



**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

Scope Revised: 2008-11-25

NVLAP Code: 20/A01

ANSI/NCSL Z540-1-1994; Part 1

Compliant

DIMENSIONAL

NVLAP Code: 20/D03

Gage Blocks - Steel and Chrome Carbide

<i>Range in inches</i>	<i>Best Uncertainty (\pm) in μinch ^{notes 1, 2}</i>	<i>Remarks</i>
0.01 to <0.05	3.4	Mechanical Comparison
0.05 to <0.1	3.4	Mechanical Comparison
0.1 to <0.125	3.0	Mechanical Comparison
0.125 to <0.14	3.0	Mechanical Comparison
0.14 to <0.20	2.9	Mechanical Comparison
0.20 to <0.25	2.8	Mechanical Comparison
0.25 to <0.5	2.9	Mechanical Comparison
0.5 to <0.75	3.1	Mechanical Comparison
0.75 to <1.0	3.0	Mechanical Comparison
1.0	3.2	Mechanical Comparison
2.0	4.5	Mechanical Comparison
3.0	5.5	Mechanical Comparison
4.0	6.6	Mechanical Comparison
5.0 to <12.0	8.4	Mechanical Comparison
12.0 to <20.0	11.8	Mechanical Comparison

2008-04-01 through 2009-03-31

Effective dates

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20.0 18.3 Mechanical Comparison

NVLAP Code: 20/D07
Measuring Wires

Range in inches	Best Uncertainty (\pm) in μinch ^{note 1}	Remarks
0.007227 (80 TPI) to 0.14434 (4 TPI)	12.4	Universal Measuring Machine with Master Set Calibration

NVLAP Code: 20/D11
Spherical Diameter, Plug/Ring Gages

Range in inches	Best Uncertainty (\pm) in μinch ^{notes 1, 2}	Remarks
Ring Gages		
0.25 to <1.0	10.1	Comparison to Gage Blocks
1.0 to <6.0	10.1	Comparison to Gage Blocks
6.0 to <11.0	19.1	Comparison to Gage Blocks
Plug Gages		
0.125 to <0.250	6.6	Comparison to Gage Blocks
0.250 to <0.500	5.5	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	18.1	Comparison to Gage Blocks

NVLAP Code: 20/D14
Threaded Plug and Ring Gages

Threaded Plug Gages, 60° Unified

Range	Thread Size TPI	Best Uncertainty (\pm) ^{notes 1, 2}	Remarks
Pitch Diameter	4 to <11	42.7 μ in	Three Wire Method
Pitch Diameter	11 to <24	42.7 μ in	Three Wire Method

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Pitch Diameter	24 to <48	39.5 μin	Three Wire Method
Pitch Diameter	48 to <80	42.0 μin	Three Wire Method
	<i>Diameter in inches</i>		
Major Diameter	0.240 to <0.375	38.3 μin	Universal Measuring Machine
Major Diameter	0.375 to <0.625	38.3 μin	Universal Measuring Machine
Major Diameter	0.625 to <4.0	30.7 μin	Universal Measuring Machine
Major Diameter	4.0 to <5.0	32.2 μin	Universal Measuring Machine
Half Angle	60° (11 TPI)	3.1 arc minutes	Optical Comparator Inspection

Threaded Ring Gages, Solid, 60° Unified

Range	Thread Size TPI	Best Uncertainty (\pm)^{note 1}	Remarks
Pitch Diameter	5 to <10	80.9 μin	Universal Measuring Machine
Pitch Diameter	10 to <12	73.2 μin	Universal Measuring Machine
	<i>Diameter in inches</i>		
Minor Diameter	0.750 to <1.75	260 μin	Measured with Bore Micrometer
Minor Diameter	1.75 to <2.00	273 μin	Measured with Bore Micrometer
Range		Best Uncertainty (\pm)^{note 1}	Remarks
Half Angle	60° (11 TPI)	4.1 arc minutes	Optical Inspection of Thread Casting

ELECTROMAGNETICS - DC/LOW FREQUENCY

NVLAP Code: 20/E02
AC Current

Current	Best Uncertainty (\pm) in ppm^{note 1}					
	Frequency in Hertz					
	10	20	40	1 k	5 k	10 k
20 mA	152	115	71	73	90	87
200 mA	152	115	71	73	90	87
2 A			102	103	103	101

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NVLAP LAB CODE 200403-0
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10 A 168 211 211 234

NVLAP Code: 20/E05
DC Current

Range (\pm)	Best Uncertainty (\pm) in ppm ^{note 1}	Remarks
200 μ A	28	
2.0 mA	21	
20 mA	22	
200 mA	22	
2.0 A	50	
3.0 A	120	
5.0 A	120	
10.0 A	121	

DC Resistance

Range in ohms	Best Uncertainty (\pm) in ppm ^{note 1}	Remarks
1.0 M	12.0	Using 242D System
10.0 M	12.0	Using 242D System
100.0 M	17.5	Using 242D System
0.01	66	Using Measurements International Bridge Model 6242A
0.1	12.9	Using Measurements International Bridge Model 6242A
1.0	2.4	Using Measurements International Bridge Model 6242A
10.0	2.4	Using Measurements International Bridge Model 6242A
100.0	2.4	Using Measurements International Bridge Model 6242A
0.1 k	1.0	Using Measurements International Bridge Model 6242A
1.0 k	0.9	Using Measurements International Bridge Model 6242A
10.0 k	1.4	Using Measurements International Bridge Model 6242A

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100.0 k	3.6	Using Measurements International Bridge Model 6242A
1000.0 k	16.1	Using Measurements International Bridge Model 6242A

NVLAP Code: 20/E06
DC Voltage - Generation

<i>Range (±)</i>	<i>Best Uncertainty (±) in ppm^{note 1}</i>	<i>Remarks</i>
0.1 V	4.9	
0.2 V	2.0	
1.0 V	1.1	
2.0 V	1.2	
10.0 V	1.1	
20.0 V	1.8	
100.0 V	1.1	
200.0 V	1.8	
1000.0 V	1.7	

DC Voltage – Measurement

0.1 V	9.1
0.2 V	7.4
1.0 V	3.9
2.0 V	3.7
10.0 V	3.0
20.0 V	4.5
100.0 V	4.8
200.0 V	4.7
1000.0 V	4.8

NVLAP Code: 20/E09
LF AC Voltage

Best Uncertainty (±) in ppm^{note 1}
Frequency in Hertz

<i>Range</i>	<i>10</i>	<i>20</i>	<i>40</i>	<i>50</i>	<i>300</i>	<i>1 k</i>	<i>20 k</i>	<i>50 k</i>	<i>100 k</i>	<i>300 k</i>	<i>500 k</i>	<i>1 M</i>
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20 mV	104	83	78	78	78	188	303	407	579	517
200 mV	44	34	30	26	26	49	99	151	129	220
2 V	32	27	28	16	16	23	18	111	117	94
20 V	32	27	26	16	17	18	22	117	128	94
200 V	44	32	26	19	20	49	37			
300 V					30					
600 V							43	60		
1000 V			29	29	29	26	27	49		

TIME AND FREQUENCY

NVLAP Code: 20/F01
Frequency Dissemination

Range	Best Uncertainty (\pm) ^{note 1}	Remarks
1 MHz, 5 MHz, 10 MHz	5.0×10^{-12}	Comparison using FMAS System

NVLAP Code: 20/F02
Time Dissemination

Range	Best Uncertainty (\pm) ^{note 1}	Remarks
N/A	1 μ sec	UTC(USNO) Transfer

MECHANICAL

NVLAP Code: 20/M06
Force

Nominal Force in lbf	Best Uncertainty (\pm) ^{note 1} in % full scale (fs)	Remarks
50 to 500	0.46	Proving Rings
200 to 2000	0.11	Proving Rings
500 to 5000	0.078	Proving Rings
1000 to 10 000	0.088	Proving Rings
2500 to 25 000	0.071	Proving Rings
10 000 to 100 000	0.12	Proving Rings

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Force - Torque

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

<i>Range in lbf-ft</i>	<i>Best Uncertainty (±) ^{note 1} in % full scale (fs)</i>	<i>Remarks</i>
10 to 100	0.107	Moment arm and dead weights
100 to 6500	0.097	Moment arm and dead weights

NVLAP Code: 20/M08
Mass

<i>Range</i>	<i>Best Uncertainty (±) in mg ^{note 1}</i>	<i>Remarks ^{note 3}</i>
20 kg	27	Echelon III
10 kg	16	Echelon III
5 kg	17	Echelon III
100 g	0.32	Echelon III
50 g	0.20	Echelon III
10 g	0.058	Echelon III
1 g	0.018	Echelon III

THERMODYNAMICS

NVLAP Code: 20/T03
Laboratory Thermometers

<i>Nominal Temperature in °F</i>	<i>Best Uncertainty (±) in °F ^{note 1}</i>	<i>Remarks</i>
32.0 to <160.0	0.56	Liquid in Glass
32.0 to <160.0	0.84	Bi-metallic

NVLAP Code: 20/T05
Pressure Gage

<i>Nominal Force in psi</i>	<i>Best Uncertainty (±) ^{note 1}</i>	<i>Remarks</i>
10 to 70	234 ppm	Ruska 2465-781
80 to 100	150 ppm	Ruska 2465-781

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100 to 2000	184 ppm	Ruska 2481-70
2000 to 10 000	183 ppm	Ruska 2481-70

Pressure Absolute

<i>Nominal Pressure in inches of Hg</i>	<i>Best Uncertainty (±) inches of Hg^{note 1}</i>	<i>Remarks</i>
0.5	0.0022	Ruska 2565-781
3.2	0.0014	Ruska 2565-781
6.4	0.0016	Ruska 2565-781
9.6	0.0016	Ruska 2565-781
12.8	0.0020	Ruska 2565-781
16.0	0.0020	Ruska 2565-781
19.2	0.0020	Ruska 2565-781
22.4	0.0020	Ruska 2565-781
25.6	0.0018	Ruska 2565-781
28.8	0.0018	Ruska 2565-781
32.0	0.0016	Ruska 2565-781

NVLAP Code: 20/T07
Resistance Thermometers

<i>Temperature Range in °C</i>	<i>Best Uncertainty (±) °C</i>	<i>Remarks</i>
-40.0 to 150.0	0.094	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

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