



**CALIBRATION LABORATORIES**

**NVLAP LAB CODE 200508-0**

**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005**

<p><b>Inscro Metrology, Inc.</b> 10434 N.W. 31st Terrace Miami, FL 33172 Ms. Mirtha Hernandez-Davila Phone: 305-994-8031 Fax: 305-994-7365 E-mail: <a href="mailto:mdavila@insco.us">mdavila@insco.us</a></p>	<p><b>Parameter(s) of Accreditation</b> Mechanical 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) <sup>Notes 1,2</sup>**

Measured Parameter or Device Calibrated	Range	Uncertainty ( $k=2$ ) <sup>Note 3</sup>	Remarks
<b>MECHANICAL</b>			
<p><b>NVLAP Code: 20/M08</b> <b>MASS</b> Metric</p>	<p>50 kg 30 kg 25 kg 20 kg 10 kg 5 kg 3 kg 2 kg 1 kg 500 g 300 g 200 g 100 g 50 g 30 g 20 g 10 g 5 g 3 g 2 g 1 g 0.500 g 0.300 g 0.200 g</p>	<p>11 mg 6.5 mg 5.7 mg 4.2 mg 0.65 mg 0.33 mg 0.19 mg 0.18 mg 0.052 mg 0.03 mg 0.027 mg 0.022 mg 0.016 mg 0.0065 mg 0.0046 mg 0.0041 mg 0.0034 mg 0.0013 mg 0.0013 mg 0.00076 mg 0.00074 mg 0.0011 mg 0.0011 mg 0.00075 mg</p>	<p>Echelon I</p>

2012-04-01 through 2013-03-31  
Effective dates

*David F. Alderson*  
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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) <sup>Notes 1,2</sup>

Measured Parameter or Device Calibrated	Range	Uncertainty (k=2) <sup>Note 3</sup>	Remarks
	0.100 g	0.00063 mg	Echelon II
	0.050 g	0.00038 mg	
	0.030 g	0.00057 mg	
	0.020 g	0.00059 mg	
	0.010 g	0.00067 mg	
	0.005 g	0.00053 mg	
	0.003 g	0.00053 mg	
	0.002 g	0.00047 mg	
	0.001 g	0.00036 mg	
	50 kg	15 mg	
	30 kg	9 mg	
	25 kg	7.9 mg	
	20 kg	6.5 mg	
	10 kg	0.69 mg	
	5 kg	0.35 mg	
	3 kg	0.22 mg	
	2 kg	0.22 mg	
	1 kg	0.053 mg	
	500 g	0.032 mg	
	300 g	0.029 mg	
	200 g	0.024 mg	
	100 g	0.018 mg	
	50 g	0.01 mg	
	30 g	0.0087 mg	
	20 g	0.0083 mg	
	10 g	0.0079 mg	
	5 g	0.0025 mg	
	3 g	0.0024 mg	
	2 g	0.002 mg	
	1 g	0.0013 mg	
	0.500 g	0.0018 mg	
	0.300 g	0.0013 mg	
	0.200 g	0.001 mg	
	0.100 g	0.00082 mg	
	0.050 g	0.00051 mg	

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Measured Parameter or Device Calibrated	Range	Uncertainty ( $k=2$ ) <sup>Note 3</sup>	Remarks
	0.030 g	0.00067 mg	
	0.020 g	0.00072 mg	
	0.010 g	0.00069 mg	
	0.005 g	0.00079 mg	
	0.003 g	0.00068 mg	
	0.002 g	0.00058 mg	
	0.001 g	0.00056 mg	
<b>THERMODYNAMIC</b>			
<b>NVLAP Code: 20/T03 LABORATORY THERMOMETERS, DIGITAL and ANALOG</b>		Digital Readout Thermometers consisting of a thermometer probe and a measurement readout device are calibrated as a unit. The uncertainty of the digital readout device is unknown and must be included by the user of the device.	
Digital/Electronic Thermometers	-196 °C -40 °C -20 °C 0 °C 50 °C 100 °C 150 °C 200 °C 400 °C 600 °C	20 mK 30 mK 25 mK 3.8 mK 12 mK 17 mK 25 mK 34 mK 30 mK 150 mK	Direct Comparison to PRT
Liquid in Glass Thermometers	-40 °C -20 °C 0 °C 50 °C 100 °C 150 °C	0.034 °C 0.033 °C 0.013 °C 0.021 °C 0.024 °C 0.03 °C	Direct Comparison to PRT

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Measured Parameter or Device Calibrated	Range	Uncertainty ( $k=2$ ) <sup>Note 3</sup>	Remarks
	200 °C 400 °C 600 °C	0.025 °C 0.25 °C 0.52 °C	
<b>NVLAP Code: 20/T07 RESISTANCE THERMOMETRY</b>			
ITS-90	-196 °C	7.1 mK	Direct Comparison; (LN <sub>2</sub> ) (TP Ar Substitution) Fixed Point (TP Hg); The temperature of this point is defined by the SPRT.
	-38.8344 °C 0.01 °C 156.5985 °C 231.928 °C 419.527 °C	1.3 mK 0.29 mK 1.2 mK 1.2 mK 2.1 mK	Fixed Point (TPW) Fixed Point (FP In) Fixed Point (FP Sn) Fixed Point (FP Zn)
Resistance Thermometry	-196 °C -40 °C 0.01 °C 30 °C 157 °C 232 °C 420 °C 660 °C	7.1 mK 26 mK 0.29 mK 11 mK 21 mK 31 mK 41 mK 42 mK	Direct Comparison to SPRT
<b>NVLAP Code: 20/T11 THERMOCOUPLES</b>			
Thermocouples	0 °C 50 °C 100 °C 150 °C 200 °C 400 °C	Calibration of used thermocouples may result in larger uncertainties due to increased homogeneity. 4.2 μV 6.5 μV 7.2 μV 8.0 μV 8.2 μV 9.3 μV	Nobel Metal

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**CALIBRATION AND MEASUREMENT CAPABILITIES (CMC)** Notes 1,2

Measured Parameter or Device Calibrated	Range	Uncertainty ( $k=2$ ) <small>Note 3</small>	Remarks
Type S	600 °C	10 $\mu$ V	Nobel Metal
	0 °C	0.78 °C	
	50 °C	1.0 °C	
	100 °C	0.98 °C	
	150 °C	1.0 °C	
	200 °C	0.90 °C	
	400 °C	0.97 °C	
Type R	600 °C	0.98 °C	Nobel Metal
	0 °C	0.79 °C	
	50 °C	1.0 °C	
	100 °C	0.96 °C	
	150 °C	0.97 °C	
	200 °C	0.93 °C	
	400 °C	0.90 °C	
600 °C	0.88 °C		
<b>END</b>			

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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:** 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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