CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Global Instrumentation Services, LLC

400 N Sam Houston Pkwy E, Suite 500
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.

Jason Stine, Vice President

Expiry Date: 10 September 2026

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

400 N Sam Houston Pkwy E, Suite 500
Houston, TX 77060
Gavin Lewis 832-428-2737

CALIBRATION

Valid to: **September 10, 2026** Certificate Number: **L2268**

Chemical Quantities

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
pH Meters [3]	4.01 pH 7 pH 10 pH	0.018 pH 0.018 pH 0.018 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 (-230 to -100) °C (-100 to 1 050) °C (1 050 to 1 371) °C Type J (-200 to -180) °C (-180 to -50) °C (-50 to 500) °C (500 to 1 200) °C Type T (-260 to -200) °C (-200 to -50) °C (-50 to 0) °C (0 to 400) °C Type E (-240 to -200) °C (-200 to -100) °C (-100 to 850) °C (850 to 1 000) °C	 0.7 °C 0.3 °C 0.4 °C 0.4 °C 0.3 °C 0.2 °C 0.3 °C 1.2 °C 0.6 °C 0.3 °C 0.2 °C 0.5 °C 0.3 °C 0.2 °C 0.3 °C	Process Calibrator

Electrical – DC/Low Frequency

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

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pins / Plugs	(0.1 to 1) in	31 µin	Supermicrometer
Shims	(0.1 to 1) in	31 µin	Supermicrometer
	(1 to 6) in	450 µin	Digital Caliper
Cutting Dies Length	Up to 12 in	450 µin	Digital Caliper

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Cutting Dies Length Diameter Radius Angle	 (0 to 25) mm (0 to 25) mm (0 to 0.5) mm (0 to 90) °	 0.008 mm 0.008 mm 0.008 mm 0.06 °	Optical Measuring System
Roll Mills Cylinder Gap	(0 to 1) in	350 µin	Gage Blocks
Blocking Testers	(0 to 25) mm	0.01 mm	ASTM D3354 Caliper
Brittleness Testers	(0 to 25) mm	0.01 mm	ASTM D746 Caliper
HDT and VICAT Testers	(0 to 1) mm	1 µm	ASTM D648 / D1525 ISO 75 Gage Blocks
	(0 to 25) mm	2 µm	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 µm	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 µm	ASTM D1238, ISO 1133-1 ISO 1133-2, Bore Gage
Capillary Rheometer Bores	(9 to 16) mm	2 µm	ASTM D3835 Bore Gage
Calipers	(0 to 12) in	210 µin	Gage Blocks Gage Rods

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Outside Micrometers[2] Length Flatness Parallelism	(0 to 2) in To 1 in*D* To 0.25 in*D*	21 µin 8 µin 21 µin	ASME B89.1.13 or ASTM D5947 Gage Blocks, Optical Flats Gage Pins
Digital and Dial Indicators	(0 to 1) in (0 to 25) mm	31 µin 0.000 8 mm	Supermicrometer
	(0 to 4) in (0 to 100) mm	49 µin 0.001 2 mm	Gage Blocks
Force Testing Machines Crosshead Travel	(0 to 4) in	250 µin	ASTM E2309 Caliper Fixture
Extensometers	(0 to 12) in	35 µin	ASTM E83, ISO 9513 Extensometer Calibrator
Brinell Microscopes	(0 to 25) mm	0.008 mm	Stage Micrometer

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	(1 000 to 60 000) lbf (12 000 to 600 000) lbf	22 lbf 360 lbf	ASTM D4703, ASTM E4 Load Cell
Capillary Rheometers Force	(200 to 10 000) lbf	0.84 lbf	ASTM D3835 Load Cell
Force Testing Machines	(0 to 300) lbf	0.003 lbf	ASTM E4, ISO 7500 Class F Weights
Force Indicating Devices (Compression)	(5 to 60) lbf (60 to 300) lbf (50 to 2 000) lbf (200 to 10 000) lbf (1 000 to 60 000) lbf (12 000 to 600 000) lbf	0.08 lbf 0.14 lbf 0.35 lbf 0.84 lbf 22 lbf 360 lbf	ASTM E4, ISO 7500 using Load Cell
Force Indicating Devices (Tension)	(5 to 60) lbf (60 to 300) lbf	0.07 lbf 0.14 lbf	ASTM E4, ISO 7500 Class F Weights

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Force Indicating Devices (Tension)	(50 to 2 000) lbf (200 to 10 000) lbf (1 919 to 60 000) lbf	0.30 lbf 0.47 lbf 13 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	HRA (>70) HRA (≥70 to <80) HRA (≥80) HRA HRBW (>60) HRBW (≥60 to <88) HRBW (≥88) HRBW HRC (<35) HRC (≥35 to <60) HRC (≥60) HRC HREW (<84) HREW (≥80 to <93) HREW (≥ 93) HREW HRMW (<92) HRMW (≥92 to < 120) 1HRMW (≥120) HRMW	 0.32 HRA 0.24 HRA 0.24 HRA 0.38 HRBW 0.4 HRBW 0.42 HRBW 0.42 HRC 0.37 HRC 0.35 HRC 0.39 HREW 0.23 HREW 0.52 HREW 0.59 HRMW 0.45 HRMW 0.45 HRMW	Indirect Verification per ASTM E18 using Hardness Test Blocks

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rockwell Hardness Testers	HRRW (< 115) HRRW (≥115 to < 120 HRRW (≥120) HRRW HR15N (<78) HR15N (≥78 to <90) HR15N (≥90) HR15N HR15TW (<81) HR15TW (≥81 to <87) HR15TW (≥87) HR15TW HR30N (<55) HR30TN (≥55 to <777) HR30TN (≥77) HR30TN HR30TW (<57) HR30TW (≥57 to <70) HR30TW (≥70) HR30TW	 0.38 HRRW 0.37 HRRW 0.37 HRRW 0.45 HR15N 0.45 HR15N 0.54 HR15N 0.32 HR15TW 0.32 HR15TW 0.45 HR15TW 0.37 HR30N 0.29 HR30N 0.28 HR30N 0.58 HR30TW 0.3 HR30TW 0.29 HR30TW	Indirect Verification per ASTM E18 using Hardness Test Blocks
Impact Testers	(0 to 8) kg	0.17 g	ASTM D256, ASTM D6110, ISO 13802, ISO179, ISO 180 Balance
Brinell Hardness Testers Verification of Test Force Verification of Indenter Diameter	 (500, 750, 1 500, 2 000, and 3 000) kgf 10 mm 5 mm	 2.5 kgf 0.002 mm 0.002 mm	Direct Verification per ASTM E10 using ASTM E74 Load Cell
Brinell Hardness Testers	(1 to 7) mm	0.025 mm	Indirect Verification per ASTM E10
Vickers Hardness Testers	> 600 HV 0.2 >600 HV 0.5 >600 HV 1 (240 to 600) HV 5 <240 HV 10	17 HV 15 HV 9.3 HV 3. HV 2.3 HV	ASTM E92 Indirect Verification
Knoop Hardness Testers	>650 HK 0.2 (250 to 650) HK 0.5 <250 HK 1	18 HK 16 HK 8.8 HK	ASTM E92 Indirect Verification

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
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	0.25 lbf·in 1.2 lbf·in 30 lbf·in 0.8 lbf·ft 1.8 lbf·ft	Torque Cells
Weighing Systems (0.001 mg resolution)	(1 to 10) mg (10 to 500) mg (1 000 to 5 000) mg	0.002 mg 0.005 mg 0.013 mg	ASTM E617 Class 00 & Class 1 weights and NIST Handbook 44 utilized for the calibration of the weighing system.
Weighing Systems (0.01 mg resolution)	(1 to 500) mg (1 to 5) g (10 to 50) g (50 to 100) g (100 to 200) g	0.013 mg 0.014 mg 0.026 mg 0.061 mg 0.1 mg	ASTM E617 Class 00 & Class 1 weights and NIST Handbook 44 utilized for the calibration of the weighing system.
Weighing Systems (0.1 mg resolution)	1 mg to 5 g (50 to 100) g (100 to 200) g (200 to 500) g	0.06 mg 0.08 mg 0.1 mg 1.4 mg	
Weighing Systems (0.001 g resolution)	1 mg to 200 g (200 to 500) g (500 to 1 000) g	0.6 mg 1.5 mg 3 mg	
Weighing Systems (0.01 g resolution)	10 mg to 1 kg (1 to 5) kg (5 to 10) kg	0.01 g 0.02 g 0.03 g	ASTM E617 Class 1 weights and NIST Handbook 44 utilized for the calibration of the weighing system.
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

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Weighing Systems (0.1 lb resolution)	(1 to 240) lb	0.06 lb	for the calibration of the weighing system.
Moisture Analyzers	(1 to 500) g	0.3 mg	Class 1 Masses
Thermogravimetric Analyzers (TGA) Weighing System	(1 to 1 000) mg	0.06 mg	ASTM E2040, ISO 11358 Class 1 Weights
Viscometers	(0 to 100) cP (100 to 500) cP (500 to 1 000) cP (1 000 to 2 500) cP (2 500 to 5 000) cP (10 000 to 35 000) cP (35 000 to 60 000) cP	0.71 cP 1.7 cP 3.1 cP 10 cP 20 cP 160 cP 280 cP	ASTM D2196 Section 6 Viscosity Standards
Dynamic Mechanical Analyzer (DMA) Torque	(0 to 1 000) grf·cm	0.32 grf·cm	ASTM D5279, E1867 Class 1 Weights
Pipettes	(1 to 10) µL (10 to 50) µL (50 to 100) µL (100 to 500) µL (500 to 1 000) µL (1 000 to 5 000) µL (5 000 to 10 000) µL (10 000 to 20 000) µL	0.1 µL 0.11 µL 0.33 µL 0.51 µL 2.4 µL 5.8 µL 15 µL 29 µL	Gravimetric method, ISO 8655-6

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
Gloss Meters 20 Degrees 60 Degrees 85 Degrees	(0 to 100) SGU	0.61 SGU 0.61 SGU 0.72 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	(-196 to 200) °C (200 to 420) °C	0.04 °C 0.05 °C	RTD Probe and Meter
Microwave Furnaces	(15 to 100) °C	0.04 °C	ASTM F1317 RTD Probe and Meter
Radiation (Infrared) Thermometers	35 °C 100 °C 200 °C 350 °C 500 °C	0.39 °C 0.52 °C 0.81 °C 1.5 °C 2.4 °C	Blackbody Source (Flat Plate) $\varepsilon = 0.95$, $\lambda = (8 \text{ to } 14)$ µm
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	Digital Thermometer
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	Digital Thermometer
Compression Press	(50 to 400) °C	0.26 °C	ASTM D4703 Digital Thermometer
Ovens, Furnaces, Freezers Temperature	(-100 to 1 370) °C	0.5 °C	ASTM D3012, E145, ISO 188, IEC 60216-4 Datalogger

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Thermocouples	Type J (-40 to 660) °C Type K (-40 to 660) °C Type T (-40 to 660) °C	0.4 °C 0.5 °C 0.4 °C	ASTM E220 Dry Block Tester Digital Thermometer
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
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^{-1}	0.03 μK^{-1}	Borosilicate Glass (SRM 731)
Dynamic Mechanical Analyzer (DMA) Temperature	(-100 to 500) °C	0.09 °C	ASTM D5279, E1867 RTD Meter and Probe

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	
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

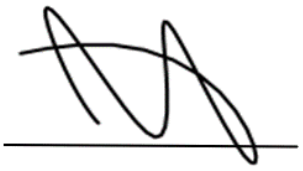
Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Timers and Stopwatches	(0 to 12) hours	0.038 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	(0 to 10) min	0.03 s	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. The nominal values listed are approximate.
4. This scope is formatted as part of a single document including Certificate of Accreditation No. L2268.



Jason Stine, Vice President