



**National Voluntary  
Laboratory Accreditation Program**



**CALIBRATION LABORATORIES**

**NVLAP LAB CODE 2004080-0**

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

<p><b>Michigan Dept. of Agriculture &amp; Rural Dev, E.C. Heffron Metrology Laboratory</b> 940 Venture Lane Williamston, MI 48895 Mr. Craig A. VanBuren Phone: 517-655-8202 Fax: 517-655-8303 E-mail: vanburenc9@michigan.gov URL: www.michigan.gov/wminfo</p>	<p><b>Parameter(s) of Accreditation</b> Dimensional 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>DIMENSIONAL</b>			
<b>NVLAP Code: 20/D13 SURVEYING RODS AND TAPES</b>	0 ft to 6 ft	0.01 in	Tape to Tape Method
	0 ft to 30 ft	0.013 in	
	0 ft to 50 ft	0.016 in	
	0 ft to 100 ft	0.022 in	
<b>MECHANICAL</b>			
<b>NVLAP Code: 20/M06 FORCE</b>	$\leq 20\ 000$ lbf	18 lbf	Wheel Load Weighers
<b>NVLAP Code: 20/M08 MASS</b> Metric	30 kg	18 mg	Echelon I
	20 kg	9.9 mg	
	10 kg	1.1 mg	
	5 kg	0.42 mg	
	3 kg	0.38 mg	
	2 kg	0.24 mg	
	1 kg	0.064 mg	
	500 g	0.037 mg	
	300 g	0.026 mg	
	200 g	0.022 mg	
	100 g	0.023 mg	

2011-10-01 through 2012-09-30  
Effective dates

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	50 g	0.014 mg	Echelon I
	30 g	0.011 mg	
	20 g	9.6 µg	
	10 g	10 µg	
	5 g	5.6 µg	
	3 g	3.7 µg	
	2 g	3.0 µg	
	1 g	2.7 µg	
	500 mg	1.4 µg	
	300 mg	0.94 µg	
	200 mg	0.72 µg	
	100 mg	0.64 µg	
	50 mg	0.40 µg	
	30 mg	0.32 µg	
	20 mg	0.28 µg	
	10 mg	0.32 µg	
	5 mg	0.20 µg	
	3 mg	0.17 µg	
	2 mg	0.17 µg	
	1 mg	0.19 µg	
	30 kg	24 mg	Echelon II
	20 kg	17 mg	
	10 kg	3.1 mg	
	5 kg	1.7 mg	
	3 kg	1.2 mg	
	2 kg	0.62 mg	
	1 kg	0.20 mg	
	500 g	0.095 mg	
	300 g	0.051 mg	
	200 g	0.050 mg	
	100 g	0.033 mg	
	50 g	0.023 mg	
	30 g	0.017 mg	
	20 g	0.016 mg	
	10 g	0.012 mg	

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Measured Parameter or Device Calibrated	Range	Uncertainty ( $k=2$ ) <sup>Note 3</sup>	Remarks
	5 g	6.5 µg	Echelon II
	3 g	4.4 µg	
	2 g	3.7 µg	
	1 g	3.2 µg	
	500 mg	2.6 µg	
	300 mg	1.4 µg	
	200 mg	1.2 µg	
	100 mg	1.8 µg	
	50 mg	1.5 µg	
	30 mg	1.0 µg	
	20 mg	1.1 µg	
	10 mg	0.76 µg	
	5 mg	1.3 µg	
	3 mg	0.31 µg	
	2 mg	0.54 µg	
	1 mg	0.42 µg	
	Avoirdupois	50 lb	
25 lb		13 mg	
20 lb		3.0 mg	
10 lb		1.4 mg	
5 lb		1.0 mg	
3 lb		0.82 mg	
2 lb		0.20 mg	
1 lb		0.099 mg	
0.5 lb		0.063 mg	
0.3 lb		0.061 mg	
0.2 lb		0.040 mg	
0.1 lb		0.027 mg	
0.05 lb		0.019 mg	
0.03 lb		0.021 mg	
0.02 lb		0.014 mg	
0.01 lb		8.0 µg	
0.005 lb		4.9 µg	
0.003 lb	5.3 µg		
0.002 lb	4.0 µg		

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Measured Parameter or Device Calibrated	Range	Uncertainty ( $k=2$ ) <sup>Note 3</sup>	Remarks
	0.001 lb	3.0 µg	Echelon II
	0.0005 lb	1.5 µg	
	0.0003 lb	1.8 µg	
	0.0002 lb	2.0 µg	
	0.0001 lb	1.6 µg	
	0.00005 lb	1.0 µg	
	0.00003 lb	1.2 µg	
	0.00002 lb	0.80 µg	
	0.00001 lb	1.3 µg	
	0.000005 lb	0.30 µg	
	0.000003 lb	0.55 µg	
	0.000002 lb	0.41 µg	
	0.000001 lb	0.41 µg	
	8 oz	0.063 mg	
	4 oz	0.055 mg	
	2 oz	0.032 mg	
	1 oz	0.018 mg	
	1/2 oz	0.021 mg	
	1/4 oz	0.016 mg	
	1/8 oz	0.0061 mg	
1/16 oz	0.0044 mg		
1/32 oz	0.0041 mg		
Metric	500 kg	1.8 g	Echelon III
	250 kg	1.1 g	
	50 kg	0.30 g	
	25 kg	0.13 mg	
	20 kg	70 mg	
	10 kg	24 mg	
	5 kg	3.1 mg	
	3 kg	2.9 mg	
	2 kg	2.7 mg	
	1 kg	2.4 mg	
	500 g	2.7 mg	
	300 g	2.5 mg	
200 g	0.13 mg		

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Measured Parameter or Device Calibrated	Range	Uncertainty ( $k=2$ ) <sup>Note 3</sup>	Remarks
	100 g	0.058 mg	Echelon III
	50 g	0.044 mg	
	30 g	0.051 mg	
	20 g	0.032 mg	
	10 g	0.032 mg	
	5 g	0.029 mg	
	3 g	0.048 mg	
	2 g	0.040 mg	
	1 g	0.032 mg	
	500 mg	3.8 µg	
	300 mg	3.1 µg	
	200 mg	3.0 µg	
	100 mg	3.3 µg	
	50 mg	3.2 µg	
	30 mg	3.0 µg	
	20 mg	3.0 µg	
	10 mg	2.9 µg	
	5 mg	3.1 µg	
	3 mg	2.8 µg	
	2 mg	2.8 µg	
1 mg	2.8 µg		
Avoirdupois	5000 lb	70 g	Echelon III
	1000 lb	1.1 g	
	500 lb	1.1 g	
	100 lb	0.21 g	
	50 lb	58 mg	
	25 lb	27 mg	
	20 lb	23 mg	
	10 lb	2.3 mg	
	5 lb	2.6 mg	
	3 lb	2.5 mg	
	2 lb	2.2 mg	
	1 lb	2.0 mg	
	0.5 lb	1.8 mg	
	0.3 lb	0.073 mg	

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Measured Parameter or Device Calibrated	Range	Uncertainty ( $k=2$ ) <sup>Note 3</sup>	Remarks
	0.2 lb	0.072 mg	Echelon III
	0.1 lb	0.045 mg	
	0.05 lb	0.037 mg	
	0.03 lb	0.045 mg	
	0.02 lb	0.037 mg	
	0.01 lb	0.025 mg	
	0.005 lb	0.036 mg	
	0.003 lb	0.040 mg	
	0.002 lb	0.032 mg	
	0.001 lb	0.024 mg	
	8 oz	1.8 mg	
	4 oz	0.082 mg	
	2 oz	0.066 mg	
	1 oz	0.042 mg	
	1/2 oz	0.035 mg	
	1/4 oz	0.031 mg	
	1/8 oz	0.032 mg	
	1/16 oz	0.047 mg	
	1/32 oz	0.038 mg	
<b>NVLAP Code: 20/M12 VOLUME AND DENSITY</b>			
	2000 gal	92 in <sup>3</sup>	Volume Transfer
	1500 gal	67 in <sup>3</sup>	
	1000 gal	48 in <sup>3</sup>	
	750 gal	27 in <sup>3</sup>	
	500 gal	19 in <sup>3</sup>	
	100 gal	2.9 in <sup>3</sup>	
	50 gal	2.1 in <sup>3</sup>	
	5 gal	0.27 in <sup>3</sup>	
	25 gal	0.42 in <sup>3</sup>	
	15 gal	0.39 in <sup>3</sup>	
	5 gal	0.11 in <sup>3</sup>	
	1 gal	0.042 in <sup>3</sup>	
	1/2 gal	0.041 in <sup>3</sup>	
	1 qt	0.020 in <sup>3</sup>	

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Measured Parameter or Device Calibrated	Range	Uncertainty ( $k=2$ ) <sup>Note 3</sup>	Remarks
	1 pt 1/2 pt	0.015 in <sup>3</sup> 0.0048 in <sup>3</sup>	Volume Gravimetric
	30 gal 20 gal 15 gal 5 gal	0.79 in <sup>3</sup> 0.44 in <sup>3</sup> 0.35 in <sup>3</sup> 0.043 in <sup>3</sup>	Small Volume Prover
	2 liter 1 liter 100 mL	0.65 mL 0.35 mL 0.074 mL	Volume Gravimetric
<b>THERMODYNAMIC</b>			
<b>NVLAP Code: 20/T03 LABORATORY THERMOMETERS</b>	0 °C to 30 °C	0.031 °C	Liquid in glass
<b>NVLAP Code: 20/T07 RESISTANCE THERMOMETRY</b>	0 °C to 30 °C	0.014 °C	PRT, RTD
<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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