



THE AMERICAN ASSOCIATION FOR
LABORATORY ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

ILLIANA INSTRUMENTATION SERVICE LLC
Merrillville, 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 ANSINCSSL 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 21st day of October 2008.

A handwritten signature in black ink, which appears to read "Peter Abney", is written over a horizontal line.

President
For the Accreditation Council
Certificate Number: 2230.01
Valid to: September 30, 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: September 30, 2010

Certificate Number: 2230.01

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

I. Electrical – DC & Low Frequency

Parameter/Equipment	Range	Best Uncertainty ^{2,3,4,5} (±)	Comments
DC Voltage – Generate	(0 to 110) mV 110 mV to 1.1 V (1.1 to 15) V	0.018 mV 26 mV 0.0041 V	Fluke 744
DC Voltage – Measure	(0 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 600) V	0.011 mV 0.043 mV 0.51 mV 0.0065 V 0.0071 V	HP 34401A
DC Current – Generate	(0 to 22) mA	0.005 mA	Fluke 744
DC Current – Measure	(0 to 10) mA (10 to 100) mA 100 mA to 1 A (1 to 3) A	0.0077 mA 0.011 mA 0.002 A 0.0045 A	HP 34401A



Parameter/Equipment	Range ⁶	Best Uncertainty ^{2,3} (±)	Comments	
Resistance – Measure	(0 to 25) Ω	0.0017 Ω	Hart 1560 & 2562	
	(25 to 400) Ω	0.019 Ω		
	(400 to 1000) Ω	0.11 Ω	HP 34401A	
	(1 to 10) kΩ	1.2 Ω		
	(10 to 100) kΩ	12 Ω		
	100 kΩ to 1 MΩ	120 Ω		
	(1 to 10) MΩ	4.5 kΩ		
(10 to 100) MΩ	880 kΩ			
Resistance – Generate	(0 to 11) Ω	0.021 Ω	Fluke 744	
	(11 to 110) Ω	0.041 Ω		
	Fixed Point	100 Ω	0.039 Ω	IET SRA fixed resistor
Electrical Calibration of Thermocouple Indicators –	110 Ω to 1.1 kΩ	0.72 Ω	Fluke 744	
	(1.1 to 11) kΩ	8.3 Ω		
	Type B	600 °C to 800 °C	0.69 °C	Fluke 744
		800 °C to 1000 °C	0.56 °C	
		1000 °C to 1820 °C	0.56 °C	
	Type C	0 °C to 800 °C	0.44 °C	
800 °C to 1200 °C		0.50 °C		
1200 °C to 1800 °C		0.63 °C		
1800 °C to 2316 °C		0.88 °C		
Type E	-250 °C to -200 °C	0.44 °C		
	-200 °C to -100 °C	0.27 °C		
	-100 °C to 600 °C	0.27 °C		
	600 °C to 1000 °C	0.22 °C		
Type J	-210 °C to -100 °C	0.27 °C		
	-100 °C to 800 °C	0.22 °C		
	800 °C to 1200 °C	0.22 °C		

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (±)	Comments
Electrical Calibration of Thermocouple Indicators (cont) –			
Type K	-200 °C to -100 °C -100 °C to 400 °C 400 °C to 1200 °C 1200 °C to 1372 °C	0.32 °C 0.27 °C 0.27 °C 0.27 °C	Fluke 744
Type L	-200 °C to -100 °C -100 °C to 800 °C 800 °C to 900 °C	0.27 °C 0.22 °C 0.22 °C	
Type N	-200 °C to -100 °C -100 °C to 900 °C 900 °C to 1300 °C	0.44 °C 0.38 °C 0.27 °C	
Type R	-20 °C to 0 °C 0 °C to 100 °C 100 °C to 1767 °C	0.82 °C 0.75 °C 0.63 °C	
Type S	-20 °C to 0 °C 0 °C to 200 °C 200 °C to 1400 °C 1400 °C to 1767 °C	0.82 °C 0.75 °C 0.63 °C 0.69 °C	
Type T	-250 °C to -200 °C -200 °C to 0 °C 0 °C to 400 °C	0.63 °C 0.32 °C 0.27 °C	
Type U	-200 °C to 0 °C 0 °C to 600 °C	0.32 °C 0.27 °C	
Electrical Calibration of RTD – Measure			
Cu 427, 10 Ω	-100 °C to 0 °C 0 °C to 260 °C	1.3 °C 1.3 °C	Fluke 744

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (±)	Comments
Electrical Calibration of RTD (cont) – Measure			
Pt 3916, 100 Ω	-200 °C to -190 °C	0.23 °C	Fluke 744
	-190 °C to 0 °C	0.23 °C	
	0 °C to 630 °C	0.35 °C	
Pt 3926, 100 Ω	-200 °C to 0 °C	0.23 °C	
	0 °C to 630 °C	0.35 °C	
Pt 385, 100 Ω	-200 °C to 0 °C	0.23 °C	
	0 °C to 400 °C	0.35 °C	
	400 °C to 800 °C	0.55 °C	
Pt 385, 200 Ω	-200 °C to 0 °C	0.23 °C	
	0 °C to 400 °C	0.35 °C	
	400 °C to 630 °C	0.55 °C	
Pt 385, 500 Ω	-200 °C to 0 °C	0.23 °C	
	0 °C to 400 °C	0.33 °C	
	400 °C to 630 °C	0.55 °C	
Pt 385, 1000 Ω	-200 °C to 0 °C	0.23 °C	
	0 °C to 400 °C	0.35 °C	
	400 °C to 630 °C	0.35 °C	
PtNi 672, 120 Ω	-80 °C to 260 °C	0.23 °C	
Electrical Calibration of RTD – Generate			
Cu 427, 10 Ω	-100 °C to 0 °C	0.68 °C	Fluke 744
	0 °C to 260 °C	0.68 °C	
Pt 3916, 100 Ω	-200 °C to -190 °C	0.23 °C	
	-190 °C to 0 °C	0.13 °C	
	0 °C to 630 °C	0.18 °C	
Pt 3926, 100 Ω	-200 °C to 0 °C	0.13 °C	
	0 °C to 630 °C	0.18 °C	
Pt 385, 100 Ω	-200 °C to 0 °C	0.13 °C	
	0 °C to 400 °C	0.18 °C	
	400 °C to 800 °C	0.29 °C	

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (±)	Comments
Electrical Calibration of RTD (cont) – Generate			Fluke 744
Pt 385, 200 Ω	-200 °C to 0 °C 0 °C to 400 °C 400 °C to 630 °C	0.13 °C 0.18 °C 0.29 °C	
Pt 385, 500 Ω	-200 °C to 0 °C 0 °C to 400 °C 400 °C to 630 °C	0.13 °C 0.18 °C 0.29 °C	
Pt 385, 1000 Ω	-200 °C to 0 °C 0 °C to 400 °C 400 °C to 630 °C	0.13 °C 0.18 °C 0.29 °C	
PtNi 672, 120 Ω	-80 °C to 260 °C	0.13 °C	

Parameter/Range	Frequency	Best Uncertainty ^{2,3,5} (±)	Comments
AC Voltage – Measure			
(1 to 100) mV	(3 to 5) Hz (5 to 10) Hz (10 to 20) kHz (20 to 500) kHz (50 to 100) kHz	1 % + 0.04 % 0.35 % + 0.04 % 0.06 % + 0.04 % 0.12 % + 0.05 % 0.6 % + 0.08 %	HP 34401A
(1 to 750) V	(3 to 5) Hz (5 to 10) Hz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	1 % + 0.03 % 0.35 % + 0.03 % 0.06 % + 0.03 % 0.12 % + 0.05 % 0.6 % + 0.08 %	
AC Current – Measure			
(0 to 1) A	(3 to 5) Hz (5 to 10) Hz 10 Hz to 5 kHz	1 % + 0.04 % 0.3 % + 0.04 % 0.1 % + 0.04 %	HP 34401A
(1 to 3) A	(3 to 5) Hz (5 to 10) Hz 10 Hz to 5 kHz	1 % + 0.06 % 0.35 % + 0.06 % 0.15 % + 0.06 %	

Parameter/Range	Frequency	Best Uncertainty ^{2,3,4,5} (±)	Comments
Frequency – Measure	(3 to 10) Hz (10 to 40) Hz 40 Hz to 100 kHz	0.01 Hz 0.05 Hz 0.047 %	HP 34401A
Frequency – Generate	(1 to 10.99) Hz (11 to 109.9) Hz (110 to 1099.9) Hz (1.1 to 21.99) kHz (22 to 50) kHz	0.01 Hz 0.01 Hz 0.01 Hz 2 Hz 5.5 Hz	Fluke 744

II. Mechanical

Parameter/Equipment	Range ⁶	Best Uncertainty ² (±)	Comments
Pressure Measuring Equipment	(-15 to 0) psi	0.017 psi	Fluke module 700P24
	(0 to 15) psi	0.017 psi	Fluke module 700P24
	(15 to 200) psi	0.15 psi	Fluke module 700PD7
	(200 to 1500) psi	0.77 psi	Fluke module 700P09
	(1500 to 3000) psi	1.7 psi	Beta module PI-03K
Pressure ³ – Measure	(-15 to 0) psi	0.017 psi	Fluke module 700P24
	(0 to 15) psi	0.017 psi	Fluke module 700P24
	(15 to 200) psi	0.15 psi	Fluke module 700PD7
	(200 to 1500) psi	0.77 psi	Fluke module 700P09
	(1500 to 3000) psi	1.7 psi	Beta module PI-03K
Scales and Balances ³	1 g	0.025 mg	Troemner class 1 weights
	5 g	0.071 mg	
	10 g	0.051 mg	
	100 g	0.2 mg	
	500 g	0.6 mg	
	1000 g	1.2 mg	
	5000 g	6 mg	
	10 000 g	12 mg	
	15 000 g	18 mg	
	20 000 g	23 mg	

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (±)	Comments
Torque – Measure	(0 to 150) ft·lb	4.6 ft·lb	Craftsman torque indicator model 44598

III. Thermodynamic

Parameter/Equipment	Range ⁶	Best Uncertainty ^{2,3} (±)	Comments
Temperature – Measure	-15 °C to 0 °C 0.01 °C 0.02 °C to 231.928 °C 231.928 °C to 660.323 °C 661 °C to 1093 °C	0.03 °C 0.02 °C 0.03 °C 0.04 °C 1 °C	Hart 5626 SPRT Hart 1560 black stack Hart 2562 PRT scanner Platinum thermocouple
Temperature – Measuring Equipment	-15 °C to 140 °C 141 °C to 250 °C 251 °C to 660 °C 661 °C to 1093 °C	0.05 °C 0.12 °C 0.13 °C 1.4 °C	Hart 5626 SPRT Hart 1560 black stack Hart 2562 PRT scanner Platinum thermocouple
Humidity – Measuring Equipment	(10 to 15) % RH (15 to 78) % RH	1.6 % RH 2 % RH	Vaisala HMI 41 and HMP 46
Humidity – Measure	(10 to 15) % RH (15 to 78) % RH	1.6 % RH 2 % RH	Vaisala HMI 41 and HMP 46
Thermocouple – Measure Type B	600 °C to 800 °C 800 °C to 1000 °C 1000 °C to 1820 °C	0.88 °C 0.69 °C 0.63 °C	Fluke 744

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (±)	Comments
Thermocouple (cont) – Measure			
Type C	0 °C to 800 °C	0.44 °C	Fluke 744
	800 °C to 1200 °C	0.56 °C	
	1200 °C to 1800 °C	0.75 °C	
	1800 °C to 2316 °C	1.3 °C	
Type E	-250 °C to -200 °C	0.88 °C	
	-200 °C to -100 °C	0.38 °C	
	-100 °C to 600 °C	0.27 °C	
	600 °C to 1000 °C	0.32 °C	
Type J	-210 °C to -100 °C	0.44 °C	
	-100 °C to 800 °C	0.27 °C	
	800 °C to 1200 °C	0.38 °C	
Type K	-200 °C to -100 °C	0.50 °C	
	-100 °C to 400 °C	0.27 °C	
	400 °C to 1200 °C	0.38 °C	
	1200 °C to 1372 °C	0.5 °C	
Type L	-200 °C to -100 °C	0.44 °C	
	-100 °C to 800 °C	0.27 °C	
	800 °C to 900 °C	0.38 °C	
Type N	-200 °C to -100 °C	0.69 °C	
	-100 °C to 900 °C	0.38 °C	
	900 °C to 1300 °C	0.44 °C	
Type R	-20 °C to 0 °C	1.5 °C	
	0 °C to 100 °C	1 °C	
	100 °C to 1767 °C	0.69 °C	

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (±)	Comments
Thermocouple (cont) – Measure			
Type S	-20 °C to 0 °C 0 °C to 200 °C 200 °C to 1400 °C 1400 °C to 1767 °C	1.5 °C 1.0 °C 0.63 °C 0.75 °C	Fluke 744
Type T	-250 °C to -200 °C -200 °C to 0 °C 0 °C to 400 °C	1.2 °C 0.44 °C 0.27 °C	
Type U	-200 °C to 0 °C 0 °C to 600 °C	0.44 °C 0.27 °C	

IV. Fluid Quantities

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (±)	Comments
Viscosity –			
Ford	2, 3, 4, 5 cups	1.7 % of reading	Certified viscosity oil
Fisher	1, 2, 3, 4 cups	1.8 % of reading	
Zahn	1, 2, 3, 4, 5 cups	2.0 % of reading	
	(19 to 880) cP	1.7 % of reading	

V. Chemical

Parameter/Equipment	Range	Best Uncertainty ^{2,3} (±)	Comments
pH	4.01, 7.0, 10.0 pH units	0.04 pH units	NIST traceable buffers

Parameter/Equipment	Range ⁶	Best Uncertainty ^{2,3} (±)	Comments
Conductivity – Liquid	10 µS (10 to 1000) µS (1000 to 10 000) µS	0.5 µS 0.5 % of reading 0.5 % of reading	Traceable conductivity standard fluids

¹ This laboratory offers commercial calibration service and field 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 and to influences from the circumstances of the specific calibration.

³ Field calibration service is available for this calibration and this laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. Please note 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 744 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.

⁵ The measurands stated are measured with the HP 34401A series of instruments. This capability is suitable for the calibration of the devices intended to generate the measurand in the ranges indicated. Best measurement uncertainties are expressed as either a specific value that covers the full range or as a combination of the fraction of the reading/output plus a range specification.

⁶ Where ranges are not specified, the best uncertainty stated is for the cardinal points only.