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

SUPERIOR GAGE SERVICE
13931 N 503 Road
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CALIBRATION

Valid To: February 28, 2019 Certificate Number: 2209.01

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

I. Dimensional

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Gage Blocks	Up to 1 in (1 to 4) in	5 µin (1.3 + 3.7*L*) µin	Mechanical comparison
Ring Gages – Inside Diameter	Up to 1 in (1 to 6) in	9 µin (2 + 8*D*) µin	Mechanical comparison to ULM
Plug Gages – Outside Diameter	Up to 1 in (1 to 2) in (2 to 4) in	10 µin (4 + 6*D*) µin 18 µin	Mechanical comparison to ULM
Threaded Plug Gages – Pitch Diameter Major Diameter	 Up to 2 in Up to 2 in	 86 µin 33 µin	Mechanical comparison to gage blocks, three-wire method

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Micrometer Standard	Up to 1 in Up to 6 in	15 µin (9 + 6*L*) µin	Mechanical comparison to gage blocks
Depth Micrometers[3]	Up to 6 in	250 µin	Gage blocks
Height Gages[3]	Up to 24 in Up to 36 in	210 µin 74 µin	Gage blocks
Pin Plugs Class ZZ – Outside Diameter	Up to 1 in	33 µin	Mechanical comparison to gage blocks
Surface Plates[3] – Flatness Repeatability	 (4 x 8) ft (4 x 8) ft	 $(2 + 9\sqrt{ft^2})$ µin 33 µin	 Electronic level system, repeat-o-meter
Dial Indicators – Linearity	Up to 1 in	66 µin	Digital indicator checker
Micrometers – Error of Indication	Up to 6 in	62 µin	Gage blocks, optical flats
Dial Calipers	Up to 6 in (6 to 12) in	200 µin 450 µin	Gage blocks, ring gages
Optical Comparator[3] – Linearity Magnification	 Up to 12 in 10x, 20x, 50x	 150 µin 0.034 % of magnification	 Glass master and scale

II. Mechanical

Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Rockwell Hardness[3] and Rockwell Superficial Hardness Testers[3]	HRA: Low Medium High HRBW: Low Medium High HRC: Low Medium High HREW: Low Medium High HRFW: Low Medium High HRGW: Low Medium High HR15N: Low Medium High HR30N: Low Medium High HR45N: Low Medium High	 0.41 HRA 0.21 HRA 0.23 HRA 1.0 HRBW 0.63 HRBW 0.47 HRBW 0.38 HRC 0.32 HRC 0.31 HRC 0.44 HREW 0.56 HREW 0.55 HREW 0.55 HRFW 0.45 HRFW 0.45 HRFW 0.79 HRGW 0.71 HRGW 0.26 HRGW 0.41 HR15N 0.22 HR15N 0.21 HR15N 0.39 HR30N 0.28 HR30N 0.31 HR30N 0.45 HR45N 0.18 HR45N 0.15 HR45N	ASTM E18

Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Rockwell Hardness[3] and Rockwell Superficial Hardness Testers[3] (cont)	HR15TW: Low Medium High HR30TW: Low Medium High HR45TW: Low Medium High	 0.42 HR15TW 0.36 HR15TW 0.31 HR15TW 0.56 HR30TW 0.34 HR30TW 0.33 HR30TW 0.61 HR45TW 0.61 HR45TW 0.39 HR45TW	ASTM E18
Indirect Verification of Brinell Hardness Testers[3] – HBW 10/3000/15	 (200 to 399) HBW (400 to 600) HBW	 4.3 HBW 1.8 HBW	 ASTM E10
Indirect Verification of Vickers and Knoop Hardness Testers[3] >1 kgf ≤1 kgf	 (400 to 500) HV (250 to 650) HK > 650 HK (100 to 240) HV > 600 HV	 5.9 HV 12 HK 15 HK 8.0 HV 11 HV	 ASTM E384
Force Gages	Up to 200 lbf	0.31 lbf	Dead weight force tension only

Parameter/Equipment	Range	CMC[2] (±)	Comments
Torque Wrenches	Up to 125 ft·lbf (125 to 250) ft·lbf (250 to 600) ft·lbf Up to 1500 in·lbf (1500 to 3000) in·lbf	0.94 ft·lbf 1.8 ft·lbf 4.0 ft·lbf 10 in·lbf 20 in·lbf	AKO torque tester
Scales and Balances[3]	(100 to 300) g 400 g to 4 kg (4 to 6) kg	0.25 mg 0.2 g 0.6 g	Class 1 certified weights

[1] This laboratory offers commercial calibration service and field 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 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.

[4] In the statement of CMC, L represents the numerical value of the nominal length of the device measured in inches; X represents the numerical value of the surface plate diagonal in inches; ft^2 represents the numerical value of the surface plate's total square footage; D represents the numerical value of the nominal diameter of the device measured in inches.

Accredited Laboratory

A2LA has accredited

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Tahlequah, OK

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/NCSLI 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 8 January 2009*).

Presented this 11th day of November 2016.

Senior Director, Accreditation Services
For the Accreditation Council
Certificate Number 2209.01
Valid to February 28, 2019
Revised January 21, 2019

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