



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

AFFRI Inc.
850 Dillon Dr.
Wood Dale, IL 60191

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



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 Inc.
850 Dillon Dr.
Wood Dale, IL 60191
Roberto Affri
224-374-0931

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	Comparison to 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 μ m	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) μ m (0 to 500) μ m (0 to 250) μ m (0 to 200) μ m (0 to 150) μ m (0 to 100) μ m	0.055 mm 0.027 mm 0.022 mm 1.6 μ m 0.9 μ m 0.71 μ m 0.69 μ m 0.66 μ m 0.63 μ m	E1951, Glass Scale ASTM E10, ISO6506-2 ASTM E1951, ASTM E92, ASTM E384 ISO 6507-2 ISO 4545-2 Stage Micrometer
Displacement Transducer ¹ Dimensional Measurements	(0 to 12) in (0 to 40) in (0 to 12) mm	600 μ in 0.003 in 2.7 μ m	Caliper ASTM-E2658 Heidenhain
Brinell Indentation Type A Microscope Type B Microscope	10x to 100x Mag 10x to 100x Mag	1.2 μ m 14 μ m	ASTM E10, E110 ISO6506-2 Glass Scale

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Extensometer, Type 1 Strain	(0 to 0.02) in (0 to 0.5) mm	20 μ in 0.026069 mm	Extensometer Calibrator VHR 3590 ASTM-E83 ISO 9513
	(>0.02 to 2) in (>0.5 to 50) mm	160 μ in 0.026 mm	Digital Caliper
	(0.0 to 12) in (0.0 to 300) mm	0.0017 in 0.032 mm	
	(2 to 40) in (50 to 1 000) mm	0.0032 in 0.065 mm	
Gauge Length	(0 to 8) in (0 to 100) mm	0.002 in 0.0029 mm	
Material Testing Machine: ¹ Displacement	(0.0 to 12) in (0.0 to 305) mm	0.0017 in 0.043 mm	Caliper ASTM-E2309 Timer
	(12 to 40) in (304.8 to 1 000) mm	0.0036 in 0.091 mm	
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 Calibration of Torque testing machines CW/CCW	10 gf to 101 971 kgf 10 gf to 305 914 kgf (5 to 1 000) Nm	0.25 % of reading 0.25 % reading 0.25 % reading	Working Standard ASTM E4 ISO 7500-1 Working Standard ASTM E2428/E2624 ISO6789-2 DIN 51309
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 ISO 6506-2, ISO 6507-2, ISO 6508-2 DIN 50157
LEEB Hardness	(400 to 900) HLD	8.5 HLD	ASTM A956 ISO16859-2
Rubber Property Durometer Hardness Types A,B,C,D, D0, 0 ,00, E, M, 000, 000-S Extension Force Direct and Indirect	(0 to 5) mm (0 to 45) N 2.5 mm	0.005 mm 0.25% of reading 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 Working force standards
Verification of Test Force	(1 to 3 000) kgf	0.25% reading	
Verification of the Indentation Measuring System	(0 to 1) mm (1 to 10) mm	0.3 μ m 1.2 μ m	ASTM E10 ISO 6506-2 Glass Scale Micrometer
Verification Of The Indentation Depth Measuring System	(1 to 5) mm (5 to 10) mm	0.0002 mm 0.0005 mm	ASTM E103 Heidenhain Std
Direct Verification of Rockwell Hardness ¹ Testing Machines:			ASTM E18 ASTM E3246 ISO 6508-2 DIN 50157-2 Working force standards
Verification of Test Force	(3 to 150) kgf	0.25% reading	
Verification of the Indentation Measuring System	(0.01 to 5) mm (5 to 10) mm	0.0002 mm 0.0005 mm	Comparison to Heidenhain Std
Verification of Time	(1 to 30) sec	0.25 sec Stopwatch	Comparison to 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	0.29 HRA	Hardness test blocks ASTM E18/110 ISO 6508-2 DIN 50157-2
	HRA Med	0.23 HRA	
	HRA High	0.18 HRA	
	HRBW Low	0.34 HRBW	
	HRBW Med	0.26 HRBW	
	HRBW High	0.38 HRBW	
	HRC Low	0.38 HRC	
	HRC Med	0.34 HRC	
	HRC High	0.32 HRC	
	HRD Low	0.25 HRD	
	HRD Med	0.26 HRD	
	HRD High	0.22 HRD	
	HREW Low	0.37 HREW	
	HREW Med	0.50 HREW	
	HREW High	0.50 HREW	
	HRFW Low	0.26 HRFW	
	HRFW Med	0.65 HRFW	
	HRFW High	0.45 HRFW	
	HRGW Low	0.77 HRGW	
	HRGW Med	0.20 HRGW	
	HRGW High	0.25 HRGW	
	HRHW Low	0.72 HRHW	
	HRHW Med	0.42 HRHW	
	HRHW High	0.36 HRHW	
	HRKW Low	0.55 HRKW	
	HRKW Med	0.48 HRKW	
	HRKW High	0.35 HRKW	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rockwell Hardness ¹ Testers Indirect verification	(90 to 114) HRLW (≥115 0) HRLW	0.26 HRLW 0.19 HRLW	Hardness test blocks ASTM E18/110 ISO 6508-2 DIN 50157-2
	(70 to 99) HRMW (≥100) HRMW	0.53 HRMW 0.42 HRMW	
	(40 to 84) HRPW (≥85) HRPW	0.51 HRPW 0.35 HRPW	
	(100 to 119) HRRW (≥120) HRRW	0.34 HRRW 0.24 HRRW	
	(110 to 111) HRSW (≥112) HRSW	0.77 HRSW 0.18 HRSW	
	(80 to 103) HRVW (≥104) HRVW	0.61 HRVW 0.21 HRVW	
	HR15N Low HR15N Med HR15N High	0.40 HR15N 0.41 HR15N 0.50 HR15N	
	HR30N Low HR30N Med HR30N High	0.28 HR30N 0.46 HR30N 0.53 HR30N	
	HR45N Low HR45N Med HR45N High	0.48 HR45N 0.23 HR45N 0.19 HR45N	
	HR15TW Low HR15TW Med HR15W High	0.60 HR15TW 0.51 HR15TW 0.42 HR15TW	
	HR30TW Low HR30TW Med HR30TW High	0.21 HR30TW 0.63 HR30TW 0.56 HR30TW	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rockwell Hardness ¹ Testers Indirect verification	HR45TW Low	0.69 HR15TW	Hardness test blocks ASTM E18/110 ISO 6508-2 DIN 50157-2
	HR45TW Med	0.39 HR15TW	
	HR45TW High	0.38 HR15TW	
	(80 to 88) HR15WW	0.36 HR15WW	
	(89 to 100) HR15WW	0.61 HR15WW	
	(40 to 64) HR30WW	0.82 HR30WW	
	(65 to 100) HR30WW	0.33 HR30WW	
	(10 to 47) HR45WW	0.76 HR45WW	
	(48 to 100) HR45WW	0.30 HR45WW	
	(80 to 87) HR15XW	0.55 HR15XW	
	(88 to 100) HR15XW	0.18 HR15XW	
	(60 to 78) HR30XW	0.95 HR30XW	
	(79 to 100) HR30XW	0.19 HR30XW	
	(40 to 68) HR45XW	0.75 HR45XW	
	(69 to 100) HR45XW	0.18 HR45XW	
	(85 to 93) HR15YW	0.45 HR15YW	
	(94 to 100) HR15YW	0.22 HR15YW	
	(60 to 87) HR30YW	0.22 HR30YW	
	(88 to 100) HR30YW	0.33 HR30YW	
	(60 to 81) HR45YW	0.63 HR45YW	
	(82 to 100) HR45YW	0.24 HR45YW	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Indirect Verification of Brinell Hardness Testers ¹			
1/1	(0 to 3.2) HBW (3.2 to 21.8) HBW	2 HBW 4 HBW	Brinell Test Blocks & Brinell Scope
1/1.25	(0 to 4.0) HBW (4.0 to 27.2) HBW	2 HBW 4 HBW	ASTM E10/110 ISO 6506-2 ASTM E103
1/2.5	(0 to 8.0) HBW (8.0 to 54.5) HBW	2 HBW 4 HBW	
1/5	(0 to 15.9) HBW (15.9 to 109) HBW	2 HBW 4 HBW	
1/10	(0 to 31.8) HBW (31.8 to 218) HBW	2 HBW 4 HBW	
1/30	(0 to 200) HBW (200 to 400) HBW (400 to 650) HBW	2 HBW 2 HBW 4 HBW	
2.5/6.25	(0 to 3.2) HBW (3.2 to 21.8) HBW	2 HBW 4 HBW	
2.5/7.8125	(0 to 4.0) HBW (4.0 to 27.2) HBW	2 HBW 4 HBW	
2.5/15.625	(0 to 8.0) HBW (8.0 to 54.5) HBW	2 HBW 4 HBW	
2.5/31.25	(0 to 15.9) HBW (15.9 to 109) HBW	2 HBW 4 HBW	
2.5/62.5	(0 to 31.8) HBW (31.8 to 218) HBW	2 HBW 4 HBW	
2.5/187.5	(0 to 200) HBW (200 to 400) HBW (400 to 650) HBW	2 HBW 2 HBW 4 HBW	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Indirect Verification of Brinell Hardness Testers ¹			
5/25	(0 to 3.2) HBW (3.2 to 21.8) HBW	2 HBW 4 HBW	Brinell Test Blocks & Brinell Scope
5/31.25	(0 to 4.0) HBW (4.0 to 27.2) HBW	2 HBW 4 HBW	ASTM E10/110 ISO 6506-2 ASTM E103
5/62.5	(0 to 8.0) HBW (8.0 to 54.5) HBW	2 HBW 4 HBW	
5/125	(0 to 15.9) HBW (15.9 to 109) HBW	2 HBW 4 HBW	
5/250	(0 to 31.8) HBW (31.8 to 218) HBW	2 HBW 4 HBW	
5/750	(0 to 200) HBW (200 to 400) HBW (400 to 650) HBW	2 HBW 2 HBW 4 HBW	
10/100	(0 to 3.2) HBW (3.2 to 21.8) HBW	2 HBW 4 HBW	
10/125	(0 to 4.0) HBW (4.0 to 27.2) HBW	2 HBW 4 HBW	
10/250	(0 to 8.0) HBW (8.0 to 54.5) HBW	2 HBW 4 HBW	
10/500	(0 to 15.9) HBW (15.9 to 109) HBW	2 HBW 4 HBW	
10/1000	(0 to 31.8) HBW (31.8 to 218) HBW	2 HBW 4 HBW	
10/1500	(0 to 47.7) HBW (47.7 to 327) HBW	2 HBW 4 HBW	
10/3000	(0 to 200) HBW (200 to 400) HBW (400 to 650) HBW	2 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 μ m 1.0 μ m	Comparison to Stage Micrometer Glass Scale
Force Time	(10 to 120 000) gf	0.25% of reading 0.2 s	Load cells Stopwatch/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 18 HV	Hardness test blocks ASTM E92/384 ISO 6507-2
HV 2 kgf	200 HV 400 HV 700 HV	2.7 HV 7.6 HV 9.8 HV	
HV 5 kgf	200 HV 400 HV 700 HV	2.9 HV 4.9 HV 11 HV	
HV 10 kgf	200 HV 400 HV 700 HV	1.9 HV 4.6 HV 11 HV	
HV 20 kgf	200 HV 400 HV 700 HV	2.5 HV 5.9 HV 9.3 HV	
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
Indirect Calibration Vickers/Knoop Indentation			Hardness test blocks
Vickers ¹ , <1 kgf HV 10 gf	200 HV 400 HV 700 HV	10 HV 20 HV 35 HV	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	
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	
HV 500 gf	200 HV 400 HV 700 HV	5 HV 2 HV 19 HV	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Indirect Calibration Vickers/Knoop Knoop, <2 kgf			Hardness test blocks
HK 10 gf	200 HK 400 HK 700 HK	7 HK 16 HK 33 HK	ASTM E92/384 ISO 4545-2 ISO 6507-2
HK 25 gf	200 HK 400 HK 700 HK	7 HK 14 HK 22 HK	
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 1000 gf	200 HK 400 HK 700 HK	5 HK 7 HK 15 HK	
HK 2000 gf	200 HK 400 HK 700 HK	5 HK 7 HK 15 HK	

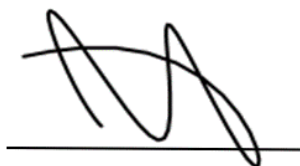
Mass and Mass Related

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