

World Class Accreditation

The American Association for Laboratory Accreditation

Accredited Laboratory

A2LA has accredited

INSTRUMENTATION SERVICES, INC.

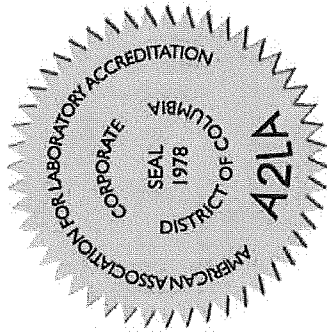
St. Paul, MN

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/NCSLI Z540-1-1994 and the requirements of ANSI/NCSLI Z540.3-2006 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 8 January 2009).

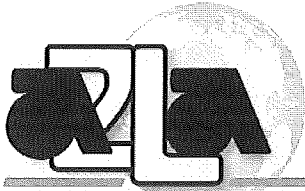
Presented this 27th day of September 2011.




President & CEO

For the Accreditation Council
Certificate Number 1532.01
Valid to October 31, 2013

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 & ANSI/NCSL Z-540.3-2006

INSTRUMENTATION SERVICES, INC.
 Division of Palen/Kimball L.L.C.
 1717 University Ave West
 St. Paul, MN 55104
 Dennis J. Brady Phone: 651 647 4501

CALIBRATION

Valid To: October 31, 2013

Certificate Number: 1532.01

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	CMC ^{2,5} (±)	Comments
Calipers ³	(0 to 24) in	(0.6R + 11L) μin	Gage blocks
Micrometers ³	(0 to 24) in	(0.6R + 11L) μin	Gage blocks

II. Electrical – DC/Low Frequency

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Voltage ³ – Generate and Measure			
2.2 mV to 220 V	40 Hz to 20 kHz (20 to 50) kHz (50 to 300) kHz	0.02 % + 10 μV 0.08 % + 10 μV 0.2 % + 30 μV	Fluke 5700A
(220 to 1100) V	50 Hz to 1 kHz	0.018 %	
(1 to 10) kV	60 Hz	0.25 %	L&N 7190A
(10 to 100) kV	60 Hz	1 %	Weston 9858

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Current ³ – Generate and Measure			
9 µA to 220 mA	40 Hz to 1 kHz 10 Hz to 5 kHz	0.033 % + 0.4 µA 0.1 % + 8 µA	Fluke 5700A w/ Keithley 2002 precision shunts
220 mA to 2.2 A	40 Hz to 1 kHz	0.036 % + 8 µA	Fluke 5500A
(2.2 to 11) A	(45 to 500) Hz	0.12 % + 4 mA	L&N 7180A
(10 to 1000) A	60 Hz	0.2 %	
Capacitance ³ –			
Generate	1 nF at 1 kHz (0.19 to 3.299) nF 3.3 nF to 10.9999 µF 11 µF to 10.9999 mF (11 to 32.9999) mF (33 to 110) mF	50 µF/F 0.6 % + 0.01 nF 0.3 % + 0.1 nF 0.6 % + 10 µF 0.85 % + 30 µF 1.3 % + 100 µF	ESI SC 1000, GR 1404A, GR 1403D, GR 1615P1, GR 1615A, Gertsch CRB-2B Fluke 5520A
Measure	1 pF to 10 µF at 1 kHz	0.015 %	

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
DC Voltage ³ –			
Generate and Measure	(1 to 220) mV 220 mV to 1100 V	18 µV/V + 1.6 µV 18 µV/V + 200 µV	Fluke 5700A, Keithley 2002
Measure	1000 V to 10 kV (10 to 100) kV	0.1 % 1 %	L&N 7190A, Weston 9858
DC Current ³ –			
Generate	10 µA to 2 A (2 to 11) A	0.014 % + 100 nA 0.07 %	Fluke 5700A w/ 5500A
Measure	(10 to 100) A (100 to 2500) A	0.050 % 0.2 %	Keithley 2002, L&N 4221, 4222, 4020B, 4025B, 4030B, 4040B, Wolf Reichsanstalt 0.0001 Ω, 0.001 Ω & 0.01 Ω, Weston 9992

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Inductance ³ – Generate and Measure @ 1 kHz	10 μH to 100 H	0.1 %	GenRad 1482B, 1482E, 1482H, 1482L 1482P & 1632A
Wattage ³ – Generate @ 60 Hz	20 W to 20 kW	0.2 %	Fluke 5500A
Resistance ³ – Generate (at cardinal points) Measure	10 Ω to 10 MΩ 0 Ω to 2 MΩ 0 Ω to 11 MΩ 0 Ω to 110 MΩ 0 Ω to 1.1 GΩ	70 μΩ/Ω 100 μΩ/Ω + 240 μΩ 0.02 % 0.1 % 1 %	L&N standard resistors, Keithley 2002 Keithley 2002
Oscilloscopes ³ – Generate Squarewave Signal 45 Hz to 1 kHz Level Sine Wave Amplitude (50 kHz reference) Flatness (50 kHz reference) Time Markers – Source and Period into a 50 Ω Load Rise Time	2.6 mV to 66 V 50 kHz to 100 MHz (100 to 300) MHz (600 to 1100) MHz 50 kHz to 100 MHz (100 to 300) MHz (300 to 1100) MHz 5 μs to 100 μs (50 to 2) μs 1 μs to 2 ns > 1 ns	0.5 % + 150 μV 5 % + 500 μV 6 % + 500 μV 8 % + 500 μV 3 % + 500 μV 5 % + 500 μV 6 % + 500 μV 50 μs/s + 1 mHz 50 μs/s + 15 mHz 50 μs/s +0/-0.8 ns	Fluke 5520A/SC1100

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Electrical Calibration of Thermocouple Indicators ³ –			
Type J	-210 °C to 1200 °C	0.27 °C	Fluke 5500A/SC600
Type K	-200 °C to 1372 °C	0.4 °C	
Type T	-250 °C to 400 °C	1.3 °C	
Type E	-250 °C to 1000 °C	1.0 °C	
Electrical Calibration of RTDs ³ –			
Pt 385 (100 Ω)	-200 °C to 630 °C	0.2 °C	Fluke 5500A/SC600
Pt 385 (200 Ω)		0.3 °C	
Pt 3926 (100 Ω)		0.2 °C	
Pt 3916 (100 Ω)		0.3 °C	

III. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Pressure and Vacuum Gauges ³ –Measuring Equipment and Measure	(0 to 10) inH ₂ O (0 to 100) psia (0 to 300) psi (0 to 7500) psi (0 to 30) inHg (-15 to 30) psig (0 to 500) psig (-5 to 5) psi (0 to 100) psi (0 to 500) psi (0 to 10 000)psi	0.01 inH ₂ O 0.07 psia 0.2 psig 5.0 psig 0.04 inHg 0.04 psig 0.25 psig 0.003 psig 0.082 psig 0.41 psig 9.8 psig	Pressure calibrator and modules Fluke, Heisse, and Ametek Druck Model PM620

IV. Thermodynamic

Parameter/Equipment	Range	CMC ² (±)	Comments
Temperature ³ – Measuring Equipment and Measure	0 °C to 100 °C	0.06 °C	Hart 1504 with 5610 thermistor
Measure Only	-200 °C to 420 °C	0.02 °C	Azonix A11011, Burns Engineering 12001 PRT
Relative Humidity ³ – Measuring Equipment and Measure	(0 to 90) % RH	1.4 % RH	Vaisala HM70, HMP77B probe

V. Time and Frequency

Parameter/Equipment	Range	CMC ² (±)	Comments
Frequency ³ – Measuring Equipment and Measure, Fixed Points	60 kHz 1 MHz 10 MHz	1 µHz/Hz 1 µHz/Hz 1 µHz/Hz	WWVB/phase chart recorder and GPS disciplined oscillator

¹ This laboratory offers commercial calibration service and field calibration service.

² Calibration and Measurement Capability (CMC) 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 nearly ideal measuring equipment. Calibration and Measurement Capabilities represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC 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 actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found 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 actual uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

⁴ Calibration and Measurement Capability is expressed as either a specific value that covers the full range or as a fraction/percentage of the reading plus a fixed floor specification.

⁵ In the statement of Calibration and Measurement Capability, L is the numerical value of the nominal length of the device measured in inches; R is the numerical value of the resolution of the device in microinches.



*Joint IAF-ILAC-ISO Communiqué
on the
Management Systems Requirements of ISO/IEC 17025:2005,
General requirements for the competence of testing and calibration
laboratories*

A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and **management system requirements** that are necessary for it to consistently deliver technically valid test results and calibrations. The **management system requirements** in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 **Quality Management Systems — Requirements** and are aligned with its pertinent requirements.

A handwritten signature in black ink, appearing to read 'A. Gode'.

IAF Chair

A handwritten signature in black ink, appearing to read 'Ruy'.

ILAC Chair

A handwritten signature in black ink, appearing to read 'J. J. ...'.

ISO Secretary General