



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

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

This is to certify that

Aozora Ventures, LLC dba MD Instruments
1129 S. Mill Iron Road
Muskegon, MI 49442

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

ISO/IEC 17025:2005

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.

L2161

Certificate Number


ANAB Approval

Certificate Valid: 06/07/2018-07/10/2019
Version No. 003 Issued: 06/07/2018



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

Aozora Ventures, LLC dba MD Instruments

1129 S. Mill Iron Road
Muskegon, MI 49442
Glen Fillion 231-773-4739

CALIBRATION

Valid to: **July 10, 2019**

Certificate Number: **L2161**

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
DC Current ¹ Source and Measure	(0 to 20) mA	0.02 mA	Precision DMM Power Supply
DC Current – Measure	(0 to 100) mA	0.08 mA + 0.01 % of reading	Precision DMM
	(0.1 to 3) A	3.6 mA + 0.03 % of reading	
DC Current – Source	(0 to 100) mA	0.08 mA + 0.01 % of reading	Precision DMM Power Supply
	(0.1 to 2) A	3.6 mA + 0.03 % of reading	
AC Current – Measure (5 Hz to 5 kHz)	(0 to 3) A	0.06 A + 0.07 % of reading	Precision DMM Power Supply
AC Current – Source	(0 to 2) A	0.06 A + 0.07 % of reading	
Resistance – Measure	(0 to 1) MΩ	25 mΩ + 0.05 % of reading	Precision DMM, 4-wire configuration
	(1 to 10) MΩ	2 kΩ + 0.05 % of reading	Precision DMM, 2-wire configuration
DC Voltage ¹ Source and Measure	(0 to 11) V	0.13 V	Precision DMM Power Supply
DC Voltage – Measure	(0 to 100) mV	0.1 mV + 0.01 % of reading	Precision DMM
	(0.1 to 1 000) V	0.08 V + 0.01 % of reading	
AC Voltage - Measure (10 Hz to 20 kHz)	(0 to 750) V	0.8 V + 0.04 % of reading	



Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Resistance RTD Simulation			
100 Ω Pt (385)	(-328 to 752) °F	0.8 °F	Precision DMM, Process Calibrator
100 Ω Pt (3926)	(-328 to 1 166) °F	1 °F	
100 Ω Pt (3916)	(-328 to 1 166) °F	1 °F	
200 Ω Pt (385)	(-328 to 1 166) °F	1 °F	
500 Ω Pt (385)	(-328 to 1 166) °F	0.9 °F	
1 000 Ω Pt (385)	(-328 to 1 166) °F	1 °F	
120 Ω Ni (672)	(-112 to 500) °F	0.5 °F	
10 Ω Cu	(-148 to 500) °F	1.8 °F	
Millivolt Thermocouple Simulation			
Type B	(1 472 to 3 300) °F	2.5 °F	Precision DMM, Process Calibrator
Type R	(212 to 3 212) °F	2.5 °F	
Type S	(392 to 3 212) °F	2.4 °F	
Type C	(32 to 3 272) °F	1.7 °F	
Type L	(-148 to 1 660) °F	0.8 °F	
Type E	(-148 to 1 832) °F	1 °F	
Type N	(-148 to 2 372) °F	1.1 °F	
Type J	(-346 to 2 190) °F	0.85 °F	
Type K	(-328 to 2 501) °F	1.4 °F	
Type T	(-328 to 752) °F	0.85 °F	
Type U	(-328 to 1 112) °F	0.85 °F	

Mass

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Pressure	(0.1 to 5) psi	0.18 psi	Process Calibrator, Pressure Modules
	(5 to 100) psi	0.3 psi	
	(100 to 1 000) psi	0.8 psi	
	(1 000 to 10 000) psi	12 psi	
Vacuum	(-1 000 to 0) mbar	4.5 mbar	MKS Baratron
	(-1 000 to 0) micron	1.5 micron	MKS Vacuum Sensor



Thermodynamic

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Humidity – Measure & Generate	(11 to 90) %RH	2.5 %RH	Humidity Probe & Saturated Salt Solutions
Temperature - Measure	(32 to 450) °F	0.2 °F	RTD / Display System
	(450 to 2 200) °F	5 °F	Thermocouple / Display
Temperature System Accuracy Tests ¹ Type K, N	(0 to 1 000) °F (1 000 to 2 372) °F	2.1 °F 3.7 °F	Reference Thermocouple with Field Test Instrument AMS 2750E
Temperature Uniformity Surveys ¹	Type J (-320 to 1 000) °F (1 000 to 1 400) °F Type K (-320 to 1 000) °F (1 000 to 2 450) °F Type N (-148 to 1 000) °F (1 000 to 2 372) °F Type S (392 to 1 000) °F (1 000 to 2 650) °F	2.1 °F 2.3 °F 2.4 °F 4.4 °F 2.2 °F 4.3 °F 3.2 °F 4.9 °F	Reference Thermocouples with Data Recorder AMS 2750E
Resistance Temperature Devices and Thermocouples	(32 to 450) °F	0.2 °F	RTD / Display System
	(450 to 2 200) °F	5 °F	Thermocouple / Display
Infrared Thermometers	(122 to 932) °F	7.9 °F	Reference Pyrometer with Blackbody $\epsilon = 0.95, \lambda = (8 \text{ to } 14) \mu\text{m}$
	(572 to 2 192) °F	12 °F	Reference Pyrometer with Blackbody $\epsilon = 0.99, \lambda = 1.6 \mu\text{m}$

Time and Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Frequency – Measure	3 Hz to 40 kHz	0.05 Hz	Precision DMM

Time and Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
	(40 to 300) kHz	0.04 kHz	Precision DMM
Stop Watch	Up to 24 hr	2 s	Comparison with a Radio-Controlled Clock
Timers ¹	Up to 24 hr	1.9 s	Comparison with a Stopwatch

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. L2161.



Vice President

