



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

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

Fulfills the requirements of

ISO/IEC 17025:2017

In the field of

CALIBRATION

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

A handwritten signature in black ink, appearing to read 'R. Douglas Leonard Jr.', is positioned above a horizontal line.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 10 July 2022
Certificate Number: L2161



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
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 17025:2017

Aozora Ventures, LLC dba MD Instruments

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

CALIBRATION

Valid to: **July 10, 2022**

Certificate Number: **L2161**

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
DC Current Source / Measure ¹	(0 to 20) mA	20 μ A	Precision Multimeter, Power Supply
DC Current – Measure	(0 to 100) mA (0.1 to 3) A	0.01 % of reading + 80 μ A 0.03 % of reading + 3.6 mA	Precision Multimeter
DC Current – Source	(0 to 100) mA (0.1 to 2) A	0.01 % of reading + 80 μ A 0.03 % of reading + 3.6 mA	Precision Multimeter, Power Supply
AC Current – Measure (5 Hz to 5 kHz)	Up to 3 A	0.07 % of reading + 60 mA	Precision Multimeter
AC Current – Source	Up to 2 A	0.07 % of reading + 60 mA	Precision Multimeter, Power Supply
Resistance – Measure	Up to 1 M Ω (1 to 10) M Ω	0.05 % of reading + 25 m Ω 0.05 % of reading + 2 k Ω	Precision Multimeter (4-wire configuration)
DC Voltage Source / Measure ¹	(0 to 11) V	0.13 V	Precision Multimeter, Power Supply
DC Voltage – Measure	(0 to 100) mV (0.1 to 1 000) V	0.01 % of reading + 0.1 mV 0.01 % of reading + 80 mV	Precision Multimeter
AC Voltage - Measure (10 Hz to 20 kHz)	Up to 750 V	0.04 % of reading + 0.8 V	
Resistance RTD Simulation 100 Ω Pt (385) 100 Ω Pt (3926) 100 Ω Pt (3916) 200 Ω Pt (385) 500 Ω Pt (385) 1 000 Ω Pt (385)	(-328 to 752) $^{\circ}$ F (-328 to 1 166) $^{\circ}$ F (-328 to 1 166) $^{\circ}$ F (-328 to 1 166) $^{\circ}$ F (-328 to 1 166) $^{\circ}$ F (-328 to 1 166) $^{\circ}$ F	0.8 $^{\circ}$ F 1 $^{\circ}$ F 1 $^{\circ}$ F 1 $^{\circ}$ F 0.9 $^{\circ}$ F 1 $^{\circ}$ F	Precision Multimeter, Process Calibrator

Electrical – DC/Low Frequency

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

Mass and Mass Related

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Pressure	(0.1 to 5) psi (5 to 100) psi (100 to 1 000) psi (1 000 to 10 000) psi	0.18 psi 0.3 psi 0.8 psi 12 psi	Process Calibrator, Pressure Modules
Vacuum ²	(-1 000 to 0) mbar	4.5 mbar	MKS Baratron Capacitance Manometer
	(-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 – Source/Measure	(11 to 90) %RH	2.5 %RH	Humidity Probe & Saturated Salt Solutions
Temperature - Measure	(32 to 450) °F	0.2 °F	RTD with Display System

Thermodynamic

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Temperature - Measure	(450 to 2 200) °F	5 °F	Thermocouple with Display System
Temperature System Accuracy Tests ¹	(0 to 1 000) °F (1 000 to 2 372) °F	2.1 °F 3.7 °F	Reference Type K or N Thermocouple with Field Test Instrument per AMS 2750F
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 per AMS 2750F
Resistance Temperature Devices and Thermocouples	(32 to 450) °F	0.2 °F	RTD with Display System
	(450 to 2 200) °F	5 °F	Thermocouple with Display System
Infrared Thermometers	122.0 °F 250.0 °F 500.0 °F 750.0 °F 932.0 °F	7.9 °F	Reference Pyrometer with Blackbody $\epsilon = 0.95, \lambda = (8 \text{ to } 14) \mu\text{m}$
	572.0 °F 850.0 °F 1 100.0 °F 1 650.0 °F 2 192.0 °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 (40 to 300) kHz	50 mHz 40 Hz	Precision Multimeter

Time and Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Stop Watch	Up to 24 hr	2 s	Comparison with a Radio-Controlled Clock
Timers ¹	Up to 24 hr	2.7 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. 1 micron = 1 μmHg
3. This scope is formatted as part of a single document including Certificate of Accreditation No. L2161.



R. Douglas Leonard Jr., VP, PILR SBU

