



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

MAGNETIC INSTRUMENTATION CALIBRATION LABORATORY  
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 Indianapolis, IN 46250  
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CALIBRATION

Valid To: February 29, 2020

Certificate Number: 1462.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations<sup>1</sup>:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC <sup>2,3,4</sup> (±)	Comments
DC Voltage – Measure	0.1 μV to 1 mV (1 to 10) mV (10 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V	0.013 % + 0.02 μV 0.013 % + 0.03 μV 0.013 % + 0.4 μV 0.012 % + 4 μV 0.012 % + 0.04 mV 0.0012 % + 0.5 mV	Agilent 34420A DMM
	(100 to 1000) V	0.013 % + 0.01 V	Agilent 34401A DMM
DC Current – Measure	(1 to 10) mA	0.13 % + 0.002 mA	Agilent 34401A DMM
	(10 to 100) mA	0.13 % + 0.005 mA	
	(0.1 to 1) A	0.12 % + 0.1 mA	
	(1 to 3) A	0.14 % + 0.6 mA	
Resistance – Measure	0.1 mΩ to 1 Ω	0.014 % + 0.002 mΩ	Agilent 34420A DMM
	(1 to 10) Ω	0.014 % + 0.02 mΩ	
	(10 to 100) Ω	0.015 % + 0.2 mΩ	
	(0.1 to 1) kΩ	0.014 % + 0.002 Ω	
	(1 to 10) kΩ	0.014 % + 0.02 Ω	
	(10 to 100) kΩ	0.014 % + 0.4 Ω	
	(0.1 to 1) MΩ	0.015 % + 4 Ω	
	(1 to 10) MΩ (10 to 100) MΩ	0.051 % + 0.1 kΩ 0.93 % + 10 kΩ	Agilent 34401A DMM

Parameter/Range	Frequency	CMC <sup>2,3,4</sup> (±)	Comments
AC Voltage – Measure			
(10 to 100) mV	10 Hz to 20 kHz	0.078 % + 40 μV	Agilent 34401A DMM
(0.1 to 1) V	10 Hz to 20 kHz	0.076 % + 0.3 mV	
(1 to 10) V	10 Hz to 20 kHz	0.075 % + 3 mV	
(10 to 100) V	10 Hz to 20 kHz	0.075 % + 30 mV	
(100 to 750) V	10 Hz to 20 kHz	0.081 % + 230 mV	

## II. Magnetic Quantities

Parameter/Equipment	Range	CMC <sup>2,3</sup> (±)	Comments
Magnetic Flux Density –  Probe & Meters	(0 to 100) G (200 to 500) G (600 to 2000) G (3000 to 10 000) G (10 000 to 20 000) G (20 000 to 30 000) G (30 000 to 100 000) G	0.38 % + 0.02 G 0.36 % + 0.1 G 0.35 % + 0.4 G 0.35 % + 2 G 0.35 % + 4 G 1.2 % + 10 G 1.2 % + 20 G	MI probe station
Magnetic Flux Density –  MI Probe Stations	(430 to 1300) G (900 to 2600) G (1700 to 5200) G (7000 to 21 000) G	0.009 % + 0.12 G 0.044 % + 1.2 G 0.022 % + 1.2 G 0.055 % + 12 G	Metrolab PT 2025 NMR system
Reference Magnets	(0 to 100) G (100 to 500) G (500 to 2000) G (2000 to 10 000) G	0.47 % + 0.050 G 0.37 % + 0.050 G 0.38 % + 0.06 G 0.37 % + 0.94 G	MI 2100 Gaussmeter

Parameter/Equipment	Range	CMC <sup>2,3</sup> (±)	Comments
DC Magnetic Flux –  Fluxmeters	(0 to 100) kMT (100 to 200) kMT (200 to 500) kMT (0.5 to 1) MMT (1 to 2) MMT (2 to 5) MMT (5 to 10) MMT (10 to 20) MMT (20 to 50) MMT (50 to 100) MMT	0.021 % + 0.075 kMT 0.035 % + 0.11 kMT 0.048 % + 0.1 kMT 0.049 % + 0.2 kMT 0.055 % + 0.16 kMT 0.048 % + 0.99 kMT 0.052 % + 1.3 kMT 0.054 % + 2.1 kMT 0.057 % + 2.5 kMT 0.051 % + 15 kMT	Function generator, multimeter w/shunt

Parameter/Range	Frequency	CMC <sup>2,3</sup> (±)	Comments
AC-RM Magnetic Flux (20 to 1000) Hz –  Fluxmeters	AC 1 MMT @ 20 Hz AC 500 kMT @ 40 Hz AC 200 kMT @ 80 Hz AC 100 kMT @ 160 Hz AC 100 kMT @ 320 Hz AC 100 kMT @ 1000 Hz	0.096 % + 3.2 kMT 0.11 % + 1.7 kMT 0.10 % + 0.74 kMT 0.11 % + 0.38 kMT 0.099 % + 0.2 kMT 0.11 % + 0.055 kMT	Function generator, multimeter w/shunt

### III. Time & Frequency

Parameter/Equipment	Range	CMC <sup>2,3</sup> (±)	Comments
Frequency – Measure	30 Hz to 10 MHz	0.00017 %	Agilent 53210A

<sup>1</sup> This laboratory offers commercial calibration service.

<sup>2</sup> Calibration and Measurement Capability Uncertainty (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. CMCs 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.

<sup>3</sup> In the statement of CMC, the value is defined as the percentage of reading, unless otherwise noted.

<sup>4</sup> The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMC's are expressed as either a specific value that covers the full range or as a percent or fraction of the reading plus a fixed floor specification.

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## *Accredited Laboratory*

A2LA has accredited

# MAGNETIC INSTRUMENTATION CALIBRATION LABORATORY

*Indianapolis, 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 R205 – *Specific Requirements: Calibration Laboratory Accreditation Program*. 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 April 2017).



Presented this 28<sup>th</sup> day of August 2018.

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President and CEO  
For the Accreditation Council  
Certificate Number 1462.01  
Valid to February 29, 2020

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