



THE AMERICAN ASSOCIATION FOR
LABORATORY ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

ALABAMA SCALE & INSTRUMENT, INC
d.b.a. ASI Calibration Labs - Alabama
Mobile, AL

for technical competence in the field of **Calibration**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration. 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 18 June 2005*).

Presented this 20th day of June 2008.

A handwritten signature in cursive script, reading "Peter Meyer".

President
For the Accreditation Council
Certificate Number 1876.01
Valid to February 28, 2010
REVISED June 25, 2008



For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
& ANSI/NCSL Z540-1-1994

ALABAMA SCALE & INSTRUMENT, INC.
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CALIBRATION

Valid until: February 28, 2010

Certificate Number: 1876.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations¹:

I. Dimensional

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (±)	Comments
Calipers, Verniers and Linear Scales	(0 to 36) in	(290 + 140L) μin	Gage blocks, rod standards
Height Gages	(0 to 36) in	(110 + 140L) μin	Gage blocks
Dial and Test Indicators	(0 to 2) in	160 μin	Gage blocks
Micrometers –			Gage blocks, rod standards
Outside	(0 to 36) in	(58 + 140L) μin	
Inside	(0 to 36) in	(72 + 140L) μin	
Depth	(0 to 36) in	(34 + 140L) μin	
Pin Gages	(0.011 to 1.00) in	84 μin	Digital micrometer

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (\pm)	Comments
Rules and Tapes	(0 to 360) in	(0.0034 + 0.009L) in	Gage blocks, linear standards
Surface Plates – Repeatability Only	18 in \times 24 in to 72 in \times 96 in	50 μ m	Repeat-o-meter

II. Electrical – DC & Low Frequency

Parameter/Equipment	Range	Best Uncertainty ² (\pm)	Comments
DC Voltage – Generate ⁴	(0 to 330) mV 330 mV to 3.3 V (3.3 to 33) V (30 to 330) V (100 to 1000) V	0.075 % 0.067 % 0.013 % 0.041 % 0.29 %	Fluke 5500A
DC Voltage – Measure Fixed Points	(20 to 30) kV 100 mV 1 V 10 V 100 V 1000 V 10 kV 40 kV	1 % rdg 50 μ V/V + 0.35 μ V 40 μ V/V + 0.7 μ V 35 μ V/V + 0.5 μ V 45 μ V/V + 0.6 μ V 45 μ V/V + 0.1 μ V 1.5 % rdg 2 % rdg	Agilent 34401A
DC Current – Generate ⁴	(0 to 3.3) mA (3.3 to 33) mA (33 to 330) mA 330 mA to 2.2 A (2.2 to 11) A	0.018 % 0.015 % 0.015 % 0.064 % 0.13 %	Fluke 5500A
DC Current – Measure, Fixed Points	10 mA 100 mA 1 A 3 A	0.05 % rdg + 0.02 % rng 0.05 % rdg + 0.005 % rng 0.1 % rdg + 0.01 % rng 0.12 % rdg + 0.02 % rng	Agilent 34401A

Parameter/Equipment	Range	Best Uncertainty ² (±)	Comments
Resistance – Generate ⁴	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω (0.33 to 1.1) kΩ (1.1 to 3.3) kΩ (3.3 to 11) kΩ (11 to 33) kΩ (33 to 110) kΩ (110 to 330) kΩ (0.33 to 1.1) MΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ	0.098 % 0.067 % 0.026 % 0.016 % 0.017 % 0.013 % 0.017 % 0.02 % 0.019 % 0.016 % 0.023 % 0.02 % 0.075 % 0.12 % 0.59 % 0.59 %	Fluke 5500A
Resistance – Measure	1 kΩ to 1 MΩ	0.01 % rdg + 0.001 % rng	Agilent 34401A
Fixed Points	100 Ω 10 MΩ 100 MΩ	0.01 % rdg + 0.004 % rng 0.04 % rdg + 0.001 % rng 0.8 % rdg + 0.01 % rng	
Capacitance – Generate ⁴	(0.33 to 0.5) nF (0.5 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 (0.33 to 1.1) μF (1.1 to 3.3) μF (3.3 to 11) μF (11 to 33) μF (33 to 110) μF (110 to 330) μF (0.33 to 1.1) mF	2.9 % 1.7 % 0.93 % 0.69 % 0.64 % 0.4 % 0.4 % 0.4 % 0.51 % 0.51 % 0.57 % 0.69 % 0.91 % 1.2 %	Fluke 5500A

Parameter/Range	Frequency	Best Uncertainty ² (±)	Comments
AC Voltage – Generate ⁴			
(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	0.41 % 0.18 % 0.24 % 0.29 % 0.41 % 1.2 %	Fluke 5500A
(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	0.29 % 0.058 % 0.12 % 0.19 % 0.28 % 0.81 %	
330 mV 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	0.18 % 0.036 % 0.093 % 0.17 % 0.34 % 0.7 %	
(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	0.34 % 0.086 % 0.32 % 0.62 % 0.99 %	
(33 to 330) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz	0.096 % 0.093 % 0.1 %	
(330 to 1020) V	45 Hz to 1 kHz (1 to 10) kHz	0.059 % 0.24%	
AC Voltage – Measure			
(1 to 100) mV	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	1 % rdg + 0.04 % rng 0.35 % rdg + 0.04 % rng 0.06 % rdg + 0.04 % rng 0.12 % rdg + 0.05 % rng 0.6 % rdg + 0.08 % rng 4 % rdg + 0.5 % rng	Agilent 34401A

Parameter/Range	Frequency	Best Uncertainty ² (±)	Comments
AC Voltage – Measure (cont) (1 to 750) V	(3 to 5) Hz (5 to 10) Hz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	1 % rdg + 0.03 % rng 0.35 % rdg + 0.03 % rng 0.06 % rdg + 0.03 % rng 0.12 % rdg + 0.05 % rng 0.6 % rdg + 0.08 % rng 4 % rdg + 0.5 % rng	Agilent 34401A
AC Current – Generate ⁴ (0 to 330) µA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.29 % 0.15 % 0.15 % 0.47 % 1.4 %	Fluke 5500A
330 µA to 3.3 mA	(10 to 20) Hz 20 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.24 % 0.12 % 0.24 % 0.7 %	
(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	0.24 % 0.12 % 0.11 % 0.23 % 0.7 %	
(33 to 330) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.23 % 0.12 % 0.11 % 0.23 % 0.7 %	
330 mA to 2.2 A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz	0.24 % 0.12 % 0.93 %	
(2.2 to 11) A	(45 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz	0.25 % 0.26 % 0.45 %	
(11 to 500) A	(50 to 60) Hz	0.45 %	

Parameter/Range	Frequency	Best Uncertainty ² (±)	Comments
AC Current – Measure			
(0 to 1) A	(3 to 5) Hz (5 to 10) Hz 10 Hz to 5 kHz	1 % rdg + 0.04 % rng 0.3 % rdg + 0.04 % rng 0.1 % rdg + 0.04 % rng	Agilent 34401A
(1 to 3) A	(3 to 5) Hz (5 to 10) Hz 10 Hz to 5 kHz	1.1 % rdg + 0.06 % rng 0.35 % rdg + 0.06 % rng 0.15 % rdg + 0.06 % rng	

Parameter/Equipment	Range	Best Uncertainty ² (±)	Comments
Electrical Calibration of Thermocouple Indicating Systems ⁴ –			
Type E	-50 °C to 650 °C 650 °C to 1000 °C	0.45 °C 0.47 °C	Fluke 5500A
Type J	-210 °C to 150 °C 150 °C to 1200 °C	0.46 °C 0.45 °C	
Type K	-200 °C to -100 °C -100 °C to 120 °C 120 °C to 1372 °C	0.53 °C 0.45 °C 0.45 °C	
Type R	0 °C to 250 °C 250 °C to 1768 °C	0.71 °C 0.57 °C	
Type S	0 °C to 250 °C 250 °C to 1768 °C	0.71 °C 0.57 °C	
Type T	-200 °C to 0 °C 0 °C to 400 °C	0.48 °C 0.45 °C	

Parameter/Equipment	Range	Best Uncertainty ² (±)	Comments
Electrical Calibration of RTD Measuring Equipment ⁴ –			
Pt 385, 100 Ω	-200 °C to -80 °C -80 °C to 0 °C 0 °C to 100 °C 100 °C to 300 °C 300 °C to 400 °C 400 °C to 630 °C 630 °C to 800 °C	0.14 °C 0.14 °C 0.15 °C 0.16 °C 0.17 °C 0.19 °C 0.37 °C	Fluke 5500A
Pt 385, 1000 Ω	-200 °C to -80 °C -80 °C to 0 °C 0 °C to 100 °C 100 °C to 260 °C 260 °C to 300 °C 300 °C to 400 °C 400 °C to 600 °C 600 °C to 630 °C	0.13 °C 0.13 °C 0.13 °C 0.14 °C 0.15 °C 0.15 °C 0.27 °C 0.37 °C	

III. Fluid Quantities

Parameter/Equipment	Range	Best Uncertainty ² (±)	Comments
Flow Indicators (Water)	(1 to 100) gpm	2.9 % rdg	Gravimetric determination

IV. Mechanical

Parameter/Equipment	Range	Best Uncertainty ² (±)	Comments
Indirect Verification of Rockwell Hardness Testers	HRB: (30 to 100) HRC: (20 to 68)	1.2 HRB 1.2 HRC	Indirect verification method per ASTM E18

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (\pm)	Comments
Scales & Balances	1 mg to 32 kg (0.005 to 400 000) lb	0.5 LSD	Verification with Class 1, 4 & F weights
Pressure Gauges, Transducers, and Transmitters	(-14 to 30) psi (30 to 700) psi (700 to 10 000) psi	0.033 psi 0.05% rdg 0.19% rdg	Pressure comparison
Torque Wrenches	(4 to 50) in•lb (30 to 400) in•lb (80 to 100) in•lb (20 to 250) ft•lb (200 to 2000) ft•lb	0.15 in•lb 1.2 in•lb 2.9 in•lb 0.73 ft•lb 5.8 ft•lb	Digital torque calibrator
Torque Analyzers and Transducers	5 in•lb to 2000 ft•lb	0.3 % of applied load	Torque arms with Class 4 & F weights, including specific arms
Force – Tension and Compression	(1 to 1000) lbs	0.029 % rdg	Class 4 & F weights and deadweights
	(1001 to 10 000) lbs	0.24 lbs	Load cell comparison
	(10 001 to 100 000) lbs	3.7 lbs	

V. Time and Frequency

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (\pm)	Comments
Digital/Mechanical Tachometer	(40 to 99 000) rpm	0.1 % of reading (rdg) \pm 1 LSD	Direct reflective pickup tachometer
Timers	15 s to 24 hr	The greater of 0.05 % full scale (fs) or 1 LSD	Reference stopwatch
Stopwatches	15 s to 24 hr	0.01 % fs + 0.5 s	NISTIME 32

VI. Thermodynamics

Parameter/Equipment	Range	Best Uncertainty ² (\pm)	Comments
Digital Thermometers and Temperature Controllers	0 °C to 400 °C	0.5 °C	Digital calibrator (RTD probe, dry block calibrator)
Relative Humidity – Measure	(0 to 90) % RH (90 to 100) % RH	2.3 % RH 3.2 % RH	Vaisala HMI41 w/ HMP42, salt chambers
Chart Recorders and Data Loggers	0 °C to 400 °C (10 to 90) % RH	2% fs Temp 2.5 % RH	Temperature and humidity calibration; applies only to chart recorders and data loggers with remote sensors

¹ This laboratory offers commercial calibration services and on-site calibration services.

² “Best Uncertainty” 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 of nearly ideal measuring equipment. Best uncertainties represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The best uncertainty of a specific calibration performed by the laboratory may be greater than the best uncertainty due to the behavior of the customer’s device, to the environment and to influences from the circumstances of the specific calibration.

³ In the statement of best uncertainty, L is the length in inches and LSD stands for Least Significant Digit.

⁴ Fluke 5500A best uncertainties are based upon the temperature the standard was calibrated ($t_{cal} \pm 5$ °C) and assuming the instrument is zeroed at least every seven days or when the ambient temperature changes more than 5 °C. For Resistance, a zero calibration is performed at least every 12 hours within ± 1 °C of use. For AC Current, best uncertainties are determined with the LCOMP off. Best uncertainties are also based upon 1-year floor specifications. Best measurement uncertainties are expressed as either a fraction of the reading or as a fraction of the reading plus a fixed floor specification.