National Voluntary Laboratory Accreditation Program

CALIBRATION LABORATORIES **NVLAP LAB CODE 600161-0**

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

RH Systems, LLC	**Fields of Calibration**
1615 South 52nd St. Tempe, AZ 85281 Mr. Shane Hendricks Phone: 480-926-1955 E-mail: shane@rhs.com URL: http://www.rhs.com	Thermodynamic Electromagnetics – DC/Low Frequency

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3	Remarks
THERMODYNAMIC			
HUMIDITY (20/T02)			
Dew/ Frost Point	-121 to -112 °C -112 to -102 °C -101 to -94 °C -93.9 to -83 °C -83.9 to -75 °C -75 to -64 °C -64 to -55 °C -55 to -21.1 °C -21 to 0 °C 0.1 to 11 °C 11.1 to 27 °C 27.1 to 37 °C 37.1 to 48 °C 48.1 to 55 °C 55.1 to 63 °C 63.1 to 70 °C 70.1 to 76 °C 76.1 to 80 °C 80.1 to 85 °C	20.7 °C 9.6 °C 0.18 °C 0.10 °C 0.09 °C 0.08 °C 0.07 °C 0.05 °C 0.04 °C 0.05 °C 0.06 °C 0.07 °C 0.08 °C 0.09 °C 0.1 °C 0.12 °C 0.14 °C 0.16 °C 0.19 °C	By primary realization in accordance to RISP-5
Dew/ Frost Point	-80 °C to -60.99 °C -60.98 °C to -40.99 °C -40.98 °C to -35 °C	0.28 °C 0.11 °C 0.08 °C	By comparison against Chilled mirror in Accordance to

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty [Note 3]	Remarks
	-34.99 °C to -25 °C	0.059 °C	RHS-CM-002
	-24.99 °C to 50 °C	0.046°C	
	50.99 °C to 95 °C	0.052 °C	
Relative Humidity			By Primary realization
-10 °C	5 %	0.013 % RH	in accordance to RISP-5.
	10 %	0.025 % RH	
	30 %	0.037 % RH	
	50 %	0.13 % RH	
	70 %	0.17 % RH	
	95 %	0.24 % RH	
0 °C	2 %	0.004 % RH	
	5 %	0.011 % RH	
	10 %	0.022 % RH	
	30 %	0.065 % RH	
	50 %	0.11 % RH	
	70 %	0.15 % RH	
	95 %	0.21 % RH	
25 °C	2 %	0.003 % RH	
	5 %	0.008 % RH	
	10 %	0.015 % RH	
	30 %	0.044 % RH	
	50 %	0.054 % RH	
	70 %	0.10 % RH	
	95 %	0.14 % RH	
50 °C	2 %	0.004 % RH	
	5 %	0.009 % RH	
	10 %	0.018 % RH	
	30 %	0.053 % RH	
	50 %	0.089 % RH	
	70 %	0.13 % RH	
	95 %	0.17 % RH	

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty [Note 3]	Remarks
70/75 °C	2 %	0.004 % RH	
	5 %	0.010 % RH	
	10 %	0.021 % RH	
	30 %	0.062 % RH	
	50 %	0.10 % RH	
	70 %	0.15 % RH	
	95 %	0.20 % RH	
85 °C	2 %	0.004 % RH	
	5 %	0.011 % RH	
	10 %	0.023 % RH	
	30 %	0.067 % RH	
	50 %	0.12 % RH	
	70 %	0.16 % RH	
	95 %	0.21 % RH	
95 °C	2 %	0.005 % RH	
	5 %	0.013 % RH	
	10 %	0.028 % RH	
	30 %	0.082 % RH	
	50 %	0.14 % RH	
	70 %	0.20 % RH	
	95 %	0.26 % RH	
PPMv	0.036 to 0.21	3.1 E-03	By primary realization in accordance to RISP-5
	0.22 to 1.4	1.6 E-02	
	1.5 to 5.8	5.4 E-02	
	5.9 to 34.4	0.24	
	34.5 to 204	0.97	
	205 to 2772	8.8	
	2773 to 12000	4.4	
PPBv	0.077 to 0.35	9.9 E-03	By primary realization in accordance to RISP-5
	0.36 to 3.32	7.8 E-2	
	3.33 to 52.5	0.92	
	52.6 to 770	9.7	

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty Note 3	Remarks
PRESSURE (20/T05)			
Pneumatic pressure devices	0.01 psia to 15 psia 15 psia to 30 psia 30 psia to 50 psia 50 psia to 150 psia 0.01 psi to 30 psi 30 psi to 50 psi 50 psi to 100 psi 100 psi to 150 psi 150 psi to 300 psi	0.0012 psi 0.0089% 0.0008 psi 0.0088% 0.012 psi 0.013 psi 0.016 psi 0.020 psi 0.033 psi	By comparison against a Mensor CPC 6050 By comparison against a Mensor CPC 6000
RESISTANCE THERMOMETRY (20/T07)			
Resistance to temperature devices	-196 °C -100 °C to -40.99 °C -40.98C to 0 °C 0.99 °C to 30.99 °C 31.00 °C to 80.99 °C 81.00 °C to 100 °C	0.014 °C 0.014 °C 0.013 °C 0.012 °C 0.014 °C 0.017 °C	By comparison against model 5626 SPRT in a liquid calibration bath.
LABORATORY THERMOMETERS, DIGITAL and ANALOG (20/T03)			
Digital and Analogue Temperature Measuring Equipment	-196 °C -100 °C to -40.99 °C -40.98C to 0 °C 0.99 °C to 30.99 °C 31.00 °C to 80.99 °C 81.00 °C to 100 °C	0.014 °C 0.014 °C 0.013 °C 0.012 °C 0.014 °C 0.017 °C	By comparison against model 5626 SPRT in a liquid calibration bath.
Air Temperature	-10 °C to 90 °C	0.08 °C	Using CGS-240 chamber
ELECTROMAGNETICS – DC/LOW FREQUENCY			
DC RESISTANCE AND CURRENT (20/E05)			
Fixed Resistors	5 Ω to 400 Ω	0.00016 Ω	By ratiometric comparison against a bank of fixed resistors.
END			

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Measured Parameter or Device Calibrated	Range	Expanded Uncertainty [Note 3]	Remarks

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.5 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: Intermediate CMC's for Relative Humidity (% RH) will not exceed the CMC of the humidity value below measured value.

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