



THE AMERICAN ASSOCIATION FOR
LABORATORY ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

VALLEY SCALE COMPANY

Clarksville, IN

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 1st day of April 2008.

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

President
For the Accreditation Council
Certificate Number 1636.01
Valid to March 31, 2010

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

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CALIBRATION

Valid To: March 31, 2010

Certificate Number: 1636.01

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

I. Mechanical

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (±)	Comments
Scales & Balances	10 mg to 1.99 g (2.00 to 199.99) g	0.0014 mg 0.011g	Verification w/Class F weights; NIST Handbook 44
	200.00 g to 5 lb	0.000076 lb	
	(5 to 25) lb	0.000013 lb	
	(25 to 50) lb	0.000030 lb	
	(50 to 500) lb	0.0037 lb	
	(500 to 1000) lb	0.011 lb	
	(1000 to 5000) lb	0.27 lb	
	(5000 to 25 000) lb (25 000 to 200 000) lb	20 lb 70 lb	
Pressure	(0 to 30) psig	0.000057 psig	Portable calibrator & external pressure source
	(0 to 100) psig	0.00048 psig	
	(100 to 500) psig	0.011 psig	
	(500 to 1000) psig	0.060 psig	
	(1000 to 5000) psig	1.1 psig	
	(5000 to 10 000) psig	17 psig	
Vacuum	(-25 to 0) in·Hg	0.043 in·Hg	Portable calibrator, external vacuum source

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (±)	Comments
Flow – Measure	(0 to 4.99) lb/min (5.00 to 24.99) lb/min (25.00 to 49.99) lb/min (50.00 to 99.99) lb/min (100.0 to 350) lb/min	0.0000007 lb/min 0.00007 lb/min 0.00045 lb/min 0.0033 lb/min 0.17 lb/min	Mass flow, calibrated scale
Force – Tension	(0 to 4.99) lbf (5.00 to 24.99) lbf (25.00 to 49.99) lbf (50.0 to 499.99) lbf (500.0 to 999.9) lbf (1000.0 to 4999) lbf (5000 to 70 000) lbf	0.0000012 lbf 0.00043 lbf 0.000030 lbf 0.0050 lbf 0.05 lbf 0.40 lbf 20 lbf	Class F Weights
Force – Compression	(0 to 4.99) lbf (5.00 to 24.99) lbf (25.00 to 49.99) lbf (50.0 to 499.99) lbf (500.0 to 999.9) lbf (1000.0 to 4999) lbf (5000 to 70 000) lbf	0.0000012 lbf 0.00043 lbf 0.000030 lbf 0.0050 lbf 0.051 lbf 0.40 lbf 20 lbf	Load cells
Torque ³ – Measuring Equipment	(0.00 to 99.99) in·lbf (0.00 to 149.99) ft·lbf	0.15 in·lbf 0.26 ft·lbf	Torque calibration system

II. Dimensional

Parameter/Equipment	Range	Best Uncertainty ² (±)	Comments
Micrometers	(0 to 6) in	82 μin	Gage blocks
Calipers	(0 to 6) in	300 μin	Gage blocks
Dial Indicators	(0 to 6) in	96 μin	Gage blocks

III. Thermodynamics

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (\pm)	Comments
Temperature – Measuring Equipment	(0 to 299.99) °C (300.00 to 680) °C	0.043 °C 0.067 °C	Comparison furnace, monitored with SPRT and precision readout device
Temperature – Measure	(-200 to 299.99) °C (300.00 to 680) °C	0.012 °C 0.025 °C	SPRT and precision readout device

IV. Electrical – DC/Low Frequency

Parameter/Equipment	Range	Best Uncertainty ^{2,4} (\pm)	Comments
DC Voltage ³ – Generate	(0 to 330) mV 330 mV to 3.3 V (3.3 to 33) V (30 to 330) V (330 to 1020) V	22 μ V/V + 3 μ V 0.022 % + 5 μ V 0.21 % + 50 μ V 2.2 % + 500 μ V 6.6 % + 1.5 mV	Fluke 5500A
DC Voltage – Measure	(0 to 200) mV 200 mV to 2V (2 to 20) V (20 to 200) V (200 to 1000) V	0.68 μ V/V + 0.2 μ V 1.3 μ V/V + 0.50 μ V 11 μ V/V + 5 μ V 0.017 % + 50 μ V 1.7 % + 0.6 mV	Fluke 8508A 8.5 digit DMM
DC Current ³ – Generate	(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	0.3 μ A/A + 0.05 μ A 2.3 μ A/A + 0.25 μ A 23 μ A/A + 3.3 μ A 0.068 % + 44 μ A 0.23 % + 330 μ A	Fluke 5500A
Clamp-type Current Meter Calibration, Toroidal	(11 to 550) A	0.26 %	50 Turn Coil
Clamp-type Current Meter Calibration, Non-Toroidal	(11 to 550) A	0.59 %	50 Turn Coil

Parameter/Equipment	Range	Best Uncertainty ^{2,3,4} (\pm)	Comments
DC Current – Measure	(0 to 200) μ A 200 μ A to 2 mA (2 to 20) mA (20 to 200) mA 200 mA to 2 A (2 to 20) A	0.054 μ A/A + 0.4 nA 0.06 μ A/A + 4 nA 0.30 μ A/A + 40 nA 8.3 μ A/A + 0.8 μ A 0.038 % + 16 μ A 0.46 % + 0.4mA	Fluke 8508A 8.5 digit DMM
Resistance ³ – Generate	(0 to 11) Ω (11 to 33) Ω (33 to 330) Ω 330 Ω to 3.3 k Ω (3.3 to 33) k Ω (33 to 110) k Ω (110 to 330) k Ω 330 k Ω to 3.3M Ω 3.3 k Ω to 11 M Ω (11 to 33) M Ω (33 to 110) M Ω (110 to 330) M Ω	0.0011 % + 8 m Ω 0.0086 % + 15 m Ω 0.0037 % + 15 m Ω 0.0057 % + 60 m Ω 0.0036 % + 0.6 Ω 0.0056 % + 6 Ω 0.004 % + 6 Ω 0.0093 % + 55 Ω 0.0014 % + 550 Ω 0.03 % + 550 Ω 0.06 % + 5.5 k Ω 0.35 % + 17 k Ω	Fluke 5500A
Resistance – Measure	(0 to 2) Ω (2 to 20) Ω (20 to 200) Ω 200 Ω to 2 k Ω (2 to 20) k Ω (20 to 200) k Ω 200 k Ω to 2 M Ω (2 to 20) M Ω (20 to 200) M Ω 200 M Ω to 2 G Ω	0.011 % + 5 μ Ω 0.022 % + 18 μ Ω 0.088 % + 60 μ Ω 0.0009 % + 600 μ Ω 0.009 % + 60 m Ω 0.009 % + 60 μ Ω 0.011 % + 1.2 Ω 0.018 % + 120 Ω 0.039 % + 1.2 k Ω 0.39 % + 1.2 M Ω	Fluke 8508A 8.5 Digit DMM

Parameter/Range	Frequency	Best Uncertainty ^{2,4} (\pm)	Comments
AC Voltage ³ – Generate (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	0.35 % + 20 μ V 0.15 % + 20 μ V 0.2 % + 20 μ V 0.25 % + 20 μ V 0.35 % + 33 μ V 1 % + 60 μ V	Fluke 5500A

Parameter/Range	Frequency	Best Uncertainty ^{2,4} (±)	Comments
AC Voltage ³ (cont) – Generate			
(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	0.25 % + 50 μV 0.05 % + 20 μV 0.10 % + 20 μV 0.16 % + 40 μV 0.24 % + 170 μV 0.70 % + 330 μV	Fluke 5500A
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	0.15 % + 250 μV 0.03 % + 60 μV 0.08 % + 60 μV 0.14 % + 300 μV 0.24 % + 1.7 mV 0.5 % + 3.3 mV	
(3.3 to 33) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.15 % + 2.5 mV 0.04 % + 600 μV 0.08 % + 2.6 mV 0.19 % + 5 mV 0.24 % + 17 mV	
(33 to 330) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz	0.05 % + 6.6 mV 0.08 % + 15 mV 0.09 % + 33 mV	
(330 to 1020) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.05 % + 80 mV 0.20 % + 100 mV 0.20 % + 500 mV	
AC Voltage – Measure			
Up to 200 mV	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	17 μV/V + 16 μV 7 μV/V + 5 μV 6 μV/V + 5 μV 5 μV/V + 2.4 μV 5 μV/V + 5 μV 14 μV/V + 10 μV 34 μV/V + 24 μV	Fluke 8508A 8.5 digit DMM
200 mV to 2 V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1MHz	0.014 % + 140 μV 0.014 % + 24 μV 0.011 % + 24 μV 90 μV/V + 24 μV 0.014 % + 24 μV 0.026 % + 50 μV 0.065 % + 240 μV 0.30 % + 2.4 mV 1.0 % + 24 mV	

Parameter/Range	Frequency	Best Uncertainty ^{2,4} (±)	Comments
AC Voltage (cont.) – Measure			
(2 to 20) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1MHz	0.019 % + 1.4 mV 0.014 % + 240 μV 0.011 % + 240 μV 0.020 % + 240 μV 0.016 % + 240 μV 0.020 % + 500 μV 0.03 % + 2.4 mV 0.04 % + 24 mV 0.08 % + 240 mV	Fluke 8508A 8.5 digit DMM
(20 to 200) V	(1 to 10) Hz (10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1MHz	0.020 % + 14 mV 0.014 % + 2.4 mV 0.011 % + 2.4 mV 90 μV/V + 2.4 mV 0.014 % + 2.4 mV 0.026 % + 5 mV 0.065 % + 24 mV 0.3 % + 240 mV 1.0 % + 2.4 V	
(200 to 1050) V	(1 to 10) Hz (10 to 40) Hz 40 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.014 % + 80 mV 0.012 % + 25 mV 0.01 % + 25 mV 0.008 % + 50 mV 0.37 % + 250 mV	
AC Current – Measure			
Up to 200 μA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	0.1 μA/A + 24 nA 0.2 μA/A + 24 nA 0.2 μA/A + 24 nA 0.3 μA/A + 24 nA	Fluke 8508A 8.5 digit DMM
200 μA to 2 mA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	1.0 μA/A + 240 nA 1.0 μA/A + 240 nA 2 μA/A + 240 nA 4 μA/A + 240 μA	
(2 to 20) mA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz (30 to 100) kHz	65 μA/A + 2.4 μA 89 μA/A + 2.4 μA 7 μA/A + 2.4 μA 15 μA/A + 2.4 μA	
(20 to 200) mA	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz	81 μA/A + 24 μA 60 μA/A + 24 μA 0.013 % + 24 μA	

Parameter/Range	Frequency	Best Uncertainty ^{2,4} (±)	Comments
AC Current – Measure (cont)			
200 mA to 2 A	(1 to 10) Hz 10 Hz to 10 kHz (10 to 30) kHz	0.08 % + 240 µA 0.08 % + 240 µA 0.35 % + 240 µA	Fluke 8508A 8.5 digit DMM
(2 to 20) A	(2 to 10) kHz (10 to 30) kHz	0.09 % + 2.4 mA 1.3 % + 2.4 mA	
AC Current ³ – Generate			
(29 to 330) µA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.25 % + 0.15 µA 0.13 % + 0.15 µA 0.13 % + 0.25 µA 0.4 % + 0.15 µA 1.3 % + 0.15 µA	Fluke 5500A
(0.33 to 3.3) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.20 % + 0.3 µA 0.10 % + 0.3 µA 0.10 % + 0.3 µA 0.20 % + 0.3 µA 0.60 % + 0.3µA	
(3.3 to 33) mA	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.20 % + 3 µA 0.10 % + 3 µA 0.09 % + 3 µA 0.20 % + 3 µA 0.60 % + 3 µA	
(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	0.20 % + 30 µA 0.10 % + 30 µA 0.09 % + 30 µA 0.20 % + 30 µA 0.60 % + 30 µA	
(0.33 to 2.2) A	10 Hz to 45 Hz 45 Hz to 1 kHz (1 to 5) kHz	0.20 % + 300 µA 0.10 % + 300 µA 0.75 % + 300 µA	
(2.2 to 11) A	(45 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz	0.06 % + 2 mA 0.10 % + 2 mA 0.33 % + 2 mA	
(2.2 to 11) A	(45 to 65) Hz	0.50 % + 0.50 A	
(2.2 to 4) A	(65 to 500) Hz 500 Hz to 1 kHz	0.59 % + 0.50 A 0.59 % + 0.50 A	
(11 to 550) A	(45 to 65) Hz (65 to 440) Hz	0.50 % + 0.5 A 0.45 % + 0.5 A	Fluke 5500A with 50 Turn Coil

Parameter/Equipment	Range	Best Uncertainty ² (±)	Comments
Electrical Calibration of RTD Indicators & Indicating Systems ³ –			
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	0.058 °C 0.08 °C 0.1 °C 0.12 °C 0.14 °C 0.12 °C 0.27 °C	Multifunction calibrator
Pt 3926, 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	0.059 °C 0.083 °C 0.10 °C 0.12 °C 0.14 °C 0.27 °C	
Pt 3916, 100 Ω	-200 °C to -190 °C -190 °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	0.29 °C 0.06 °C 0.07 °C 0.08 °C 0.07 °C 0.09 °C 0.09 °C 0.12 °C 0.27 °C	
Pt 385, 200 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	0.05 °C 0.05 °C 0.05 °C 0.05 °C 0.14 °C 0.13 °C 0.15 °C 0.19 °C	
Pt 385, 500 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	0.013 °C 0.05 °C 0.07 °C 0.093 °C 0.094 °C 0.10 °C 0.11 °C 0.13 °C	

Parameter/Equipment	Range	Best Uncertainty ² (±)	Comments
Electrical Calibration of RTD Indicators & Indicating Systems (cont.) –			
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	0.037 °C 0.05 °C 0.06 °C 0.07 °C 0.08 °C 0.07 °C 0.08 °C 0.26 °C	Multifunction calibrator
PtNi 385, 120 Ω (Ni 120)	-80 °C to 0 °C 0 °C to 100 °C 100 °C to 260 °C	0.09 °C 0.13 °C 0.16 °C	
Cu 427, 10 Ω	-100 °C to 260 °C	0.35 °C	
Electrical Calibration of Thermocouple Indicators & Indicating Systems ³ –			
Type B	600 °C to 800 °C 800 °C to 1000 °C 1000 °C to 1550 °C 1550 °C to 1820 °C	0.51 °C 0.41 °C 0.39 °C 0.40 °C	Multifunction calibrator
Type C	0 °C to 150 °C 150 °C to 650 °C 650 °C to 1000 °C 1000 °C to 1800 °C 1800 °C to 2316 °C	0.36 °C 0.37 °C 0.31 °C 0.58 °C 0.84 °C	
Type E	-250 °C to -100 °C -100 °C to -25 °C -25 °C to 350 °C 350 °C to 650 °C 650 °C to 1000 °C	0.58 °C 0.20 °C 0.21 °C 0.25 °C 0.28 °C	

Parameter/Equipment	Range	Best Uncertainty ² (±)	Comments
Electrical Calibration of Thermocouple Indicators & Indicating Systems (cont.) –			
Type J	-210 °C to -100 °C -100 °C to -30 °C -30 °C to 150 °C 150 °C to 760 °C 760 °C to 1200 °C	0.32 °C 0.22 °C 0.21 °C 0.28 °C 0.30 °C	Multifunction calibrator
Type K	-200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 1000 °C 1000 °C to 1372 °C	0.40 °C 0.23 °C 0.16 °C 0.32 °C 0.47 °C	
Type L	-200 °C to -100 °C -100 °C to 800 °C 800 °C to 900 °C	0.44 °C 0.31 °C 0.21 °C	
Type N	-200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 410 °C 410 °C to 1300 °C	0.47 °C 0.27 °C 0.25 °C 0.27 °C 0.33 °C	
Type R	0 °C to 250 °C 250 °C to 400 °C 400 °C to 1000 °C 1000 °C to 1767 °C	0.66 °C 0.41 °C 0.33 °C 0.47 °C	
Type S	0 °C to 250 °C 250 °C to 1000 °C 1000 °C to 1400 °C 1400 °C to 1767 °C	0.55 °C 0.43 °C 0.54 °C 0.57 °C	
Type T	-250 °C to -150 °C -150 °C to 0 °C 0 °C to 120 °C 120 °C to 400 °C	0.74 °C 0.30 °C 0.20 °C 0.25 °C	
Type U	-200 °C to 0 °C 0 °C to 600 °C	0.66 °C 0.34 °C	

III. Time & Frequency

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (\pm)	Comments
Frequency – Measure	(0 to 1.3) GHz	9 parts in 10^8	Frequency counter
Frequency – Measuring Equipment	(0 to 600) MHz	3 parts in 10^6	Multifunction calibrator with SC600
Time – Measure	(0 to 60) sec	590 ms	Frequency counter

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

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 On-site capability is available for these parameters. The uncertainties achievable on a customer's site can normally be expected to be larger than the Best Measurement Capabilities (BMC) that the accredited laboratory has been assigned as Best Uncertainty on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the calibration uncertainty being larger than the BMC.”

⁴ The measurands stated are generated with the Fluke 5500A & 8508A series of instruments. This capability is suitable for the calibration of the devices intended to measure the stated measurand in the ranges indicated. Best measurement uncertainties are expressed as either a specific value that covers the full range or as a fraction of the reading plus a fixed floor specification.