



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Global Instrumentation Services, LLC
519 N. Sam Houston Parkway E, Suite 125
Houston, TX 77060

Fulfills the requirements of

ISO/IEC 17025:2017

In the field of

CALIBRATION

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.

A handwritten signature in black ink, appearing to read 'R. Douglas Leonard Jr.', is positioned above a horizontal line.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 10 September 2023

Certificate Number: L2268



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

Global Instrumentation Services, LLC

519 N. Sam Houston Parkway E, Suite 125

Houston, TX 77060

Gavin Lewis

832-428-2737

CALIBRATION

Valid to: **September 10, 2023**

Certificate Number: **L2268**

Chemical Quantities

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
pH Meters	4.01 pH 7 pH 10 pH	0.039 pH 0.023 pH 0.036 pH	Aqueous pH Buffer Solutions

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Thermocouple Millivolt Simulation	Type K		Process Calibrator
	(-230 to -100) °C	0.7 °C	
	(-100 to 1 050) °C	0.3 °C	
	(1 050 to 1 371) °C	0.4 °C	
	Type J		
	(-200 to -180) °C	0.4 °C	
	(-180 to -50) °C	0.3 °C	
	(-50 to 500) °C	0.2 °C	
	(500 to 1 200) °C	0.3 °C	
	Type T		
	(-260 to -200) °C	1.2 °C	
	(-200 to -50) °C	0.6 °C	
	(-50 to 0) °C	0.3 °C	
	(0 to 400) °C	0.2 °C	
	Type E		
(-240 to -200) °C	0.5 °C		
(-200 to -100) °C	0.3 °C		
(-100 to 850) °C	0.2 °C		
(850 to 1 000) °C	0.3 °C		

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment	
Thermocouple Millivolt Simulation	Type R		Process Calibrator	
		(-18 to 250) °C		1.5 °C
		(250 to 750) °C		0.9 °C
		(750 to 1 600) °C		0.8 °C
		(1 600 to 1 768) °C		0.9 °C
	Type S			
		(-18 to 100) °C		1.5 °C
		(100 to 400) °C		1.1 °C
		(400 to 1 700) °C		0.9 °C
		(1 700 to 1 768) °C		1 °C
	Type B			
		(316 to 550) °C		2.2 °C
		(550 to 900) °C		1.5 °C
		(900 to 1 150) °C		1.1 °C
		(1 150 to 1 820) °C		1 °C
	Type N			
	(-230 to -180) °C	1.2 °C		
	(-180 to -50) °C	0.6 °C		
	(-50 to 1 100) °C	0.3 °C		
	(1 100 to 1 300) °C	0.4 °C		
Type C				
	(-1 to 1500) °C	0.6 °C		
	(1 500 to 1 900) °C	0.7 °C		
	(1 900 to 2 100) °C	0.8 °C		
	(2 100 to 2 320) °C	1.1 °C		

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pins, Plugs, and Shims	(0.1 to 1) in	56 µin	Micrometer
Shims	(1 to 6) in	454 µin	Caliper
Cutting Dies	Up to 12 in		
Roll Mills Cylinder Gap	(0 to 1) in	349 µin	Gage Blocks
Blocking Testers	(0 to 25) mm	0.01 mm	ASTM D3354 Caliper

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Brittleness Testers	(0 to 25) mm	0.01 mm	ASTM D746 Caliper
HDT and VICAT Testers	(0 to 1) mm	1 μ m	ASTM D648 / D1525 ISO 75 Gage Blocks
	(0 to 25) mm	2 μ m	ASTM D648 / D1525 ISO 75 Micrometer
Impact Testers and Notchers	(0 to 300) mm	0.01 mm	ASTM D256, ASTM D6110, ISO 13802, ISO 179, ISO 180 Caliper
Melt Flow Indexers Capillary Rheometer Piston Dimensions	(0 to 25) mm	2 μ m	ASTM D1238, ISO 1133-1 ISO 1133-2, ASTM D3835 Micrometer
Tear Testers	(0 to 25) mm	0.008 mm	ASTM D1922 Caliper
Liquid Limit Devices, (LLD) Wear of Base Wear of Cup Wear of Cup Hanger Height of Drop	(0 to 10) mm (0 to 0.1) mm (0 to 3) mm (9 to 11) mm	0.06 mm 0.01 mm 0.06 mm 0.06 mm	ASTM D4318 Micrometer Calipers Metric Gage Blocks Gage Blocks
Melt Flow Indexers Bores	(9 to 16) mm	2 μ m	ASTM D1238, ISO 1133-1 ISO 1133-2, Bore Gage
Capillary Rheometer Bores	(9 to 16) mm	2 μ m	ASTM D3835 Bore Gage
Calipers	(0 to 12) in	207 μ in	Gage Blocks Gage Rods
Outside Micrometers ² Length Flatness Parallelism	(0 to 2) in To 1 inD To 0.25 inD	21 μ in 8 μ in 21 μ in	ASME B89.1.13 or ASTM D5947 Gage Blocks, Optical Flats Gage Pins
Dial Indicators	(0 to 4) in	49 μ in	Gage Blocks
Force Testing Machines Crosshead Travel	(0 to 4) in	247 μ in	ASTM E2309 Caliper Fixture
Extensometers	(0 to 12) in	93 μ in	ASTM E83, ISO 9513 Extensometer Calibrator



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Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Ovens, Furnaces, Freezers Air Exchanges	(0 to 500) Air changes per hour	3 Air changes per hour	ASTM D3012, E145, D5374 ISO 188, IEC 60216-4 Ammeter, Anemometer
Air Flow	(10 to 500) fpm	5 fpm	
Compression Presses Force	(1000 to 50 000) lbf (12 000 to 300 000) lbf	1.4 lbf 108 lbf	ASTM D4703, ASTM E4 Load Cell
Capillary Rheometers Force	(200 to 10 000) lbf	0.39 lbf	ASTM D3835 Load Cell
Force Testing Machines	(0 to 300) lbf	0.003 lbf	ASTM E4, ISO 7500 Class F Weights
Compression	(50 to 2 000) lbf (200 to 10 000) lbf (1 000 to 50 000) lbf (12 000 to 300 000) lbf	0.2 lbf 0.39 lbf 1.4 lbf 108 lbf	ASTM E4, ISO 7500 using Load Cell
Tension	(0 to 300) lbf	0.003 lbf	ASTM E4, ISO 7500 Class F Weights
	(50 to 2 000) lbf (200 to 10 000) lbf (1 000 to 50 000) lbf	0.18 lbf 0.27 lbf 2.6 lbf	ASTM E4, ISO 7500 using Load Cell
Plastic Thickness Gages and Micrometers	(5 to 900) kPa	1.8 kPa	ASTM D5947 Load Cell
Durometers Direct Verification Spring Force Types A, B, E, & O Types C, D, & DO Type M Type OO, OOO, & OOO-S	(0.5 to 9) N (4 to 45) N (0.3 to 0.8) N (0.1 to 2) N	0.001 2 N 0.005 N 0.001 2 N 0.001 2 N	ASTM D2240 Load Cells
Durometer Indenters Length, Diameter, Radius Angle	(0 to 25) mm (0 to 0.5) mm (0 to 90) °	0.008 mm 0.008 mm 0.06 °	ASTM D2240 Optical Measuring System
Rockwell Hardness Testers	HRBW Low Medium High HRC Low Medium High	1 HRBW 0.46 HRBW 0.46 HRBW 0.38 HRC 0.33 HRC 0.31 HRC	Indirect Verification per ASTM E18 using Hardness Test Blocks



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Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rockwell Hardness Testers	HREW		Indirect Verification per ASTM E18 using Hardness Test Blocks
	Low	0.45 HREW	
	Medium	0.55 HREW	
	High	0.56 HREW	
	HRMW		
	Low	0.52 HRMW	
	Medium	0.48 HRMW	
	High	0.48 HRMW	
	HRRW		
	Low	0.31 HRRW	
	Medium	0.32 HRRW	
	High	0.31 HRRW	
	HR30N		
	Low	0.28 HR30N	
Medium	0.32 HR30N		
High	0.4 HR30N		
HR30TW			
Low	0.31 HR30TW		
Medium	0.54 HR30TW		
High	0.32 HR30TW		
Impact Testers	(0 to 8) kg	0.17 g	ASTM D256, ASTM D6110, ISO 13802, ISO179, ISO 180 Balance
Melt Flow Indexers	(0 to 8) kg (8 to 14) kg	0.17 g 5 g	ASTM D1238, ISO 1133-1 ISO 1133-2, Balances
HDT and VICAT Testers	(0 to 8) kg	0.17 g	ASTM D648 / D1525 ISO 75, Balance
Pressure Gages & Transducers	(-28 to 0) inHg (0.01 to 500) psig (500 to 3 000) psig (3 000 to 10 000) psig (10 000 to 20 000) psig (20 000 to 60 000) psig	0.66 inHg 0.3 psi 0.79 psi 5 psi 12 psi 70 psi	Pressure Module
Torque Wrenches	(4 to 50) lbf-in (50 to 400) lbf-in (400 to 1 000) lbf-in (50 to 250) lbf-ft (250 to 600) lbf-ft	0.2 lbf.in 1.2 lbf.in 3.0 lbf.in 0.8 lbf.ft 1.8 lbf.ft	Torque Cells

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Weighing Systems (0.01 mg resolution)	(1 to 500) mg	0.013 mg	ASTM E617 Class 00 & Class 1 weights and NIST Handbook 44 utilized for the calibration of the weighing system.
	(1 to 5) g	0.014 mg	
	(10 to 50) g	0.026 mg	
	(50 to 100) g	0.061 mg	
	(100 to 200) g	0.1 mg	
Weighing Systems (0.1 mg resolution)	1 mg to 5 g	0.06 mg	
	(50 to 100) g	0.08 mg	
	(100 to 200) g	0.1 mg	
	(200 to 500) g	1.4 mg	
Weighing Systems (0.001 g resolution)	1 mg to 200 g	0.6 mg	
	(200 to 500) g	1.5 mg	
	(500 to 1 000) g	3 mg	
Weighing Systems (0.01 g resolution)	10 mg to 1 kg	0.01 g	ASTM E617 Class 1 weights and NIST Handbook 44 utilized for the calibration of the weighing system.
	(1 to 5) kg	0.02 g	
	(5 to 10) kg	0.03 g	
Weighing Systems (0.1 g resolution)	500 mg to 10 kg	0.06 g	
Weighing Systems (0.01 lb resolution)	(1 to 240) lb	0.01 lb	NIST Class F weights and NIST Handbook 44 utilized for the calibration of the weighing system.
Weighing Systems (0.1 lb resolution)	(1 to 240) lb	0.06 lb	
Moisture Analyzers	(1 to 500) g	0.3 mg	Class 1 Masses
Viscometers	(0 to 100) cP	0.71 cP	ASTM D2196 Section 6 Viscosity Standards
	(100 to 500) cP	1.7 cP	
	(500 to 1 000) cP	3.1 cP	
	(1 000 to 2 500) cP	10 cP	
	(2 500 to 5 000) cP	20 cP	
	(10 000 to 35 000) cP	161 cP	
	(35 000 to 60 000) cP	276 cP	

Photometry and Radiometry

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Infrared Spectrophotometer (FTIR) Wavelength	(540 to 3 125) cm ⁻¹	See Certificate SRM 1921b	ASTM E131 SRM 1921b

Photometry and Radiometry

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Gloss Meters 20 Degrees 60 Degrees 85 Degrees	(0 to 100) SGU	0.33 SGU 0.33 SGU 0.34 SGU	ASTM D523 Tri Gloss Tile

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Humidity	(10 to 90) %RH	1.8 %RH	Hygrometer
Temperature Measure	(-96 to 200) °C	0.04 °C	RTD Probe and Meter
	(200 to 400) °C	0.05 °C	
Microwave Furnaces	(15 to 100) °C	0.04 °C	ASTM F1317 RTD Probe and Meter
HDT and VICAT Testers	(0 to 400) °C	0.06 °C	ASTM D648 / D1525 ISO 75 RTD Probe and Meter
Melt Flow Indexers	(0 to 400) °C	0.05 °C	ASTM D1238, ISO 1133-1, ISO 1133-2 RTD Probe and Meter
Brittleness Testers	(-80 to 40) °C	0.03 °C	ASTM D746 RTD Probe and Meter
Capillary Rheometer	(23 to 400) °C	0.05 °C	ASTM D3835 RTD Probe and Meter
Moisture Analyzers	(50 to 200) °C	0.26 °C	Omega CL27
Roll Mills	(20 to 400) °C	0.51 °C	
Extruders	(20 to 400) °C	0.36 °C	
Viscometers	(50 to 300) °C	0.04 °C	ASTM D2196 RTD Probe and Meter
Injection Molders	(20 to 400) °C	0.36 °C	Omega CL27
Compression Press	(50 to 400) °C	0.26 °C	ASTM D4703 Omega CL27

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Ovens, Furnaces, Freezers Temperature	(-100 to 1 370) °C	0.5 °C	ASTM D3012, E145, ISO 188, IEC 60216-4 Datalogger
Thermocouples	Type J (-190 to 750) °C Type K (-190 to 1 370) °C Type T (-190 to 390) °C	0.4 °C 0.5 °C 0.4 °C	ASTM E220 Dry Block Tester Omega CL27
Differential Scanning Calorimeters (DSC) Temperature Heat Flow	(0 to 500) °C 28.51 J/g	0.12 °C 0.24 J/g	ASTM D3895, E967, E968, ISO 11357-1 Indium (SRM 2232) Tin (LGC 2609)
Thermogravimetric Analyzers (TGA) Curie Temperature	(20 to 1 000) °C	0.53 °C	ASTM E1582, E2040, ISO 11358 Alumel and Nickel Curie Standards
Weight	(1 to 1 000) mg	0.06 mg	Class 1 Weights
Thermomechanical Analyzer (TMA) Temperature	(20 to 500) °C	0.35 °C	ASTM E1363, E2113, ISO 11359-1, -2, -3 Indium (SRM 2232)
Coefficient of Thermal Expansion	(293 to 680) K	0.03 µK	Borosilicate Glass (SRM 731)
Dynamic Mechanical Analyzer (DMA) Temperature	(-100 to 500) °C	0.09 °C	ASTM D5279, E1867 RTD Meter and Probe
Torque	(0 to 1 000) grf·cm	0.32 grf·cm	Class 1 Weights

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Injection Molders Screw Speed	(0 to 200) rpm	0.17 rpm	Tachometer
Extruders Screw Speed	(0 to 200) rpm	0.17 rpm	

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Roll Mills Rotational Speed	(0 to 100) rpm	0.17 rpm	Tachometer
Viscometers Rotational Speed	(0 to 100) rpm	0.13 rpm	
Force Testing Machines Crosshead Speed	Up to 20 in/min	0.004 in/min	ASTM E2658 Stopwatch
Timers and Stopwatches	(0 to 12) hours	0.03 s	NIST SP-960 Totalize Method Stopwatch
Blocking Testers	(0 to 10) min	0.03 s	ASTM D3354 Stopwatch
Microwave Furnaces			ASTM F1317 Stopwatch
Compression Press			ASTM D4703 Stopwatch
HDT and VICAT Testers			ASTM D648 / D1525 Stopwatch
Impact Tester			ASTM D256, ASTM D6110, ISO 13802, ISO179, ISO 180 Stopwatch

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. D = diameter in inches.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. L2268.



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