National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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CALIBRATION LABORATORIES **NVLAP LAB CODE 105013-0**

NVLAP Code: 20/A01 ANSI/NCSL Z540-1-1994; Part 1 Compliant

DIMENSIONAL

NVLAP Code: 20/D05
Length Indicators- Comparison to Gage Blocks

Range in Inches	***Best Uncertainty (±) in uinches*** [note 1]
0.05 to 1	68
2	94
3	138
4	174
6	177
10	211

ELECTROMAGNETICS – DC LOW FREQUENCY

NVLAP Code: 20/E02
AC Current

	Best Uncertainty (±) in ppm [note 1] ***Frequency in Hertz***					
Range	***10 Hz***	***60 Hz***	***1 kHz***	***5 kHz***	***10 kHz***	***30 kHz***
100 µA	950	375	375	375	375	
1 mA		100	50	75	120	1250

2008-10-01 through 2009-09-30

Effective dates

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10 mA	75	75	125	125	1300
100 mA	70	70	90	70	1250
1 A	400	400	400	950	
10 A	150	150	1400		

NVLAP Code: 20/E05
DC Current – Generated

Range	***Best Uncertainty (±) in ppm*** [note 1]
100 µA	20
1 mA	20
10 mA	20
100 mA	20
1 A	100
10 A	150

NVLAP Code: 20/E05
DC Resistance

Range in ohms	***Best Uncertainty (±) in ppm*** [note 1]
1	125
10	20
100	15
1 k	10
10 k	10
100 k	10
1 M	10
10 M	20
100 M	125
1 G	1110

NVLAP Code: 20/E06
DC Voltage

Range in volts	***Best Uncertainty (±) in ppm*** [note 1]
10 mV	140
100 mV	16
1 V	7.2
10 V	8.0

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100 V	7.2
1000 V	6.5

NVLAP Code: 20/E09
LF AC Voltage

	Best Uncertainty (±) in ppm [note 1] ***Frequency in Hertz***					
Range	***10***	***60***	***1 k***	***5 k***	***10 k***	***30 k***
10 mV			410			
100 mV	60	60	75	60	75	125
1 V	75	65	55	55	70	150
10 V	150	125	125	125	150	225
100 V		110	110	115	120	175
1000 V		100	50	50	125	

MECHANICAL

NVLAP Code: 20/M08
Mass

Range	***Best Uncertainty (±)*** [notes 1, 2]	***Remarks***
50 kg	5.6 mg	Echelon I
30 kg	3.6 mg	Echelon I
25 kg	3.1 mg	Echelon I
20 kg	2.0 mg	Echelon I
10 kg	0.61 mg	Echelon I
5 kg	0.33 mg	Echelon I
3 kg	0.16 mg	Echelon I
2 kg	0.10 mg	Echelon I
1 kg	0.043 mg	Echelon I
500 g	0.027 mg	Echelon I
300 g	0.018 mg	Echelon I
200 g	0.012 mg	Echelon I
100 g	0.0069 mg	Echelon I
50 g	0.0055mg	Echelon I
30 g	0.004 mg	Echelon I

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20 g	0.0029 mg	Echelon I
10 g	0.0019 mg	Echelon I
5 g	0.0012 mg	Echelon I
3 g	0.00092 mg	Echelon I
2 g	0.00072 mg	Echelon I
1 g	0.00055 mg	Echelon I
500 mg	0.0005 mg	Echelon I
300 mg	0.00051 mg	Echelon I
200 mg	0.00046 mg	Echelon I
100 mg	0.00043 mg	Echelon I
50 mg	0.00039 mg	Echelon I
30 mg	0.00040 mg	Echelon I
20 mg	0.00036 mg	Echelon I
10 mg	0.00033 mg	Echelon I
5 mg	0.00036 mg	Echelon I
3 mg	0.00039 mg	Echelon I
2 mg	0.00035 mg	Echelon I
1 mg	0.00029 mg	Echelon I
1000 kg	10.3 g	Echelon III
500 kg	5.0 g	Echelon III
200 kg	3.3 g	Echelon III
100 kg	1.6 g	Echelon III
50 kg	0.087 g	Echelon III
30 kg	0.072 g	Echelon III
25 kg	0.066 g	Echelon III
20 kg	0.057 g	Echelon III
10 kg	0.024 g	Echelon III
5 kg	18 mg	Echelon III
3 kg	17 mg	Echelon III
2 kg	12 mg	Echelon III
1 kg	10 mg	Echelon III
500 g	10 mg	Echelon III
300 g	10 mg	Echelon III
3000 lb	17 g	Echelon III

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2500 lb	14 g	Echelon III
2000 lb	10 g	Echelon III
1000 lb	5.2 g	Echelon III
500 lb	3.8 g	Echelon III
100 lb	0.088 g	Echelon III
50 lb	0.054 g	Echelon III
30 lb	0.046 g	Echelon III
25 lb	0.035 g	Echelon III
20 lb	0.029 g	Echelon III
10 lb	0.018 g	Echelon III
5 lb	11 mg	Echelon III
3 lb	10 mg	Echelon III
2 lb	10 mg	Echelon III
1 lb	10 mg	Echelon III
0.5 lb	10 mg	Echelon III

Magnetic Susceptibility (χ) of mass standards or materials used to manufacture mass standards

Mass Range	*Best Uncertainty (±) in χ* [notes 1, 2]	*Remarks*
10 kg	0.000464	
5 kg	0.000375	
3 kg	0.000339	
2 kg	0.000316	
1 kg	0.000349	
500 g	0.000438	
300 g	0.000488	
200 g	0.000515	
100 g	0.000567	
50 g	0.000628	
30 g	0.000654	
20 g	0.000665	
10 g	0.000462	
5 g	0.000682	
3 g	0.000684	
2 g	0.000685	

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1 g	0.000986

NVLAP Code: 20/M12
Volume - Pipettes

Gravimetric method

Test Volume in µl [note 4]	***Best Uncertainty (±) in µl*** [notes 1, 3]	***Remarks***
0.1	0.03	
0.2	0.03	
0.5	0.03	
1.0	0.038	
2.5	0.047	
5.0	0.056	
10	0.12	
25	0.12	
50	0.26	
100	0.41	
200	0.44	
500	1.37	
1000	2.05	
2500	5.25	
5000	10	
10 000	20	

Spectrophotometric method

Test Volume in µl [note 4]	***Best Uncertainty (±) in µl*** [notes 1, 3]	***Remarks***
0.1	0.031	
0.2	0.026	
0.5	0.050	
1.0	0.078	
2.5	0.119	
5	0.251	
10	0.339	
25	0.39	

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50	1.87
100	2.60
500	13.12
1000	16.76
2500	23.08

Density in the Range of 2.69 g/cm^3 to 8.5 g/cm^3

Mass Range	*Best Uncertainty (±)* [note 1]	*Remarks*
5 kg	0.0056 g/cm^3	
3 kg	0.0041 g/cm^3	
2 kg	0.0034 g/cm^3	
1 kg	0.0014 g/cm^3	
500 g	0.0064 g/cm^3	
300 g	0.0075 g/cm^3	
200 g	0.0053 g/cm^3	
100 g	0.0031 g/cm^3	
50 g	0.0030 g/cm^3	
30 g	0.0067 g/cm^3	
20 g	0.0029 g/cm^3	
10 g	0.0065 g/cm^3	
5 g	0.0170 g/cm^3	
3 g	0.0148 g/cm^3	
2 g	0.0127 g/cm^3	
1 g	0.0156 g/cm^3	

THERMODYNAMIC

NVLAP Code: 20/T02
Humidity Generation

Range in %	*Best Uncertainty (±) in %* [note 1]	*Remarks*
10 to 95	0.7	Relative Humidity

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NVLAP Code: 20/T05
Pressure

Range	***Best Uncertainty (±)*** [note 1]
Pneumatic Pressure using Piston Gauge (absolute mode) – Direct Pressure Comparison	
2.0 psia to 10.0 psia (13.8 kPa to 68.9 kPa)	30.5 ppm + 0.2 Pa
10.0 psia to 50.0 psia (68.9 kPa to 345.0 kPa)	19.3 ppm + 0.2 Pa
50.0 psia to 100.0 psia (345.0 kPa to 689.500 kPa)	46.1 ppm + 2.0 Pa
100 psia to 1000 psia (689.5 kPa to 6895.0 kPa)	22.5 ppm + 2.0 Pa
Pneumatic Pressure using Piston Gauge (Gauge Mode) – Direct Pressure Comparison	
2.0 psig to 10.0 psig (13.8 kPa to 68.9 kPa)	30.5 ppm + 0.2 Pa
10.0 psig to 50.0 psig (68.9 kPa to 345.0 kPa)	19.3 ppm + 0.2 Pa
50.0 psig to 100.0 psig (345.0 kPa to 689.500 kPa)	46.1 ppm + 2.0 Pa
100 psig to 1000 psig (689.5 kPa to 6895.0 kPa)	22.5 ppm + 2.0 Pa
Pneumatic Effective Area using Piston Gauge- Direct Pressure Comparison	
2 psi to 50 psi (13.8 kPa to 344.7 kPa)	16.4 ppm + 0.2 Pa
100 psi to 1000 psi (689.5 kPa to 6895 kPa)	25.8 ppm + 2.0 Pa
Pneumatic Pressure using Pressure Calibrator (absolute Mode) – Direct Pressure Comparison	
1.0 psia to 4.0 (6.8 kPa to 28.0 kPa)	20.0×10^{-5}
4.0 psia to 50.0 psia (28.0 kPa to 345.0 kPa)	6.2×10^{-5}
50.0 psia to 1000.0 psia (345.0 kPa to 6895.0 kPa)	5.5×10^{-5}
Pneumatic Pressure using Pressure Calibrator (Gauge Mode) – Direct Comparison	
0.0 psig to 50.0 psig (0.0 kPa to 345.0 kPa)	6.2×10^{-5}
50.0 psig to 1000.0 psig (345.0 kPa to 6895.0 kPa)	5.5×10^{-5}
Pneumatic Pressure using Precision Transducer	
100 to 200 psi (1000 psi range on PPC3)	273 ppm + 2.0 Pa
200 to 500 psi (1000 psi range on PPC3)	145 ppm + 2.0 Pa
500 to 1000 psi (1000 psi range on PPC3)	70 ppm + 2.0 Pa
1 to 10 psi (100 psi range on PPC3)	1381 ppm + 0.2 Pa
10 to 50 psi (100 psi range on PPC3)	126 ppm + 0.2 Pa
50 to 100 psi (100 psi range on PPC3)	58 ppm + 2.0 Pa

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NVLAP Code: 20/T07
Digital Thermometry Indicators

Readout devices that actually measure resistance

Range	*Best Uncertainty (±)* [note 1]	*Remarks*
10 Ω	8 ppm	Resistance Function
25 Ω	2 ppm	Resistance Function
100 Ω	2 ppm	Resistance Function
300 Ω	2 ppm	Resistance Function
10 000 Ω	10 ppm	Resistance Function
1 Ω to 400 Ω	8 ppm	Resistance Function
400 Ω to 10 000 Ω	26 ppm	Resistance Function

Digital Thermometer with PRT System

-196 °C	8 mk	Comparison Method
-40 °C to 0.0 °C	8 mk	Comparison Method
0.05 °C to 95 °C	8 mk	Comparison Method
90 °C to 156 °C	10 mk	Comparison Method
156 °C to 250 °C	16 mk	Comparison Method
250 °C to 420 °C	20 mk	Comparison Method
420 °C to 550 °C	21 mk	Comparison Method

NVLAP Code: 20/T07
Resistance Thermometry

Range in °C	*Best Uncertainty (±) in mk* [note 1]	*Remarks*
-196	8	Comparison Method
-40 to 0.0	8	Comparison Method
-0.5 to 95	8	Comparison Method
95 to 156	10	Comparison Method
156 to 250	16	Comparison Method
250 to 420	20	Comparison Method
420 to 660	21	Comparison Method

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-40 to 0	8	Thermistors
0 to 95	8	Thermistors
95 to 150	10	Thermistors

NVLAP Code: 20/T08
Thermocouple Indicator

Range in mV	***Best Uncertainty (±) in ppm*** [note 1]
-100	42
-10	231
-1	1922
1	1778
10	222
100	41

1. Represents an expanded uncertainty using a coverage factor, k = 2, at an approximate level of confidence of 95 %.
2. Approximate value. Actual value determined by the test statistics.
3. Uncertainties at specified test volumes may be greater depending on the range of the unit under test.
4. It is recommended that adjustable volume pipettes not be used below 10 % of capacity.

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