



**National Voluntary  
Laboratory Accreditation Program**



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

**SWFLANT Metrology Laboratory Operated by Lockheed Martin**

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**CALIBRATION LABORATORIES**

**NVLAP LAB CODE 200403-0**

Revised Scope: 2011-06-23

*NVLAP Code:* 20/A01

ANSI/NCSL Z540-1-1994; Part 1

Compliant

**DIMENSIONAL**

*NVLAP Code:* 20/D03

Gage Blocks - Steel and Chrome Carbide <sup>note 4</sup>

<i>Range in inches</i>	<i>Best Uncertainty (±) in μinch</i> <sup>notes 1, 2</sup>	<i>Remarks</i>
0.01 to < 2.0	3.5	Mechanical Comparison
2.0 to < 3.0	4.7	Mechanical Comparison
3.0 to < 4.0	6.1	Mechanical Comparison
4.0 to < 5.0	6.6	Mechanical Comparison
5.0 to < 12.0	8.7	Mechanical Comparison
12.0 to < 20.0	15.9	Mechanical Comparison
20.0	18.3	Mechanical Comparison

*NVLAP Code:* 20/D07

Measuring Wires

<i>Range in inches</i>	<i>Best Uncertainty (±) in μinch</i> <sup>note 1</sup>	<i>Remarks</i>
0.007227 (80 TPI) to 0.14434 (4 TPI)	12.4	Universal Measuring Machine with Master Set Calibration

2011-04-01 through 2012-03-31

*Effective dates*

*Sally S. Bruce*

*For the National Institute of Standards and Technology*



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## CALIBRATION LABORATORIES

NVLAP LAB CODE 200403-0

Revised Scope: 2011-06-23

**NVLAP Code:** 20/D11

Spherical Diameter, Plug/Ring Gages

<b>Range in inches</b>	<b>Best Uncertainty (<math>\pm</math>) in <math>\mu</math>inch</b> <small>notes 1, 2</small>	<b>Remarks</b>
Ring Gages		
0.25 to < 2.0	12.0	Comparison to Gage Blocks
2.0 to < 11.0	25.0	Comparison to Gage Blocks
Plug Gages		
0.125 to < 0.250	6.6	Comparison to Gage Blocks
0.250 to < 0.500	7.5	Comparison to Gage Blocks
0.500 to < 3.000	11.3	Comparison to Gage Blocks
3.000 to < 6.000	12.6	Comparison to Gage Blocks
6.000 to < 11.000	21.9	Comparison to Gage Blocks

**NVLAP Code:** 20/D14

Threaded Plug and Ring Gages

Threaded Plug Gages, 60° Unified

<b>Range</b>	<b>Thread Size</b> <i>TPI</i>	<b>Best Uncertainty (<math>\pm</math>)</b> <small>notes 1, 2</small>	<b>Remarks</b>
Pitch Diameter	4 to < 24	43.7 $\mu$ in	Three Wire Method
Pitch Diameter	24 to < 48	44.4 $\mu$ in	Three Wire Method
Pitch Diameter	48 to 80	38.8 $\mu$ in	Three Wire Method
	<i>Diameter in inches</i>		
Major Diameter	0.073 to < 0.375	37.5 $\mu$ in	Universal Measuring Machine
Major Diameter	0.375 to < 0.625	39.7 $\mu$ in	Universal Measuring Machine
Major Diameter	0.625 to 1.000	42.1 $\mu$ in	Universal Measuring Machine

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Revised Scope: 2011-06-23

190 Ω	11	5720A
1 kΩ	9	5720A
1.9 kΩ	9	5720A
10 kΩ	9	5720A
19 kΩ	9	5720A
100 kΩ	12	5720A
190 kΩ	12	5720A
1 MΩ	21	5720A
1.9 MΩ	22	5720A
10 MΩ	41	5720A
19 MΩ	48	5720A
100 MΩ	110	5720A

DC Resistance-  
Measure

<b>Range</b>	<b>Best Uncertainty (±) in <math>\mu\Omega/\Omega</math><sup>note</sup></b>	<b>Remarks</b>
0.01 $\mu\Omega$ to < 2 Ω	18	8508A
0.1 $\mu\Omega$ to < 20 Ω	10	8508A
1 $\mu\Omega$ to < 200 Ω	8	8508A
10 $\mu\Omega$ to < 2 kΩ	8	8508A
0.1 mΩ to < 20 kΩ	8	8508A
1 mΩ to < 200 kΩ	8	8508A
10 mΩ to < 2 MΩ	10	8508A
0.1 Ω to < 20 MΩ	21	8508A
1 Ω to < 200 MΩ	120	8508A

**NVLAP Code:** 20/E05

DC Current-  
Generate

<b>Range (±)</b>	<b>Best Uncertainty (±) in <math>\mu A/A</math><sup>note 1</sup></b>	<b>Remarks</b>
9 $\mu A$ to 220 $\mu A$	69	5720A
220 $\mu A$ to 2.2 mA	39	5720A
2.2 mA to 22.0 mA	38	5720A
22.0 mA to 220 mA	60	5720A
220 mA to 2.2 A	137	5720A

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Revised Scope: 2011-06-23

2.2 A to 11 A  
DC Current-  
Measure

412

5720A/5725A

<b>Range (±)</b>	<b>Best Uncertainty (±) in <math>\mu\text{A/A}</math> <sup>note 1</sup></b>	<b>Remarks</b>
10 pA to < 200 $\mu\text{A}$	15	8508A
100 pA to < 2.0 mA	15	8508A
1 nA to < 20 mA	16	8508A
10 nA to < 200 mA	41	8508A
100 nA to < 2.0 A	182	8508A
1 $\mu\text{A}$ to < 20.0 A	409	8508A

**NVLAP Code:** 20/E06

DC Voltage –  
Generate

<b>Range (±)</b>	<b>Best Uncertainty (±) in <math>\mu\text{V/V}</math> <sup>note 1</sup></b>	<b>Remarks</b>
22 mV to 220 mV	9.6	5720A
0.22 V to 2.2 V	5.5	5720A
1.1 V to 11 V	3.9	5720A
2.2 V to 22 V	3.8	5720A
22 V to 220 V	5.4	5720A
110 V to 1100 V	7.1	5720A

DC Voltage –  
Measure

<b>Range (±)</b>	<b>Best Uncertainty (±) in <math>\mu\text{V/V}</math> <sup>note 1</sup></b>	<b>Remarks</b>
1 nV to < 200 mV	5.2	8508A
10 nV to < 2 V	3.3	8508A
100 nV to < 20 V	3.3	8508A
1 $\mu\text{V}$ to < 200 V	4.9	8508A
10 $\mu\text{V}$ to 1000 V	5.2	8508A

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Revised Scope: 2011-06-23

NVLAP Code: 20/E09

AC Voltage – Generate

Range	Best Uncertainty ( $\pm$ ) in $\mu\text{V/V}$								Remarks
	Frequency in Hz								
	10 to 20	20 to 40	40 to 20 k	20 k to 50 k	50 k to 100 k	100k to 30 k	300k to 500k	500k to 1M	
0.22 mV to 2.2 mV	2100	1900	2000	2100	2900	5800	11000	13000	5720A
2.2 mV to 22 mV	440	280	270	390	740	1600	2400	3700	5720A
22 mV to 220 mV	3100	130	120	240	550	1100	1600	3000	5720A
220 mV to 2.2 V	270	100	50	82	130	450	1200	1900	5720A
2.2 V to 22 V	270	99	49	82	120	310	1200	1700	5720A
22 V to 220 V	270	99	56	87	170	1000	5100	11000	5720A
220 V to 250 V		15 to 50							5720A
220 V to 1100 V			50 to 1k						
220 V to 750 V				30 k to 50 k	50 k to 100 k				5720A/ 5725A
220 V to 1100 V			40 to 1 k	1 k to 20 k	20 k to 30 k				5720A/ 5725A

AC Voltage – Measure

Range	Best Uncertainty ( $\pm$ ) in $\mu\text{V/V}$									Remarks
	Frequency in Hz									
	1 to 10	10 to 40	40 to 100	100 to 2k	2 k to 10 k	10 k to 30 k	30 k to 100 k	100 k to 300 k	300 k to 1 M	
2 mV to < 200 mV	240	160	140	120	130	360	830			8508A
20 mV to < 2 V	210	120	97	77	97	230	620	4100	21000	8508A
200 mV to < 20 V	210	120	97	77	97	230	620	4100	21000	8508A

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Revised Scope: 2011-06-23

2 V to < 200 V	210	120	97	77	97	230	620	4100	8508A
10 V to 1050 V	310	170	160	160	160	390	1100		

## TIME AND FREQUENCY

**NVLAP Code:** 20/F01  
Frequency Dissemination

<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>)<sup>note 1</sup></b>	<b>Remarks</b>
1 MHz, 5 MHz, 10 MHz	$5.0 \times 10^{-12}$	Comparison using FMAS System

**NVLAP Code:** 20/F02  
Time Dissemination

<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>)<sup>note 1</sup></b>	<b>Remarks</b>
N/A	1 $\mu$ sec	UTC(USNO) Transfer

## MECHANICAL

**NVLAP Code:** 20/M06  
Force

<b>Nominal Force in lbf</b>	<b>Best Uncertainty (<math>\pm</math>)<sup>note 1</sup> in % full scale (fs)</b>	<b>Remarks</b>
1000 to 10000	0.15	Proving Ring

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## CALIBRATION LABORATORIES

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Revised Scope: 2011-06-23

Force - Torque

Calibration of strain gage torque standards, increasing torque, non-adjustable, defined scale instruments

<i>Range in lbf-ft</i>	<i>Best Uncertainty (<math>\pm</math>)<sup>note 1</sup> in % full scale (fs)</i>	<i>Remarks</i>
100 to 1000	0.19	Moment arm and dead weights

*NVLAP Code:* 20/M08

Mass

<i>Range</i>	<i>Best Uncertainty (<math>\pm</math>) in mg<sup>note 1</sup></i>	<i>Remarks<sup>note 3</sup></i>
20 kg	50	Echelon III
10 kg	25	Echelon III
5 kg	12.5	Echelon III
2 kg	5	Echelon III
1 kg	3	Echelon III
500 g	3	Echelon III
200 g	1	Echelon III
100 g	0.6	Echelon III
50 g	0.4	Echelon III
30 g	0.35	Echelon III
20 g	0.3	Echelon III
10 g	0.2	Echelon III
5 g	0.15	Echelon III
3 g	0.11	Echelon III
2 g	0.10	Echelon III
1 g	0.07	Echelon III

Avoirdupois

<i>Range</i>	<i>Best Uncertainty (<math>\pm</math>) in mg<sup>note 1</sup></i>	<i>Remarks</i>
50 lb	105	Echelon III
30 lb	80	Echelon III

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25 lb	120	Echelon III
20 lb	50	Echelon III
10 lb	25	Echelon III
5 lb	15	Echelon III
3 lb	10	Echelon III
2 lb	7	Echelon III
1 lb	3	Echelon III
8 oz	4	Echelon III
4 oz	1	Echelon III
2 oz	0.5	Echelon III
1 oz	0.35	Echelon III
1/2 oz	0.30	Echelon III
1/4 oz	0.18	Echelon III
1/8 oz	0.12	Echelon III
1/16 oz	0.10	Echelon III

### Weight Hangers

5 lb	200	See note 3
2 lb	40	See note 3

## THERMODYNAMICS

**NVLAP Code:** 20/T03  
Laboratory Thermometers

<b>Nominal Temperature in °F</b>	<b>Best Uncertainty (<math>\pm</math>) in °F <sup>note 1</sup></b>	<b>Remarks</b>
32.0 to < 150.0	0.94	Bi-metallic

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Pressure Gage

<i>Range in psi</i>	<i>Best Uncertainty (±) in psi <sup>note 1</sup></i>	<i>Remarks</i>
10.0 to < 80.0	0.011	2465A-754
80.0 to 200.0	0.013	2465A-754
200 to < 600	0.043	PG7202 system with PC-7200-100 piston
600 to 1000	0.084	PG7202 system with PC-7200-100 piston
2000 to 7250	0.411	PG7202 system with PC-7200-500 piston
200 to < 2000	0.11	PG7202 system with PC-7200-1 piston
2000 to < 5000	0.37	PG7202 system with PC-7200-1 piston
5000 to 10000	0.68	PG7202 system with PC-7200-1 piston

Pressure Absolute

<i>Range in inches Hg abs</i>	<i>Best Uncertainty (±) in inches Hg abs</i>	<i>Remarks</i>
0.5 to < 3.2	0.0016	2465A-754
3.2 to < 6.4	0.0008	2465A-754
6.4 to < 9.6	0.0009	2465A-754
9.6 to < 12.8	0.0010	2465A-754
12.8 to < 16.0	0.0014	2465A-754
16.0 to < 19.2	0.0018	2465A-754
19.2 to < 22.4	0.0014	2465A-754
22.4 to < 25.6	0.0014	2465A-754
25.6 to < 28.8	0.0017	2465A-754
28.8 to < 32.0	0.0013	2465A-754
32.0 to 35.0	0.0015	2465A-754

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*NVLAP Code:* 20/T07  
Resistance Thermometers

<i>Temperature Range in °C</i>	<i>Best Uncertainty (±) °C</i>	<i>Remarks</i>
0.0 to < 37.0	0.016	PRT and Temperature baths
37.0 to < 65.0	0.026	PRT and Temperature baths
65.0 to 107.0	0.025	PRT and Temperature baths
107.0 to < 148.0	0.025	PRT and Temperature baths
148.0 to 150.0	0.032	PRT and Temperature baths

- 
1. Represents an expanded uncertainty using a coverage factor,  $k = 2$ , at an approximate level of confidence of 95 %.
  2. L is length or diameter in inches.
  3. Double Substitution using ASTM Class 3 weights
  4. Chrome Carbide gage blocks to and including 4 inch. (0.01 to 4.0).

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