CERTIFICATE OF ACCREDITATION

This is to attest

INDUSTRIAL PHYSICS, INC

100 QUALITY AVENUE
NEW ALBANY, INDIANA 47150 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.

Expiry Date July 1, 2026
Effective Date December 5, 2024

International Accreditation Service
Issued under the authority of IAS management

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SCOPE OF ACCREDITATION

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INDUSTRIAL PHYSICS, INC

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Accredited to ISO/IEC 17025:2017 *Effective Date December 5, 2024*

CALIBRATION AND MEASUREMENT CAPABILITY (CMC)*

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Dimensional			
Extensometers	0.0001 in to 2 in 2 in to 20 in	0.00001 in 0.002 in	Direct measurement method by using Linear Calibrator, Caliper, Height Gage, Gage Blocks as needed per per ASTM E83
	0.0001 in to 2 in	0.00003 in	Direct measurement using Linear Calibrator, Caliper, Height Gage, Gage Blocks as needed as per ISO 9513[5]
Micrometers[4]	0.00005 in to 1 in	0.00015 in	Gage blocks by direct measurement method
Digital Thickness Gage (Micrometer) [4] Thickness Imperial Metric Parallelism Imperial Metric Deadweight Load Force	 0.01 in to 0.05 in 0.1 in to 0.5 in 0.254 mm to 1.272 mm 2.54 mm to 12.72 mm Up to 1 in Up to 25.4 mm Up to 5 lbf	 0.000014 in 0.000059 in 0.04 mm 0.0015 mm 0.000013 in 0.0003 mm 0.06 lbf	Using Gage Blocks, Load Cell by direct measurement method

** 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.*

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Calipers[4]	0.0005 in to 6 in	0.00073 in	Caliper checker, Ring gage by direct measurement method
Mechanical			
Force – Compression and Tension (Load Cells)	0.01 lbf to 500,000 lbf	0.05 %	Per method ASTM E74 using primary master load cells calibrated with dead weights
Force – Compression and Tension (Universal Testing Machines)[4]	100 lbf to 500000 lbf	0.05 %	Per method ASTM E4 using master load cells calibrated per ASTM E74
	100 lbf to 12,000 lbf 12,000 lbf to 25,000 lbf 25,000 lbf to 200,000 lbf	0.15 % 0.06 % 0.04 %	Per method ISO 7500-1 using master load cells calibrated per ISO 376.
Compression Testers[4] Force Crosshead Speed	 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 Up to 3 in/min	 0.29 lbf 0.67 lbf 2.7 lbf 3.7 lbf 18 lbf 29 lbf 0.011 in/min	Force – By using load cell by Direct measurement and Speed by using Stopwatch by comparison method
Tensile Testers[4] Force Crosshead Speed (Distance/Time) Crosshead Travel	 0 lbf to 250 lbf 250 lbf to 2000 lbf 2000 lbf to 10000 lbf 10000 lbf to 25000 lbf Up to 12 in/min Up to 8 in	 0.67 lbf 3.8 lbf 18 lbf 33 lbf 0.11 in/min 0.002 in	Force – By using load cell by direct measurement and Speed and travel by using Stopwatch and ruler by comparison method
Z-Directional Tensile Testers[4] Force (Tension/Compression) Revolutions Per Minute Speed	 0 lbf to 250 lbf 0 rpm to 30 rpm Up to 20 in/min	 0.67 lbf 0.18 rpm 0.005 in/min	Force – By using load cell by direct measurement and RPM/ Speed by using Stopwatch by comparison method
Force - Tension Creep Testing Machines[4]	100 lbf to 10,000 lbf	0.06 %	Master Load Cells by direct measurement per ISO 376, Calibration per ISO 7500-2

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Machine and Specimen Alignment[4]	0.1 % to 100 % Bending	2.1 % Bending	30,000 lbf Alignment Bar, Data Acquisition System by direct measurement method as per ASTM E1012
Crosshead Speed[4]	0.001 in/min to 40 in/min	0.001 in/min	Stopwatch, Dial Indicator by direct measurement method as per ASTM E2658
Crosshead Displacement[4]	0.0001 in to 2 in 2 in to 20 in	0.001 in 0.003 in	Dial/Digital Indicator, Height Gage by direct measurement method as per ASTM E2309
Load Rate – Compression and Tension[4]	Up to 25,000 lbf/min (Upper limit of 100,000 psi/min)	0.25 %	Load cell and stopwatch by direct measurement method as per ASTM E2309, E2658
Strain Rate Gages[4]	0.002 in/in/min (0.2 %/min) to 0.01 in/in/min (1 %/min)	0.25 %	Stopwatch and Caliper by direct measurement method as per ASTM E2309, E2658
Pressure Gages[4]	1 psi to 5 psi 5 psi to 500 psi 500 psi to 10,000 psi	0.15 % 0.05 % 0.06 %	Pressure Transducer by comparison measurement method
Tear Testers[4] 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	Load Cell and Caliper by direct measurement method
Canadian Standard Freeness Tester[4] ID Length Volume	 0 mm to 130 mm 0 mL to 24 mL	 0.07 mm 0.07 mL	Caliper and scale by direct measurement method
Burst Testers[4] Pressure	 0 psi to 200 psi 200 psi to 1000 psi	 0.6 psi 2.9 psi	Direct measurement by using Pressure Gauge
Melt Flow Indexers[4] 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	Temp sensors, Caliper, mass, scale, by direct measurement method
Horizontal Friction Tester[4] Force Sled Mass	 Up to 2000 gf 100 g to 2000 g	 1.3 gf 1.9 g	Scale and mass by direct measurement method

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Inclined Plane Slip and Friction Tester[4]			Scale and protractor by direct measurement method
Sled Mass	200 g to 1260 g	1.9 g	
Plane Angle	0° to 90°	0.32°	
Impact Testers[4]			Scale and caliper by direct measurement method
Sample Support Length	Up to 4 in	0.003 in	
Mass	0 kg to 4 kg	0.1 g	
Notch Depth	Up to 0.4 in	0.0011 in	
Release and Adhesion Testers[4]			Load cell and Tachometer by direct measurement method
Force	0 gf to 2000 gf	0.1 gf	
Revolutions	0 rpm to 160 rpm	0.18 rpm	
Ink Rub Testers[4]			Load cell and Tachometer by direct measurement method
Mass	0 lb to 4 lb	0.01 lb	
Frequency	Up to 100 strokes/min	0.26 strokes/min	
Brinell Hardness Testers (Indirect)[4]	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 by using test block per ASTM E10
Brinell Hardness Testers (Direct)	Up to 500 kgf 500 kgf to 1000 kgf 1000 kgf to 1500 kgf 1500 kgf to 3000 kgf	0.25 kgf 0.5 kgf 0.75 kgf 1.5 kgf	Direct Verification by using load cell per ASTM E10
Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers[4]	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	 0.19 HRA 0.31 HRA 0.29 HRA 0.39 HRBW 0.30 HRBW 0.42 HRBW 0.31 HRC 0.38 HRC	Indirect verification per ASTM Standard E18 with NIST traceable blocks

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers[4] (cont'd.)	(20 to 30) HRC	0.40 HRC	Indirect verification per ASTM Standard E18 with NIST traceable blocks
	HRD		
	(71 to 75) HRD	0.18 HRD	
	(51 to 67) HRD	0.31 HRD	
	(40 to 48) HRD	0.27 HRD	
	HREW		
	(93 to 100) HREW	0.49 HREW	
	(84 to 90) HREW	0.49 HREW	
	(70 to 79) HREW	0.49 HREW	
	HRFW		
	(94 to 100) HRFW	0.45 HRFW	
	(80 to 90) HRFW	0.44 HRFW	
	(60 to 75) HRFW	0.28 HRFW	
	HRGW		
	(80 to 94) HRGW	0.43 HRGW	
	(55 to 75) HRGW	0.29 HRGW	
	(30 to 50) HRGW	0.82 HRGW	
	HRHW		
	(96 to 100) HRHW	0.36 HRHW	
	(80 to 94) HRHW	0.36 HRHW	
	HRKW		
	(85 to 100) HRKW	0.25 HRKW	
	(65 to 80) HRKW	0.36 HRKW	
	(40 to 60) 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	

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers[4] (cont'd.)	HR15N (90 to 92) HR15N (78 to 88) HR15N (70 to 77) HR15N HR30N (77 to 82) HR30N (55 to 73) HR30N (42 to 50) HR30N HR45N (66 to 72) HR45N (37 to 61) HR45N (20 to 31) HR45N HR15TW (87 to 93) HR15TW (81 to 86) HR15TW (74 to 80) HR15TW HR30TW (70 to 83) HR30TW (57 to 69) HR30TW (43 to 56) HR30TW HR45TW (53 to 73) HR45TW (33 to 7352) HR45TW (13 to 32) HR45TW HR15WW (76 to 96) HR15WW HR30WW (50 to 92) HR30WW HR45WW (20 to 86) HR45WW HR15XW (86) HR15XW HR30XW (72 to 97) HR30XW HR45XW (72 to 97) HR45XW	 0.53 HR15N 0.43 HR15N 0.41 HR15N 0.52 HR30N 0.47 HR30N 0.42 HR30N 0.23 HR45N 0.27 HR45N 0.59 HR45N 0.29 HR15TW 0.39 HR15TW 0.41 HR15TW 0.36 HR30TW 0.29 HR30TW 0.66 HR30TW 0.43 HR45TW 0.40 HR45TW 0.70 HR45TW 0.26 HR15WW 0.56 HR30WW 0.31 HR45WW 0.19 HR15XW 0.26 HR30XW 0.76 HR45XW	Indirect verification per ASTM Standard E18 with NIST traceable blocks

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers[4] (cont'd.)	HR15YW (90 to 100) HR15YW HR30YW (84 to 99) HR30YW HR45YW 92 HR45YW	 0.22 HR15YW 0.43 HR30YW 0.24 HR45YW	Indirect verification per ASTM Standard E18 with NIST traceable blocks
Direct Verification of Rockwell & Rockwell Superficial Hardness Testers	Force 0.1 kgf to 150 kgf Depth Up to 3 mm	0.021 kgf 1.0 µm	Direct Measurement using Load Cell and -Digital Linear Scale per ASTM E18
Indirect Verification of Hardness Testers -Vickers[4]	HV 0.01 (100 to 240) HV (600 to 800) HV HV 0.025 (100 to 240) HV (600 to 800) HV HV 0.05 (100 to 240) HV (600 to 800) HV HV 0.10 (240 to 600) HV (600 to 800) HV HV 0.20 (240 to 600) HV (600 to 800) HV HV 0.30 (240 to 600) HV (600 to 800) HV HV 0.50 (240 to 600) HV (600 to 800) HV HV 1 (240 to 600) HV (600 to 800) HV	 24 HV 80 HV 18 HV 51 HV 12 HV 36 HV 13 HV 16 HV 13 HV 18 HV 12 HV 16 HV 12 HV 13 HV 23 HV 11 HV	Indirect Verification by using load cell per ASTM E92

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Indirect Verification of Hardness Testers -Vickers[4] (cont'd.)	HV 5 (100 to 240) HV (600 to 800) HV HV 10 (100 to 240) HV (600 to 800) HV HV 30 (100 to 240) HV (600 to 800) HV	 14 HV 17 HV 10 HV 21 HV 11 HV 24 HV	Indirect Verification by using load cell per ASTM E92
Indirect Verification of Hardness -Knoop	HK 0.01 (100 to 250) HK (650 to 800) HK HK 0.025 (100 to 250) HK (250 to 650) HK HK 0.05 (100 to 250) HK (250 to 650) HK HK 0.10 (250 to 650) HK (650 to 800) HK HK 0.20 (250 to 650) HK (650 to 800) HK HK 0.30 (250 to 650) HK (650 to 800) HK HK 0.50 (250 to 650) HK (650 to 800) HK HK 1 (250 to 650) HK (650 to 800) HK	 16 HK 36 HK 14 HK 25 HK 14 HK 23 HK 26 HK 31 HK 15 HK 30 HK 16 HK 29 HK 10 HK 27 HK 11 HK 21 HK	Indirect Verification per ASTM E92
Scales[4]	0.005 kg to 100 kg	0.003 kg	Class F1 Weights by direct method

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY[1,2] (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Thermal			
Laboratory Thermometers[4]	10 °C to 50 °C	0.3 °C	Dry Block Standard UTS by direct measurement
Ovens, Furnaces, Presses[4]	-100 °C to 1800 °C	1.4 °C	Temp sensor by direct measurement method as per ASTM E145 / Keithley Martel
Electrical – DC/LF			
DC Voltage – Measure[3,4]	0.1 mV to 10 mV 10 mV to 100 mV 0.1 V to 1 V 1 V to 10 V 10 V to 100 V	0.006 % + 40 nV 0.004 % + 0.5 µV 0.0032 % + 3 µV 0.0032 % + 30 µV 0.0052 % + 500 µV	Keithley 2182 by direct measurement method

[1]The 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.

[2]When 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.

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

[4]Only 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.