



**CALIBRATION LABORATORIES**

**NVLAP LAB CODE 200947 -0**

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

<p><b>INSTITUTO NACIONAL DE METROLOGIA</b> Avenida Cra 50 No 26-22 Interior 2, CAN Bogotá, D.C. Postal Code 111321 COLOMBIA Mr. Alvaro Bermudez Coronel Phone: 571-2 542 2222 x1611 E-mail: abermudez@inm.gov.co URL: <a href="http://www.inm.gov.co">http://www.inm.gov.co</a></p>	<p><b>Fields of Calibration</b> Time and Frequency Thermodynamic</p>
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**CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) <sup>Notes 1,2</sup>**

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty <sup>Notes 3,5</sup>	Remarks
<b>TIME and FREQUENCY</b>			
<b>FREQUENCY DISEMINATION (20/F01)</b>			
Frequency Standards	0.1 MHz, 1 MHz, 5 MHz, or 10 MHz	6 x 10 <sup>-13</sup> Hz/Hz	Comparison to Cesium Standard
Frequency Measure	1 Hz to 8 GHz	1 x 10 <sup>-10</sup> Hz/Hz	Frequency Counter/Generator disciplined to Cesium Standard
Tachometers	6 RPM to 99 999 RPM	6 x 10 <sup>-06</sup> RPM/RPM <sup>Note 8</sup>	Optical Pulses Disciplined to Cesium Standard
<b>THERMODYNAMIC</b>			
<b>Humidity (20/T02)</b>			
Humidity Measuring Equipment	12 % RH to 85 % RH	1.7 % RH	Two Pressure Generator and Dew Point Hygrometer
<b>LABORATORY THERMOMETERS (20/T03)</b>			
Thermo-Hygrometer Temperature Measurement	0 °C to 70 °C	0.2 °C	Comparison in Climatic Chamber
Temperature Measuring Devices Electronic Thermometers With Thermistor Sensor	0 °C	0.011 °C	Ice Point Bath

2016-06-16 through 2017-06-30  
Effective dates

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty <sup>Notes 3,5</sup>	Remarks
With Base Metal Thermocouple Sensor	-80 °C to -40 °C	0.072 °C	Stirred Liquid Bath and Metal Block Calibrator
	-40 °C to 0 °C	0.040 °C	
	0 °C to 200 °C	0.040 °C	
Liquid-in-Glass Graduation: 0.05 °C	-38 °C to 5 °C	0.048 °C	Stirred Liquid Bath
		0.1 °C	
Graduation: 0.2 °C	5 °C to 80 °C	0.056 °C	Stirred Liquid Bath
		0.5 °C	
Graduation: 1 °C	80 °C to 150 °C	0.17 °C	Stirred Liquid Bath
		0.053 °C	
Graduation: 0.1 °C	16 °C to 24 °C	0.061 °C	Stirred Liquid Bath
		0.096 °C	
Graduation: 0.2 °C	-1 °C to 1 °C	0.013 °C	Stirred Liquid Bath
		0.011 °C	
<b>RADIATION THERMOMETRY (20/T06)</b>			
Calibration of IR Thermometers	0 °C to 300 °C	1.6 °C	Calibration is performed over the spectral band of 8 μm to 14 μm

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*John S. Laman*  
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**CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) <sup>Notes 1,2</sup>**

<b>Measured Parameter or Device Calibrated</b>	<b>Range</b>	<b>Expanded Uncertainty <sup>Notes 3,5</sup></b>	<b>Remarks</b>
<b>RESISTANCE THERMOMETRY (20/T07)</b>			
PRT – Variable Points by comparison to SPRT	0 °C	0.011 °C	Ice Point Bath Stirred Liquid Bath and Metal Block Calibrator
	-80 °C to 0 °C	0.072 °C	
	0 °C to 420 °C	0.040 °C	
	420 °C to 660 °C	0.046 °C	
<b>THERMOCOUPLES (20/T11)</b>			
Calibration of Types S, R, and B Thermocouples	0 °C to 400 °C	0.12 °C to 1.2 °C	Comparison to Standard TC Metal Tube & Block Furnace
	400 °C to 800 °C	1.2 °C to 2.4 °C	
	800 °C to 1200 °C	2.4 °C to 3.3 °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 with a level of confidence of approximately 95 %, typically using a coverage factor of k = 2. However, laboratories may report a coverage factor different than k = 2 to achieve the 95 % level of confidence. 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.

Note 8: Best existing device resolution is not included. Uncertainty will be limited by device under test resolution (R) and be no better than 0.58R.

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