



CERTIFICATE OF ACCREDITATION

This is to attest that

INDUSTRIAL PHYSICS, INC

40 MCCULLOUGH DRIVE
NEW CASTLE, DELAWARE 19720 U.S.A.

Calibration Laboratory CL-128

has met the requirements of AC204, *IAS Accreditation Criteria for Calibration Laboratories*, and has demonstrated compliance with ISO/IEC Standard 17025:2017, *General requirements for the competence of testing and calibration laboratories*. This organization is accredited to provide the services specified in the scope of accreditation.

Effective Date December 21, 2023

Expiration Date July 1, 2024



A handwritten signature in black ink that reads "Raj Nathan".

President

SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | www.iasonline.org

INDUSTRIAL PHYSICS, INC

<http://www.industrialphysics.com/>

Contact Name Nicholas Riggs

Contact Phone +1-812-558-5390

Accredited to ISO/IEC 17025:2017

Effective Date December 21, 2023

CALIBRATION AND MEASUREMENT CAPABILITY (CMC)*

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY ^{1,2} (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
<i>Dimensional</i>			
Depth meters	Up to 3 mm	0.1 µm	Direct verification per ASTM E18, Hardness Blocks Procedure 280
Extensometers	0.0001 in to 2 in 2 in to 20 in	0.00001 in 0.002 in	Verified per ASTM E83 Height Gage, Gage Blocks Procedure 115 and 125
	0.0001 in to 2 in	0.00003 in	Verified per ISO9513 & UTS Procedures 116 using Linear Calibrator and Gage Blocks
Micrometers	0.00005 in to 1 in	0.00015 in	UTS proc. 210, Gage blocks
Digital Thickness Gage (Micrometer) ⁵			FCI/497000 using Gage Blocks, Load Cell
Thickness			
Imperial	0.01 in to 0.05 in 0.1 in to 0.5 in	0.000014 in 0.000059 in	
Metric	0.254 mm to 1.272 mm 2.54 mm to 12.72 mm	0.04 mm 0.0015 mm	
Parallelism			
Imperial	Up to 1 in	0.000013 in	
Metric	Up to 25.4 mm	0.0003 mm	
Deadweight Load Force	Up to 5 lbf	0.06 lbf	
Height Gages	0.0015 in to 40 in	0.0011 in	UTS proc. 381, Gage Blocks, setting standards

* If information in this CMC is presented in non-SI units, the conversion factors stated in NIST Special Publication 811 "Guide for the Use of the International System of Units (SI)" apply.

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Calipers	0.0005 in to 6 in	0.00073 in	UTS Proc. 211, Caliper checker, Ring gage.
Mechanical			
Force – Compression and Tension (Load Cells and Universal Testing Machines)	0.01 lbf to 500,000 lbf	0.05 %	Master Load Cells per ASTM E74 and ASTM E4 Procedure 100 and 105
	100 lbf to 12,000 lbf	0.15 %	Master load cells per ISO 376. Calibration per ISO 7500-1 and UTS Procedure 101
	12,000 lbf to 25,000 lbf 25,000 lbf to 200,000 lbf	0.06 % 0.04 %	
Compression Testers ⁵			Procedure FCI 173700, FCI/170000
Force	0 lbf to 100 lbf 100 lbf to 250 lbf 250 lbf to 1000 lbf 1000 lbf to 2000 lbf 2000 lbf to 10000 lbf 10000 lbf to 25000 lbf	0.29 lbf 0.67 lbf 2.7 lbf 3.7 lbf 18 lbf 29 lbf	
Crosshead Speed	Up to 3 in/min	0.011 in/min	
Tensile Testers ⁵			Procedure FCI/84000, FCI/842100
Force	0 lbf to 250 lbf 250 lbf to 2000 lbf 2000 lbf to 10000 lbf 10000 lbf to 25000 lbf	0.67 lbf 3.8 lbf 18 lbf 33 lbf	
Crosshead Speed (Distance/Time)	Up to 12 in/min	0.11 in/min	
Crosshead Travel	Up to 8 in	0.002 in	
Revolutions Per Minute	0 rpm to 48 rpm	0.18 rpm	
Z-Directional Tensile Testers ⁵			Procedure FCI/842200
Force (Tension/Compression)	0 lbf to 250 lbf	0.67 lbf	
Revolutions Per Minute	0 rpm to 30 rpm	0.18 rpm	
Speed	Up to 20 in/min	0.005 in/min	
Force -Tension (Load Cells and Tension Creep Testing Machines)	100 lbf to 10,000 lbf	0.06 %	Master Load Cells per ISO 376, Calibration per ISO 7500-2 and UTS Procedure 101

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Machine and Specimen Alignment	0.1 % to 100 % Bending	2.1 % Bending	30,000 lbf Alignment Bar, Data Acquisition System, ASTM E1012 Procedure 290
Crosshead Speed	0.001 in/min to 40 in/min	0.001 in/min	ASTM E2658 Stopwatch, Dial Indicator, Procedure 315
Crosshead Displacement	0.0001 in to 2 in 2 in to 20 in	0.001 in 0.003 in	ASTM E2309 Dial/Digital Indicator, UTS Height Gage Procedure 315
Load Rate – Compression and Tension	Up to 25,000 lbf/min (Upper limit of 100,000 psi/min)	0.25 %	ASTM E2309, E2658, and UTS Procedure 405
Strain Rate Gages	0.002 in/in/min (0.2 %/min) to 0.01 in/in/min (1 %/min)	0.25 %	ASTM E2309, E2658, and UTS Procedure 410
Pressure Gages	1 psi to 5 psi 5 psi to 500 psi 500 psi to 10,000 psi	0.15 % 0.05 % 0.06 %	Pressure Transducer, UTS Procedure 320
Tear Testers ⁵ Pendulum Force Cut Depth Jaw Separation	0 gf to 4385 gf 0 in to 0.787 in 0 in to 0.11 in	0.1 gf 0.002 in 0.002 in	Procedure FCI/831100
Canadian Standard Freeness Tester ⁵ ID Length Volume	0 mm to 130 mm 0 mL to 24 mL	0.07 mm 0.07 mL	Procedure FCI/332400
Burst Testers ⁵ Pressure	0 psi to 200 psi 200 psi to 1000 psi	0.6 psi 2.9 psi	Procedure FCI/130100, 130900
Melt Flow Indexers ⁵ Temperature Bore Diameter Piston Diameter Mass Die Length Piston Land Length	100 °C to 400 °C Up to 0.4 in Up to 0.4 in Up to 4 kg Up to 0.4 in Up to 0.3 in	0.56 °C 0.0006 in 0.0006 in 0.1 g 0.0006 in 0.0006 in	Procedure FCI/460000
Horizontal Plane Slip and Friction Tester ⁵ Force Sled Mass	Up to 2000 gf 100 g to 2000 g	1.3 gf 1.9 g	Procedure FCI/320000

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Inclined Plane Slip and Friction Tester ⁵ Sled Mass Plane Angle	200 g to 1260 g 0° to 90°	1.9 g 0.32°	Procedure FCI/322500
Impact Testers ⁵ Sample Support Length Mass Notch Depth	Up to 4 in 0 kg to 4 kg Up to 0.4 in	0.003 in 0.1 g 0.0011 in	Procedure FCI/430100, 430200, 220500
Release and Adhesion Testers ⁵ Force Revolutions per Minute	0 gf to 2000 gf 0 rpm to 160 rpm	0.1 gf 0.18 rpm	Procedure FCI/809000
Ink Rub Testers ⁵ Mass Frequency	0 lb to 4 lb Up to 100 strokes/min	0.01 lb 0.26 strokes/min	FCI/101801
Brinell Hardness Testers (Indirect)	HBW (95 to 200) HBW (200 to 300) HBW (300 to 400) HBW (400 to 500) HBW (500 to 600) HBW (600 to 650) HBW	1 HBW 2 HBW 3 HBW 4 HBW 5 HBW 6 HBW	Indirect Verification per ASTM E10 Procedure 175
Brinell Hardness Testers (Direct)	500 kgf 1000 kgf 1500 kgf 3000 kgf	0.25 kgf 0.5 kgf 0.75 kgf 1.5 kgf	Direct Verification per ASTM E10 Procedure 180
Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers	HRA (80 to 84) HRA (70 to 78) HRA (20 to 65) HRA HRBW (80 to 100) HRBW (60 to 79) HRBW (40 to 59) HRBW HRC (60 to 65) HRC (35 to 55) HRC (20 to 30) HRC	0.19 HRA 0.31 HRA 0.29 HRA 0.39 HRBW 0.30 HRBW 0.42 HRBW 0.31 HRC 0.38 HRC 0.40 HRC	Indirect verification per ASTM Standard E18 with NIST traceable blocks, Procedure 165

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Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers (continued)	HRD (71 to 75) HRD (51 to 67) HRD (40 to 48) HRD	0.18 HRD 0.31 HRD 0.27 HRD	Indirect verification per ASTM Standard E18 with NIST traceable blocks, Procedure 165
	HREW (93 to 100) HREW (84 to 90) HREW (70 to 79) HREW	0.49 HREW 0.49 HREW 0.49 HREW	
	HRFW (94 to 100) HRFW (80 to 90) HRFW (60 to 75) HRFW	0.45 HRFW 0.44 HRFW 0.28 HRFW	
	HRGW (80 to 94) HRGW (55 to 75) HRGW (30 to 50) HRGW	0.43 HRGW 0.29 HRGW 0.82 HRGW	
	HRHW (96 to 100) HRHW (80 to 94) HRHW	0.36 HRHW 0.36 HRHW	
	HRKW (85 to 100) HRKW (65 to 80) HRKW (40 to 60) HRKW	0.25 HRKW 0.36 HRKW 0.54 HRKW	
	HRLW (105 to 126) HRLW	0.20 HRLW	
	HRMW (86 to 123) HRMW	0.54 HRMW	
	HRPW (63 to 119) HRPW	0.36 HRPW	
	HRRW (114 to 120) HRRW	0.23 HRRW	
	HRSW (105 to 112) HRSW	0.35 HRSW	
	HRVW (98 to 121) HRVW	0.79 HRVW	

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Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers (Continued)	HR15N (90 to 92) HR15N (78 to 88) HR15N (70 to 77) HR15N	0.53 HR15N 0.43 HR15N 0.41 HR15N	Indirect verification per ASTM Standard E18 with NIST traceable blocks, Procedure 165
	HR30N (77 to 82) HR30N (55 to 73) HR30N (42 to 50) HR30N	0.52 HR30N 0.47 HR30N 0.42 HR30N	
	HR45N (66 to 72) HR45N (37 to 61) HR45N (20 to 31) HR45N	0.23 HR45N 0.27 HR45N 0.59 HR45N	
	HR15TW (87 to 93) HR15TW (81 to 86) HR15TW (74 to 80) HR15TW	0.29 HR15TW 0.39 HR15TW 0.41 HR15TW	
	HR30TW (70 to 83) HR30TW (57 to 69) HR30TW (43 to 56) HR30TW	0.36 HR30TW 0.29 HR30TW 0.66 HR30TW	
	HR45TW (53 to 73) HR45TW (33 to 7352) HR45TW (13 to 32) HR45TW	0.43 HR45TW 0.40 HR45TW 0.70 HR45TW	
	HR15WW (76 to 96) HR15WW	0.26 HR15WW	
	HR30WW (50 to 92) HR30WW	0.56 HR30WW	
	HR45WW (20 to 86) HR45WW	0.31 HR45WW	
	HR15XW (86) HR15XW	0.19 HR15WX	
	HR30XW (72 to 97) HR30XW	0.26 HR30XW	
	HR45XW (72 to 97) HR45XW	0.76 HR45XW	

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Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers (continued)	HR15YW (90 to 100) HR15YW	0.22 HR15YW	Indirect verification per ASTM Standard E18 with NIST traceable blocks, Procedure 165
	HR30YW (84 to 99) HR30YW	0.43 HR30YW	
	HR45YW 92 HR45YW	0.24 HR45YW	
Indirect Verification of Hardness Testers -Vickers	HV 0.01 (100 to 240) HV (600 to 800) HV	24 HV 80 HV	Indirect Verification per ASTM E92, Procedure 380
	HV 0.025 (100 to 240) HV (600 to 800) HV	18 HV 51 HV	
	HV 0.05 (100 to 240) HV (600 to 800) HV	12 HV 36 HV	
	HV 0.10 (240 to 600) HV (600 to 800) HV	13 HV 16 HV	
	HV 0.20 (240 to 600) HV (600 to 800) HV	13 HV 18 HV	
	HV 0.30 (240 to 600) HV (600 to 800) HV	12 HV 16 HV	
	HV 0.50 (240 to 600) HV (600 to 800) HV	12 HV 13 HV	
	HV 1 (240 to 600) HV (600 to 800) HV	23 HV 11 HV	
	HV 5 (100 to 240) HV (600 to 800) HV	14 HV 17 HV	

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Indirect Verification of Hardness Testers -Vickers (continued)	HV 10 (100 to 240) HV (600 to 800) HV	10 HV 21 HV	Indirect Verification per ASTM E92, Procedure 380
	HV 30 (100 to 240) HV (600 to 800) HV	11 HV 24 HV	
Scales	0.005 kg to 100 kg	0.003 kg	Class F1 Weights, UTS Procedure 200
Torque Measuring Instruments	1 lbf·ft to 250 lbf·ft	2.1 lbf·ft	250 lbf·ft Torque cell, UTS Proc. 240
Thermal			
Laboratory Thermometers	10 °C to 50 °C	0.3 °C	Dry Block Standard UTS Procedure 295
Ovens, Furnaces, Presses	-100 °C to 1800 °C	1.4 °C	ASTM E145 Keithley Martel Procedure 140 and 145
Relative Humidity – Measure ³	57 %RH	2.9 %RH	Digital Hygrometer, UTS Procedure 340
Electrical – DC/LF			
DC Voltage – Measure ³	0.1 mV to 10 mV	0.006 % + 40 nV	Keithley 2182 Procedure 360
	10 mV to 100 mV	0.004 % + 0.5 µV	
	0.1 V to 1 V	0.0032 % + 3 µV	
	1 V to 10 V	0.0032 % + 30 µV	
	10 V to 100 V	0.0052 % + 500 µV	

¹The uncertainty covered by the Calibration and Measurement Capability (CMC) is expressed as the expanded uncertainty having a coverage probability of approximately 95 %. It is the smallest measurement uncertainty that a laboratory can achieve within its scope of accreditation when performing calibrations of a best existing device. The measurement uncertainty reported on a calibration certificate may be greater than that provided in the CMC due to the behavior of the calibration item and other factors that may contribute to the uncertainty of a specific calibration.

²When uncertainty is stated in relative terms (such as percent, a multiplier expressed as a decimal fraction or in scientific notation), it is in relation to instrument reading or instrument output, as appropriate, unless otherwise indicated.

³Capability is suitable for the calibration of measuring devices in the stated ranges.

⁴Capability is suitable for the calibration of devices intended to generate the indicated quantity in the stated ranges.

⁵Only available as site calibration. Note that actual measurement uncertainties achievable at a specific customer's site may be larger than the uncertainties listed on this Scope of Accreditation.