



**National Voluntary
Laboratory Accreditation Program**



CALIBRATION LABORATORIES

NVLAP LAB CODE 200730-0

ELECTROMAGNETICS – DC/LOW FREQUENCY

NVLAP Code: 20/E02

AC Current

*Best Uncertainty (±) in % ^{note 1}
Frequency in Hz*

<i>Range</i>	<i>10 to 20</i>	<i>20 to 40 k</i>	<i>40 to 10 k</i>	<i>10 k to 30 k</i>
100 µA	0.02	0.01	0.009	0.014
200 µA	0.02	0.009	0.009	0.014
300 µA	0.02	0.01	0.007	0.013
1 mA	0.022	0.009	0.006	0.008
2 mA	0.02	0.009	0.005	0.007
10 mA	0.024	0.009	0.005	0.006
20 mA	0.025	0.009	0.005	0.007
50 mA	0.024	0.009	0.006	0.012
100 mA	0.024	0.009	0.005	0.008
200 mA	0.024	0.009	0.006	0.008
300 mA	0.024	0.009	0.006	0.012
1 A	0.024	0.009	0.007	0.012
2 A	0.024	0.009	0.006	0.012
3 A	0.027	0.01	0.008	0.016
5 A	0.027	0.01	0.008	0.02
10 A	0.049	0.042	0.042	0.044
20 A	0.11	0.11	0.11	0.11

AC Current ^{note 2}

Measuring Equipment and Measure

*Best Uncertainty (±) in % + A ^{note 1}
Frequency in Hz*

<i>Range</i>	<i>10 to 20</i>	<i>20 to 45</i>	<i>45 to 100</i>	<i>100 to 5 k</i>
(0 to 100) µA	0.46 + 30 n	0.18 + 30 n	0.08 + 30 n	0.08 + 30 n
(0.1 to 1) mA	0.46 + 200 n	0.18 + 200 n	0.07 + 200 n	0.07 + 200 n
(1 to 10) mA	0.46 + 2 µ	0.17 + 2 µ	0.07 + 2 µ	0.04 + 2 µ
(10 to 100) mA	0.46 + 20 µ	0.18 + 20 µ	0.69 + 20 µ	0.35 + 20 µ
(100 to 1000) mA	0.46 + 200 µ	0.19 + 200 µ	0.1 + 200 µ	0.12 + 200 µ

2009-01-01 through 2009-12-31

Effective dates

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NVLAP Code: 20/E05

DC Resistance

Measuring Equipment and Measure

Range	Best Uncertainty (\pm)^{note 1}	Remarks
0 Ω to 0.1 m Ω	1.4 n Ω	Standard Resistors w/Low Thermal Switch
0.1 m Ω to 1 m Ω	7.1 n Ω	Standard Resistors w/Low Thermal Switch
1 m Ω to 10 m Ω	5.4 ppm	Standard Resistors w/Low Thermal Switch
10 m Ω to 100 m Ω	8.2 ppm	Standard Resistors w/Low Thermal Switch
0.1 Ω to 1 Ω	0.36 ppm	Standard Resistors w/Low Thermal Switch
1 Ω to 10 Ω	0.5 ppm	Standard Resistors w/Guildline 9975 Bridge
10 Ω to 100 Ω	0.84 ppm	Standard Resistors w/Guildline 9975 Bridge
100 Ω to 1 k Ω	0.42 ppm	Standard Resistors w/Guildline 9975 Bridge
1 k Ω to 10 k Ω	0.31 ppm	Standard Resistors w/Guildline 9975 Bridge
19 k Ω	0.78 ppm	Standard Resistors w/Fluke 8508A in transfer mode
100 k Ω	2.9 ppm	Standard Resistors w/Fluke 8508A in transfer mode
190 k Ω	2.8 ppm	Standard Resistors w/Fluke 8508A in transfer mode
1 M Ω	3.8 ppm	Standard Resistors w/Fluke 8508A in transfer mode
1.9 M Ω	5.1 ppm	Standard Resistors w/Fluke 8508A in transfer mode
10 M Ω Source	4.4 ppm	Standard Resistors w/Fluke 8508A in transfer mode
10 M Ω Measure	5.0 ppm	Standard Resistors w/Fluke 8508A in transfer mode
19 M Ω Measure	8.3 ppm	Standard Resistors w/Fluke 8508A in transfer mode
100 M Ω	13 ppm	Standard Resistors w/Fluke 8508A in transfer mode
1 G Ω Source	63 ppm	Standard Resistors w/Fluke 8508A in transfer mode
1 G Ω Measure	200 ppm	Standard Resistors w/Fluke 8508A in transfer Mode

Resistance Ratio

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1 Ω to 1 k Ω	0.33 ppm	Guidline 9975 Bridge
Measuring Equipment and Measure ^{note 2}		
10 m Ω to 10 Ω	19 ppm + 0.05 m Ω	HP3458A w/Decade Resistor
10 Ω to 1 k Ω	15 ppm + 0.5 m Ω	HP3458A w/Decade Resistor
1 k Ω to 10 k Ω	12 ppm + 5 m Ω	HP3458A w/Decade Resistor
10 k Ω to 100 k Ω	14 ppm + 50 m Ω	HP3458A w/Decade Resistor
100 k Ω to 1 M Ω	23 ppm + 2 Ω	HP3458A w/Decade Resistor
1 M Ω to 10 M Ω	73 ppm + 50 Ω	HP3458A w/Decade Resistor
10 M Ω to 100 M Ω	630 ppm + 1 k Ω	HP3458A w/Decade Resistor
100 M Ω to 1 G Ω	0.6 % + 10 k Ω	HP3458A w/Decade Resistor

Measuring Equipment ^{note 2}		
10 G Ω to 100 G Ω	1.16 %	Biddle Mega Dek

DC Current
Measuring Equipment and Measure

Range	Best Uncertainty (\pm) ^{note 1}	Remarks
0 A to 100 μ A	4 ppm + 230 pA	Standard Shunts w/current source
100 μ A to 1 mA	3.1 ppm + 1.2 nA	Standard Shunts w/current source
1 mA to 10 mA	3.2 ppm + 12 nA	Standard Shunts w/current source
10 mA to 100 mA	3.2 ppm + 115 nA	Standard Shunts w/current source
100 mA to 1 A	8.8 ppm + 1.4 μ A	Standard Shunts w/current source
1 A to 10 A	8.8 ppm + 12 μ A	Standard Shunts w/current source
10 A to 100 A	160 ppm + 7 mA	Standard Shunts w/current source

DC Current ^{note 2}		
Measuring Equipment and Measure		
0 μ A to 100 μ A	26 ppm + 0.8 nA	HP3458A w/current source
100 μ A to 1 mA	26 ppm + 5 nA	HP3458A w/current source
1 mA to 10 mA	26 ppm + 50 nA	HP3458A w/current source
10 mA to 100 mA	42 ppm + 0.5 μ A	HP3458A w/current source
100 mA to 1 A	0.013 % + 10 μ A	HP3458A w/current source
1 A to 20 A	0.12 %	Fluke 5520A w/current shunt

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800 V to 1000 V

21 ppm + 100 μV

3458A (002) w/5700A

NVLAP Code: 20/E09

AC Voltage

Frequency in Hz	Best Uncertainty (±) in % ^{note 1}			Remarks
	6 mV	10 mV	20 mV	
10	0.19	0.03	0.03	Fluke 792A
20	0.14	0.03	0.02	Fluke 792A
(40, 100)	0.14	0.03	0.014	Fluke 792A
(1, 10, 20) k	0.14	0.03	0.014	Fluke 792A
50 k	0.14	0.05	0.03	Fluke 792A
100 k	0.17	0.07	0.02	Fluke 792A
300 k	0.22	0.12	0.014	Fluke 792A
500 k	0.40	0.15	0.014	Fluke 792A
1 M	0.45	0.15	0.13	Fluke 792A
220 mV Range				
	20 mV	60 mV	200 mV	
10	0.04	0.035	0.02	Fluke 792A
20	0.03	0.021	0.008	Fluke 792A
(40, 100)	0.02	0.017	0.004	Fluke 792A
(1, 10, 20) k	0.02	0.017	0.004	Fluke 792A
50 k	0.03	0.021	0.01	Fluke 792A
100 k	0.05	0.041	0.015	Fluke 792A
300 k	0.07	0.068	0.045	Fluke 792A
500 k	0.11	0.11	0.06	Fluke 792A
1 M	0.2	0.17	0.06	Fluke 792A
700 mV Range				
	200 mV	600 mV		
10	0.022	0.007		Fluke 792A
20	0.008	0.007		Fluke 792A
(40, 100)	0.005	0.003		Fluke 792A
(1, 10, 20) k	0.005	0.003		Fluke 792A

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50 k	0.01	0.005	Fluke 792A
100 k	0.02	0.006	Fluke 792A
300 k	0.05	0.014	Fluke 792A
500 k	0.06	0.043	Fluke 792A
1 M	0.06	0.06	Fluke 792A

2.2 V Range

	600 mV	1 V	2 V	
10	0.02	0.02	0.02	Fluke 792A
20	0.007	0.006	0.006	Fluke 792A
40	0.003	0.003	0.003	Fluke 792A
(0.1, 1, 10, 20) k	0.003	0.004	0.0011	Fluke 792A
50 k	0.005	0.005	0.004	Fluke 792A
100 k	0.006	0.012	0.005	Fluke 792A
300 k	0.012	0.043	0.012	Fluke 792A
500 k	0.043	0.045	0.043	Fluke 792A
1 M	0.06	0.045	0.045	Fluke 792A

7 V Range

	2 V	6 V	
10	0.02	0.02	Fluke 792A
20	0.007	0.006	Fluke 792A
40	0.003	0.003	Fluke 792A
(0.01, 1, 10, 20) k	0.003	0.0011	Fluke 792A
50 k	0.005	0.004	Fluke 792A
100 k	0.006	0.005	Fluke 792A
300 k	0.012	0.012	Fluke 792A
500 k	0.044	0.043	Fluke 792A
1 M	0.05	0.046	Fluke 792A

22 V Range

	6 V	10 V	20 V	
10	0.02	0.02	0.02	Fluke 792A
20	0.007	0.006	0.006	Fluke 792A

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40	0.003	0.003	0.003	Fluke 792A
(0.1, 1, 10, 20) k	0.003	0.002	0.002	Fluke 792A
50 k	0.005	0.004	0.004	Fluke 792A
100 k	0.006	0.005	0.005	Fluke 792A
300 k	0.012	0.012	0.012	Fluke 792A
500 k	0.044	0.043	0.043	Fluke 792A
1 M	0.05	0.05	0.05	Fluke 792A

70 V Range

	20 V	60 V	
10	0.02	0.02	Fluke 792A
20	0.007	0.006	Fluke 792A
40	0.003	0.003	Fluke 792A
(0.1, 1, 10, 20) k	0.003	0.002	Fluke 792A
50 k	0.006	0.005	Fluke 792A
100 k	0.007	0.007	Fluke 792A
300 k	0.013	0.013	Fluke 792A

220 V Range

	60 V	100 V	200 V	
10	0.02	0.02	0.02	Fluke 792A
20	0.007	0.007	0.006	Fluke 792A
(0.04, 0.1, 1, 10, 20) k	0.004	0.003	0.003	Fluke 792A
50 k	0.007	0.007	0.006	Fluke 792A
100 k	0.007	0.007	0.007	Fluke 792A
200 k	0.01	0.01	0.01	Fluke 792A

1000 V Range

	200 V	600 V	1000 V	
10	0.02			Fluke 792A
20	0.009			Fluke 792A
(0.04, 0.1, 1, 10, 20) k	0.004	0.004	0.003	Fluke 792A
50 k	0.007	0.007	0.006	Fluke 792A
100 k	0.007	0.008	0.007	Fluke 792A

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(5 to 80) kV @ 60 Hz

0.054

HV Divider
Comparison

AC Voltage – Measure ^{note 2}

Range	Frequency in Hz	Best Uncertainty (\pm) ^{note 1}	Remarks
(0 to 10) mV	1 to 40	0.06 % + 3 μ V	3458A
	40 to 1 k	0.05 % + 1 μ V	3458A
	1 k to 20 k	0.05 % + 1 μ V	3458A
	20 k to 50 k	0.12 % + 1 μ V	3458A
	50 k to 100 k	0.6 % + 1 μ V	3458A
	100 k to 300 k	4.6 % + 2 μ V	3458A
(10 to 100) mV	1 to 40	0.01 % + 4 μ V	3458A
	40 to 1 k	0.01 % + 2 μ V	3458A
	1 k to 20 k	0.018 % + 2 μ V	3458A
	20 k to 50 k	0.036 % + 2 μ V	3458A
	50 k to 100 k	0.1 % + 2 μ V	3458A
	100 k to 300 k	0.35 % + 10 μ V	3458A
(100 m to 1) V	300 k to 1 M	1.2 % + 10 μ V	3458A
	1 to 40	0.009 % + 40 μ V	3458A
	40 to 1 k	0.009 % + 20 μ V	3458A
	1 k to 20 k	0.017 % + 20 μ V	3458A
	20 k to 50 k	0.035 % + 20 μ V	3458A
	50 k to 100 k	0.09 % + 20 μ V	3458A
(1 to 10) V	100 k to 300 k	0.35 % + 100 μ V	3458A
	300 k to 1 M	1.2 % + 100 μ V	3458A
	1 to 40	0.009 % + 0.4 mV	3458A
	40 to 1 k	0.009 % + 0.2 mV	3458A
	1 k to 20 k	0.017 % + 0.2 mV	3458A
	20 k to 50 k	0.035 % + 0.2 mV	3458A
(10 to 100) V	50 k to 100 k	0.09 % + 0.2 mV	3458A
	100 k to 300 k	0.35 % + 1 mV	3458A
	300 k to 1 M	1.2 % + 1 mV	3458A
(10 to 100) V	1 to 40	0.025 % + 4 mV	3458A
	40 to 1 k	0.025 % + 2 mV	3458A

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	1 k to 20 k	0.025 % + 2 mV	3458A
	20 k to 50 k	0.04 % + 2 mV	3458A
	50 k to 100 k	0.14 % + 2 mV	3458A
	100 k to 300 k	0.5 % + 10 mV	3458A
	300 k to 1 M	1.8 % + 10 mV	3458A
(100 to 700) V	1 to 40	0.05 % + 40 mV	3458A
	40 to 1 k	0.05 % + 20 mV	3458A
	1 k to 20 k	0.07 % + 20 mV	3458A
	20 k to 50 k	0.14 % + 20 mV	3458A
	50 k to 100 k	0.35 % + 20 mV	3458A

AC Voltage ^{note 2}
Measuring Equipment

Range	Frequency in Hz	Best Uncertainty (\pm) ^{note 1}	Remarks
(0 to 2.2) mV	10 to 40	0.6 % + 5 μ V	5700A / 5725A
	40 to 50 k	0.15 % + 5 μ V	5700A / 5725A
	50 k to 100 k	0.1 % + 7 μ V	5700A / 5725A
	100 k to 300 k	0.13 % + 13 μ V	5700A / 5725A
	300 k to 500 k	0.2 % + 30 μ V	5700A / 5725A
	500 k to 1 M	0.4 % + 30 μ V	5700A / 5725A
(2.2 to 22) mV	10 to 20	0.08 % + 5 μ V	5700A / 5725A
	20 to 20 k	0.05 % + 5 μ V	5700A / 5725A
	20 k to 50 k	0.06 % + 5 μ V	5700A / 5725A
	50 k to 100 k	0.13 % + 7 μ V	5700A / 5725A
	100 k to 300 k	0.15 % + 12 μ V	5700A / 5725A
	300 k to 500 k	0.13 % + 25 μ V	5700A / 5725A
	500 k to 1 M	0.4 % + 25 μ V	5700A / 5725A
(22 to 220) mV	10 to 20	0.07 % + 13 μ V	5700A / 5725A
	20 to 40	0.03 % + 10 μ V	5700A / 5725A
	40 to 20 k	0.015 % + 10 μ V	5700A / 5725A
	20 k to 50 k	0.04 % + 8 μ V	5700A / 5725A
	50 k to 100 k	0.1 % + 25 μ V	5700A / 5725A
	100 k to 300 k	0.14 % + 25 μ V	5700A / 5725A
	300 k to 500 k	0.2 % + 35 μ V	5700A / 5725A

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	500 k to 1 M	0.34 % + 80 μ V	5700A / 5725A
(220 m to 2.2) V	10 to 20	0.06 % + 100 μ V	5700A / 5725A
	20 to 40	0.02 % + 25 μ V	5700A / 5725A
	40 to 20 k	0.01 % + 6 μ V	5700A / 5725A
	20 k to 50 k	0.014 % + 16 μ V	5700A / 5725A
	50 k to 100 k	0.03 % + 70 μ V	5700A / 5725A
	100 k to 300 k	0.06 % + 130 μ V	5700A / 5725A
	300 k to 500 k	0.13 % + 350 μ V	5700A / 5725A
	500 k to 1 M	0.26 % + 85 μ V	5700A / 5725A
(2.2 to 22) V	10 to 20	0.06 % + 0.8 mV	5700A / 5725A
	20 to 40	0.02 % + 0.3 mV	5700A / 5725A
	40 to 20 k	0.009 % + 60 μ V	5700A / 5725A
	20 k to 50 k	0.014 % + 0.2 mV	5700A / 5725A
	50 k to 100 k	0.03 % + 0.4 mV	5700A / 5725A
	100 k to 300 k	0.06 % + 1.5 mV	5700A / 5725A
	300 k to 500 k	0.15 % + 5 mV	5700A / 5725A
	500 k to 1 M	0.32 % + 9 mV	5700A / 5725A
(22 to 220) V	10 to 20	0.06 % + 8 mV	5700A / 5725A
	20 to 40	0.02 % + 3 mV	5700A / 5725A
	40 to 20 k	0.01 % + 1 mV	5700A / 5725A
	20 k to 50 k	0.03 % + 4 mV	5700A / 5725A
	50 k to 100 k	0.06 % + 8 mV	5700A / 5725A
	100 k to 300 k	0.18 % + 8 mV	5700A / 5725A
(220 to 1100) V	40 to 1 k	0.01 % + 4 mV	5700A / 5725A
	1 k to 20 k	0.02 % + 6 mV	5700A / 5725A
	20 k to 30 k	0.07 % + 11 mV	5700A / 5725A
(220 to 750) V	30 k to 50 k	0.07 % + 11 mV	5700A / 5725A
	50 k to 100 k	0.3 % + 45 mV	5700A / 5725A

NVLAP Code: 20/E10

Capacitance – Source: (100 to 10 k) Hz

Range	Best Uncertainty (\pm)^{note 1}	Remarks
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0.01 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
0.1 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
1 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
10 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
100 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
500 pF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
1 nF	0.002%	Fixed Capacitors w/GR1615-A Bridge
10 nF	0.02 %	Fixed Capacitors w/GR1615-A Bridge
200 nF	0.02 %	Fixed Capacitors w/GR1615-A Bridge

Capacitance – Measure: (50 to 1M) Hz

(1 a to 1.1 μ) F	0.012 % + 30 aF
(1.1 μ to 10 m) F	0.06 % + 30 aF

GR1615-A Bridge
Quadtech 7600LCR Bridge

Capacitance – Measure Equipment ^{note 2}

Range	Frequency in Hz	Best Uncertainty (±) ^{note 1}	Remarks
(0.19 to 1.0999) nF	10 to 10 k	0.60 % + 0.01 nF	5520A
(1.1 to 3.2999) nF	10 to 3 k	0.60 % + 0.01 nF	5520A
(3.3 to 10.9999) nF	10 to 1 k	0.30 % + 0.01 nF	5520A
(11 to 109.999) nF	10 to 1 k	0.30 % + 0.01 nF	5520A
(110 to 329.999) nF	10 to 1 k	0.30 % + 0.3 nF	5520A
(0.33 to 1.09999) μF	10 to 600	0.30 % + 1 nF	5520A
(1.1 to 3.2999) μF	10 to 300	0.30 % + 3 nF	5520A
(3.3 to 10.9999) μF	10 to 150	0.30 % + 10 nF	5520A
(11 to 32.9999) μF	10 to 120	0.48 % + 30 nF	5520A
(33 to 109.9999) μF	10 to 80	0.54 % + 100 nF	5520A
(110 to 329.999) μF	DC to 50	0.54 % + 300 nF	5520A
(0.33 to 1.09999) mF	DC to 20	0.54 % + 1 μF	5520A
(1.1 to 3.29999) mF	DC to 6	0.54 % + 3 μF	5520A
(3.3 to 10.9999) mF	DC to 2	0.54 % + 10 μF	5520A
(11 to 32.9999) mF	DC to 0.6	0.90 % + 30 μF	5520A
(33 to 110) mF	DC to 0.2	1.31 % + 100 μF	5520A

NVLAP Code: 20/E11
LF Inductance ^{note 2}

Source Only

Range	Best Uncertainty (±) in % ^{note 1}	Remarks
1 mH	0.07	Fixed Inductors w/Quadtech 7600

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10 mH	0.07	Fixed Inductors w/Quadtech 7600
100 mH	0.07	Fixed Inductors w/Quadtech 7600
1 H	0.07	Fixed Inductors w/Quadtech 7600

Measure @ 1 kHz (10 μ to 100) H	0.07	Quadtech 7600
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NVLAP Code: 20/E15

AC Phase ^{note 2}

Measure

Range	Frequency in Hz	Best Uncertainty (±) ^{note 1}	Remarks
0° to 360°	1 to 50 k	3 m°	Clark-Hess 5002 Bridge Set
	50 k to 200 k	11 m°	Clark-Hess 5002 Bridge Set

AC Phase – Generate ^{note 2}

50mV to 100V

Range	Frequency in Hz	Best Uncertainty (±) ^{note 1}	Remarks
0° to 360°	1 to 1 k	13 m°	Clark-Hess 5500-2 Phase Standard
	1 k to 6.25 k	17 m°	Clark-Hess 5500-2 Phase Standard
	6.25 k to 50 k	21 m°	Clark-Hess 5500-2 Phase Standard
	50 k to 200 k	50 m°	Clark-Hess 5500-2 Phase Standard

100V to 120V

Range	Frequency in Hz	Best Uncertainty (±) ^{note 1}	Remarks
0° to 360°	1 to 1 k	1.7 m°	Clark-Hess 5500-2 Phase Standard
	1 k to 6.25 k	26 m°	Clark-Hess 5500-2 Phase Standard
	6.25 k to 50 k	37 m°	Clark-Hess 5500-2 Phase Standard

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50 k to 200 k

95 m°

Clark-Hess 5500-2 Phase Standard

TIME AND FREQUENCY

NVLAP Code: 20/F01

Frequency – Source and Measure

<i>Range in Hz</i> ^{note 3}	<i>Best Uncertainty (±)</i> ^{note 1}	<i>Remarks</i>
10 M	5.8 x 10 ⁻¹¹	Rubidium Frequency Standard

MECHANICAL

NVLAP Code: 20/M06

Torque ^{note 2}

Measure

<i>Range</i>	<i>Best Uncertainty (±) in %</i> ^{note 1}	<i>Remarks</i>
10 lbf-in to 600 lbf-ft	2.0 %	CDI

NVLAP Code: 20/M08

Mass ^{note 2}

<i>Range</i>	<i>Best Uncertainty (±)</i> ^{note 1}	<i>Remarks</i>
8 kg	12 mg	Echelon III
7 kg	12 mg	Echelon III
6 kg	12 mg	Echelon III
5 kg	9.3 mg	Echelon III
4 kg	8.8 mg	Echelon III
2 kg	6.9 mg	Echelon III
1 kg	3.6 mg	Echelon III
500 g	2 mg	Echelon III
200 g	0.68 mg	Echelon III
100 g	0.34 mg	Echelon III
50 g	0.17 mg	Echelon III
20 g	0.10 mg	Echelon III
10 g	68 µg	Echelon III
5 g	54 µg	Echelon III
2 g	54 µg	Echelon III

2009-01-01 through 2009-12-31

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1 g	54 µg	Echelon III
500 mg	43 µg	Echelon III
200 mg	43 µg	Echelon III
100 mg	43 µg	Echelon III
50 mg	43 µg	Echelon III
20 mg	43 µg	Echelon III
10 mg	43 µg	Echelon III
5 mg	43 µg	Echelon III
2 mg	43 µg	Echelon III
1 mg	43 µg	Echelon III

ELECTROMAGNETICS – RF/MICROWAVE

NVLAP Code: 20/R11

RF-DC Voltage/Current Converters *note 2*

Sinewave Flatness

Range in Hz	Best Uncertainty (±) in % <i>note 1</i>	Remarks
30 k to 1 M	0.014	Thermal Converters
1 M to 10 M	0.08	Thermal Converters
10 M to 30 M	0.17	Thermal Converters
30 M to 80 M	0.71	Thermal Converters
80 M to 100 M	0.84	Thermal Converters

NVLAP Code: 20/R17

RF Power *note 2*

Absolute

Range	Frequency in Hz	Best Uncertainty (±) <i>note 1</i>	Remarks
(+30 to -20) dBm	0.1 M to 1.3 G	0.10 dBm + M	8902A

Harmonic Distortion (50 and 600 Ω)

Range	Best Uncertainty (±) <i>note 1</i>	Remarks
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0 dB @ (10 to 26 G) Hz

0.3 dB

8903B
71209A
8902A

THERMODYNAMIC

NVLAP Code: 20/T05

Pressure

Absolute Pressure Source – Pneumatic

Range

(0.2 to 100) psia
(100 to 1000) psia

Best Uncertainty (\pm) ^{note 1}

11 ppm + 0.07 m psia
12 ppm

Remarks

Ruska 2465
Ruska 2465

Gage Pressure Source – Gage

Range

(0 to 1.2) psi
(1.2 to 100) psi
(100 to 1000) psi
(-20 to 20) in H₂O

Best Uncertainty (\pm) ^{note 1}

0.013 m psi
11 ppm
12 ppm
11 ppm + 240 μ in H₂O

Remarks

Ruska 2465
Ruska 2465
Ruska 2465
Differential

Gage Pressure Source – Hydraulic

Range

(75 to 3000) psi
(725 to 30 000) psi

Best Uncertainty (\pm) ^{note 1}

16 ppm
36 ppm

Remarks

DHI PG7000
DHI PG7000

Determination of Piston Area

Range

(0.2 to 100) psi
(100 to 1000) psi
(40 to 10 000) psi

Best Uncertainty (\pm) ^{note 1}

16 ppm
17 ppm
35 ppm

Remarks

Ruska 2465
Ruska 2465
DHI 5300

Gage Pressure Source ^{note 2}

Range

(0.5 to 500) psi

Best Uncertainty (\pm) ^{note 1}

73 ppm

Remarks

Pressurements T2300

Hydraulic ^{note 2}

Range

Best Uncertainty (\pm) ^{note 1}

Remarks

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(500 to 15 000) psi 0.03 % Ametek T-150

NVLAP Code: 20/T07
Thermodynamic

<i>Range in °C</i>	<i>Best Uncertainty (±) in C[•] note 1</i>	<i>Remarks</i>
-10 to 110	0.044	Liquid Bath w/PRT
100 to 300	0.12	Dry Block Calibrator
300 to 600	0.23	Dry Block Calibrator

Measure only ^{note 2}
-195 to 660 0.044 PRT & Super
Thermometer

NVLAP Code: 20/T08
Thermocouple

Isothermal Block Verification ^{note 2}

<i>Range</i>	<i>Best Uncertainty (±) note 1</i>	<i>Remarks</i>
Ambient (~23 °C)	0.04 °C	Thermocouple Half Junction

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

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