



**National Voluntary
Laboratory Accreditation Program**



CALIBRATION LABORATORIES

NVLAP LAB CODE 200502-0

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

<p>Pyromation Inc. Metrology Laboratory 5211 Industrial Road Fort Wayne, IN 46825-5152 Mr. Chris Moritz Phone: 260-484-2580 Fax: 260-482-6805 E-mail: chris@pyromation.com URL: http://www.pyromation.com</p>	<p>Parameter(s) of Accreditation Electromagnetics - DC/Low Frequency Thermodynamic</p> <p>This laboratory is compliant to ANSI/NCSL Z540-1-1994; Part 1. (NVLAP Code: 20/A01)</p>
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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) ^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3}	Remarks
ELECTROMAGNETICS – DC/LOW FREQUENCY			
<p>NVLAP Code: 20/E05 DC RESISTANCE DC Resistance</p>	<p>1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ</p>	<p>0.004 Ω 0.004 Ω 0.015 Ω 0.12 Ω 2.0 Ω 320 Ω 1.2 kΩ 12 kΩ</p>	<p>Simulated</p>
	<p>10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ</p>	<p>0.003 Ω 0.004 Ω 0.02 Ω 0.2 Ω 2.0 Ω 300 Ω 900 Ω</p>	<p>Measured</p>
<p>DC Current</p>	<p>0 mA to 100 mA</p> <p>0 mA to 25 mA 100 mA</p>	<p>0.017 mA</p> <p>0.008 mA 0.009 mA</p>	<p>Simulated</p> <p>Measured</p>

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3}	Remarks	
NVLAP Code: 20/E06 DC VOLTAGE DC Voltage	0 mV to 100 mV	0.01 mV	Simulated	
	100 mV	0.004 mV	Measured	
	1 V	0.040 mV		
	10 V	0.11 mV		
THERMODYNAMIC				
NVLAP Code: 20/T03 LABORATORY THERMOMETERS, DIGITAL AND ANALOG Comparison measurement against PRT	-196 °C	0.03 °C	Min. Overall Length 12 in	
	-75 °C	0.03 °C		12 in
	-40 °C to 230 °C	0.05 °C		6 in
	230 °C to 420 °C	0.05 °C		18 in
	Comparison measurement against S Thermocouple	420 °C to 660 °C	0.52 °C	18 in
	Comparison measurement against SPRT	-196 °C	0.013 °C	12 in
		-75 °C	0.015 °C	12 in
		-40 °C to 230 °C	0.026 °C	6 in
		230 °C to 420 °C	0.026 °C	18 in
	Fixed Point (TPW)	0.01 °C	0.004 °C	18 in
	Fixed Point (MPGa)	29.7646 °C	0.004 °C	12 in

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3}	Remarks
NVLAP Code: 20/T08 THERMOCOUPLE & PYROMETER INDICATORS Digital/Analog Temperature Indicators			
Type PT100 E J K T B R S	-200 °C to 660 °C -270 °C to 1000 °C -210 °C to 1200 °C -270 °C to 1372 °C -270 °C to 400 °C 0 °C to 1820 °C -50 °C to 1768 °C -50 °C to 1768 °C	0.02 °C 0.08 °C 0.08 °C 0.10 °C 0.10 °C 0.30 °C 0.55 °C 0.55 °C	Simulated
Type PT100 E J K N T B R S	-200 °C to 660 °C -270 °C to 1000 °C -210 °C to 1200 °C -270 °C to 1372 °C -270 °C to 1300 °C -270 °C to 400 °C 0 °C to 1820 °C -50 °C to 1768 °C -50 °C to 1768 °C	0.02 °C 0.07 °C 0.06 °C 0.08 °C 0.11 °C 0.08 °C 0.30 °C 0.36 °C 0.36 °C	Measured
NVLAP Code: 20/T11 THERMOCOUPLES <u>Type E</u> Comparison measurement against PRT	-196 °C -75 °C -40 °C to 230 °C 230 °C to 420 °C	0.57 °C 0.56 °C 0.56 °C 0.56 °C	Min. Overall Length 12 in 12 in 6 in 18 in
Comparison measurement against S Thermocouple	420 °C to 1000 °C	0.79 °C	20 in

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3}	Remarks
<u>Type J</u>			
Comparison measurement against PRT	-196 °C	0.72 °C	12 in
	-75 °C	0.72 °C	12 in
	-40 °C to 230 °C	0.72 °C	6 in
	230 °C to 420 °C	0.72 °C	18 in
Comparison measurement against S Thermocouple	420 °C to 1100 °C	0.89 °C	20 in
	1100 °C to 1204 °C	1.1 °C	20 in
<u>Type K</u>			
Comparison measurement against PRT	-196 °C	0.73 °C	12 in
	-75 °C	0.72 °C	12 in
	-40 °C to 230 °C	0.72 °C	6 in
	230 °C to 420 °C	0.72 °C	18 in
Comparison measurement against S Thermocouple	420 °C to 1100 °C	0.89 °C	20 in
	1100 °C to 1204 °C	1.1 °C	20 in
Comparison measurement against B Thermocouple	1200 °C to 1372 °C	1.6 °C	30 in
<u>Type N</u>			
Comparison measurement against PRT	-196 °C	0.74 °C	12 in
	-75 °C	0.73 °C	12 in
	-40 °C to 230 °C	0.73 °C	6 in
	230 °C to 420 °C	0.73 °C	18 in
Comparison measurement against S Thermocouple	420 °C to 1100 °C	0.90 °C	20 in
	1100 °C to 1204 °C	1.1 °C	20 in
Comparison measurement against B Thermocouple	1200 °C to 1300 °C	1.3 °C	30 in
<u>Type T</u>			
Comparison measurement against PRT	-196 °C	0.37 °C	12 in
	-75 °C	0.34 °C	12 in

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3}	Remarks
	-40 °C to 230 °C	0.72 °C	6 in
	230 °C to 420 °C	0.72 °C	18 in
<u>Type B</u>			
Comparison measurement against PRT	200 °C to 420 °C	1.0 °C	18 in
Comparison measurement against S Thermocouple	420 °C to 1100 °C	0.84 °C	20 in
	1100 °C to 1200 °C	0.92 °C	20 in
Comparison measurement against B Thermocouple	1200 °C to 1450 °C	1.7 °C	30 in
<u>Type R</u>			
Comparison measurement against PRT	-40 °C to 230 °C	0.71 °C	6 in
	230 °C to 420 °C	0.71 °C	18 in
Comparison measurement against S Thermocouple	420 °C to 1100 °C	0.81 °C	20 in
	1100 °C to 1204 °C	0.99 °C	20 in
Comparison measurement against B Thermocouple	1200 °C to 1450 °C	1.8 °C	30 in
<u>Type S</u>			
Comparison measurement against PRT	-40 °C to 230 °C	0.69 °C	6 in
	230 °C to 420 °C	0.69 °C	18 in
Comparison measurement against S Thermocouple	420 °C to 1100 °C	0.87 °C	20 in
	1100 °C to 1204 °C	1.1 °C	20 in
Comparison measurement against B Thermocouple	1200 °C to 1450 °C	1.8 °C	30 in
END			

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Notes

Note 1: A Calibration and Measurement Capability (CMC) is a description of the best result of a calibration or measurement (result with the smallest uncertainty of measurement) that is available to the laboratory's customers under normal conditions, when performing more or less routine calibrations of nearly ideal measurement standards or instruments. The CMC is described in the laboratory's scope of accreditation by: the measurement parameter/device being calibrated, the measurement range, the uncertainty associated with that range (see note 3), and remarks on additional parameters, if applicable.

Note 2: Calibration and Measurement Capabilities are traceable to the national measurement standards of the U.S. or to the national measurement standards of other countries and are thus traceable to the internationally accepted representation of the appropriate SI (Système International) unit.

Note 3: The uncertainty associated with a measurement in a CMC is an expanded uncertainty using a coverage factor, $k = 2$, with a level of confidence of approximately 95 %. Units for the measurand and its uncertainty are to match. Exceptions to this occur when marketplace practice employs mixed units, such as when the artifact to be measured is labeled in non-SI units and the uncertainty is given in SI units (Example: 5 lb weight with uncertainty given in mg).

Note 3a: The uncertainty of a specific calibration by the laboratory may be greater than the uncertainty in the CMC due to the condition and behavior of the customer's device and specific circumstances of the calibration. The uncertainties quoted do not include possible effects on the calibrated device of transportation, long term stability, or intended use.

Note 3b: As the CMC represents the best measurement results achievable under normal conditions, the accredited calibration laboratory shall not report smaller uncertainty of measurement than that given in a CMC for calibrations or measurements covered by that CMC.

Note 3c: As described in Note 1, CMCs cover calibrations and measurements that are available to the laboratory's customers under *normal conditions*. However, the laboratory may have the capability to offer special tests, employing special conditions, which yield calibration or measurement results with lower uncertainties. Such special tests are not covered by the CMCs and are outside the laboratory's scope of accreditation. In this case, NVLAP requirements for the labeling, on calibration reports, of results outside the laboratory's scope of accreditation apply. These requirements are set out in Annex A.1.h. of NIST Handbook 150, Procedures and General Requirements.

Note 4: Uncertainties associated with field service calibration may be greater as they incorporate on-site environmental contributions, transportation effects, or other factors that affect the measurements. (This note applies only if marked in the body of the scope.)

Note 5: Uncertainty values listed with percent (%) are percent of reading or generated value unless otherwise noted.

Note 6: NVLAP accreditation is the formal recognition of specific calibration capabilities. Neither NVLAP nor NIST guarantee the accuracy of individual calibrations made by accredited laboratories.

Note 7: See NIST Handbook 150 for further explanation of these notes.

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