

Scope of Accreditation For Aozora Ventures, LLC dba MD Instruments

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In recognition of a successful assessment to ISO/IEC 17025:2005 to the following Calibration and Measurement Capabilities, accreditation has been granted to **Aozora Ventures, LLC dba MD Instruments** for the following:

Accreditation granted through: **July 10, 2019**

Calibration

Electrical – Current

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
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	

Electrical – Resistance

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
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

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
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	

Electrical – Voltage

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
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	
Millivolt Thermocouple Simulation			Precision DMM, Process Calibrator
Type B	(1 472 to 3 300) °F	2.5 °F	
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 – Pressure / Low Vacuum

Calibration Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
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	

Mass – Medium / High Vacuum

Calibration Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Vacuum	(-1 000 to 0) mbar	3.4 torr	MKS Baratron
	(-1 000 to 0) micron	1.5 micron	MKS Vacuum Sensor

Thermodynamic – Humidity

Calibration Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Humidity – Measure & Generate	(11 to 90) %RH	2.5 %RH	Humidity Probe & Saturated Salt Solutions

Thermodynamic – Thermodynamic Sources

Calibration Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
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			Reference Thermocouple with Field Test Instrument AMS 2750E
Type K, N	(0 to 1 000) °F (1 000 to 2 372) °F	2.1 °F 3.7 °F	
Temperature Uniformity Surveys ¹			Reference Thermocouples with Data Recorder AMS 2750E
Type J	(-320 to 1 000) °F (1 000 to 1 400) °F	2.1 °F 2.3 °F	
Type K	(-320 to 1 000) °F (1 000 to 2 450) °F	2.4 °F 4.4 °F	
Type N	(-148 to 1 000) °F (1 000 to 2 372) °F	2.2 °F 4.3 °F	
Type S	(392 to 1 000) °F (1 000 to 2 650) °F	3.2 °F 4.9 °F	

Thermodynamic – Thermometers and Probes

Calibration Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Resistance Temperature Devices and Thermocouples	(32 to 450) °F	0.2 °F	RTD / Display System
	(450 to 2 200) °F	5 °F	Thermocouple / Display

Time and Frequency – Frequency / Period

Calibration Parameter/Equipment ¹	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Frequency – Measure	3 Hz to 40 kHz	0.05 Hz	Precision DMM
	(40 to 300) kHz	0.04 kHz	

Time and Frequency – Time Dissemination

Calibration Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Remarks
Stop Watch	Up to 24 hr	2 S	Comparison with an 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 remarks. 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) Laboratory offers calibration services at the laboratory's own facilities and at the client or other agreed upon facilities.

Approved by:



 R. Douglas Leonard
 Chief Technical Officer

 Date: August 10, 2016