters. 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] In the statement of CMC, percentages are percentage of reading, unless otherwise indicated.

[5] This scope meets A2LA's *P112 Flexible Scope Policy*.

[6] 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.

Accredited Laboratory

A2LA has accredited

ZWICKROELL, LP

Kennesaw, GA

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 11th day of February 2021.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1891.01
Valid to January 31, 2023

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