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, TESTING
and **DIMENSIONAL MEASUREMENT**

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.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 25 January 2023
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.
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CALIBRATION, DIMENSIONAL MEASUREMENT AND TESTING

Valid to: **January 25, 2023** 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 (0.5 to 1.099) nF (1.1 to 3.299) nF (3.3 to 10.999) nF (11 to 32.999) nF (33 to 109.999) nF (110 to 329.999) nF (0.33 to 1.099) µF (1.1 to 3.299) µF (3.3 to 10.999) µF	0.57 % of reading + 12 pF 0.57 % of reading + 12 pF 0.57 % of reading + 12 pF 0.57 % of reading + 14 pF 0.29 % of reading + 0.12 nF 0.28 % of reading + 0.14 nF 0.28 % of reading + 0.39 nF 0.28 % of reading + 1.4 nF 0.4 % of reading + 3.8 nF 0.39 % of reading + 15 nF	Fluke 5500A Multi Product Calibrator
Capacitance – Measuring Equipment [1]	(11 to 32.999) µF (33 to 109.999) µF (110 to 329.999) µF (0.33 to 1.1) mF	0.4 5% of reading + 39 nF 0.56 % of reading + 0.16 µF 0.8 % of reading + 0.41 µF 1.2 % of reading + 0.46 µF	Fluke 5500A Multi Product Calibrator
DC Current – Measuring Equipment [1]	(0 to 3.299) mA (3.299 to 32.999) mA (33 to 329.999) mA (0.33 to 2.199) A (2.2 to 11) A (10 to 16.499 9) A (16.5 to 149.999) A (150 to 550) A	0.015 % of reading + 0.066 µA 0.011 % of reading + 0.46 µA 0.011 % of reading + 6.58 µA 0.034 % of reading + 0.06 mA 0.068 % of reading + 0.56 mA 0.14 A 1.7 A 3.8 A	Fluke 5500A Multi Product Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measuring Equipment - Sinewave [1]	(0.029 to 0.329 99) mA		Fluke 5500A Multi Product 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 + 0.30 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 - Sinewave [1]	(10 to 16.5) A		Fluke 5500A Multi Product Calibrator w/Coil
	(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 - Sinewave [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	0.014 % of reading + 9.5 mΩ	Fluke 5500A Multi Product Calibrator
	(11 to 32.999) Ω	0.014 % of reading + 19 mΩ	
	(33 to 109.999) Ω	0.01 % of reading + 19 mΩ	
	(110 to 329.999) Ω	0.01 % of reading + 19 mΩ	
	(0.33 to 1.099) kΩ	0.01 % of reading + 0.071 Ω	
	(1.1 to 3.299) kΩ	0.01 % of reading + 0.073 Ω	
	(3.3 to 10.999) kΩ	0.01 % of reading + 0.71 Ω	
	(11 to 32.999) kΩ	0.01 % of reading + 0.073 Ω	
	(33 to 109.999) kΩ	0.014 % of reading + 7.1 Ω	
	(110 to 329.999) kΩ	0.014 % of reading + 7.2 Ω	
	(0.33 to 1.099) MΩ	0.017 % of reading + 0.065 kΩ	
	(1.1 to 3.299) MΩ	0.011 % of reading + 0.068 kΩ	
	(3.3 to 10.999) MΩ	0.12 % of reading + 0.65 kΩ	
	(11 to 32.999) MΩ	0.11 % of reading + 0.86 kΩ	
	(33 to 109.999) MΩ	0.58 % of reading + 20 kΩ	
	(110 to 330) MΩ	0.58 % of reading + 26 kΩ	
Electrical Calibration of RTD Indicators	Pt 385, 100Ω		Fluke 5500A Multi Product Calibrator
	(-200 to 300) °C	0.12 °C	
	Pt 3926, 100Ω		
	(300 to 630) °C	0.16 °C	
	(630 to 800) °C	0.31 °C	
	(-200 to 630) °C	0.16 °C	
	Pt 3916, 100Ω		
	(-200 to -190) °C	0.34 °C	
	(-190 to 100) °C	0.09 °C	
	(100 to 600) °C	0.14 °C	
	(600 to 630) °C	0.31 °C	
	Pt 385, 200Ω		
	(-200 to 260) °C	0.08 °C	
	(260 to 630) °C	0.21 °C	
	Pt 385, 500Ω		
	(-200 to 260) °C	0.09 °C	
	(260 to 630) °	0.15 °C	
	Pt 385, 1 000Ω		
	(-200 to 100) °C	0.07 °C	
	(100 to 600) °C	0.1 °C	
	(600 to 630) °C	0.31 °C	
	Pt Ni 385, 120Ω		
	(-80 to 100) °C	0.11 °C	
	(100 to 260) °C	0.19 °C	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Calibration of RTD Indicators	Cu 427, 10Ω (-100 to 260) °C	 0.41 °C	Fluke 5500A Multi Product Calibrator
Thermocouple Millivolt Simulation	Type C (0 to 1 000) °C (1 000 to 2 316) °C Type E (-250 °C to -100) °C (-100 °C to 1 000) °C Type J (-210 °C to 1 200) °C Type K (-200 to -100) °C (-100 to 120) °C (120 to 1 000) °C (1 000 to 1 372) °C Type N (-200 to -100) °C (-100 to 1 300) °C Type R (0 to 250) °C (250 to 1 767) °C Type S (0 to 1 767) °C Type T (-250 to -150) °C (-150 to 0) °C (0 to 400) °C Type U (-200 to 0) °C (0 to 600) °C	 0.46 °C 1.2 °C 0.69 °C 0.24 °C 0.35 °C 0.46 °C 0.23 °C 0.35 °C 0.58 °C 0.58 °C 0.35 °C 0.81 °C 0.58 °C 0.69 °C 0.81 °C 0.35 °C 0.23 °C 0.69 °C 0.35 °C	Fluke 5500A Multi Product Calibrator
DC Voltage – Measuring Equipment	(0 to 329.999) mV (0.33 to 3.299) V (3.3 to 32.999) V (33 to 329.999) V (330 to 1 020) V	69 µV/V + 4.2 µV 57 µV/V + 10 µV 57 µV/V + 77 µV 63 µV/V + 1.3 mV 63 µV/V + 6.9 mV	Fluke 5500A Multi Product Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measuring Equipment – Sinewave [1]	(0 to 32.999 9) mV		Fluke 5500A Multi Product Calibrator
	45 Hz to 10 kHz	0.17 % of reading + 1.7 µV	
	(10 to 20) kHz	0.23 % of reading + 1.4 µV	
	(20 to 50) kHz	0.28 % of reading + 3.5 µV	
	(50 to 100) kHz	0.39 % of reading + 4.5 µV	
	(100 to 500) kHz	1.2 % of reading + 12 µV	
	(33 to 329.999) mV		
	(10 to 45) Hz	0.29 % of reading + 0.49 µV	
	45 Hz to 10 kHz	0.057 % of reading + 2.2 µV	
	(10 to 20) kHz	0.12 % of reading + 1.1 µV	
	(20 to 50) kHz	0.19 % of reading + 1.9 µV	
	(50 to 100) kHz	0.28 % of reading + 3.3 µV	
	(100 to 500) kHz	0.81 % of reading + 11 µV	
	(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 + 0.096 mV	
	(10 to 20) kHz	0.092 % of reading + 0.085 mV	
	(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 + 3.0 mV	
	45 Hz to 10 kHz	0.046 % of reading + 0.90 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 + 0.097 V	
	(1 to 5) kHz	0.24 % of reading + 0.12 V	
	(5 to 10) kHz	0.24 % of reading + 0.58 V	

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) µin	Mechanical Comparison

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rulers and Tapes Ruler Tape	 (0 to 24) in (0 to 100) ft	 0.004 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) ° (0.0002 to 0.002) in/ft	 0.6 ° 0.08 ° 0.34 ° 0.000 15 in/ft	Geometry, Angle Blocks
Stage Micrometers 0.001 in Resolution 0.01 in Resolution	 (0 to 2) in (0 to 2) in	 0.000 59 in 0.005 8 in	Indicator and 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 and Surface Block
Reference Rods [3]	(0 to 24) in	(280 + 23*L*) µin	Gage Blocks
Micrometers [3] Inside – Outside - Depth (0.000 05 in Resolution) (0.000 1 in Resolution) (0.001 in Resolution)	(0 to 14) in	 (70 + 28*L*) µin (85 + 27*L*) µin (630 + 11*L*) µin	Gage Blocks
Calipers [3] Outside, Inside, Depth and End Face (0.000 5 in Resolution) (0.001 in Resolution)	(0 to 24) in	 (600 + 16*L*) µin (850 + 13*L*) µin	Gage Blocks
Indicators [3] Plunger and Level Types (0.000 1 in Resolution) (0.000 5 in Resolution) (0.001 in Resolution)	(0 to 4) in	 (185 + 19*L*) µin (410 + 6.5*L*) µin (820 + 3.4*L*) µin	Gage Blocks and 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) L/min (0.2 to 4) L/min (4 to 350) L/min	0.000 3 L/min 0.072 L/min 9.1 L/min	By volume

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Water Flow Meters	(0.1 to 760) L/min	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 Test Machine	(0.1 to 300 000) lbf	0.3 % of reading	ASTM E4 using load cells
Load Cells Tension and Compression	(0.1 to 100) lbf	0.1 % of reading	Dead Weights and Load Cell
Tension	(1 to 100 000) lbf	0.06 % of reading	
Compression	(1 to 300 000) lbf	0.06 % of reading	
Force Gauges – Push/Pull	(0 to 500) lbf	0.5 lbf	Dead Weight
	(0 to 1 000) lbf	1 lbf	Load Cell
Shore Hardness Tester – Force only	(0 to 100) units	0.6 units	Load Cells
Mass – Laboratory Weights	(1, 2, 5, 10, 100, 500) mg (1, 2, 5) g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg 30 kg	0.004 6 mg 0.014 mg 0.018 mg 0.019 mg 0.023 mg 0.048 mg 0.08 mg 0.27 mg 10 mg 10 mg 27 mg 95 mg 0.13 g 0.14 g	Single Substitution
Vacuum Gauges (0.1 inHg Resolution) (0.2 inHg Resolution) (0.5 inHg Resolution)	(0 to 30) inHg	 0.09 inHg 0.13 inHg 0.29 inHg	Manometer

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
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 [3] (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)	(0 to 5) g (0 to 200) g (0 to 500) g (0 to 5 000) g (0 to 10 000) g (0 to 30 000) g	0.000 5 % of reading + 0.004 5 mg 0.000 4 % of reading + 0.025 mg 0.000 1 % of reading + 0.38 mg 0.004 7 % of reading + 1.52 mg 0.008 1 % of reading + 18.25 mg 0.001 8 % of reading + 190.5 mg	Class 1 and 4 Weights
Scales and Balances [3] (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 + 0.110 lb	Class F weights
Torque Wrench	(0.1 to 3 000) lbf·in (2.5 to 500) lbf·ft	2% of reading 2 % of reading (Clockwise only)	Torque Calibrator
Torque Calibrator	(0 to 3 000) lbf·in Up to 250 lbf·ft	0.29 % of reading + 0.015 lbf·in 0.02 % of reading + 2.8 lbf·ft	Torque Arm and Deadweights
Auto Pipettes Fixed Volume	Up to 1 000 µL Up to 50 mL	0.59 % of reading + 0.000 1 µL 0.59 % of reading + 0.000 1 mL	Balance
Auto Pipettes Adjustable Volume	Up to 1 000 µL Up to 50 mL	0.99 % of reading + 0.000 1 µL 0.99 % of reading + 0.000 1 mL	
Volumetric Glassware Volumetric Flask Graduated Cylinder Graduated Burette	Up to 5 000 mL Up to 2 000 mL Up to 100 mL	0.01 % of reading + 0.025 mL 0.03 % of reading + 0.185 mL 0.03 % of reading + 0.009 mL	Balance

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Optical Pyrometers	(Ambient to 1 090) °C	1 % of reading	Black body with thermocouples $\varepsilon = 0.995$, $\lambda = (9 \text{ to } 14)$ µm
Relative Humidity	(20 to 90) %RH	3 %RH	Humidity Meter

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Liquid in Glass Thermometers	(-30 to 400) °C	0.1 °C	SPRT
Bi-Metal Thermometers	(-30 to 0) °C (0.01 to 700) °C	0.3 °C 1 % of reading	Thermocouple
RTD Thermometers	(-30 to 125) °C (125 to 450) °C	0.04 °C 0.06 °C	SPRT
Thermocouple Thermometers	(-30 to 0) °C (0.01 to 700) °C	0.1 °C 0.3 % of reading	Thermocouple
Temperature – Measure – Ovens and Furnaces	(-200 to 25) °C (25 to 250) °C (250 to 500) °C (500 to 1 000) °C	0.5 °C 0.8 °C 1.5 °C 2.5 °C	RTD and thermocouple references

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Tachometer Contact	(0 to 3 500) rpm	0.2 rpm	Tachometer Calibrator
Tachometer Non-Contact	(0 to 12 000) rpm	0.9 rpm	Strobe Light/Motor
	(0 to 100 000) rpm	0.36 rpm	Fluke 5500A Multi Product Calibrator
Stop Watch	(0 to 24) hrs	0.29 s	Reference Stopwatch
Frequency Measuring Equipment	DC to 2 MHz	25 µHz/Hz + 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
Length Measurement	(0 to 24) in	0.004 in	Caliper
	(0 to 24) in	0.011 in	Steel Rule
	(0 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
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)
Phosphorus	ASTM E53 ASTM E350; ASTM E351 ASTM E352; ASTM E353 E478 (All Mod.) BMI 34-072	Metals and Metal Alloys	By Gravimetric Analysis
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
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
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

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
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 – Glow Discharge (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	-
Fourier Transform Infrared Spectroscopy (FTIR)	ASTM D3677 (part A, pyrolysis), ASTM E1252 BMI 37-003; BMI 37-004	Plastics, Rubber Polymers, and Petroleum Products	By Energy Dispersive Spectroscopy
Chemical Analysis of Limestone, Quicklime, and Hydrated Lime	ASTM C25, Parts 10, 16, 17, 19, 33 BMI 32-071	Limestone Quicklime Hydrated Lime	-
X-Ray Spectrometric Analysis of Lime and Limestone	ASTM C1271; BMI 32-035	Lime Limestone	-
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	-
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	-
Chlorine in Petroleum Products	ASTM D808; BMI 35-057	Petroleum and Petroleum Products	-

Chemical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
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	-
Processing Microscopically Sizing and Counting Particles from Aerospace Fluids on Membrane Filters	ASTM F311, ASTM F312 BMI 35-072	Aerospace Fluids	-

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	-
Evaluating Degree of Rusting on Painted Steel Surfaces	ASTM D610; GMW14872, GMW15288, GMW15282, GMW14671	Painted Steel	-
Evaluating Degree of Blistering of Painted Surfaces	ASTM D714; GMW14872	Painted Surfaces	-
Testing Water Resistance of Coatings Using Water Immersion	ASTM D870; GMW3044	Coated Parts	-
Testing Water Resistance of Coatings using Water Fog Apparatus	ASTM D1735; BMI 31-014 MIL-STD 810A-G Sec. 507	Coated Parts	-
Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments	ASTM D1654	All Types	-
Water Resistance of Coatings in 100% Relative Humidity	ASTM D2247; GMW14729 BMI 31-014	Coated Parts	-
Measuring Adhesion by Tape Test	ASTM D3359 GMW14829	Coated Parts	-
Accelerated Weathering - Xenon	ASTM G155	Coated Parts	-
Flammability	FMVSS 302	Plastics and Textiles	-

Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Environmental Conditioning: Temperature [2] (-75 to 190) ºC	MIL STD-810A-G Methods 501, 502	All Types	-
Environmental Conditioning: Humidity [2] Up to 95 % RH	MIL STD-810A-G Method 507	All Types	-
Environmental Conditioning: Humidity [2] (60 to 100) ºF Up to 100 %RH	MIL STD-810A-G Method 507	All Types	-
Altitude and Temperature	MIL STD-810A-G Method 5000	All Types	-
Pencil Hardness	ASTM D3363	Coated Parts	-
Tension Testing for Gray Iron Castings	ASTM A48; BMI 36-005	Gray Iron Castings	-
Evaluating the Microstructure of Graphite in Iron Castings	ASTM A247; BMI 36-020	Iron Castings	-
Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels	ASTM A262, Methods A, B, C, E, F	Austenitic Stainless Steels	-
Tension Testing	ASTM B557	Wrought and Cast Aluminum Products	-
Tension Testing	ASTM B557	Magnesium Alloy Products	-
Adhesion of Metallic Coatings	ASTM B571	Coated Parts	-
Preparation of Metallographic Specimens	BMI 36-007	Metals	-
Tension Testing	ASTM E8; ASTM E8M ASTM A370; ASTM B381 BMI 36-005; 36-006	Metallic Materials	-
Brinell Hardness	ASTM E10; ASTM A370 BMI 36-002	Metallic Materials	-
Rockwell Hardness Scales: A, B, C, D, F	ASTM E18; ASTM A370 BMI 36-004; 36-001	Metallic Materials	-
Rockwell Superficial Hardness Scales: 15T, 30T, 45T, 15N, 30N. 45N	ASTM E18; ASTM A370 BMI 36-004; 36-001	Metallic Materials	-
Notched Bar Impact Testing of Metallic Metals	ASTM E23; ASTM A370 BMI 36-004; 36-011	Metallic Metals	-

Mechanical

Specific Tests and/or Properties Measured	Specification, Standard, Method, or Test Technique	Items, Materials or Product Tested	Key Equipment or Technology
Macro etching Metals and Alloys	ASTM E340; BMI 36-008	Metals and Metal Alloys	-
Microhardness of Metals, 500 grf Knoop	ASTM E384; BMI 36-003	Metals	-
Axial Tensile	ASTM F606; ASTM F606M	Fasteners	-
Wedge Tensile	ASTM F606; ASTM F606M	Fasteners	-
Proof Load	ASTM F606; ASTM F606M	Fasteners	-
Impact Testing of Safety Glazing Materials	ANSI Z 97.1, 16 CFR 1201 CAN/CGSB-12.1 BMI 30-004; BMI 30-005	Glass	-

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.
4. This scope is formatted as part of a single document including Certificate of Accreditation No. L2444.

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