

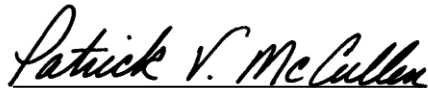
This is to signify that

ACCURATE SOLUTIONS – ATLANTA, INC.

6303 WOODLORE DRIVE, NORTHWEST
ACWORTH, GEORGIA 30101

Calibration Laboratory CL-105
(Revised August 23, 2011)

has met the requirements of the IAS Accreditation Criteria for Calibration Laboratories (AC204), has demonstrated compliance with the ANS/ISO/IEC Standard 17025:2005, *General criteria for the competence of testing and calibration laboratories*, and has been accredited commencing January 15, 2010, for the calibration discipline(s) listed in the approved scope of accreditation. The laboratory meets IAS program requirements in the field of calibration.



Patrick V. McCullen
Vice President



C. P. Ramani, P.E.
President

(see attached scope of accreditation for fields of calibration and accredited calibration methods)

Accurate Solutions – Atlanta, Inc. CL-105
(Revised August 23, 2011)

Accurate Solutions – Atlanta, Inc.
6303 Woodlore Drive, NW
Acworth, GA 30101

Galen Evans
President
(770) 428-9400

MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
<i>Dimensional</i> Length Calipers	(0 to 12) inches (12 to 36) inches	(50 + 15L) μin (210 + 24L) μin	Gage Blocks, Rings Rod Standards
Micrometers	(0 to 3) inches (3 to 12) inches	35 μin 70 μin	Gage Blocks
Height Gages	(0 to 12) inches (12 to 36) inches	(50 + 15L) μin (210 + 24L) μin	Gage Blocks
Indicators	(0 to 1) inch	20 μin	Gage Blocks
Rules & Tapes	(0 to 39) inches (39 to 117) inches	0.0025 in 30 μin/in + (L/39) · (0.0025) in	Linear Standard, Gauge Blocks

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<i>Dimensional (continued)</i> Micrometer End Standards, Height Blocks, Test Block	(0 to 1) inch (1 to 3) inches (3 to 12) inches	15 µin 30 µin 70 µin	Electronic comparator Gage Blocks
Mass ²	(0.001 to 100) g (100 to 6000) g (6 Kg to 26 Kg)	200 µg 20 mg 40 mg	Comparison to Class 1 Weights
<i>Mechanical</i> Balances	20 mg to 6 kg	See Note	ASTM Class 1 Weights
Scales	(0.0005 to 4000) lb	See Note	ASTM Class F Weights
Force - Tension	(0 to 3000) lb	0.01% of reading	Class F weights Set the force method
Force – Tension & Compression	(0 to 50) lbf (0 to 250) lbf (0 to 2500) lbf (0 to 20,000) lbf (0 to 100,000) lbf	0.005 lbf 0.025 lbf 0.25 lbf 1.01 lbf 4.8 lbf	Calibrated Load Cell Follow the force method

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MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
<i>Mechanical (continued)</i> Tachometer, Rotational Speed Noncontact – Source Noncontact – Measure Contact	(0.6 to 720,000) RPM (6 to 45,000) RPM (45,000 to 99,999) RPM (0.8 to 9999.9) RPM (10,000 to 25,000) RPM	2.5 ppm ±0.5 RPM ±1.0 RPM ±0.6% of reading ±0.006% of reading	Signal Generator, Photo Pulse Generator Laser Tachometer, Timer
Timers and Time Intervals, Electrical or Mechanical Trigger Event	10 µs to 256 s	1.3 µs	MicroSet Temperature Compensated Timer Calibrated via GPS Signal
Timers/Stopwatches– Manual	15 s to 24 hours	0.27 s	Reference Stopwatch, NIST Time Service

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<i>Mechanical (continued)</i> Pressure	(-14.8 to 300) lbf/in ² (0 to 10,000) lbf/in ² ±2 in H ₂ O ±100 in H ₂ O	0.02 lbf/in ² 0.5 lbf/in ² 0.06% of reading 0.01 in H ₂ O	Druck DPI 610 ATE-100
<i>Thermal</i> Thermometers, Temperature Indicators	-15 to 300°C -150°C to 600°C	0.2°C 0.0073°C	RTD, Dry Block Calibrator, Liquid Bath SPRT

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<i>Thermal(continued)</i> Thermocouple Indicators & Standards			
Type B	(600 to 1820)°C	0.4°C	Electrical Simulation of Temperature, using Digital Calibrator, DMM and/or Ice Bath or Dry Block Calibrator
Type C	(0 to 2316)°C	0.3°C	
Type E	(-250 to 1000)°C	0.2°C	
Type J	(-210 to 1200)°C	0.2°C	
Type K	(-200 to 1372)°C	0.2°C	
Type N	(-200 to 1300)°C	0.2°C	
Type R	(0 to 1767)°C	0.4°C	
Type S	(0 to 1767)°C	0.4°C	
Type T	(-250 to 400)°C	0.2°C	
Type U	(-200 to 600)°C	0.3°C	
RTD - Measuring Equipment and Probes	(-200 to 800)°C (-190 to 630)°C	0.08°C 0.05°C	Digital Calibrator Decade Resistors

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<i>Thermal(continued)</i> RTD PT 385 100Ω, 1K Ω	0°	0.007°	Triple Point Cell and SPRT
Chart Recorder or Data logger	(0 to 300)°C	0.2°C	RTD, Dry Block Calibrator, Electronic Signal Simulation
Relative Humidity	(10 to 90)%	1.25%	Digital RH Meter, Psychrometer
<i>Electromagnetics–DC/Low Frequency</i> DC Volts – Source	(0 to 330) mV (0 to 3.3) V (0 to 33) V (30 to 330) V (100 to 1000) V	20 μV/V + 1 μV 11 μV/V + 2 μV 12 μV/V + 15 μV 18 μV/V + 150 μV 18 μV/V + 1.5 mV	Fluke 5520A
DC Volts – Measure	(0 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1000) V	50 μV/V + 3.5 μV 40 μV/V + 7 μV 35 μV/V + 50 μV 45 μV/V + 600 μV 45 μV/V + 10 mV	HP 34401A

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<i>Electromagnetics–DC/Low Frequency(continued)</i> DC Current – Source	(0 to 330) µA (0.33 to 3.3) mA (3.3 to 33) mA (33 to 330) mA (0.33 to 1.1) A (1.1 to 3) A (3 to 11) A (11 to 20.5) A	150 µA/A + 0.02 µA 100 µA/A + 0.05 µA 100 µA/A + 0.25 µA 100 µA/A + 2.5 µA 200 µA/A + 40 µA 380 µA/A + 40 µA 500 µA/A + 500 µA 1000 µA/A + 750 µA	Fluke 5520A
DC Current – Measure	(0 to 10) mA (10 to 100) mA (0.1 to 1) A (1 to 3) A	500 µA/A + 2 µA 500 µA/A + 5 µA 1 mA/A + 100 µA 1.2 mA/A + 600 µA	HP 34401A


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<i>Electromagnetics–DC/Low Frequency(continued)</i> Resistance – Source	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω (330 to 1100) Ω (1.1 to 3.3) kΩ (3.3 to 11) kΩ (11 to 33) kΩ (33 to 110) kΩ (110 to 330) kΩ (330 to 1100) kΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ (330 to 1100) MΩ	40 μΩ/Ω + 0.001'Ω 30 μΩ/Ω + 0.0015 Ω 28 μΩ/Ω + 0.0014 Ω 28 μΩ/Ω + 0.002 Ω 28 μΩ/Ω + 0.002 Ω 28 μΩ/Ω + 0.02 Ω 28 μΩ/Ω + 0.02 Ω 28 μΩ/Ω + 0.2 Ω 28 μΩ/Ω + 0.2 Ω 32 μΩ/Ω + 2 Ω 32 μΩ/Ω + 2 Ω 60 μΩ/Ω + 30 Ω 130 μΩ/Ω + 50 Ω 250 μΩ/Ω + 2.5 kΩ 500 μΩ/Ω + 3 kΩ 3 mΩ/Ω + 100 kΩ 15 mΩ/Ω + 500 kΩ	Fluke 5520A

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<i>Electromagnetics–DC/Low Frequency(continued)</i> Resistance – Measure	(0 to 100) Ω (0.1 to 1) kΩ (1 to 10) kΩ (10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ (10 to 100) MΩ	0.1 mΩ/Ω + 4 mΩ 0.1 mΩ/Ω + 10 mΩ 0.1 mΩ/Ω + 100 mΩ 0.1 mΩ/Ω + 1 Ω 0.1 mΩ/Ω + 10 Ω 0.4 mΩ/Ω + 100 Ω 8.0 mΩ/Ω + 10 kΩ	HP 34401A
AC Volts – Source	(1 to 33) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	800 μV/V + 6 μV 150 μV/V + 6 μV 200 μV/V + 6 μV 1000 μV/V + 6 μV 3.5 mV/V + 12 μV 8 mV/V + 50 μV	Fluke 5520A

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<i>Electromagnetics–DC/Low Frequency(continued)</i> AC Volts – Source	(33 to 330) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (0.33 to 3.3) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	300 µV/V + 8 µV 145 µV/V + 8 µV 160 µV/V + 8 µV 350 µV/V + 8 µV 800 µV/V + 32 µV 2 mV/V + 70 µV 300 µV/V + 50 µV 150 µV/V + 60 µV 190 µV/V + 60 µV 300 µV/V + 50 µV 700 µV/V + 125 µV 2.4 mV/V + 600 µV	Fluke 5520A

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<i>Electromagnetics–DC/Low Frequency(continued)</i> AC Volts – Source	(3.3 to 33) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (33 to 330) V 45 Hz to 1kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (330 to 1020) V 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	300 µV/V + 650 µV 150 µV/V + 600 µV 240 µV/V + 600 µV 350 µV/V + 600 µV 900 µV/V + 1600 µV 190 µV/V + 2 mV 200 µV/V + 6 mV 250 µV/V + 6 mV 300 µV/V + 6 mV 2.0 mV/V + 50 mV 300 µV/V + 10 mV 250 µV/V + 10 mV 300 µV/V + 10 mV	Fluke 5520A

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MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
<i>Electromagnetics–DC/Low Frequency(continued)</i> AC Voltage – Measure	(0 to 100) mV (3 to 5) Hz (5 to 10) Hz (0.01 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (1 to 750) V (3 to 5) Hz (5 to 10) Hz (0.01 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	10 µV/mV + 40 µV 350 µV/V + 40 µV 60 µV/V + 40 µV 120 µV/V + 50 µV 600 µV/V + 80 µV 4 mV/V + 500 µV 10 µV/mV + 30 µV 350 µV/V + 30 µV 60 µV/V + 30 µV 120 µV/V + 50 µV 600 µV/V + 80 µV 4 mV/V + 500 µV	HP 34401A

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<i>Electromagnetics–DC/Low Frequency(continued)</i> AC Current – Source	(29 to 330) µA (10 to 20)n Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (0.33 to 3.30) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	2 mA/A + 0.1 µA 1.5 mA/A + 0.1 µA 1.25 mA/A + 0.1 µA 3 mA/A + 0.15 µA 8 mA/A + 0.2 µA 16 mA/A + 0.4 µA 2.0 mA/A + 0.15 µA 1.25 mA/A + 0.15 µA 1.0 mA/A + 0.15 µA 2.0 mA/A + 0.2 µA 5.0 mA/A + 0.3 µA 10 mA/A + 0.6 µA	Fluke 5520A

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<i>Electromagnetics–DC/Low Frequency(continued)</i> AC Current – Source	(3.3 to 33) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (33 to 330) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	1.8 mA/A + 2 µA 0.9 mA/A + 2 µA 0.4 mA/A + 2 µA 0.8 mA/A + 2 µA 2.0 mA/A + 3 µA 4.0 mA/A + 4 µA 1.8 mA/A + 20 µA 0.9 mA/A + 20 µA 0.4 mA/A + 20 µA 1.0 mA/A + 50 µA 2.0 mA/A + 100 µA 4.0 mA/A + 200 µA	Fluke 5520A

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<i>Electromagnetics–DC/Low Frequency(continued)</i> AC Current – Source	(0.33 to 1.1) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (1.1 to 3.0) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	1.8 mA/A + 100 µA 0.5 mA/A + 100 µA 6.0 mA/A + 1 mA 25 mA/A + 5 mA 1.8 mA/A + 100 µA 0.6 mA/A + 100 µA 6.0 mA/A + 1 mA 25 mA/A + 5mA	Fluke 5520A

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MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
<i>Electromagnetics–DC/Low Frequency(continued)</i> Capacitance – Source	(0.19 to 0.4) nF (0.4 to 1.1) nF (1.1 to 3.3) nF (3.3 to 11) nF (11 to 33) nF (33 to 110) nF (110 to 330) nF (330 to 1100) nF (1.1 to 3.3) μF (3.3 to 11) μF (11 to 33) μF (33 to 110) μF	5 nF/μF + 0.01 nF 5 nF/μF + 0.01 nF 5 nF/μF + 0.01 nF 2.5 nF/μF + 0.01 nF 2.5 nF/μF + 0.1 nF 2.5 nF/μF + 0.1 nF 2.5 nF/μF + 0.3 nF 2.5 nF/μF + 1 nF 2.5 nF/μF + 3 nF 2.5 nF/μF + 10 nF 4 nF/μF + 30 nF 4.5 nF/μF + 100 nF	Fluke 5520A

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MEASUREMENT AREA	RANGE & RESOLUTION	CALIBRATION & MEASUREMENT CAPABILITY ¹ (CMC) (±)	TECHNIQUE, REFERENCE STANDARD, EQUIPMENT
<i>Electromagnetics–DC/Low Frequency(continued)</i> Capacitance – Source	(110 to 330) μ F (330 to 1100) μ F (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	4.5 nF/ μ F + 300 nF 4.5 nF/ μ F + 1 μ F 4.5 μ F/mF + 3 μ F 4.5 μ F/mF + 10 μ F 7.5 μ F/mF + 30 μ F 11 μ F/mF + 100 μ F	Fluke 5520A
Frequency – Source	0.01 Hz to 2.0 MHz	2.5 μ Hz/Hz + 5 μ Hz	Fluke 5520

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Frequency – Measure	10 Hz to 10 MHz (3 to 5) Hz (5 to 10) Hz	10 µHz/Hz + 0.1 Hz 0.1% of reading 0.05% of reading	Agilent 5314A HP 34401A

¹ “Calibration Measurement Capability” is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or of nearly ideal measuring instruments. Calibration Measurement Capabilities are expressed as uncertainties at approximately the 95% level of confidence, usually using a coverage factor of $k=2$. The measurement uncertainty of a specific calibration performed by the laboratory may be greater than the least uncertainty due to the behavior of the customer’s device, to the environment (if the calibration is performed in the field), and to influences from the circumstances of the specific calibration.

²**NOTE:** Calibration parameters are performed primarily on-site at customer locations. The uncertainty of scale/balance calibration is highly dependent on local conditions, such as scale resolution and sensitivity, scale cleanliness, local gravity, temperature and humidity, dust, vibration, etc.; therefore, any statement of uncertainty is misleading. The class of the best weights used by the laboratory is shown in the Technique column. Use of weights in combination, whether in the same class or different classes, will increase measurement uncertainty resulting from the additive effect of weight tolerances, as defined in ASTM E 617.

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C. P. Ramani, P.E.
President