



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

Miller Instrument Laboratory

1763 East 400 North

Portland, IN 47341

has been assessed by ANAB
and meets the requirements of international standard

ISO/IEC 17025:2005

and national standard

ANSI/NCSL Z540-1-1994 (R2002)

while demonstrating technical competence in the field of

CALIBRATION

Refer to the accompanying Scope of Accreditation for information regarding the types of calibrations to which this accreditation applies.

L2425

Certificate Number


ANAB Approval

Certificate Valid: 10/11/2018-11/18/2019
Version No. 002 Issued: 10/11/2018



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. 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).



**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
AND ANSI/NCSL Z540-1-1994 (R2002)**

Miller Instrument Laboratory

1763 East 400 North
Portland, IN 47341
Todd Miller
260-726-3503

CALIBRATION

Valid to: **November 18, 2019**

Certificate Number: **L2425**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current Source	(1 to 329) μ A (0.329 to 3.29) mA (3.29 to 32.9) mA (0.329 to 329) mA (0.329 to 1.09) A (1.09 to 2.99) A (3.29 to 11) A	0.15 μ A/A + .04 μ A 0.38 μ A/A + 0.1 μ A 3.8 μ A/A + 0.5 μ A 38 μ A/A + 5 μ A 0.25 mA/A + 80 μ A 1.3 mA/A + 80 μ A 5.8 mA/A + 1 mA	Fluke 5522A Multifunction Calibrator
DC Current Measure	(10 to 100) μ A (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	41 nA/A + 1.6 nA 0.17 μ A/A + 10 nA 1.6 μ A/A + 0.1 μ A 16 μ A/A + 1.0 μ A 0.31 mA/A + 0.02 mA	HP 3458A Multimeter
AC Current Source	(29 to 329.9) μ A (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (0.33 to 3.299 9) mA (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.17 uA/A + 0.2 uA 0.14 uA/A + 0.2 uA 0.35 uA/A + 0.3 uA 0.09 uA/A + 0.4 uA 1.8 uA/A + 0.8 uA 0.14 uA/A + 0.3 uA 0.12 uA/A + 0.3 uA 0.23 uA/A + 0.4 uA 0.06 uA/A + 0.6 uA 1.2 uA/A + 1.2 uA	Fluke 5522A Multifunction Calibrator



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current Source	(3.3 to 32.999) mA		Fluke 5522A Multifunction Calibrator
	(20 to 45) Hz	0.1 uA/A + 4 uA	
	45 Hz to 1 kHz	0.05 uA/A + 4 uA	
	(1 to 5) kHz	0.09 uA/A + 4 uA	
	(5 to 10) kHz	0.02 uA/A + 6 uA	
	(10 to 30) kHz	0.46 mA/A + 8 uA	
	(33 to 329.99) mA		
	(20 to 45) Hz	0.1 mA/A + 40 uA	
	45 Hz to 1 kHz	0.05 mA/A + 40 uA	
	(1 to 5) kHz	0.12 mA/A + 100 uA	
	(5 to 10) kHz	0.02 mA/A + 200 uA	
	(10 to 30) kHz	0.46 mA/A + 400 uA	
	(0.33 to 1.099 9) A		
	(20 to 45) Hz	0.21 mA/A + 200 uA	
	45 Hz to 1 kHz	0.06 mA/A + 200 uA	
	(1 to 5) kHz	0.69 mA/A + 2 mA	
(5 to 10) kHz	2.9 mA/A + 10 mA		
(1.1 to 2.999 9) A			
(20 to 45) Hz	0.21 mA/A + 200 uA		
45 Hz to 1 kHz	0.07 mA/A + 200 uA		
(1 to 5) kHz	0.69 mA/A + 2 mA		
(5 to 10) kHz	2.9 mA/A + 10 mA		
(3 to 10.999 9) A			
45 Hz to 1 kHz	0.12 mA/A + 4 mA		
(1 to 5) kHz	3.5 mA/A + 4 mA		
Resistance Measure	(1 to 10) Ω	1.7 mΩ/Ω + 0.1mΩ	HP 3458A Multimeter
	(10 to 100) Ω	5.4 mΩ/Ω + 1 mΩ	
	(0.1 to 1) kΩ	39 mΩ/Ω + 1 mΩ	
	(1 to 10) kΩ	390 mΩ/Ω + 10 mΩ	
	(10 to 100) kΩ	3.9 Ω/Ω + 100 mΩ	
	(0.1 to 1) MΩ	48 Ω/Ω + 4 Ω	
	(1 to 10) MΩ	1.7 kΩ/Ω + 200 Ω	
	(10 to 100) MΩ	63 kΩ/Ω + 2 kΩ	
(0.1 to 1) GΩ	18 MΩ/Ω + 20 kΩ		



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance Source	(1 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	0.51 mΩ/Ω + 4 mΩ 1.1 mΩ/Ω + 6 mΩ 3.6 mΩ/Ω + 6 mΩ 11 mΩ/Ω + 8 mΩ 32 mΩ/Ω + 8 mΩ 110 mΩ/Ω + 80 mΩ 360 mΩ/Ω + 80 mΩ 1.1 Ω/Ω + 800 mΩ 3.7 Ω/Ω + 800 mΩ 12 Ω/Ω + 8 Ω 41 Ω/Ω + 8 Ω 230 Ω /Ω + 120 Ω 1.7 kΩ/Ω + 200 Ω 9.8 k/Ω + 10 kΩ 59 kΩ/Ω + 12 KΩ	Fluke 5522A Multifunction Calibrator
DC Voltage Source	(1 to 329) mV (0.329 to 3.29) V (3.29 to 329) V (32.9 to 329) V (329 to 1 000) V	9.3 μV/V + 2 μV 49 μV/V + 4 μV 480 μV/V + 30 μV 7 mV/V + 150 μV 21 mV/V + 3 mV	Fluke 5522A Multifunction Calibrator
DC Voltage Measure	(1 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1 000) V	3.9 μV/V + 0.6 μV 19 μV/V + 0.6 μV 0.2 mV/V + 1 μV 2.7 mV/V + 0.06 μV 27 mV/V + 2 μV	HP 3458A Multimeter
AC Voltage Source	(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 (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	28 μV/V + 12 μV 6.3 μV/V + 12 μV 7.8 μV/V + 12 μV 35 μV/V + 12 μV 120 μV/V + 24 μV 280 μV/V + 100 μV 100 μV/V + 16 μV 57 μV/V + 16 μV 57 μV/V + 16 μV 120 μV/V + 16 μV 280 μV/V + 60 μV 700 μV/V+ 1.2 mV	Fluke 5522A Multifunction Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage Source	(0.33 to 3.3) V		Fluke 5522A Multifunction Calibrator
	(10 to 45) Hz	0.1 μ V/V + 100 μ V	
	45 Hz to 10 kHz	530 μ V/V + 120 μ V	
	(10 to 20) kHz	670 μ V/V + 120 μ V	
	(20 to 50) kHz	1.1 mV/V + 100 μ V	
	(50 to 100) kHz	2.4 mV/V + 250 μ V	
	(100 to 500) kHz	8.4 mV/V + 1.2 mV	
	(3.3 to 33) V		
	(10 to 45) Hz	10 mV/V + 1.3 mV	
	45 Hz to 10 kHz	5.2 mV/V + 1.2 mV	
	(10 to 20) kHz	12 mV/V + 1.2 mV	
	(20 to 50) kHz	12 mV/V + 0.7 mV	
	(50 to 100) kHz	31 mV/V + 3.2 mV	
	(33 to 330) V		
45 Hz to 1 kHz	71 mV/V + 4 mV		
(1 to 10) kHz	71 mV/V + 1.2 mV		
(10 to 20) kHz	110 mV/V + 12 mV		
(20 to 50) kHz	110 mV/V + 12 mV		
(50 to 100) kHz	690 mV/V + 10mV		
(330 to 1 020) V			
45 Hz to 1 kHz	350 mV/V + 20 mV		
(1 to 10) kHz	290 mV/V + 20 mV		
AC Voltage Measure	(1 to 10) mV		HP 3458A Multimeter
	40 Hz	16 μ V/V	
	1 kHz	9.4 μ V/V	
	10 kHz	9.9 μ V/V	
	20 kHz	10 μ V/V	
	50 kHz	31 μ V/V	
	100 kHz	80 μ V/V	
	(10 to 100) mV		
	40 Hz	46 μ V/V	
	1 kHz	28 μ V/V	
	10 kHz	32 μ V/V	
	20 kHz	32 μ V/V	
	50 kHz	62 μ V/V	
	100 kHz	160 μ V/V	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage Measure	(0.1 to 1) V		HP 3458A Multimeter
	40 Hz	400 μ V/V	
	1 kHz	240 μ V/V	
	10 kHz	240 μ V/V	
	20 kHz	290 μ V/V	
	50 kHz	400 μ V/V	
	100 kHz	950 μ V/V	
	(1 to 10) V		
	40 Hz	4.2 mV/V	
	1 kHz	2.4 mV/V	
	10 kHz	2.4 mV/V	
	20 kHz	3.5 mV/V	
	50 kHz	4.7 V/V	
	100 kHz	12 mV/V	
	(10 to 100) V		
	1 kHz	24 mV/V	
	10 kHz	30 mV/V	
	20 kHz	36 mV/V	
	50 kHz	42 mV/V	
100 kHz	289 mV/V		
(100 to 700) V			
1 kHz	301 mV/V		
10 kHz	358 mV/V		
Thermocouple Simulation Source/Measure	Type E		Fluke 5522A Multifunction Calibrator
	(-250 to -100) °C	0.6 °C	
	(-100 to -25) °C	0.25 °C	
	(-25 to 350) °C	0.23 °C	
	(350 to 650) °C	0.25 °C	
	(650 to 1 000) °C	0.29 °C	
	Type J		
	(-210 to -100) °C	0.35 °C	
	(-100 to -30) °C	0.25 °C	
	(-30 to 150) °C	0.23 °C	
	(150 to 760) °C	0.26 °C	
(760 to 1 200) °C	0.31 °C		



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Thermocouple Simulation Source/Measure	Type K		Fluke 5522A Multifunction Calibrator
	(-210 to -100) °C	0.42 °C	
	(-100 to -25) °C	0.27 °C	
	(-25 to 120) °C	0.25 °C	
	(120 to 1 000) °C	0.34 °C	
	(1 000 to 1 372) °C	0.49 °C	
	Type T		
	(-250 to -150) °C	0.75 °C	
	(-150 to 0) °C	0.32 °C	
	(0 to 120) °C	0.25 °C	
(120 to 400) °C	0.23 °C		

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Micrometers Error of Indication	(0 to 2) in	126 µin	Gage Blocks
	(2 to 4) in	228 µin	
	(4 to 6) in	341 µin	
Calipers	(0 to 4) in	500 µin	Gage Blocks
	(4 to 8) in	634 µin	
	(8 to 20) in	0.001 2 in	

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 ($k=2$), corresponding to a confidence level of approximately 95%.

Notes:

1. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
2. This scope is formatted as part of a single document including Certificate of Accreditation No. L2425.


 Vice President

