



LABORATORY ACCREDITATION BUREAU

Certificate of Accreditation

ISO/IEC 17025:1999

Certificate Number L1048

Digital Measurement Metrology Inc.

26 Automatic Road, Unit 4

Raj Sharma

Brampton, Ontario L6S 5N7

Canada

Is recognized by the Laboratory Accreditation Bureau (L-A-B) for satisfactory compliance with the requirements set forth in L-A-B's policies and procedures, and all requirements of ISO/IEC 17025:1999. Laboratories that comply with ISO/IEC 17025:1999 also operate in accordance with ISO 9002:1994. Accreditation is granted for specific services listed on the Scope of Accreditation.

May 29, 2006

Effective through

R. Douglas Leonard, Jr., Chief Technical Officer
Laboratory Accreditation Bureau

Scope of Accreditation For Digital Measurement Metrology Inc.

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In recognition of a successful assessment to ISO/IEC 17025:1999, accreditation is granted to **Digital Measurement Metrology, Inc.** to perform the following **Calibrations**:

Accreditation granted through: **May 29, 2006**

Calibration

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ¹²	Remarks
Gauge Blocks	0.01 in to 20 in (0.5 mm to 500 mm)	$(4 + 3L) \mu\text{in}$ $(0.1 + 0.003L) \mu\text{m}$	Master gauge blocks and Gauge Block Comparator
Length Measuring Machine ¹	10 μin to 4 in	$(6 + 3L) \mu\text{in}$	Gage Blocks
Step Gauges	0.5 in to 40 in (10 mm to 1000 mm)	$(30 + 5L) \mu\text{in}$ $(0.8 + 0.005L) \mu\text{m}$	Step Gauge and Laser Measuring System
Coordinate Measuring Machine (Linear) ¹	0 in to 96 in (0 m to 2.4 m)	300 μin (8 μm)	Laser Measuring System
Surface Plates ¹	3 in to 72 in x 144 in	0.1 $F^2 \mu\text{in/in}$	Laser Measuring System
Squares	1 in to 40 in (25 mm to 1000 mm)	5L μin (0.005L μm)	Ceramic Square, Mu-Checker and Height Gauge



Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ¹²	Remarks
Calipers	0.01 in to 80 in (0.5 mm to 2000 mm)	0.001 in 0.025 mm	Length Standard
Depth Gauges	0.05 in to 12 in (1 mm to 300 mm)	700 μ in 18 μ m	Depth Master
Outside Micrometers	0.01 in to 40 in (0.5 mm to 1000 mm)	(50 + 20L) μ in (1 + 0.02L) μ m	Gauge Blocks and Micmaster
Inside Micrometers	1 in to 60 in (25 mm to 1500 mm)	(250 + 10L) μ in (7 + 0.01L) μ m	Length Standard and Laser Measuring System
Micrometer Standards	1 in to 40 in (25 mm to 1000 mm)	(60 + 2L) μ in (1.5 + 0.002L) μ m	Step Gage Linear Height Gauge & Gauge Blocks
Height Gauges	0.05 in to 40 in (1 mm to 1000 mm)	(70 + 3L) μ in (2 + 0.003L) μ m	Step Gage
Plain Ring Gauges	0.5 in to 8 in (10 mm to 200 mm)	(9 + 5L) μ in (0.23 + 0.005L) μ m	Length Measuring Machine and Master Ring Gauges
Threaded Go/No Go Plug Gauges	0.05 in to 6 in (1.6 mm to 150 mm) Pitch Diameter Thread Pitch	160 μ in (4 μ m) 234 μ in (6 μ m)	Length Measuring Machine, Thread Wire Set, and Optical Projector
Threaded Go/No Go Ring Gauges	1.6 mm to 150 mm (0.05 in to 6 in)	4.3 μ m (170 μ in)	Setting Thread Plug Gauge

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ¹²	Remarks
Indicators	0.01 in to 6 in (0.5 mm to 150 mm)	38 μ in (1 μ m)	Indicator Tester
Precision Levels	4 in to 12 in	327 μ in	Master Precision Level and Surface Plate
Pin Gauges	0.01 in to 2 in (0.2 mm to 50 mm)	42 μ in (1 μ m)	Laser System
CNC Machine Tools ¹	1 mm to 2.2 m	12 μ m	Laser Measuring System
Optical Projectors ¹	12 in to 60 in (Screens)	Angular 0.04° Magnification 4 μ m Linear 5 μ m	Glass Masters, Precision Square and Gauge Blocks
Indicator Testers	100 μ in to 1 in (1 μ m to 25 mm)	94 μ in (2.4 μ m)	Length Standard
Microscopes ¹	100 μ in to 2 in	125 μ in	Glass Masters
2 PT. & 3 PT. Bore Gauges	0.2 in to 7 in (5 mm to 175 mm)	136 μ in (3.5 μ m)	Bore Gauge Calibrator, Gauge Blocks and Ring Gauges
Thickness Gauges	0.001 in to 1 in (0.1 mm to 25 mm)	40 μ in (1 μ m)	Digital Micrometer
Radius Gauges	0.05 in to 1 in (1 mm to 25 mm)	327 μ in (9 μ m)	Optical Projector
Rulers & Tape Measures	0.0005 in to 100 ft (0.005 mm to 25 m)	(640 + 28L) μ in (16 + 0.028L) μ m	Length Measuring Machine

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ¹²	Remarks
Inclinometer/Digital Protractors	0.1° to 360°	0.15°	Sine Bar Plate and Gauge Blocks
Balances ^{1,2}	0.001 g to 210 g	ASTM E617 Class 0 (See Note)	Calibration Method Tolerances are in accordance with Handbook 44 and “client” procedures
Balances ^{1,2}	1 g to 1.2 kg	ASTM Class 1 (See Note)	Calibration Method Tolerances are in accordance with Handbook 44 and “client” procedures
Balances ^{1,2}	1 lb to 50 lb	ASTM Class 1 (See Note)	Calibration Method Tolerances are in accordance with Handbook 44 and “client” procedures
Class F Weights	1 mg 2 mg 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g	0.12 mg 0.12 mg 0.12 mg 0.12 mg 0.12 mg 0.12 mg 0.12 mg 0.12 mg 0.12 mg 0.12 mg 0.12 mg 0.12 mg 0.12 mg 0.12 mg 0.12 mg 0.3 mg 0.3 mg 0.3 mg	Precision Balance and ASTM E617 Class 0 weights
Class F Weights	500 g 1000 g	3 mg 3.3 mg	Precision Balance and ASTM E617 Class 1 weights

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ¹²	Remarks
Class F Dead Weights	2 kg 5 kg 10 kg 20 kg	0.32 g 0.32 g 0.32 g 0.55 g	Precision Balance and ASTM E617 Class 1 weights
Class F Dead Weights	0.125 lb (2 oz) 0.25 lb (4 oz)	0.7×10^{-6} lb 0.7×10^{-6} lb	Precision Balance and ASTM E617 Class 1 weights
Class F Dead Weights	0.5 lb (8 oz) 1 lb (16 oz) 2 lb	7×10^{-6} lb 7×10^{-6} lb 7×10^{-6} lb	Precision Balance and ASTM E617 Class 1 Weights
Class F Dead Weights	5 lb 10 lb 20 lb 50 lb	0.7×10^{-3} lb 0.7×10^{-3} lb 0.7×10^{-3} lb 1.2×10^{-3} lb	Precision Balance and ASTM E617 Class 1 Weights
Force Gauges ¹ Compression/Tension	0.1 lbf to 200 lbf (0.1 kgf to 100 kgf)	0.08 lbf	ASTM E 617 Class F weights
Force Gauges ¹ Compression/Tension	1 lbf to 10000 lbf (1 kgf to 5000 kgf)	0.7 % of applied load	Load Cell System
Force Test Stands ¹	(0.1 to 12) in/min	0.5 % of setting	Stop Watch
Torque Watches	4 in·ozf to 40 in·ozf	1 % of full scale	Torque Calibration System
Torque Wrenches	4 lbf·in to 250 lbf·ft	0.35 % of full scale	Torque Calibration System
Torque Wrenches	100 lbf·ft to 2000 lbf·ft	0.65 % of full scale	Torque Calibration System
Torque Testers	1 lbf·in to 500 lbf·ft	0.05 % of reading	ASTM E617 Class F weights, Torque Arm

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ¹²	Remarks
Durometers	10 duro to 90 duro	0.7 duro	ASTM D-2240 Using Arm & Weight
Durometer Calibrators	Type A	2.6 g	ASTM D-2240 Using Force Gage
Durometer Calibrators	Type D	4.9 g	ASTM D-2240 Using Force Gage
Durometer Test Blocks	10 duro to 90 duro	1.4 duro	ASTM D-2240 Using Arm & Weight
Roughness Testers	16.1 Ra 119.5 Ra	1.5 μ in 2.3 μ in	Roughness Standard
Rockwell Hardness Testers	HRB High Mid Low HRC High Mid Low	1.2 HRB 1.3 HRB 1.3 HRB 1.3 HRC 1.3 HRC 1.3 HRC	Indirect comparison to test blocks
Pressure ¹ -generate	2 psi to 1000 psi	0.2 % of reading	Dead Weight Tester
Temperature Controllers ^{1,6}			Multifunction Calibrator (Thermocouple Simulation)
Type K	-200 °C to 1372 °C	0.23 °C	
Type J	-210 °C to 1200 °C	0.19 °C	
Type S	0 °C to 1767 °C	0.23 °C	
Type C	0 °C to 2316 °C	0.23 °C	
Type E	-250 °C to 1000 °C	0.17 °C	
Type U	-200 °C to 600 °C	0.21 °C	
Type N	-200 °C to 1300 °C	0.23 °C	

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ¹²	Remarks
Temperature Sensors (RTD's) ^{1,6}	32 °C to 1382 °C	0.3 °C	Process Calibrator
Thermohygrometers	19 °C to 25 °C (30 to 50) % RH	1.2 °C 3.6 % RH	Temperature & Humidity Standard
Liquid Flowmeters ¹	(0 to 100) U.S. gal/h	2.5 % of reading	Mass, Precision Balance and Test Rig ³
Refractometers	1 mg/g to 100 mg/g	0.6 mg/g	Test Solution and Precision Balance
Tachometers (Contact Type)	1 rpm to 4000 rpm	0.4 rpm	Tachometer Calibrator
Tachometers (Non-Contact Type)	(500 to 40 x 10 ³) rpm	1.4 rpm	Tachometer Calibrator
Stopwatch	1 s to 24 h	0.14 s	Master Stopwatch & Camera
Resistance-generate	0 Ω to 1 Ω 1 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 kΩ 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ 100 MΩ to 110 MΩ	129 μΩ + 0.01 Ω/Ω 139 μΩ + 0.01 Ω/Ω 124 μΩ + 0.015 Ω/Ω 3.3 mΩ + 0.02 Ω/Ω 33 mΩ + 0.1 Ω/Ω 339 mΩ + 1 Ω/Ω 3.4 Ω + 10 Ω/Ω 38 Ω + 250 Ω/Ω 1.4 kΩ + 3 kΩ/Ω 58 kΩ + 3 kΩ/Ω	Multifunction Calibrator
DC Voltage-generate	0 mV to 300 mV 300 mV to 3 V 3 V to 30 V 30 V to 300 V 300 V to 1000 V	7 μV + 1 μV/V 40 μV + 2 μV/V 429 μV + 20 μV/V 6.3 mV + 150 μV/V 21 mV + 1.5 mV/V	Multifunction Calibrator




Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ¹²	Remarks
Capacitance-generate 10 Hz to 10 kHz	1 nF to 10 nF 10 nF to 100 nF 100 nF to 1 μ F 1 μ F to 5 μ F 5 μ F to 11 μ F	0.008 nF + 0.01 nF/F 0.06 nF + 0.1 nF/F 0.6 nF + 1 nF/F 6 nF + 10 nF/F 16 nF + 30 nF/F	Multifunction Calibrator
Frequency-generate 1 Volt	120 Hz 1 kHz 10 kHz 100 kHz	355 μ Hz + 5 μ Hz/Hz 3 mHz + 5 μ Hz/Hz 297 mHz + 5 μ Hz/Hz 1.5 Hz + 5 μ Hz/Hz	Multifunction Calibrator

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ¹²	Remarks
AC Voltage-generate			
0 mV to 30 mV	10 Hz to 45 Hz	6 μ V + 6 μ V/V	Multifunction Calibrator
	45 Hz to 1 kHz	6 μ V + 6 μ V/V	
	1 kHz to 10 kHz	8 μ V + 6 μ V/V	
	10 kHz to 20 kHz	35 μ V + 6 μ V/V	
	20 kHz to 50 kHz	121 μ V + 12 μ V/V	
	50 kHz to 100 kHz	277 μ V + 50 μ V/V	
	100 kHz to 500 kHz	278 μ V + 50 μ V/V	
30 mV to 300 mV	10 Hz to 45 Hz	51 μ V + 8 μ V/V	
	45 Hz to 1 kHz	51 μ V + 8 μ V/V	
	1 kHz to 10 kHz	56 μ V + 8 μ V/V	
	10 kHz to 20 kHz	122 μ V + 8 μ V/V	
	20 kHz to 50 kHz	278 μ V + 32 μ V/V	
	50 kHz to 100 kHz	693 μ V + 70 μ V/V	
	100 kHz to 500 kHz	697 μ V + 70 μ V/V	
300 mV to 3 V	10 Hz to 45 Hz	523 μ V + 60 μ V/V	
	45 Hz to 1 kHz	523 μ V + 60 μ V/V	
	1 kHz to 10 kHz	661 μ V + 60 μ V/V	
	10 kHz to 20 kHz	1 mV + 50 μ V/V	
	20 kHz to 50 kHz	2.4 mV + 125 μ V/V	
	50 kHz to 100 kHz	8.3 mV + 600 μ V/V	
	100 kHz to 500 kHz	8.4 mV + 600 μ V/V	
3 V to 30 V	10 Hz to 45 Hz	5.3 mV + 600 μ V/V	
	45 Hz to 1 kHz	5.3 mV + 600 μ V/V	
	1 kHz to 10 kHz	8.4 mV + 600 μ V/V	
	10 kHz to 20 kHz	12 mV + 0.6 mV/V	
	20 kHz to 50 kHz	31 mV + 1.6 mV/V	
	50 kHz to 100 kHz	31 mV + 1.6 mV/V	
30 V to 300 V	45 Hz to 1 kHz	70 mV + 6 mV/V	
	1 kHz to 10 kHz	87 mV + 6 mV/V	
	10 kHz to 20 kHz	104 mV + 6 mV/V	
	20 kHz to 50 kHz	694 mV + 50 mV/V	
	50 kHz to 100 kHz	703 mV + 50 mV/V	
300 V to 750 V	45 Hz to 1 kHz	219 mV + 10 mV/V	
	1 kHz to 10 kHz	262 mV + 10 mV/V	

Calibration Parameter/Equipment	Range	Best Measurement Capability (+/-) ¹²	Remarks
DC Current-generate	0 mA to 3 mA 3 mA to 30 mA 30 mA to 300 mA 300 mA to 3 A	0.35 μ A + 0.05 μ A/A 3.47 μ A + 0.25 μ A/A 34.7 μ A + 2.5 μ A/A 1.7 mA + 500 μ A/A	Multifunction Calibrator
AC Current-generate 0 mA to 3 mA	10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 kHz to 30 kHz	32 μ A + 2 μ A/A 15 μ A + 2 μ A/A 28 μ A + 2 μ A/A 70 μ A + 3 μ A/A 139 μ A + 4 μ A/A 139 μ A + 4 μ A/A	Multifunction Calibrator
30 mA to 300 mA	10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 kHz to 30 kHz	314 μ A + 20 μ A/A 140 μ A + 20 μ A/A 347 μ A + 50 μ A/A 693 μ A + 100 μ A/A 1.4 mA + 200 μ A/A 1.4 mA + 200 μ A/A	
300 mA to 3 A	45 Hz to 1 kHz 1 kHz to 5 kHz	3.5 mA + 2 mA/A 104 mA + 2 mA/A	
Ultrasonic Thickness Gauges	0.001 in to 4 in (0.01 mm to 100 mm)	0.0028 in (0.07 mm)	Steel Gauge Blocks

Notes:

- 1) On site calibration services available for these items. This laboratory offers commercial calibration service and on site calibration services is dependent on local conditions
- 2) The uncertainty associated when calibrating a balance/scale is dependent on local conditions, such as the resolution of the unit being calibrated and the environment in which the balance/scale is operated. Therefore, a statement of the best measurement capability can be misleading. The class of the weights used by the laboratory for each range is identified in the BMC column. The Specified Metrological Method is specified in the remarks column.
- 3) This test is performed in accordance with ISO 4185.
- 4) Best Measurement Capabilities are expressed as expanded uncertainties at approximately the 95 % level of confidence using a coverage factor of $k = 2$.
- 5) L = Length in inch and/or mm, F = the diagonal length of the surface plate in inch, R = Resolution.
- 6) Thermocouple and RTD simulation best measurement capability represents the capability for all ranges.

Approved by:  Date: July 11, 2005
R. Douglas Leonard
Chief Technical Officer

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