



**National Voluntary  
Laboratory Accreditation Program**



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

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**CALIBRATION LABORATORIES**

**NVLAP LAB CODE 200866-0**  
Scope Revised: 2011-07-06

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

**DIMENSIONAL**

*NVLAP Code:* 20/D05  
Length and Diameter  
Micrometers and Calipers

<i>Range</i> (0 to 12) in	<i>Best Uncertainty</i> ( $\pm$ ) <sup>note 1, 2</sup> (3 + 23L) $\mu$ in	<i>Remarks</i> Comparison to Gage Blocks
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Anvil Flatness

<i>Range</i> 0 to 1 in	<i>Best Uncertainty</i> ( $\pm$ ) <sup>note 1, 2</sup> 6.4 $\mu$ in	<i>Remarks</i> Optical Flats
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Dial and Digital Indicators

<i>Range</i> (0 to 4) in	<i>Best Uncertainty</i> ( $\pm$ ) <sup>note 1, 2</sup> (5 + 14L) $\mu$ in	<i>Remarks</i> Comparison to Gage Blocks
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Distance Measuring Equipment

<i>Range</i> (0 to 99,999) ft.	<i>Best Uncertainty</i> ( $\pm$ ) <sup>note 1</sup> 0.0005L	<i>Remarks</i> Cylindrical Square w/Counter L value is in feet
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2011-04-01 through 2012-03-31

*Effective dates*

*For the National Institute of Standards and Technology*



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## CALIBRATION LABORATORIES

NVLAP LAB CODE 200866-0

Scope Revised: 2011-07-06

### ELECTROMAGNETICS – DC/LOW FREQUENCY

NVLAP Code: 20/E02

AC Current

AC Current – Measuring Equipment

Range	Frequency Range	Best Uncertainty ( $\pm$ ) <sup>note 1, 2</sup>	Remarks
(11 to 20) A	(1 to 5) kHz	2.3% + 5 mA	Fluke 5520A
(11 to 20) A	(45 to 1000) Hz	0.095% + 2 mA	Fluke 5520A
(2.2 to 11) A	(5 to 10) kHz	0.36 % + 750 $\mu$ A	Fluke 5700A–EP/5725A
	(1 to 5) kHz	0.097 % + 380 $\mu$ A	Fluke 5700A –EP/5725A
	(0.04 to 1) kHz	0.05 % + 170 $\mu$ A	Fluke 5700A –EP/5725A
(0.22 to 2.2) A	(5 to 10) kHz	0.7 % + 160 $\mu$ A	Fluke 5700A –EP/5725A
	(1 to 5) kHz	0.046 % + 80 $\mu$ A	Fluke 5700A –EP/5725A
	(0.02 to 1) kHz	0.027 % + 35 $\mu$ A	Fluke 5700A –EP/5725A
(22 to 220) mA	(5 to 10) kHz	0.11 % + 10 $\mu$ A	Fluke 5700A-EP
	(1 to 5) kHz	0.021 % + 3.5 $\mu$ A	Fluke 5700A-EP
	(0.04 to 1) kHz	0.014 % + 2.5 $\mu$ A	Fluke 5700A-EP
	(20 to 40) Hz	0.018 % + 3.5 $\mu$ A	Fluke 5700A-EP
	(10 to 20) Hz	0.033 % + 4 $\mu$ A	Fluke 5700A-EP
(2.2 to 22) mA	(5 to 10) kHz	0.16 % + 10 $\mu$ A	Fluke 5700A-EP
	(1 to 5) kHz	0.07 % + 5 $\mu$ A	Fluke 5700A-EP
	(0.04 to 1) kHz	0.025 % + 400 nA	Fluke 5700A-EP
	(20 to 40) Hz	0.041 % + 400 nA	Fluke 5700A-EP
	(10 to 20) Hz	0.039 % + 400 nA	Fluke 5700A-EP
(0.22 to 2.2) mA	(5 to 10) kHz	0.11 % + 650 nA	Fluke 5700A-EP
	(1 to 5) kHz	0.021 % + 110 nA	Fluke 5700A-EP
	(0.04 to 1) kHz	0.013 % + 35 nA	Fluke 5700A-EP
	(20 to 40) Hz	0.018 % + 35 nA	Fluke 5700A-EP
	(10 to 20) Hz	0.03 % + 40 nA	Fluke 5700A-EP

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(0 to 220) $\mu$ A	(5 to 10) kHz	0.11 % + 65 nA	Fluke 5700A-EP
	(1 to 5) kHz	0.03 % + 12 nA	Fluke 5700A-EP
	(0.04 to 1) kHz	0.015 % + 8 nA	Fluke 5700A-EP
	(20 to 40) Hz	0.019 % + 10 nA	Fluke 5700A-EP

### Extended Frequency Ranges for AC Current Measuring Equipment

(29 to 329.99) $\mu$ A	(10 to 30) kHz	0.31% + 0.16 mA	Fluke 5520A
(0.33 to 3.299) mA	(10 to 30) kHz	0.31% + 3 $\mu$ A	Fluke 5520A
(3.3 to 32.99) mA	(10 to 30) kHz	0.78% + 0.5 $\mu$ A	Fluke 5520A
(29 to 329.99) mA	(10 to 30) kHz	1.2 % + 3 $\mu$ A	Fluke 5520A

### Clamp-on Ammeter Toroidal Type

<b>Range</b>	<b>Frequency</b>	<b>Best Uncertainty (<math>\pm</math>)</b>	<b>Remarks</b>
(150 to 1000) A	(65 to 440) Hz	1.2 % + 0.22 A	Fluke 5500A/Coil w/5520A
(150 to 1000) A	(45 to 65) Hz	0.38 % + 0.12 A	Fluke 5500A/Coil w/5520A
(20 to 150) A	(65 to 440) Hz	0.95 % + 47 mA	Fluke 5500A/Coil w/5520A
(20 to 150) A	(45 to 65) Hz	0.34 % + 26 mA	Fluke 5500A/Coil w/5520A

### Clamp-on Ammeter Non-Toroidal Type

<b>Range</b>	<b>Frequency Range</b>	<b>Best Uncertainty (<math>\pm</math>)</b>	<b>Remarks</b>
(150 to 1000) A	(65 to 440) Hz	1.4 % + 0.92 A	Fluke 5500A/Coil w/5520A
(150 to 1000) A	(45 to 65) Hz	0.68 % + 0.9 A	Fluke 5500A/Coil w/5520A
(20 to 150) A	(65 to 440) Hz	1.2 % + 0.25 A	Fluke 5500A/Coil w/5520A
(20 to 150) A	(45 to 65) Hz	0.66 % + 0.25A	Fluke 5500A/Coil w/5520A

### AC Current – Measure

<b>Range</b>	<b>Frequency Range</b>	<b>Best Uncertainty (<math>\pm</math>) in % + A <sup>note 1, 2</sup></b>	<b>Remarks</b>
(0.1 to 1) A	(0.1 to 5) kHz	0.12 % + 200 $\mu$ A	Agilent 3458A Opt 002
	(45 to 100) Hz	0.097 % + 200 $\mu$ A	Agilent 3458A Opt 002
	(20 to 45) Hz	0.19 % + 200 $\mu$ A	Agilent 3458A Opt 002
	(10 to 20) Hz	0.46 % + 200 $\mu$ A	Agilent 3458A Opt 002

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(10 to 100) mA	(0.1 to 5) kHz	0.037 % + 20 $\mu$ A	Agilent 3458A Opt 002
	(45 to 100) Hz	0.07 % + 20 $\mu$ A	Agilent 3458A Opt 002
	(20 to 45) Hz	0.17 % + 20 $\mu$ A	Agilent 3458A Opt 002
	(10 to 20) Hz	0.46 % + 20 $\mu$ A	Agilent 3458A Opt 002
(1 to 10) mA	(0.1 to 5) kHz	0.038 % + 2 $\mu$ A	Agilent 3458A Opt 002
	(45 to 100) Hz	0.071 % + 2 $\mu$ A	Agilent 3458A Opt 002
	(20 to 45) Hz	0.17 % + 2 $\mu$ A	Agilent 3458A Opt 002
	(10 to 20) Hz	0.46 % + 2 $\mu$ A	Agilent 3458A Opt 002
(0.1 to 1) mA	(0.1 to 5) kHz	0.043 % + 200 nA	Agilent 3458A Opt 002
	(45 to 100) Hz	0.074 % + 200 nA	Agilent 3458A Opt 002
	(20 to 45) Hz	0.17 % + 200 nA	Agilent 3458A Opt 002
	(10 to 20) Hz	0.46 % + 200 nA	Agilent 3458A Opt 002
(0 to 100) $\mu$ A	(0.1 to 5) kHz	0.072 % + 30 nA	Agilent 3458A Opt 002
	(45 to 100) Hz	0.072 % + 30 nA	Agilent 3458A Opt 002
	(20 to 45) Hz	0.18 % + 30 nA	Agilent 3458A Opt 002
	(10 to 20) Hz	0.46 % + 30 nA	Agilent 3458A Opt 002

**NVLAP Code:** 20/E05

DC Current and Resistance

DC Current – Measuring Equipment

<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>)</b> <small>note 1, 2</small>	<b>Remarks</b>
(11 to 20) A	820 $\mu$ A/A + 750 $\mu$ A	Fluke 5520A
(2.2 to 11) A	410 $\mu$ A/A + 480 $\mu$ A	Fluke 5700A –EP/5725A
(0.22 to 2.2) A	84 $\mu$ A/A + 12 $\mu$ A	Fluke 5700A-EP
(22 to 220) mA	49 $\mu$ A/A + 0.7 $\mu$ A	Fluke 5700A-EP
(2.2 to 22) mA	36 $\mu$ A/A + 40 nA	Fluke 5700A-EP
(0.22 to 2.2) mA	36 $\mu$ A/A + 7 nA	Fluke 5700A-EP
(0 to 220) $\mu$ A	41 $\mu$ A/A + 6 nA	Fluke 5700A-EP

Clamp-on Ammeter Non-Toroidal Type

<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>)</b> <small>note 1, 2</small>	<b>Remarks</b>
(150 to 1000) A	0.52 % + 0.54 A	Fluke 5500A/Coil w/Fluke 5520A
(20 to 150) A	0.50% + 0.14 A	Fluke 5500A/Coil w/Fluke 5520A

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Scope Revised: 2011-07-06

### DC Current – Measure

<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>) <sup>note 1, 2</sup></b>	<b>Remarks</b>
(1 to 3) A	0.15% + 0.6 mA	HP 34401A
(0.1 to 1) A	130 $\mu$ A/A + 10 $\mu$ A	Agilent 3458A Opt. 002
(10 to 100) mA	44 $\mu$ A/A + 500 nA	Agilent 3458A Opt. 002
(1 to 10) mA	26 $\mu$ A/A + 50 nA	Agilent 3458A Opt. 002
(0.1 to 1) mA	26 $\mu$ A/A + 5 nA	Agilent 3458A Opt. 002
(0 to 100) $\mu$ A	26 $\mu$ A/A + 0.8 nA	Agilent 3458A Opt. 002

### DC Resistance – Measuring Equipment and Measure

<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>) <sup>note 1, 2</sup></b>	<b>Remarks</b>
(0.1 to 1) G $\Omega$	0.58 % + 10 k $\Omega$	Agilent 3458A Opt. 002
(10 to 100) M $\Omega$	0.059 % + 1 k $\Omega$	Agilent 3458A Opt. 002
(1 to 10) M $\Omega$	62 $\mu\Omega/\Omega$ + 100 $\Omega$	Agilent 3458A Opt. 002
(0.1 to 1) M $\Omega$	19 $\mu\Omega/\Omega$ + 2 $\Omega$	Agilent 3458A Opt. 002
(10 to 100) k $\Omega$	12 $\mu\Omega/\Omega$ + 50 m $\Omega$	Agilent 3458A Opt. 002
(1 to 10) k $\Omega$	12 $\mu\Omega/\Omega$ + 5 m $\Omega$	Agilent 3458A Opt. 002
(0.1 to 1) k $\Omega$	12 $\mu\Omega/\Omega$ + 0.5 m $\Omega$	Agilent 3458A Opt. 002
(10 to 100) $\Omega$	15 $\mu\Omega/\Omega$ + 0.5 m $\Omega$	Agilent 3458A Opt. 002
(0.01 to 10) $\Omega$	18 $\mu\Omega/\Omega$ + 50 $\mu\Omega$	Agilent 3458A Opt. 002

### DC Resistance – Measuring Equipment

<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>) <sup>note 1, 2</sup></b>	<b>Remarks</b>
(100 to 500) G $\Omega$	4.2 %	Biddle 72-6349
(10 to 100) G $\Omega$	1.2 %	Biddle 72-6349
(1 to 10) G $\Omega$	0.60 %	Biddle 72-6349

NVLAP Code: 20/E06

DC Voltage

DC Voltage – Measuring Equipment

<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>) <sup>note 1, 2</sup></b>	<b>Remarks</b>
(0.22 to 1.1) kV	6.9 $\mu$ V/V + 500 $\mu$ V	Fluke 5700A-EP5725A
(22 to 220) V	5.5 $\mu$ V/V + 40 $\mu$ V	Fluke 5700A-EP
(11 to 22) V	3.6 $\mu$ V/V + 4 $\mu$ V	Fluke 5700A-EP

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(2.2 to 11) V	3.6 $\mu\text{V/V} + 2.5 \mu\text{V}$	Fluke 5700A-EP
(0.22 to 2.2) V	5.1 $\mu\text{V/V} + 0.7 \mu\text{V}$	Fluke 5700A-EP
(0 to 220) mV	7.6 $\mu\text{V/V} + 0.4 \mu\text{V}$	Fluke 5700A-EP

### DC Voltage – Measure

<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>) <sup>note 1, 2</sup></b>	<b>Remarks</b>
(20 to 100) kV	0.09 %	Hipotronics KVM100-A
(2 to 20) kV	0.05 % + 4 V	Vitrek 4600A
(1 to 2) kV	0.05 % + 0.4 V	Vitrek 4600A
(0.8 to 1) kV	21 $\mu\text{V/V} + 100 \mu\text{V}$	Agilent 3458A Opt. 002
(500 to 800) V	16 $\mu\text{V/V} + 100 \mu\text{V}$	Agilent 3458A Opt. 002
(100 to 500) V	11 $\mu\text{V/V} + 100 \mu\text{V}$	Agilent 3458A Opt. 002
(10 to 100) V	7.6 $\mu\text{V/V} + 30 \mu\text{V}$	Agilent 3458A Opt. 002
(1 to 10) V	5.1 $\mu\text{V/V} + 0.5 \mu\text{V}$	Agilent 3458A Opt. 002
(0.1 to 1) V	5 $\mu\text{V/V} + 0.5 \mu\text{V}$	Agilent 3458A Opt. 002
(0 to 100) mV	7.1 $\mu\text{V/V} + 0.5 \mu\text{V}$	Agilent 3458A Opt. 002

NVLAP Code: 20/E09

LF AC Voltage

AC Voltage – Measuring Equipment

<b>Range</b>	<b>Frequency Range</b>	<b>Best Uncertainty (<math>\pm</math>) <sup>note 1, 2</sup></b>	<b>Remarks</b>
(0.22 to 1.1) kV	(20 to 30) kHz	0.061 % + 11 mV	Fluke 5700A-EP5725A
	(1 to 20) kHz	0.017 % + 6 mV	Fluke 5700A-EP5725A
	(0.04 to 1) kHz	0.011 % + 4 mV	Fluke 5700A-EP5725A
(220 to 750) V	(50 to 100) kHz	0.23 % + 45 mV	Fluke 5700A-EP5725A
	(30 to 50) kHz	0.06 % + 11 mV	Fluke 5700A-EP5725A
(22 to 220) V	(0.5 to 1) MHz	0.8 % + 40 mV	Fluke 5700A-EP
	(300 to 500) kHz	0.44 % + 40 mV	Fluke 5700A-EP
	(100 to 300) kHz	0.0085 % + 16 mV	Fluke 5700A-EP
	(50 to 100) kHz	0.016 % + 2.5 mV	Fluke 5700A-EP
	(20 to 50) kHz	0.0093 % + 1 mV	Fluke 5700A-EP
	(0.04 to 20) kHz	0.0056 % + 0.6 mV	Fluke 5700A-EP
	(20 to 40) Hz	0.01 % + 1.5 mV	Fluke 5700A-EP
(10 to 20) Hz	0.028 % + 4 mV	Fluke 5700A-EP	

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(2.2 to 22) V	(0.5 to 1) MHz	0.17 % + 3.2mV	Fluke 5700A-EP
	(300 to 500) kHz	0.1 % + 2 mV	Fluke 5700A-EP
	(100 to 300) kHz	0.03 % + 0.6 mV	Fluke 5700A-EP
	(50 to 100) kHz	0.011 % + 0.2 mV	Fluke 5700A-EP
	(20 to 50) kHz	0.0083 % + 0.1 mV	Fluke 5700A-EP
	(0.04 to 20) kHz	0.0049 % + 0.05 mV	Fluke 5700A-EP
	(20 to 40) Hz	0.012 % + 0.15 mV	Fluke 5700A-EP
	(10 to 20) Hz	0.028 % + 0.4 mV	Fluke 5700A-EP
(0.22 to 2.2) V	(0.5 to 1) MHz	0.18 % + 300 $\mu$ V	Fluke 5700A-EP
	(300 to 500) kHz	0.1 % + 200 $\mu$ V	Fluke 5700A-EP
	(100 to 300) kHz	0.043 % + 80 $\mu$ V	Fluke 5700A-EP
	(50 to 100) kHz	0.012 % + 30 $\mu$ V	Fluke 5700A-EP
	(20 to 50) kHz	0.0081 % + 10 $\mu$ V	Fluke 5700A-EP
	(0.04 to 20) kHz	0.0048 % + 8 $\mu$ V	Fluke 5700A-EP
	(20 to 40) Hz	0.01 % + 15 $\mu$ V	Fluke 5700A-EP
	(10 to 20) Hz	0.028 % + 40 $\mu$ V	Fluke 5700A-EP
(22 to 220) mV	(0.5 to 1) MHz	0.28 % + 45 $\mu$ V	Fluke 5700A-EP
	(300 to 500) kHz	0.14 % + 25 $\mu$ V	Fluke 5700A-EP
	(100 to 300) kHz	0.092 % + 20 $\mu$ V	Fluke 5700A-EP
	(50 to 100) kHz	0.047 % + 17 $\mu$ V	Fluke 5700A-EP
	(20 to 50) kHz	0.021 % + 7 $\mu$ V	Fluke 5700A-EP
	(0.04 to 20) kHz	0.083 % + 7 $\mu$ V	Fluke 5700A-EP
	(20 to 40) Hz	0.011 % + 7 $\mu$ V	Fluke 5700A-EP
	(10 to 20) Hz	0.028 % + 12 $\mu$ V	Fluke 5700A-EP
(2.2 to 22) mV	(0.5 to 1) MHz	0.30 % + 20 $\mu$ V	Fluke 5700A-EP
	(300 to 500) kHz	0.16 % + 20 $\mu$ V	Fluke 5700A-EP
	(100 to 300) kHz	0.12 % + 12 $\mu$ V	Fluke 5700A-EP
	(50 to 100) kHz	0.059 % + 5 $\mu$ V	Fluke 5700A-EP
	(20 to 50) kHz	0.031 % + 5 $\mu$ V	Fluke 5700A-EP
	(0.04 to 20) kHz	0.015 % + 4 $\mu$ V	Fluke 5700A-EP
	(20 to 40) Hz	0.031 % + 4 $\mu$ V	Fluke 5700A-EP
	(10 to 20) Hz	0.044 % + 4 $\mu$ V	Fluke 5700A-EP

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(0 to 2.2) mV	(0.5 to 1) MHz	0.58 % + 20 $\mu$ V	Fluke 5700A-EP
	(300 to 500) kHz	0.47 % + 20 $\mu$ V	Fluke 5700A-EP
	(100 to 300) kHz	0.33 % + 10 $\mu$ V	Fluke 5700A-EP
	(50 to 100) kHz	0.17 % + 5 $\mu$ V	Fluke 5700A-EP
	(20 to 50) kHz	0.12 % + 4.5 $\mu$ V	Fluke 5700A-EP
	(0.04 to 20) kHz	0.077% + 4 $\mu$ V	Fluke 5700A-EP
	(20 to 40) Hz	0.1 % + 4 $\mu$ V	Fluke 5700A-EP
	(10 to 20) Hz	0.16 % + 4 $\mu$ V	Fluke 5700A-EP

### AC Voltage – Measure

<b>Range</b>	<b>Frequency Range</b>	<b>Best Uncertainty (<math>\pm</math>)</b> <small>note 1, 2</small>	<b>Remarks</b>
(20 to 80) kV	60 Hz	1.0 %	Hipotronics KVM100-A
(2 to 20) kV	(20 to 100) Hz	0.25 % + 20 V	Vitrek 4600A
(0.7 to 2) kV	(100 to 400) Hz	0.47 % + 4 V	Vitrek 4600A
	(20 to 100) Hz	0.098% + 2 V	Vitrek 4600 A
(100 to 700) V	(50 to 100) kHz	0.035 % + 20 mV	Agilent 3458A Opt. 002
	(20 to 50) kHz	0.14 % + 20 mV	Agilent 3458A Opt. 002
	(1 to 20) kHz	0.071 % + 20 mV	Agilent 3458A Opt. 002
	(0.04 to 1) kHz	0.047 % + 20 mV	Agilent 3458A Opt. 002
	(1 to 40) Hz	0.047 % + 40 mV	Agilent 3458A Opt. 002
(10 to 100) V	(0.3 to 1) MHz	1.7 % + 10 mV	Agilent 3458A Opt. 002
	(100 to 300) kHz	0.46 % + 10 mV	Agilent 3458A Opt. 002
	(50 to 100) kHz	0.14 % + 2 mV	Agilent 3458A Opt. 002
	(20 to 50) kHz	0.041 % + 2 mV	Agilent 3458A Opt. 002
	(1 to 20) kHz	0.024 % + 2 mV	Agilent 3458A Opt. 002
	(0.04 to 1) kHz	0.024 % + 2 mV	Agilent 3458A Opt. 002
	(1 to 40) Hz	0.024 % + 4 mV	Agilent 3458A Opt. 002
(1 to 10) V	(1 to 2) MHz	1.4 % + 1 mV	Agilent 3458A Opt. 002
	(0.3 to 1) MHz	1.1 % + 1 mV	Agilent 3458A Opt. 002
	(100 to 300) kHz	0.35 % + 1 mV	Agilent 3458A Opt. 002
	(50 to 100) kHz	0.093 % + 200 $\mu$ V	Agilent 3458A Opt. 002
	(20 to 50) kHz	0.036 % + 200 $\mu$ V	Agilent 3458A Opt. 002
	(1 to 20) kHz	0.017 % + 200 $\mu$ V	Agilent 3458A Opt. 002

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	(0.04 to 1) kHz (1 to 40) Hz	0.0095 % + 200 $\mu$ V 0.0095 % + 400 $\mu$ V	Agilent 3458A Opt. 002 Agilent 3458A Opt. 002
(0.1 to 1) V	(1 to 2) MHz (0.3 to 1) MHz (100 to 300) kHz (50 to 100) kHz (20 to 50) kHz (1 to 20) kHz (0.04 to 1) kHz (1 to 40) Hz	1.7 % + 100 $\mu$ V 1.2 % + 100 $\mu$ V 0.35 % + 100 $\mu$ V 0.093 % + 20 $\mu$ V 0.036 % + 20 $\mu$ V 0.017 % + 20 $\mu$ V 0.0094 % + 20 $\mu$ V 0.0098 % + 40 $\mu$ V	Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002
(10 to 100) mV	(1 to 2) MHz (0.3 to 1) MHz (100 to 300) kHz (50 to 100) kHz (20 to 50) kHz (1 to 20) kHz (0.04 to 1) kHz (1 to 40) Hz	1.7 % + 10 $\mu$ V 1.1 % + 10 $\mu$ V 0.36 % + 10 $\mu$ V 0.093 % + 2 $\mu$ V 0.037 % + 2 $\mu$ V 0.017 % + 2 $\mu$ V 0.0094 % + 2 $\mu$ V 0.013 % + 4 $\mu$ V	Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002
(0 to 10) mV	(100 to 300) kHz (50 to 100) kHz (20 to 50) kHz (1 to 20) kHz (0.04 to 1) kHz (1 to 40) Hz	4.6 % + 2 $\mu$ V 0.59 % + 1 $\mu$ V 0.15 % + 1 $\mu$ V 0.038 % + 1 $\mu$ V 0.028 % + 1 $\mu$ V 0.039 % + 3 $\mu$ V	Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002 Agilent 3458A Opt. 002

**NVLAP Code:** 20/E10

LF Capacitance

Capacitance – Measuring Equipment

<b>Range</b>	<b>Frequency</b>	<b>Best Uncertainty (<math>\pm</math>)</b> <small>note 1, 2</small>	<b>Remarks</b>
(33 to 109.9999) mF	DC to 0.2 Hz	0.85 % + 78 $\mu$ F	Fluke 5520A
(11 to 32.9999) mF	DC to 0.6 Hz	0.58% + 23 $\mu$ F	Fluke 5520A
(33 to 10.9999) mF	DC to 2 Hz	0.35 % + 7.8 $\mu$ F	Fluke 5520A
(1.1 to 3.2999) mF	DC to 6 Hz	0.35 % + 2.3 $\mu$ F	Fluke 5520A

2011-04-01 through 2012-03-31

Effective dates

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# National Voluntary Laboratory Accreditation Program



## CALIBRATION LABORATORIES

NVLAP LAB CODE 200866-0

Scope Revised: 2011-07-06

(0.33 to 1.09999) mF	DC to 20 Hz	0.35 % + 0.78 $\mu$ F	Fluke 5520A
(110 to 329.999) $\mu$ F	DC to 50 Hz	0.35 % + 0.23 $\mu$ F	Fluke 5520A
(33 to 109.999) $\mu$ F	(10 to 80) Hz	0.35 % + 0.78 nF	Fluke 5520A
(11 to 32.9999) $\mu$ F	(10 to 120) Hz	0.32 % + 23 nF	Fluke 5520A
(3.3 to 10.9999) $\mu$ F	(10 to 150) Hz	0.2 % + 7.8 nF	Fluke 5520A
(1.1 to 3.29999) $\mu$ F	(10 to 300) Hz	0.21 % + 2.3 nF	Fluke 5520A
(0.33 to 1.0999) $\mu$ F	(10 to 600) Hz	0.21% + 0.78 nF	Fluke 5520A
(110 to 329.999) nF	(10 to 1000) Hz	0.21 % + 0.23 nF	Fluke 5520A
(33 to 109.9999) nF	(10 to 1000) Hz	0.21 % + 78 pF	Fluke 5520A
(11 to 32.9999) nF	(10 to 1000) Hz	0.21 % + 78 pF	Fluke 5520A
(3.3 to 10.9999) nF	(10 to 1000) Hz	0.21 % + 78 pF	Fluke 5520A
(1.1 to 3.2999) nF	(0.010 to 3) kHz	0.39 % + 7.8 pF	Fluke 5520A
(0.19 to 1.0999) nF	(0.010 to 10) kHz	0.39 % + 7.8 pF	Fluke 5520A

### NVLAP Code: 20/E15

Low Frequency Phase  
Measuring Equipment

Range	Frequency	Best Uncertainty ( $\pm$ ) <sup>note 1, 2, 4</sup>	Remarks
0° to 180°	(10 to 20) kHz	7.3°	Fluke 5520A
0° to 180°	(5 to 10) kHz	3.6°	Fluke 5520A
0° to 180°	(1 to 5) kHz	1.8°	Fluke 5520A
0° to 180°	(500 to 1000) Hz	0.37°	Fluke 5520A
0° to 180°	(65 to 500) Hz	0.2°	Fluke 5520A
0° to 180°	(10 to 65) Hz	0.1°	Fluke 5520A

### NVLAP Code: 20/E20

Oscilloscopes  
Sine Wave Flatness

Range	Best Uncertainty ( $\pm$ ) <sup>note 1, 2, 4</sup>	Remarks
(600 to 1100) MHz	5.1 % + 100 $\mu$ V	Fluke 5520A/SC1100
(300 to 600) MHz	4.1 % + 100 $\mu$ V	Fluke 5520A/SC1100

2011-04-01 through 2012-03-31

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## CALIBRATION LABORATORIES

NVLAP LAB CODE 200866-0

Scope Revised: 2011-07-06

(100 to 300) MHz	2.2 % + 100 μV	Fluke 5520A/SC1100
(0.05 to 100) MHz	1.7 % + 100 μV	Fluke 5520A/SC1100

Rise Time		
<b>Range</b>	<b>Best Uncertainty (±) <sup>note 1, 2</sup></b>	<b>Remarks</b>
≤ 300 ps	2.6%	Fluke 5520A/SC1100

## MECHANICAL

NVLAP Code: 20/M06

Force  
Torque – Measure

<b>Range</b>	<b>Best Uncertainty (±) <sup>note 1, 2</sup></b>	<b>Remarks</b>
5 in-lbf to 250 ft-lbf	1.0 %	C.D.I. 950-DT

Torque Screwdrivers – Measure

<b>Range</b>	<b>Best Uncertainty (±) <sup>note 1, 2</sup></b>	<b>Remarks</b>
5 in-lb to 50 in-lb	1.5%	C.D.I. 950-DT

NVLAP Code: 20/M08

Mass  
Mass – Scales and Balances

<b>Range</b>	<b>Best Uncertainty (±) <sup>note 1, 2</sup></b>	<b>Remarks</b>
2 kg	21 mg	ASTM Class 2 Mass Standards
1 kg	16 mg	ASTM Class 2 Mass Standards
500 g	12 mg	ASTM Class 2 Mass Standards
200 g	1.2 mg	ASTM Class 2 Mass Standards
100 g	1.2 mg	ASTM Class 2 Mass Standards
50 g	1.2 mg	ASTM Class 2 Mass Standards
20 g	1.2 mg	ASTM Class 2 Mass Standards
10 g	1.2 mg	ASTM Class 2 Mass Standards
5 g	1.2 mg	ASTM Class 2 Mass Standards
2 g	1.2 mg	ASTM Class 2 Mass Standards

2011-04-01 through 2012-03-31

Effective dates

For the National Institute of Standards and Technology



# National Voluntary Laboratory Accreditation Program



## CALIBRATION LABORATORIES

NVLAP LAB CODE 200866-0

Scope Revised: 2011-07-06

1 g	1.2 mg	ASTM Class 2 Mass Standards
500 mg	1.2 mg	ASTM Class 2 Mass Standards
200 mg	1.2 mg	ASTM Class 2 Mass Standards
100 mg	1.2 mg	ASTM Class 2 Mass Standards

Mass

<i>Range</i>	<i>Best Uncertainty</i> ( $\pm$ ) <sup>note 1</sup>	<i>Remarks</i>
20 kg	0.48 g	Echelon III
10 kg	0.26 g	Echelon III

Mass – Avoirdupois

<i>Range</i>	<i>Best Uncertainty</i> ( $\pm$ ) <sup>note 1</sup>	<i>Remarks</i>
50 lb	0.15 g	Echelon III
20 lb	0.10 g	Echelon III
10 lb	0.10 g	Echelon III

## THERMODYNAMIC

NVLAP Code: 20/T03  
Laboratory Thermometers

Temperature – Measure

<i>Range</i>	<i>Best Uncertainty</i> ( $\pm$ ) <sup>note 1, 2</sup>	<i>Remarks</i>
(-100 to 600) °C	0.018 °C	Hart 5626, 1560, 2560

Temperature – Measuring Equipment

<i>Range</i>	<i>Best Uncertainty</i> ( $\pm$ ) <sup>note 1, 2</sup>	<i>Remarks</i>
(300 to 600) °C	0.35 °C + 0.005 %	Hart 5626, 1560, 2560, 9122
(150 to 300) °C	0.12 °C	Hart 5626, 1560, 2560, 9122
(-20 to 150) °C	0.018 °C + 0.10 %	Hart 5626, 1560, 2560, 9122

2011-04-01 through 2012-03-31

Effective dates

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# National Voluntary Laboratory Accreditation Program



## CALIBRATION LABORATORIES

NVLAP LAB CODE 200866-0

Scope Revised: 2011-07-06

**NVLAP Code:** 20/T05

Pressure

Pressure – Gage

<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>)</b> <small>note 1, 2</small>	<b>Remarks</b>
(25 to 500) psi	0.0075 %	Ruska 7250xi Pressure Controller
(-15 to 25) psi	0.0016 psi	Ruska 7250xi Pressure Controller
(72 to 804) inH <sub>2</sub> O	0.0090 % + 0.00015 inH <sub>2</sub> O	DHI PPC4 Controller
(60 to 72) inH <sub>2</sub> O	0.0067 inH <sub>2</sub> O	DHI PPC4 Controller
(22 to 60) inH <sub>2</sub> O	0.0090 % + 0.0015 inH <sub>2</sub> O	DHI PPC4 Controller
(-22 to 22) inH <sub>2</sub> O	0.0022 inH <sub>2</sub> O	DHI PPC4 Controller
(500 to 15,000) psi	0.0084 %	Ametek T-150 Deadweight Tester

Pressure – Absolute

<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>)</b> <small>note 1, 2</small>	<b>Remarks</b>
(25 to 500) psia	0.0077 % + 0.001 psi	Ruska 7250xi Controller
(0 to 25) psia	0.0019 psia	Ruska 7250xi Controller

**NVLAP Code:** 20/T08

Thermocouple Devices

<b>Thermocouple Type</b>	<b>Range</b>	<b>Best Uncertainty (<math>\pm</math>)</b> <small>note 1, 2</small>	<b>Remarks</b>
Type B	(1550 to 1820) °C	0.35 °C	Fluke 5520A
	(1000 to 1550) °C	0.32 °C	Fluke 5520A
	(800 to 1000) °C	0.35 °C	Fluke 5520A
	(600 to 800) °C	0.45 °C	Fluke 5520A
Type E	(650 to 1000) °C	0.23 °C	Fluke 5520A
	(350 to 650) °C	0.19 °C	Fluke 5520A
	(-25 to 350) °C	0.17 °C	Fluke 5520A
	(-100 to -25) °C	0.19 °C	Fluke 5520A
	(-250 to -100) °C	0.51 °C	Fluke 5520A

2011-04-01 through 2012-03-31

Effective dates

For the National Institute of Standards and Technology



# National Voluntary Laboratory Accreditation Program



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Scope Revised: 2011-07-06

Type J	(760 to 1200) °C	0.25 °C	Fluke 5520A
	(150 to 760) °C	0.20 °C	Fluke 5520A
	(-30 to 150) °C	0.17 °C	Fluke 5520A
	(-100 to -30) °C	0.19 °C	Fluke 5520A
	(-210 to -100) °C	0.29 °C	Fluke 5520A
Type K	(1000 to 1372) °C	0.41 °C	Fluke 5520A
	(120 to 1000) °C	0.28 °C	Fluke 5520A
	(-25 to 120) °C	0.19 °C	Fluke 5520A
	(-100 to -25) °C	0.21 °C	Fluke 5520A
	(-200 to -100) °C	0.35 °C	Fluke 5520A
Type N	(410 to 1300) °C	0.29 °C	Fluke 5520A
	(120 to 410) °C	0.21 °C	Fluke 5520A
	(-25 to 120) °C	0.22 °C	Fluke 5520A
	(-100 to -25) °C	0.24 °C	Fluke 5520A
	(-200 to -100) °C	0.41 °C	Fluke 5520A
Type R	(1000 to 1767) °C	0.47 °C	Fluke 5520A
	(400 to 1000) °C	0.35 °C	Fluke 5520A
	(250 to 400) °C	0.36 °C	Fluke 5520A
	(0 to 250) °C	0.58 °C	Fluke 5520A
Type S	(1400 to 1767) °C	0.47 °C	Fluke 5520A
	(1000 to 1400) °C	0.38 °C	Fluke 5520A
	(250 to 1000) °C	0.37 °C	Fluke 5520A
	(0 to 250) °C	0.48 °C	Fluke 5520A
Type T	(120 to 400) °C	0.17 °C	Fluke 5520A
	(0 to 120) °C	0.19 °C	Fluke 5520A
	(-150 to 0) °C	0.26 °C	Fluke 5520A
	(-250 to -150) °C	0.64 °C	Fluke 5520A

2011-04-01 through 2012-03-31

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**CALIBRATION LABORATORIES**

**NVLAP LAB CODE 200866-0**

Scope Revised: 2011-07-06

**TIME AND FREQUENCY**

*NVLAP Code:* 20/F01

Frequency Dissemination

Frequency Measuring Equipment

**Range**

10 MHz

**Best Uncertainty ( $\pm$ )** <sup>note 3</sup>

$5.8 \times 10^{-10}$

**Remarks**

Rubidium Frequency Standard

1. Represents an expanded uncertainty using a coverage factor,  $k=2$  at an approximate level of confidence of 95%.
2. Onsite calibration is available.
3. Uncertainty values of derivatives of 10 MHz will differ due resolution, noise, and gating errors.
4. Referenced to 50 kHz

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