



**CALIBRATION LABORATORIES**

**NVLAP LAB CODE 200381-0**

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

<p><b>Arizona Department of Weights and Measures Metrology Laboratory</b> 4425 West Olive Avenue, Suite 134 Glendale, AZ 85302-3844 Mr. Brian Sellers Phone: 602-771-4938 Fax: 623-463-0440 E-mail: <a href="mailto:bsellers@azdwm.gov">bsellers@azdwm.gov</a> URL: <a href="http://www.azdwm.gov">http://www.azdwm.gov</a></p>	<p><b>Parameter(s) of Accreditation</b> Mechanical</p> <p>This laboratory is compliant to ANSI/NC SL 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>NVLAP Code: 20/M08 MASS Metric</p>	<p>500 kg 250 kg 30 kg 25 kg 20 kg 10 kg 5 kg 4 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</p>	<p>2.8 g 2.7 g 12 mg 11 mg 9.6 mg 2.1 mg 1.11 mg 0.78 mg 0.78 mg 0.62 mg 0.16 mg 89 µg 62 µg 50 µg 26 µg 17 µg 15 µg 14 µg 14 µg 4.0 µg 3.8 µg 3.7 µg 3.7 µg</p>	<p>Echelon II</p>

2012-10-01 through 2013-09-30

Effective dates

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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
Avoirdupois	500 mg	1.9 $\mu$ g	Echelon II
	300 mg	1.8 $\mu$ g	
	200 mg	1.8 $\mu$ g	
	100 mg	1.8 $\mu$ g	
	50 mg	1.2 $\mu$ g	
	30 mg	1.2 $\mu$ g	
	20 mg	1.2 $\mu$ g	
	10 mg	1.2 $\mu$ g	
	5 mg	1.2 $\mu$ g	
	3 mg	1.2 $\mu$ g	
	2 mg	1.2 $\mu$ g	
	1 mg	1.2 $\mu$ g	
	2500 lb	0.076 lb	
	2000 lb	0.075 lb	
	1000 lb	0.0060 lb	
	500 lb	0.0060 lb	
	50 lb	12 mg	
	30 lb	10.1 mg	
	25 lb	9.6 mg	
	20 lb	2.8 mg	
	10 lb	1.4 mg	
	5 lb	0.80 mg	
	4 lb	0.61 mg	
	3 lb	0.61 mg	
	2 lb	0.34 mg	
	1 lb	53 $\mu$ g	
	0.5 lb	40 $\mu$ g	
0.3 lb	41 $\mu$ g		
0.2 lb	18 $\mu$ g		
0.1 lb	16 $\mu$ g		
0.05 lb	14 $\mu$ g		
0.03 lb	14 $\mu$ g		
0.02 lb	13 $\mu$ g		
0.01 lb	3.0 $\mu$ g		
0.005 lb	2.4 $\mu$ g		
0.003 lb	2.3 $\mu$ g		

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Measured Parameter or Device Calibrated	Range	Uncertainty ( $k=2$ ) <small>Note 3</small>	Remarks
	0.002 lb	1.4 $\mu$ g	
	0.001 lb	1.2 $\mu$ g	
	8 oz	40 $\mu$ g	Echelon II
	4 oz	40 $\mu$ g	
	2 oz	16 $\mu$ g	
	1 oz	14 $\mu$ g	
	1/2 oz	14 $\mu$ g	
	1/4 oz	13 $\mu$ g	
	1/8 oz	2.7 $\mu$ g	
	1/16 oz	2.4 $\mu$ g	
	1/32 oz	1.4 $\mu$ g	
Metric	500 kg	5.1 g	
	250 kg	4.3 g	
	50 kg	0.18 g	
	25 kg	99 mg	
	20 kg	86 mg	
	10 kg	60 mg	
	5 kg	15 mg	
	4 kg	13 mg	
	3 kg	9.8 mg	
	2.5 kg	7.3 mg	
	2 kg	7.3 mg	
	1 kg	4.0 mg	
	524.20 g	3.4 mg	
	500 g	3.4 mg	
	464.08 g	3.2 mg	
	300 g	3.2 mg	
	250 g	2.9 mg	
	209.68 g	2.9 mg	
	200 g	0.16 mg	
	185.63 g	0.16 mg	
	104.84 g	0.15 mg	
	100 g	0.15 mg	
92.82 g	0.15 mg		
50 g	0.14 mg		

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Measured Parameter or Device Calibrated	Range	Uncertainty ( $k=2$ ) <small>Note 3</small>	Remarks
Avoirdupois	41.94 g	0.14 mg	Echelon III
	30 g	0.14 mg	
	25 g	0.14 mg	
	20.97 g	0.14 mg	
	20 g	0.14 mg	
	10 g	0.14 mg	
	5 g	46 µg	
	3 g	40 µg	
	2 g	34 µg	
	1 g	29 µg	
	500 mg	25 µg	
	300 mg	22 µg	
	200 mg	20 µg	
	100 mg	19 µg	
	50 mg	18 µg	
	30 mg	16 µg	
	20 mg	15 µg	
	10 mg	15 µg	
	5 mg	15 µg	
	3 mg	15 µg	
	2 mg	15 µg	
	1 mg	15 µg	
	5000 lb	0.11 lb	
	3000 lb	0.082 lb	
	2500 lb	0.11 lb	
	2000 lb	0.076 lb	
	1000 lb	0.010 lb	
	500 lb	0.009 lb	
	100 lb	0.16 g	
	50 lb	94 mg	
	30 lb	70 mg	
	25 lb	63 mg	
	20 lb	58 mg	
18 lb	53 mg		
15 lb	53 mg		
10 lb	13 mg		

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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
	5 lb	7.2 mg	
	4 lb	6.0 mg	
	3 lb	4.8 mg	
	2 lb	3.8 mg	
	1 lb	3.4 mg	
	0.5 lb	3.0 mg	
	0.3 lb	0.82 mg	
	0.2 lb	0.55 mg	
	0.1 lb	0.29 mg	
	0.05 lb	0.17 mg	
	0.03 lb	0.14 mg	
	0.02 lb	0.12 mg	
	0.01 lb	44 $\mu$ g	
	0.005 lb	34 $\mu$ g	
	0.003 lb	32 $\mu$ g	
	0.002 lb	29 $\mu$ g	
	0.001 lb	25 $\mu$ g	
	100 oz	23 mg	
	80 oz	23 mg	
	40 oz	15 mg	
	20 oz	11 mg	
	10 oz	7.7 mg	
	8 oz	3.0 mg	
	5 oz	6.7 mg	
	4 oz	0.14 mg	
	2 oz	0.14 mg	
	1 oz	0.14 mg	
	1/2 oz	0.14 mg	
	1/4 oz	0.13 mg	
	1/8 oz	40 $\mu$ g	
	1/16 oz	34 $\mu$ g	
	1/32 oz	29 $\mu$ g	
	0.5 oz	0.64 mg	
	0.2 oz	0.40 mg	
	0.1 oz	0.23 mg	
	0.05 oz	0.17 mg	

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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
Weight Carts	5000 lb	0.14 lb	Echelon III
	3000 lb	0.094 lb	
	2500 lb	0.12 lb	
	2000 lb	0.12 lb	
<b>NVLAP Code: 20/M12</b> <b>VOLUME and DENSITY</b> Volume	1044 gal	21 in <sup>3</sup>	Volume Transfer Method
	500 gal	12 in <sup>3</sup>	
	200 gal	8.0 in <sup>3</sup>	
	100 gal	4.8 in <sup>3</sup>	
	50 gal	2.8 in <sup>3</sup>	
	15 gal	3.8 in <sup>3</sup>	
	5 gal	0.37 in <sup>3</sup>	
	1 gal	0.39 in <sup>3</sup>	
	100 gal	5.9 in <sup>3</sup>	LPG Volume Transfer
	20 gal	2.3 in <sup>3</sup>	
	100 gal	0.93 in <sup>3</sup>	Volume Gravimetric
	50 gal	0.74 in <sup>3</sup>	
	15 gal	0.07 in <sup>3</sup>	
	5 gal	0.04 in <sup>3</sup>	
	1 gal	0.06 in <sup>3</sup>	
	20 gal	0.99 in <sup>3</sup>	SVP - Volume Gravimetric
<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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