CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

1Source Metrology Corp.
465 Pinebush Rd. Unit #2
Cambridge, Ontario, N1T 2J4

Fulfills the requirements of

ISO/IEC 17025:2017

In the fields of

CALIBRATION and **DIMENSIONAL MEASUREMENT**

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

Jason Stine, Vice President

Expiry Date: 21 May 2027

Certificate Number: AD-2678

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. 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).

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

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CALIBRATION AND DIMENSIONAL MEASUREMENT

Valid to: **May 21, 2027** Certificate Number: **AD-2678**

CALIBRATION

Length – Dimensional Metrology

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Coordinate Measuring Machines (CMMs) — CMMs Used for Measuring Linear Dimensions[1]	(10 to 1 010) mm	(1.4 + 0.004 4*L*) µm	ISO 10360-2 using Step Gauges as references
Coordinate Measuring Machines (CMMs) — CMMs Used for Measuring Linear Dimensions[1]	(10 to 5 000) mm	(1.5 + 0.004*L*) µm	ISO 10360-2 using Laser Interferometer and Gauge Block as references
Profile Projectors [1] Length (X & Y axis) Squareness between X axis and Y axis Angle	 (5 to 300) mm X/Y travel up to 100 mm 0° to 180°	 (2.4 + 0.003*L*) µm 3.2 µm 0.017°	JIS B 7184 using Glass Scales, squareness standard and protractor as references
Thread Plug Gauges Pitch Diameter Major Diameter	 Up to 304.8 mm Up to 304.8 mm	 (1.2 + 0.005*L*) µm (0.3 + 0.009*L*) µm	ASME B1-16M & ASME B1-2 using Trimos ULM, Gauge Blocks and Thread Wires as references

Length – Dimensional Metrology

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Adjustable Thread Ring Gauges	Up to 101.6 mm	(7.3 + 5.9*L*) µm	ASME B1-16M & ASME B1-2 using Calibrated Master Set Plugs as references
Plain Plug/Pin Gauges	(0.1 to 304.8) mm	(0.3 + 0.009*L*) µm	ASME B89-1-5 using Trimos ULM and Gauge Blocks as reference
Plain Ring Gauges	(12.7 to 304.8) mm	(0.2 + 0.009*L*) µm	ASME B89-1-6 using Trimos ULM and master rings as references
Pipe Taper Thread Plug Gauges			ASME B1-20-1 using Trimos ULM, thread wires, height gauge and gauge blocks as references
Simple Pitch Diameter	Up to 304.8 mm (Up to 12 in)	(1.5 + 0.003*L*) µm	
Basic Step Length	(Up to 34.55 mm) (Up to 1.36 in)	(5.3 + 0.001*L*) µm	
Taper per Thread	Up to 0.2 mm	4.3 µm	
Pipe Taper Thread Ring Gauges			ASME B1-20-1 using master NPT set plugs, height gauge and gauge blocks as references
Standoff Height	Up to 50.8 mm (Up to 2 in)	9.3 µm	
Ring Thickness	Up to 50.8 mm	(5.3 + 0.001*L*) µm	
Solid Thread Ring Gauges			ASME B1-16M & ASME B1-2 using Trimos ULM with touch probe and master rings as references
Pitch Diameter	Up to 152.4 mm (Up to 6 in)	(2.4 + 0.000 2*L*) µm	
Solid Thread Ring Gauges			ASME B1-16M & ASME B1-2 using Zeiss Contura CMM as reference standard.
Minor Diameter	Up to 152.4 mm (Up to 6 in)	(3.4 + 0.003*L*) µm	

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Granite Surface Plates [1] Overall Flatness Flatness of Local Area	 Diagonal: Up to 6 000 mm Up to 0.5 mm	 (1.3 + 0.1*D*) µm 0.23 µm	Fed GGG-P-463c using Tesa TT20 & Autocollimator (*D* is the length of the diagonal in meters)
Gauge Blocks	1 mm to 101.6 mm	(0.1 + 0.004 1*L*) µm	ASME B89.1.9 and ISO 3650 Using Gauge Block Comparator and Master Gauge Blocks as references
Gauge Blocks	>101.6 mm to 508 mm (> 4 in to 20 in)	(0.6 + 0.004 2*L*) µm	ASME B89.1.9 and ISO 3650 Using Trimos ULM and Master Gauge Blocks as references
Calipers (Outside and Inside Measurements)	(0 to 1016) mm	(2 + 0.01*L*) µm + 0.6*R*	ASME B89.1.14 using Gauge Blocks as references
Outside Micrometers	(0 to 25.4) mm (25.4 to 609.6) mm	0.51 µm + 0.007*L* + 0.6*R* 0.15 µm + 0.01*L* + 0.6*R*	ASME B89.1.13 using Gauge Blocks as references
Inside Micrometers Extension Rods	(25 to 1 000) mm (1 in to 40) in (25 to 1 000) mm (1 in to 40) in	1.7 µm + 0.007 2*L* + 0.6*R* (1.2 + 0.021*L*) µm	ASME B89.1.13 using Gauge blocks and Trimos ULM as reference
Depth Micrometers	(0 to 25.4) mm	0.52 µm + 0.004*L* + 0.6*R*	ASME B89.1.13 using Gauge Blocks as references
Height Gauges [1]	(0 to 914.4) mm	4.8 µm + 0.006 7*L* + 0.6*R*	JIS B 7517 using gauge Blocks and/or Step Gauges as references
Dial Indicators (Mechanical and Electronic Types)	(0 to 25.4) mm	1.3 µm + 0.002 2*L* + 0.6*R*	ASME B89.1.10M using Trimos ULM as reference
Test Indicators	(0 to 10) mm	1.3 µm + 0.01*L* + 0.6*R*	ASME B89.1.10M using Trimos ULM as reference
Snap Gauges (Adjustable/Fixed)	(0 to 500) mm	(2.3 + 0.01*L*) µm	Internal procedure WI-25 using Gauge Blocks as reference and CMM as direct measurement

Length – Dimensional Metrology

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Micrometer Setting Standards	(25 to 1 000) mm	(1.2 + 0.021*L*) µm	Internal procedure WI-27 using Universal Measuring Machine.
Universal Length Measuring Machines (ULMs)	(10 to 1 000) mm	(0.024 + 0.004 8*L*) µm	Comparison to Laser Interferometer

Mass and Mass Related

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Indirect Verification of Rockwell Hardness Testers [1]	HRA: Low Medium High	 0.48 HRA 0.54 HRA 0.35 HRA	Indirect verification method per ASTM E18
	HRC: Low Medium High	 0.49 HRC 0.74 HRC 0.38 HRC	
	HREW: Low Medium High	 0.66 HREW 0.75 HREW 0.63 HREW	
	HRBW: Low Medium High	 1.20 HRBW 0.81 HRBW 0.55 HRBW	

Mass and Mass Related

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Indirect Verification of Rockwell Hardness Testers [1]	HR15N: Low Medium High	 0.49 HR15N 0.71 HR15N 0.31 HR15N	Indirect verification method per ASTM E18
	HR30TS: Low Medium High	 0.83 HR30TS 0.68 HR30TS 0.55 HR30TS	
	HR30N: Low Medium High	 0.49 HR30N 0.86 HR30N 0.40 HR30N	
	HR15TW: Low Medium High	 0.61 HR15TW 0.47 HR15TW 0.58 HR15TW	
	HR30TW: Low Medium High	 0.74 HR30TW 0.45 HR30TW 0.50 HR30TW	
	HR45N: Low Medium High	 0.66 HR45N 0.82 HR45N 0.44 HR45N	
	HR45TW: Low Medium High	 0.77 HR45TW 0.52 HR45TW 0.57 HR45TW	

DIMENSIONAL MEASUREMENT

3 Dimensional

Parameter	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Dimensional Measurement 3D	X: Up to 1 200 mm Y: Up to 2 000 mm Z: Up to 1 000 mm	(4.2 + 0.03*L*) µm	Measurement using Coordinate Measuring as Reference Standard for Dimensional Measurement
Dimensional Measurement 3D	X: Up to 700 mm Y: Up to 1 000 mm Z: Up to 700 mm	(3.2 + 0.03*L*) µm	Measurement using Coordinate Measuring as Reference Standard for Dimensional Measurement
Dimensional Measurement 3D	X: Up to 1 000 mm Y: Up to 1 000 mm Z: Up to 600 mm	(2.5 + 0.03*L*) µm	Measurement using Coordinate Measuring as Reference Standard for Dimensional Measurement

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 (k=2), corresponding to a confidence level of approximately 95%.

Notes:

1. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
2. *L* is the length of object under calibration or measurement in mm. *R* is the resolution of the device under calibration in µm.
3. This scope is formatted as part of a single document including the Certificate of Accreditation No. AD-2678.

Jason Stine, Vice President