CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

AFFRI TESTING INSTRUMENTS S.R.L.

Via Monte Tagliaferro #8
Induno Olona, Varese 21056 Italy

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: 01 October 2025

Certificate Number: AC-3026.01

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

AFFRI TESTING INSTRUMENTS S.R.L.

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Induno Olona, Varese 21056
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CALIBRATION

Valid to: **October 1, 2025** Certificate Number: **AC-3026.01**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical	(0 to 2) mV/V	0.000 24 mV/V	Rice Lake Ranger 3

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Calipers [1]	Up to 12 in	730 µin	Gauge Block Standards ASME B89.1.14-2018

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Reticles and Light Microscope Magnifications Stereo Microscope Objective 0.5x Objective 1x Objective 1.6x High Magnification Microscope Objective 10x Objective 20x Objective 40x Objective 50x Objective 60x Objective 100x	 (0 to 40) mm (0 to 20) mm (0 to 10) mm (0 to 1 000) µm (0 to 500) µm (0 to 250) µm (0 to 200) µm (0 to 150) µm (0 to 100) µm	 0.055 mm 0.027 mm 0.022 mm 1.6 µm 0.9 µm 0.71 µm 0.69 µm 0.66 µm 0.63 µm	 E1951, Glass Scale ASTM E1951, ASTM E92, Stage Micrometer
Displacement Transducer[1] Dimensional Measurements	(0 to 12) in (0 to 40) in (0 to 12) mm	600 µin 0.003 in 2.7 µm	Caliper ASTM-E2658 Heidenhain
Brinell Indentation Type A Microscope Type B Microscope	 10X to 100X Mag 10X to 100X Mag	 1.2 µm 14 µm	 ASTM E10, E110 Glass Scale
Extensometer, Type 1 Strain Gauge Length	 (0 to 0.2) in (>0.2 to 2) in 	 20 µin 160 µin 0.002 in	Extensometer Calibrator VHR 3590 ASTM-E83 ISO 9513 Digital Caliper

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Material Testing Machine: [1] Displacement	(0.0 to 12) in (0.0 to 305) mm (12 to 40) in (304.8 to 1 000) mm	0.001 7 in 0.043 mm 0.003 6 in 0.091 mm	Caliper ASTM-E2309 Timer
Speed	(0.01 to 0.1) in/min (0.1 to 20) in/min (20 to 40) in/min	1.95% of reading 0.23% of reading 0.38% of reading	ASTM-E2658 Digital Stopwatch
Time Component	(0 to 30) min	0.2 s	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Calibration of force[1] testing machines and force measuring systems: Tension Compression	(10 g to 20 000 kgf) (10g to 305 914 kgf)	0.25 % of reading 0.25 % reading	Working Standard ASTM E4 ISO 7500-1
Calibration of Torque testing machines CW/CCW	5 Nm to 1 000 Nm	0.25 % reading	Working Standard ASTM E2428/E2624 DIN 51309

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Differential Indentation Hardness Testers Indirect	HRBW Low HRBW Med HRBW High HRC Low HRC Med HRC High (0 to 400) HBW (400 to 600) HBW 200 HV 400 HV 700 HV	0.34 HRBW 0.26 HRBW 0.38 HRBW 0.38 HRC 0.34 HRC 0.32 HRC 2 HBW 4 HBW 3 HV 6 HV 11 HV	Hardness Test Blocks ASTM-E18, E10, E92/384 E3246 DIN 50157
LEEB Hardness	400 LD to 900 HLD	8.5 HLD	ASTM A956
Rubber Property Durometer Hardness Types A,B,C,D, D0,0,00, E, M,000,000-S Extension Force Indenter Extension Measurement	 (0 to 5) mm (0 to 45) N 2.5 mm	 0.20 Duro 0.34 Duro 2 µm	ASTM-D2240 ISO 21509 Micrometer Load Cell Micrometer

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Direct Verification of Brinell Hardness[1] Testing Machines:			ASTM E10 ISO 6506-2 ASTM E103
Verification of Test Force	(1 to 3 000) kgf	0.25% reading	Working force standards
Verification of the Indentation Measuring System	(0 to 1) mm	0.3 µm	ASTM E10 ISO 6506-2
	(1 to 10) mm	1.2 µm	Glass Scale Micrometer
Verification Of The Indentation Depth Measuring System	(1 to 5) mm (5 to 10) mm	0.000 2 mm 0.000 5 mm	ASTM E103 Heidenhain Std
Direct Verification of Rockwell Hardness[1] Testing Machines:			ASTM E18 ASTM E3246 ISO 6508-2
Verification of Test Force	(3 to 150) kgf	0.25% reading	DIN 50157-2 Working force standards
Verification of the Indentation Measuring System	(1 to 5) mm (5 to 10) mm	0.000 2 mm 0.000 5 mm	Heidenhain Std
Verification of Time	(1 to 30) sec	0.25 sec Stopwatch	Computer Clock

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rockwell Hardness[1] Testers Indirect verification	HRA Low HRA Med HRA High HRBW Low HRBW Med HRBW High HRC Low HRC Med HRC High HRD Low HRD Med HRD High HRE Low HRE Med HRE High	0.29 HRA 0.23 HRA 0.18 HRA 0.34 HRBW 0.26 HRBW 0.38 HRBW 0.38 HRC 0.34 HRC 0.32 HRC 0.25 HRD 0.26 HRD 0.22 HRD 0.37 HRE 0.50 HRE 0.50 HRE	Hardness test blocks ASTM E18/110 ISO 6508-2 DIN 50157-2

Rockwell Hardness[1] Testers Indirect verification	HRF Low HRF Med HRF High HRG Low HRG Med HRG High HRH Low HRH Med HRH High HRK Low HRK Med HRK High (90 to 114) HRL (≥115 0) HRL (70 to 99) HRM (≥100) HRM (40 to 84) HRP (≥85) HRP (100 to 119) HRR (≥120) HRR (110 to 111) HRS (≥112) HRS (80 to 103) HRV (≥104) HRV HR15N Low HR15N Med HR15N High HR30N Low HR30N Med HR30N High HR45N Low HR45N Med HR45N High	0.26 HRF 0.65 HRF 0.45 HRF 0.77 HRG 0.20 HRG 0.25 HRG 0.72 HRH 0.42 HRH 0.36 HRH 0.55 HRK 0.48 HRK 0.35 HRK 0.26 HRL 0.19 HRL 0.53 HRM 0.42 HRM 0.51 HRP 0.35 HRP 0.34 HRR 0.24 HRR 0.77 HRS 0.18 HRS 0.61 HRV 0.21 HRV 0.40 HR15N 0.41 HR15N 0.50 HR15N 0.28 HR30N 0.46 HR30N 0.53 HR30N 0.48 HR45N 0.23 HR45N 0.19 HR45N	Hardness test blocks ASTM E18/110 ISO 6508-2 DIN 50157-2

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rockwell Hardness[1] Testers Indirect verification	HR15TW Low HR15TW Med HR15W High HR45TW Low HR45TW Med HR45TW High (80 to 88) HR15W (89 to 100) HR15W (40 to 64) HR30W (65 to 100) HR30W (10 to 47) HR45W (48 to 100) HR45W (80 to 87) HR15X (88 to 100) HR15X (60 to 78) HR30X (79 to 100) HR30X (40 to 68) HR45X (69 to 100) HR45X (85 to 93) HR15Y (94 to 100) HR15Y (60 to 87) HR30Y (88 to 100) HR30Y (60 to 81) HR45Y (82 to 100) HR45Y	0.60 HR15TW 0.51 HR15TW 0.42 HR15TW 0.69 HR15TW 0.39 HR15TW 0.38 HR15TW 0.36 HR15W 0.61 HR15W 0.82 HR30W 0.33 HR30W 0.76 HR45W 0.30 HR45W 0.55 HR15X 0.18 HR15X 0.95 HR30X 0.19 HR30X 0.75 HR45X 0.18 HR45X 0.45 HR15Y 0.22 HR15Y 0.22 HR30Y 0.33 HR30Y 0.63 HR45Y 0.24 HR45Y	Hardness test blocks ASTM E18/110 ISO 6508-2 DIN 50157-2

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Brinell Hardness Testers[1]			
1/62.5	(0 to 400) HBW (400 to 600) HBW	2 HBW 4 HBW	
2.5/62.5	(0 to 400) HBW (400 to 600) HBW	2 HBW 4 HBW	
2.5/187.5	(0 to 400) HBW (400 to 600) HBW	2 HBW 4 HBW	
10/500	(0 to 100) HBW (100 to 150) HBW	2 HBW 4 HBW	
5/1 000	(0 to 400) HBW (400 to 600) HBW	2 HBW 4 HBW	Brinell Test Blocks & Brinell Scope ASTM E10/110 ISO 6506-2 ASTM E103
10/1 000	(0 to 400) HBW (400 to 600) HBW	2 HBW 4 HBW	
10/1 500	(0 to 400) HBW (400 to 600) HBW	2 HBW 4 HBW	
10/2 000	(0 to 400) HBW (400 to 600) HBW	2 HBW 4 HBW	
10/2 500	(0 to 400) HBW (400 to 600) HBW	2 HBW 4 HBW	
10/3 000	(0 to 400) HBW (400 to 600) HBW	2 HBW 4 HBW	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Direct Calibration Vickers/Knoop Indentation	 (0 to 1) mm (0 to 100) mm	 0.1 µm 1.0 µm	ASTM E92/384 ISO 6507-2 Stage Micrometer Glass Scale
Force Time	(10 to 120 000) gf	0.25% of reading 0.2 s	 Computer Clock
Indirect Calibration Vickers/Knoop Indentation			
Vickers[1], ≥1 kgf HV 1 kgf	200 HV 400 HV 700 HV	4.1 HV 7.9 HV 17.7 HV	
HV 2 kgf	200 HV 400 HV 700 HV	2.7HV 7.6HV 9.8 HV	
HV 5 kgf	200 HV 400 HV 700 HV	2.9HV 4.9 HV 10.8 HV	Hardness test blocks ASTM E92/384 ISO 6507-2
HV 10 kgf	200 HV 400 HV 700 HV	1.9 HV 4.6 HV 10.5 HV	
HV 20 kgf	200 HV 400 HV 700 HV	2.5 HV 5.9 HV 9.3 HV	
Vickers[1], ≥1 kgf HV 30 kgf	200 HV 400 HV 700 HV	2.8 HV 3.9 HV 6.5 HV	
HV 50 kgf	200 HV 400 HV 700 HV	1.6 HV 4.7 HV 5.9 HV	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Vickers[1], <1 kgf HV 10 gf	200 HV 400 HV 700 HV	10 HV 20 HV 35 HV	Hardness test blocks ASTM E92/384 ISO 6507-2
HV 25 gf	200 HV 400 HV 700 HV	8.9 HV 20 HV 30 HV	
HV 50 gf	200 HV 400 HV 700 HV	8.5 HV 19 HV 27 HV	
HV 100 gf	200 HV 400 HV 700 HV	8 HV 18 HV 25 HV	Hardness test blocks ASTM E92/384 ISO 6507-2
HV 200 gf	200 HV 400 HV 700 HV	7 HV 13 HV 20 HV	
HV 300 gf	200 HV 400 HV 700 HV	5 HV 14 HV 19 HV	
Vickers[1], <1 kgf HV 500 gf	200 HV 400 HV 700 HV	5 HV 2 HV 17HV	
HV 1 000 gf	200 HV 400 HV 700 HV	4 HV 8 HV 15 HV	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Knoop[1] Micro-Indentation Hardness Testers			
HK 10 gf	200 HK 400 HK 700 HK	7 HK 16 HK 33 HK	
HK 25 gf	200 HK 400 HK 700 HK	7 HK 14 HK 22 HK	Hardness test blocks ASTM E92/384 ISO 6507-2
HK 50 gf	200 HK 400 HK 700 HK	7 HK 14 HK 20 HK	
HK 100 gf	200 HK 400 HK 700 HK	7 HK 12 HK 19 HK	
HK 200 gf	200 HK 400 HK 700 HK	5 HK 8 HK 17 HK	
HK 300 gf	200 HK 400 HK 700 HK	5 HK 8 HK 17 HK	
HK 500 gf	200 HK 400 HK 700 HK	5 HK 7 HK 15 HK	
HK 1 000 gf	200 HK 400 HK 700 HK	5 HK 7 HK 15 HK	

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Stopwatch	0 min to 48 h	0.1 sec	NRC Time Signal Computer Clock

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. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-3026.01.

Jason Stine, Vice President