



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Bowser-Morner, Inc.
4518 Taylorsville Road
Dayton, OH 45424

Fulfills the requirements of

ISO/IEC 17025:2017

In the fields of

CALIBRATION, DIMENSIONAL MEASUREMENT and TESTING

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.

A handwritten signature in black ink, appearing to be 'R. Douglas Leonard Jr.', is positioned above a horizontal line.

R. Douglas Leonard Jr., VP, PILR SBU
Expiry Date: 25 January 2026
Certificate Number: L2444



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

Bowser-Morner, Inc.
4518 Taylorsville Road
Dayton, OH 45424
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CALIBRATION, DIMENSIONAL MEASUREMENT AND TESTING

Valid to: **January 25, 2026**

Certificate Number: **L2444**

CALIBRATION

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance – Measuring Equipment ¹	(0.33 to 0.499) nF	0.57 % of reading + 12 pF	Fluke 5500A Multiproduct Calibrator
	(0.5 to 1.099) nF	0.57 % of reading + 12 pF	
	(1.1 to 3.299) nF	0.57 % of reading + 12 pF	
	(3.3 to 10.999) nF	0.57 % of reading + 14 pF	
	(11 to 32.999) nF	0.29 % of reading + 0.12 nF	
	(33 to 109.999) nF	0.28 % of reading + 0.14 nF	
	(110 to 329.999) nF	0.28 % of reading + 0.39 nF	
	(0.33 to 1.099) μF	0.28 % of reading + 1.4 nF	
	(1.1 to 3.299) μF	0.4 % of reading + 3.8 nF	
	(3.3 to 10.999) μF	0.39 % of reading + 15 nF	
	(11 to 32.999) μF	0.4 5% of reading + 39 nF	
	(33 to 109.999) μF	0.56 % of reading + 0.16 μF	
	(110 to 329.999) μF	0.8 % of reading + 0.41 μF	
(0.33 to 1.1) mF	1.2 % of reading + 0.46 μF		
DC Current – Measuring Equipment ¹	(0 to 3.299) mA	0.015 % of reading + 66 nA	Fluke 5500A Multiproduct Calibrator
	(3.299 to 32.999) mA	0.011 % of reading + 0.46 μA	
	(33 to 329.999) mA	0.011 % of reading + 6.58 μA	
	(0.33 to 2.199) A	0.034 % of reading + 60 μA	
	(2.2 to 11) A	0.068 % of reading + 0.56 mA	
	(10 to 16.499 9) A	0.14 A	
	(16.5 to 149.999) A	1.7 A	
(150 to 550) A	3.8 A		

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measuring Equipment ¹	(0.029 to 0.329 99) mA		Fluke 5500A Multiproduct Calibrator
	(10 to 20) Hz	0.29 % of reading + 0.19 μA	
	(20 to 45) Hz	0.15 % of reading + 0.19 μA	
	45 Hz to 1 kHz	0.15 % of reading + 0.3 μA	
	(1 to 5) kHz	0.33 % of reading + 0.81 μA	
	(5 to 10) kHz	1.5 % of reading + 0.21 μA	
	(0.33 to 3.299 9) mA		
	(10 to 20) Hz	0.23 % of reading + 0.45 μA	
	(20 to 45) Hz	0.12 % of reading + 0.45 μA	
	45 Hz to 1 kHz	0.12 % of reading + 0.45 μA	
	(1 to 5) kHz	0.23 % of reading + 0.45 μA	
	(5 to 10) kHz	0.69 % of reading + 0.49 μA	
	(3.3 to 32.999) mA		
	(10 to 20) Hz	0.23 % of reading + 4.3 μA	
	(20 to 45) Hz	0.12 % of reading + 4.5 μA	
	45 Hz to 1 kHz	0.11 % of reading + 4.5 μA	
	(1 to 5) kHz	0.23 % of reading + 4.5 μA	
	(5 to 10) kHz	0.69 % of reading + 4.9 μA	
	(33 to 329.99) mA		
	(10 to 20) Hz	0.23 % of reading + 43 μA	
(20 to 45) Hz	0.12 % of reading + 45 μA		
45 Hz to 1 kHz	0.11 % of reading + 45 μA		
(1 to 5) kHz	0.23 % of reading + 45 μA		
(5 to 10) kHz	0.69 % of reading + 51 μA		
(0.33 to 2.199 99) A			
(10 to 45) Hz	0.23 % of reading + 0.58 mA		
45 Hz to 1 kHz	0.11 % of reading + 0.66 mA		
(1 to 5) kHz	0.83 % of reading + 1.4 mA		
(2.2 to 11) A			
(45 to 65) Hz	0.065 % of reading + 3.1 mA		
(65 to 500) Hz	0.12 % of reading + 3.1 mA		
500 Hz to 1 kHz	0.38 % of reading + 2.7 mA		
AC Current – Measuring Equipment ¹	(10 to 16.5) A		Fluke 5500A Multiproduct Calibrator
	(45 to 65) Hz	0.16 A	
	(65 to 440) Hz	0.24 A	
	(16.5 to 149.999) A		
(45 to 65) Hz	2.2 A		
(65 to 440) Hz	2.9 A		
AC Current – Measuring Equipment ¹	(150 to 550) A		Fluke 5500A Multi Product Calibrator w/Coil
	(45 to 65) Hz	4.7 A	
	(65 to 440) Hz	7.4 A	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Measuring Equipment ¹	(0 to 10.99) Ω (11 to 32.999) Ω (33 to 109.999) Ω (110 to 329.999) Ω (0.33 to 1.099) kΩ (1.1 to 3.299) kΩ (3.3 to 10.999) kΩ (11 to 32.999) kΩ (33 to 109.999) kΩ (110 to 329.999) kΩ (0.33 to 1.099) MΩ (1.1 to 3.299) MΩ (3.3 to 10.999) MΩ (11 to 32.999) MΩ (33 to 109.999) MΩ (110 to 330) MΩ	0.014 % of reading + 9.5 mΩ 0.014 % of reading + 19 mΩ 0.01 % of reading + 19 mΩ 0.01 % of reading + 19 mΩ 0.01 % of reading + 71 mΩ 0.01 % of reading + 73 mΩ 0.01 % of reading + 0.71 Ω 0.01 % of reading + 73 mΩ 0.014 % of reading + 7.1 Ω 0.014 % of reading + 7.2 Ω 0.017 % of reading + 65Ω 0.011 % of reading + 68 Ω 0.12 % of reading + 0.65 kΩ 0.11 % of reading + 0.86 kΩ 0.58 % of reading + 20 kΩ 0.58 % of reading + 26 kΩ	Fluke 5500A Multiproduct Calibrator
Electrical Simulation of RTD Indicating Devices ¹	Pt 385, 100 Ω (-200 to 300) °C Pt 3926, 100Ω (300 to 630) °C (630 to 800) °C (-200 to 630) °C Pt 3916, 100 Ω (-200 to -190) °C (-190 to 100) °C (100 to 600) °C (600 to 630) °C Pt 385, 200 Ω (-200 to 260) °C (260 to 630) °C Pt 385, 500 Ω (-200 to 260) °C (260 to 630) °C Pt 385, 1 000 Ω (-200 to 100) °C (100 to 600) °C (600 to 630) °C Pt Ni 385, 120 Ω (-80 to 100) °C (100 to 260) °C Cu 427, 10 Ω (-100 to 260) °C	0.12 °C 0.16 °C 0.31 °C 0.16 °C 0.34 °C 0.09 °C 0.14 °C 0.31 °C 0.08 °C 0.21 °C 0.09 °C 0.15 °C 0.07 °C 0.1 °C 0.31 °C 0.11 °C 0.19 °C 0.41 °C	Fluke 5500A Multiproduct Calibrator



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices – Source/Measure ¹	Type C (0 to 1 000) °C	0.46 °C	Fluke 5500A Multiproduct Calibrator
	(1 000 to 2 316) °C	1.2 °C	
	Type E (-250 °C to -100) °C	0.69 °C	
	(-100 °C to 1 000) °C	0.24 °C	
	Type J (-210 °C to 1 200) °C	0.35 °C	
	Type K (-200 to -100) °C	0.46 °C	
	(-100 to 120) °C	0.23 °C	
	(120 to 1 000) °C	0.35 °C	
	(1 000 to 1 372) °C	0.58 °C	
	Type N (-200 to -100) °C	0.58 °C	
	(-100 to 1 300) °C	0.35 °C	
	Type R (0 to 250) °C	0.81 °C	
	(250 to 1 767) °C	0.58 °C	
	Type S (0 to 1 767) °C	0.69 °C	
	Type T (-250 to -150) °C	0.81 °C	
(-150 to 0) °C	0.35 °C		
(0 to 400) °C	0.23 °C		
Type U (-200 to 0) °C	0.69 °C		
(0 to 600) °C	0.35 °C		
DC Voltage – Measuring Equipment ¹	(0 to 329.999) mV	69 μV/V + 4.2 μV	Fluke 5500A Multiproduct Calibrator
	(0.33 to 3.299) V	57 μV/V + 10 μV	
	(3.3 to 32.999) V	57 μV/V + 77 μV	
	(33 to 329.999) V	63 μV/V + 1.3 mV	
	(330 to 1 020) V	63 μV/V + 6.9 mV	



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measuring Equipment ¹	(0 to 32.999 9) mV		Fluke 5500A Multiproduct Calibrator
	45 Hz to 10 kHz	0.17 % of reading + 1.7 μ V	
	(10 to 20) kHz	0.23 % of reading + 1.4 μ V	
	(20 to 50) kHz	0.28 % of reading + 3.5 μ V	
	(50 to 100) kHz	0.39 % of reading + 4.5 μ V	
	(100 to 500) kHz	1.2 % of reading + 12 μ V	
	(33 to 329.999) mV		
	(10 to 45) Hz	0.29 % of reading + 0.49 μ V	
	45 Hz to 10 kHz	0.057 % of reading + 2.2 μ V	
	(10 to 20) kHz	0.12 % of reading + 1.1 μ V	
	(20 to 50) kHz	0.19 % of reading + 1.9 μ V	
	(50 to 100) kHz	0.28 % of reading + 3.3 μ V	
	(100 to 500) kHz	0.81 % of reading + 11 μ V	
	(0.33 to 3.299 99) V		
	(10 to 45) Hz	0.18 % of reading + 0.3 mV	
	45 Hz to 10 kHz	0.034 % of reading + 96 μ V	
	(10 to 20) kHz	0.092 % of reading + 85 μ V	
	(20 to 50) kHz	0.17 % of reading + 0.36 mV	
	(50 to 100) kHz	0.28 % of reading + 2.0 mV	
	(100 to 500) kHz	0.58 % of reading + 3.9 mV	
	(3.3 to 32.999 9) V		
	(10 to 45) Hz	0.18 % of reading + 3 mV	
	45 Hz to 10 kHz	0.046 % of reading + 0.9 mV	
	(10 to 20) kHz	0.092 % of reading + 3.1 mV	
(20 to 50) kHz	0.23 % of reading + 5.5 mV		
(50 to 100) kHz	0.28 % of reading + 20 mV		
(33 to 329.999) V			
45 Hz to 1 kHz	0.057 % of reading + 11 mV		
(1 to 10) kHz	0.092 % of reading + 19 mV		
(10 to 20) kHz	0.11 % of reading + 40 mV		
(330 to 1 020) V			
45 Hz to 1 kHz	0.058 % of reading + 97 mV		
(1 to 5) kHz	0.24 % of reading + 0.12 V		
(5 to 10) kHz	0.24 % of reading + 0.58 V		



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Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Gage Blocks – Shop Grade	Up to 10 in	$(64 + 27L) \mu\text{in}$	Vertical Indicator, Master Gage Blocks, Surface Plate
Rulers and Measuring Tapes Ruler Tape	(0 to 24) in (0 to 100) ft	0.037 in 0.038 in	Gage Blocks, Steel Rule 6 in intervals 24 in intervals
Angle Measurement Protractor, Fixed Protractor, Adjustable Inclinometer Level	(0 to 90)° (0 to 90)° (0 to 45)° (0.000 2 to 0.002) in/ft	0.6° 0.08° 0.34° 150 $\mu\text{in}/\text{ft}$	Angle Blocks; Geometric Method
Stage Micrometers 0.001 in Resolution 0.01 in Resolution	(0 to 2) in (0 to 2) in	590 μin 0.005 8 in	Indicator, Microscope with Mechanical Stage
Gage Marker	(0 to 8) in	0.002 in	Caliper
Thickness Gauges – Blade, Block, and Wire Type	(0.001 to 0.5) in	180 μin	Indicator, Surface Block
Reference Rods ^{1,3}	Up to 24 in	$(280 + 23L) \mu\text{in}$	Gage Blocks
Micrometers ^{1,3} Inside, Outside, Depth (0.000 05 in Resolution) (0.000 1 in Resolution) (0.001 in Resolution)	Up to 14 in Up to 14 in Up to 14 in	$(70 + 28L) \mu\text{in}$ $(85 + 27L) \mu\text{in}$ $(630 + 11L) \mu\text{in}$	Gage Blocks
Calipers ^{1,3} Outside, Inside, Depth, End Face (0.000 5 in Resolution) (0.001 in Resolution)	Up to 24 in Up to 24 in	$(600 + 16L) \mu\text{in}$ $(850 + 13L) \mu\text{in}$	Gage Blocks
Indicators ^{1,3} Plunger – Level Types (0.000 1 in Resolution) (0.000 5 in Resolution) (0.001 in Resolution)	Up to 4 in Up to 4 in Up to 4 in	$(185 + 19L) \mu\text{in}$ $(410 + 6.5L) \mu\text{in}$ $(820 + 3.4L) \mu\text{in}$	Gage Blocks, Indicator Calibrator

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Gas Flow Meters	(0.001 to 0.2) lpm (0.2 to 4) lpm (4 to 350) lpm	0.000 3 lpm 0.072 lpm 9.1 lpm	Volumetric Method
Water Flow Meters	(0.1 to 760) lpm	3.3 % of reading	By weight
Gas Flow Totalizing Meters	(0.007 to 0.14) ft ³ /min	1.5 % of reading	By volume
	(0.14 to 3.3) ft ³ /min		By weight
Water Flow Totalizing Meters	(1 to 40) gal	1.5 % of reading	By weight
Universal Testing Machines ¹ Force	Up to 100 000 lbf	0.68 % of reading	ASTM E4 using Load Cells with an Indicator
Load Cells Tension and Compression	(0.1 to 100) lbf	0.21 % of reading	Dead Weights
Tension	(1 to 100 000) lbf	0.06 % of reading	Master Load Cells
Compression	(1 to 300 000) lbf	0.61 % of reading	Master Load Cells
Force Gauges – Push/Pull	Up to 100 lbf	0.1 lbf	Dead Weights
	(9 to 45.4) kgf	0.45 kgf	
Durometers (Type A) Spring Force Only	Up to 8.01 N	0.012 N	Partial Direct Verification per ASTM D 2240-02B using Load Cells
(Type D) Spring Force Only	Up to 44.5 N	0.25 N	
Mass – Weights	1 mg 2 mg 5 mg 10 mg 100 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g	4.6 µg 4.6 µg 4.6 µg 4.6 µg 4.6 µg 4.6 µg 14 µg 14 µg 14 µg 18 µg 19 µg 23 µg	Comparison to ASTM E617 Class 0 and Class 1 Weights, Electronic Balances

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Mass – Laboratory Weights	100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg 30 kg	48 µg 80 µg 0.27 mg 10 mg 10 mg 27 mg 95 mg 0.13 g 0.14 g	Comparison to ASTM E617 Class 0 and Class 1 Weights, Electronic Balances
Vacuum Gauges (0.1 inHg Resolution) (0.2 inHg Resolution) (0.5 inHg Resolution)	(0 to 30) inHg (0 to 30) inHg (0 to 30) inHg	0.09 inHg 0.13 inHg 0.29 inHg	Comparison to Master Manometer
Pressure Gauges	(0 to 100) psi (0 to 500) psi (0 to 2 000) psi (0 to 5 000) psi (0 to 30 000) psi	0.13 psi 0.25 psi 5.5 psi 11 psi 13 psi	Reference Gauge and Transducer
Scales and Balances ¹ (SI) (0.000 001 g Resolution) (0.000 01 g Resolution) (0.000 1 g Resolution) (0.001 g Resolution) (0.01 g Resolution) (0.1 g Resolution)	(1 to 500) mg (0.5 to 5) g (5 to 50) g (50 to 500) g (500 to 1 000) g (1 000 to 5 000) g (5 000 to 10 000) g (10 000 to 20 000) g (20 000 to 30 000) g	5.6 µg 18 µg 0.12 % of reading + 24 µg 0.16 % of reading 0.52 % of reading + 1.4 mg 0.28 % of reading + 1 mg 0.22 % of reading + 16 mg 0.23 g 0.24 g	ASTM E617 Class 1, Class 4 Weights and Internal Calibration Procedure BM-4010 utilized in the calibration of the weighing system.
Scales and Balances ¹ (Avoirdupois) (0.01 lb Resolution) (0.05 lb Resolution) (0.2 lb Resolution)	(0 to 100) lb (0 to 250) lb (0 to 500) lb	0.000 2 % of reading + 0.006 lb 0.000 1 % of reading + 0.03 lb 0.000 1 % of reading + 0.11 lb	NIST Class F Weights and Internal Calibration Procedure BM-4010 utilized in the calibration of the weighing system.
Torque Wrenches	(0.1 to 3 000) lbf·in (2.5 to 500) lbf·ft	2% of reading 2 % of reading (Clockwise only)	Torque Calibrator
Torque Testers, Torque Calibrators	(0 to 1 000) lbf·in Up to 250 lbf·ft	0.29 % of reading 0.55 % of reading	Torque Wheels, Deadweights



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Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Volumetric Glassware Volumetric Flask	(0.1 to 5 000) mL	0.01 % of reading + 25 μ L	Electronic Balance
Graduated Cylinder	(0.1 to 2 000) mL	0.03 % of reading + 0.18 mL	
Graduated Burette	(0.1 to 100) mL	0.03 % of reading + 9 μ L	

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Optical Pyrometers	(200 to 1 200) $^{\circ}$ C	1.3 % of reading	Black Body Calibrator (flat plate) $\epsilon = 0.995, \lambda = (9 \text{ to } 14) \mu\text{m}$
Relative Humidity – Measuring Devices	(20 to 90) %RH	4 %RH	Comparison to Master Humidity Meter
Liquid-in-Glass Thermometers	(-30 to 400) $^{\circ}$ C	0.1 $^{\circ}$ C	Comparison to SPRT w/Indicator, Water Bath
Bi-Metal Thermometers	(-30 to 0) $^{\circ}$ C (0.01 to 700) $^{\circ}$ C	0.3 $^{\circ}$ C 1 % of reading	Comparison to Thermocouple Probe w/Indicator, Oil Bath, Dry Wells
RTD Thermometers	(-30 to 125) $^{\circ}$ C (125 to 450) $^{\circ}$ C	0.04 $^{\circ}$ C 0.06 $^{\circ}$ C	Comparison to SPRT w/Indicator
Thermocouple Thermometers	(-30 to 0) $^{\circ}$ C (0.01 to 700) $^{\circ}$ C	0.1 $^{\circ}$ C 0.3 % of reading	Comparison to Thermocouple Probe w/Indicator, Oil Bath, Dry Wells
Temperature – Measure – Ovens and Furnaces	(-200 to 25) $^{\circ}$ C (25 to 250) $^{\circ}$ C	0.5 $^{\circ}$ C 0.8 $^{\circ}$ C	RTD, Readout
Temperature – Measure – Ovens and Furnaces	(250 to 450) $^{\circ}$ C (450 to 1 000) $^{\circ}$ C	1.5 $^{\circ}$ C 7.5 $^{\circ}$ C	Thermocouple Probe, Readout

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Contact Tachometers ³	(0 to 3 500) rpm	0.7 rpm	Tachometer Calibrator
Non-Contact Tachometers ³	(0 to 100 000) rpm	0.36 rpm	Fluke 5500A Multi Product Calibrator
Stopwatches	Up to 24 h	0.29 s	Comparison to Reference Stopwatch
Frequency – Measuring Equipment	Up to 2 MHz	0.002 5 % of reading + 15 mHz	Fluke 5500A Multi Product Calibrator

DIMENSIONAL MEASUREMENT

1 Dimensional

Specific Tests and / or Properties Measured	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
1D – Length Measurement	Up to 24 in	0.003 7 in	Caliper
	Up to 24 in	0.011 in	Steel Rule
	Up to 72 in	0.073 in	Steel Tape

TESTING

Chemical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Chemical Analysis of Metals	ASTM E 34; ASTM E53 ASTM E350; ASTM E351 ASTM E352; ASTM E353 ASTM E478 (All Mod.)	Metals and Metal Alloys	By Inductively Coupled Plasma (ICP)

Chemical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Chemical Analysis of Phosphorus	ASTM E53 ASTM E350; ASTM E351 ASTM E352; ASTM E353 E478 (All Mod.) BMI 34-072	Metals and Metal Alloys	By Gravimetric Analysis
Chemical Analysis for Silicon	ASTM E53 ASTM E350; ASTM E351 ASTM E352; ASTM E353 ASTM E478 (All Mod.) BMI 34-066, 34-067	Metals and Metal Alloys	By Gravimetric Analysis
Chemical Analysis for Chromium	ASTM E53 ASTM E350; ASTM E351 ASTM E352; ASTM E353 ASTM E478 (All Mod.); BMI 34-073	Metals and Metal Alloys	By Volumetric Analysis
Chemical Analysis for Nickel	ASTM E53 ASTM E350; ASTM E351 ASTM E352; ASTM E353 ASTM E478 (All Mod.) BMI 34-074	Metals and Metal Alloys	By Gravimetric Analysis
Chemical Analysis of Copper	ASTM E53 ASTM E350; ASTM E351 ASTM E352; ASTM E353 ASTM E478 (All Mod.) BMI 34-070	Metals and Metal Alloys	By Electrolytic Analysis
Chemical Analysis of Metals and Metal Alloys	ASTM E1251; ASTM E415 ASTM E1086 (All Mod.) BMI 34-071	Metals and Metal Alloys	By Optical Emission Vacuum Spectrometric Analysis – Glow Discharge Spectroscopy (GDS)
Chemical Analysis of Carbon and Sulfur Content in Metal Alloys	ASTM E1019; BMI 34-065	Metal and Metal Alloys	By Induction Method
Microscopic Evaluation and Characterization	ASTM E1508 (Qual.); BMI 36-024	All Types	By Scanning Electron Microscope (SEM)
Qualitative Elemental Analysis	ASTM E1508 (Qual.); BMI 36-024	All Types	By Scanning Electron Microscope (SEM)
Fourier Transform Infrared Spectroscopy (FTIR)	ASTM D3677 (part A, pyrolysis), ASTM E1252; BMI 37-004	Plastics, Rubber Polymers, and Petroleum Products	By IR Spectrometer
Chemical Analysis of Limestone, Quicklime, and Hydrated Lime	ASTM C25, Parts 10, 16, 17, 19, 33; BMI 32-069	Limestone Quicklime Hydrated Lime	By Analytical Balance, Burettes, Furnace



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Chemical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
X-Ray Spectrometric Analysis of Lime and Limestone	ASTM C1271; BMI 32-035	Lime Limestone	By XRF Spectrometer
Major and Trace Elements in Limestone and Lime	ASTM C1301; BMI 32-071	Lime Limestone	By Inductively Coupled Plasma (ICP)
Soluble Chloride in Mortar and Cement (Acid and Water)	ASTM C114; ASTM C1218 ASTM C1524; BMI 32-007	Mortar Cement	By Auto Titrator
Flash Point	ASTM D56; BMI 35-061	Petroleum and Petroleum Products	By Tag Closed Tester
Flash and Fire Points	ASTM D92; BMI 35-060	Petroleum and Petroleum Products	By Cleveland Open Cup
Flash Point	ASTM D93; BMI 35-059	Petroleum and Petroleum Products	By Pensky-Martens Closed Cup Tester
Water in Petroleum Products	ASTM D95, BMI 35-065	Petroleum and Petroleum Products	By Distillation
Sulfur in Petroleum Products	ASTM D129; BMI 35-058	Petroleum and Petroleum Products	General Bomb Method
Ash Content in Petroleum Products	ASTM D482; BMI 35-056	Petroleum and Petroleum Products	By Balance, Furnace
Chlorine in Petroleum Products	ASTM D808; BMI 35-057	Petroleum and Petroleum Products	By Balance
Moisture Content of Petroleum Products	ASTM D1744; BMI 35-063	Petroleum and Petroleum Products	By Karl Fischer Reagent
Sulfated Ash from Lubricating Oils and Additives	ASTM D874; BMI 35-071	Petroleum and Petroleum Products	By Balance, Furnace
Processing Microscopically Sizing and Counting Particles from Aerospace Fluids on Membrane Filters	ASTM F311, ASTM F312 BMI 35-072	Aerospace Fluids	By Microscope

Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Salt Spray (Fog) Testing	ASTM B117; GM4298P; RTCA/DO-160D, G (Sec. 14); MIL-STD-810A-G (Sec. 509); BMI 31-001, BMI 31-002; GMW3286	Coated Parts	Salt Spray Chamber

Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Evaluating Degree of Rusting on Painted Steel Surfaces	ASTM D610; GMW14872, GMW15288, GMW15282, GMW14671	Painted Steel	Visual Evaluation
Evaluating Degree of Blistering of Painted Surfaces	ASTM D714; GMW14872	Painted Surfaces	Visual Evaluation
Testing Water Resistance of Coatings Using Water Immersion	ASTM D870; GMW3044	Coated Parts	Water Immersion
Testing Water Resistance of Coatings using Water Fog Apparatus	ASTM D1735; BMI 31-014 MIL-STD 810A-G Sec. 507	Coated Parts	Water Fog Apparatus
Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments	ASTM D1654	All Types	Visual Evaluation
Water Resistance of Coatings in 100% Relative Humidity	ASTM D2247; GMW14729 BMI 31-014	Coated Parts	Water Resistance Chamber
Measuring Adhesion by Tape Test	ASTM D3359 GMW14829	Coated Parts	Testing Tapes
Flammability	FMVSS 302	Plastics and Textiles	Flammability Cabinet, Stop Watch, Tape Measure
Pencil Hardness	ASTM D3363	Coated Parts	Pencil Leads
Tension Testing for Gray Iron Castings	ASTM A48; BMI 36-005	Gray Iron Castings	Tensile Testing Machine
Evaluating the Microstructure of Graphite in Iron Castings	ASTM A247; BMI 36-020	Iron Castings	Microscope
Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels	ASTM A262, Methods B, C, E, F	Austenitic Stainless Steels	Balance, Caliper
Tension Testing	ASTM B557	Wrought and Cast Aluminum Products	Tensile Testing Machine
Tension Testing	ASTM B557	Magnesium Alloy Products	Tensile Testing Machine
Adhesion of Metallic Coatings	ASTM B571	Coated Parts	Bend Testing Fixture
Preparation of Metallographic Specimens	BMI 36-007	Metals	Polishing Equipment
Tension Testing	ASTM E8; ASTM E8M ASTM A370; ASTM B381 BMI 36-005; 36-006	Metallic Materials	Tensile Testing Machine
Brinell Hardness	ASTM E10; ASTM A370 BMI 36-002	Metallic Materials	Brinell Hardness Testing Machine

Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Rockwell Hardness Scales: A, B, C, D, F	ASTM E18; ASTM A370 BMI 36-004; 36-001	Metallic Materials	Rockwell Hardness Testing Machine
Rockwell Superficial Hardness Scales: 15T, 30T, 45T, 15N, 30N, 45N	ASTM E18; ASTM A370 BMI 36-004; 36-001	Metallic Materials	Rockwell Hardness Testing Machine
Notched Bar Impact Testing of Metallic Metals	ASTM E23; ASTM A370 BMI 36-004; 36-011	Metallic Metals	Impact Testing Machine
Macro-etching Metals and Alloys	ASTM E340; BMI 36-008	Metals and Metal Alloys	Macro-etching Equipment
Axial Tensile	ASTM F606; ASTM F606M	Fasteners	Tensile Testing Machine
Wedge Tensile	ASTM F606; ASTM F606M	Fasteners	Tensile Testing Machine
Proof Load	ASTM F606; ASTM F606M	Fasteners	Tensile Testing Machine
Impact Testing of Safety Glazing Materials	ANSI Z 97.1, 16 CFR 1201 CAN/CGSB-12.1 BMI 30-004; BMI 30-005	Glass	Impact Testing Machine

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 laboratory offers commercial testing services.
3. L = length in inches; rpm = revolutions per minute.
4. This scope is formatted as part of a single document including Certificate of Accreditation No. L2444.



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