National Voluntary Laboratory Accreditation Program

CALIBRATION LABORATORIES **NVLAP LAB CODE 200894-0**

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Transcat – San Juan	**Fields of Calibration**
281 Calle Matadero Urb Puerto Nuevo San Juan, PR 00920 Mr. John Strouth Phone: 787-706-8855 Fax: 787-792-3614 E-mail: jstrouth@transcat.com URL: www.transcat.com	Dimensional Electromagnetics – DC/Low Frequency Time and Frequency Mechanical Electromagnetics – RF/Microwave Thermodynamic This laboratory is compliant to ANSI/NCSL Z540-1-1994; Part 1. ((20/A01)

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Uncertainty (*k*=2) Note 3	Remarks
DIMENSIONAL			
LENGTH & DIAMETER; STEP GAGES (20/D05)			
Micrometers and Calipers– Outside, Inside, Depth	0.05 in to 10 in	9 µin + 14 µin/in	Comparison to Gage Blocks
Anvil Flatness	0 in to 1 in	6.1 µin	Optical Flats
Rulers	0 in to 36 in	0.002 in + 14 µin/in	Glass Scale with Optics

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty (*k*=2) Notes 3, 5	Remarks
ELECTROMAGNETICS – DC/LOW FREQUENCY				
AC RESISTORS AND CURRENT (20/E02)				
AC Current – Generate	29 to 329.99 µA	10 Hz to 20 Hz	0.16 % + 0.08 µA	Fluke 5520A
		20 Hz to 45 Hz	0.12 % + 0.08 µA	
		45 Hz to 1 kHz	0.097 % + 0.12 µA	
		1 kHz to 5 kHz	0.23 % + 0.16 µA	
		5 kHz to 10 kHz	0.62 % + 0.16 µA	
		10 kHz to 30 kHz	1.2 % + 0.31µA	
	0.33 to 3.2999 mA	10 Hz to 20 Hz	0.16 % + 0.12 µA	
		20 Hz to 45 Hz	0.097 % + 0.12 µA	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty (k=2) Notes 3, 5	Remarks
		45 Hz to 1 kHz	0.078 % + 0.12 µA	
		1 kHz to 5 kHz	0.16 % + 0.16 µA	
		5 kHz to 10 kHz	0.39 % + 0.23 µA	
		10 kHz to 30 kHz	0.78 % + 0.47 µA	
	3.3 to 32.999 mA	10 Hz to 20 Hz	0.14 % + 1.6 µA	
		20 Hz to 45 Hz	0.07 % + 1.6 µA	
		45 Hz to 1 kHz	0.031 % + 1.6 µA	
		1 kHz to 5 kHz	0.062 % + 1.6 µA	
		5 kHz to 10 kHz	0.16 % + 2.3 µA	
		10 kHz to 30 kHz	0.31 % + 3.1 µA	
	33 to 329.99 mA	10 Hz to 20 Hz	0.14 % + 16 µA	
		20 Hz to 45 Hz	0.07 % + 16 µA	
		45 Hz to 1 kHz	0.033 % + 16 µA	
		1 kHz to 5 kHz	0.078 % + 39 µA	
		5 kHz to 10 kHz	0.16 % + 78 µA	
		10 kHz to 30 kHz	0.31 % + 160 µA	
	0.33 to 1.1 A	10 Hz to 45 Hz	0.14 % + 78 µA	
		45 Hz to 1 kHz	0.039 % + 78 µA	
		1 kHz to 5 kHz	0.47 % + 780 µA	
		5 kHz to 10 kHz	1.9 % + 4 mA	
AC Current – Generate	1.1 A to 3 A	10 Hz to 45 Hz	0.14 % + 78 µA	Fluke 5520A
		45 Hz to 1 kHz	0.047 % + 78 µA	
		1 kHz to 5 kHz	0.47 % + 780 µA	
		5 kHz to 10 kHz	1.9 % + 4 mA	
	3 A to 11 A	45 Hz to 100 Hz	0.047 % + 2 mA	
		100 Hz to 1 kHz	0.08 % + 2 mA	
		1 kHz to 5 kHz	2.3 % + 2 mA	
	11 A to 20.5 A	45 Hz to 100 Hz	0.097 % + 4 mA	
		100 Hz to 1 kHz	0.12 % + 4 mA	
		1 kHz to 5 kHz	2.3 % + 4 mA	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty (k=2) Notes 3, 5	Remarks
Clamp-on Ammeter (Toroidal Type)	20 A to 150 A	45 Hz to 65 Hz	0.30 % + 26 mA	Fluke 5520A with 5500A/Coil
		65 Hz to 440 Hz	0.83 % + 47 mA	
	150 A to 1000 A	45 Hz to 65 Hz	0.35 % + 0.12 A	
		65 Hz to 440 Hz	1.1 % + 0.22 A	
Clamp-on Ammeter (Non-Toroidal Type)	20 A to 150 A	45 Hz to 65 Hz	0.57 % + 0.25 A	
		65 Hz to 440 Hz	1.0 % + 0.25 A	
	150 A to 1000 A	45 Hz to 65 Hz	0.60 % + 0.90 A	
		65 Hz to 440 Hz	1.3 % + 0.92 A	
AC Current – Measure	0 µA to 100 µA	10 Hz to 20 Hz	0.46 % + 35 nA	Agilent 3458A Option 002
		20 Hz to 45 Hz	0.18 % + 35 nA	
		45 Hz to 100 Hz	0.072 % + 35 nA	
		100 Hz to 5 kHz	0.072 % + 35 nA	
	100 µA to 1 mA	10 Hz to 20 Hz	0.46 % + 230 nA	
		20 Hz to 45 Hz	0.17 % + 230 nA	
		45 Hz to 100 Hz	0.071 % + 230 nA	
		100 Hz to 5 kHz	0.038 % + 230 nA	
	1 mA to 10 mA	10 Hz to 20 Hz	0.46 % + 2.3µA	
		20 Hz to 45 Hz	0.17 % + 2.3µA	
		45 Hz to 100 Hz	0.071 % + 2.3 µA	
		100 Hz to 5 kHz	0.038 % + 2.3 µA	
	10 mA to 100 mA	10 Hz to 20 Hz	0.46 % + 23 µA	
		20 Hz to 45 Hz	0.17 % + 23 µA	
		45 Hz to 100 Hz	0.071 % + 23 µA	
		100 Hz to 5 kHz	0.037 % + 23 µA	
	100 mA to 1 A	10 Hz to 20 Hz	0.46 % + 230 µA	
		20 Hz to 45 Hz	0.19 % + 230 µA	
		45 Hz to 100 Hz	0.097 % + 230 µA	
		100 Hz to 5 kHz	0.12 % + 230 µA	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) [Notes 1,2]

Measured Parameter or Device Calibrated	Range	Uncertainty (*k*=2) [Note 3, 5]	Remarks
DC RESISTANCE AND CURRENT (20/E05)			
DC Resistance – Measure	0 Ω to 10 Ω	18 μΩ/Ω + 58 μΩ	Agilent 3458A Option 002
	10 Ω to 100 Ω	15 μΩ/Ω + 0.58 mΩ	
	100 Ω to 1 kΩ	12 μΩ/Ω + 0.58 mΩ	
	1 kΩ to 10 kΩ	12 μΩ/Ω + 5.8 mΩ	
	10 kΩ to 100 kΩ	12 μΩ/Ω + 58 mΩ	
	100 kΩ to 1 MΩ	19 μΩ/Ω + 2.3 Ω	
	1 MΩ to 10 MΩ	62 μΩ/Ω + 120 Ω	
	10 MΩ to 100 MΩ	590 μΩ/Ω + 1.2 kΩ	
	100 MΩ to 1 GΩ	0.58 % + 12 kΩ	
DC Resistance – Generate	0 Ω to 11Ω	32 μΩ/Ω + 1 mΩ	Fluke 5520A
	11 Ω to 33 Ω	24 μΩ/Ω + 1.2 mΩ	
	33 Ω to 110 Ω	22 μΩ/Ω + 1.1 mΩ	
	110 Ω to 330 Ω	23 μΩ/Ω + 1.6 mΩ	
	330 Ω to 1.1 kΩ	22 μΩ/Ω + 1.6 mΩ	
	1.1 kΩ to 3.3 kΩ	23 μΩ/Ω + 16 mΩ	
	3.3 kΩ to 11 kΩ	22 μΩ/Ω + 16 mΩ	
	11 kΩ to 33 kΩ	23 μΩ/Ω + 0.16 Ω	
	33 kΩ to 110 kΩ	22 μΩ/Ω + 0.16 Ω	
	110 kΩ to 330 kΩ	27 μΩ/Ω + 1.6 Ω	
	330 kΩ to 1.1 MΩ	26 μΩ/Ω + 1.6 Ω	
	1.1 MΩ to 3.3 MΩ	66 μΩ/Ω + 23 Ω	
	3.3 MΩ to 11 MΩ	110 μΩ/Ω + 39 Ω	
	11 MΩ to 33 MΩ	200 μΩ/Ω + 1.9 kΩ	
	33 MΩ to 110 MΩ	420 μΩ/Ω + 2.8 kΩ	
	110 MΩ to 330 MΩ	0.23 % + 100 kΩ	
	330 MΩ to 1 GΩ	1.2 % + 400 kΩ	
	10 GΩ	0.66 %	Decade Resistor
	100 GΩ	1.4 %	
DC Current – Measure	0 μA to 100 μA	26 μA/A + 0.92 nA	Agilent 3458A Option 002
	100 μA to 1 mA	26 μA/A + 5.8 nA	
	1 mA to 10 mA	26 μA/A + 58 nA	
	10 mA to 100 mA	43 μA/A + 580 nA	
	100 mA to 1 A	130 μA/A + 12 μA	

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Measured Parameter or Device Calibrated	Range	Uncertainty (*k*=2) Note 3, 5	Remarks
DC Current – Generate	0 µA to 330 µA 330 µA to 3.3 mA 3.3 mA to 33 mA 33 mA to 330 mA 330 mA to 1.1 A 1.1 A to 3 A 3 A to 11 A 11 A to 20 A	0.012 % + 0.02 µA 0.0081 % + 0.05 µA 0.0098 % + 0.19 µA 0.0078 % + 1.9µA 0.016 % + 31 µA 0.030 % + 31 µA 0.051 % + 0.39 mA 0.084 % + 0.58 mA	Fluke 5520A
Clamp-on Ammeter (Non-Toroidal Type)	20 A to 150 A 150 A to 1000 A	0.50 % + 0.14 A 0.52 % + 0.50 A	Fluke 5520A with 5500A/Coil
DC VOLTAGE (20/E06)			
DC Voltage – Measure	0 V to 100 mV 100 mV to 10 V 10 V to 100 V 100 V to 500 V 500 V to 800 V 800 V to 1 kV	7 µV/V + 0.58 µV 5.1 µV/V + 0.58 µV 7.6 µV/V + 35 µV 11 µV/V + 120 µV 16 µV/V + 120 µV 21 µV/V + 120 µV	Agilent 3458A Option 002
DC Voltage – Generate	0 mV to 330 mV 330 mV to 3 V 3 V to 33 V 33 V to 330 V 330V to 1 kV	16 µV/V + 0.78 µV 9.1 µV/V +1.6 µV 10 µV/V + 16 µV 15 µV/V + 116 µV 15 µV/V + 1.2 mV	Fluke 5520A

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty (*k*=2) Notes 3, 5	Remarks
LF AC VOLTAGE (20/E09)				
AC Voltage – Measure	0 mV to 10 mV	1 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	0.039 % + 3.5 µV 0.028 % + 1.2 µV 0.038 % + 1.2 µV 0.15 % + 1.2 µV 0.59 % + 1.2 µV	Agilent 3458A Option 002

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty (k=2) Notes 3, 5	Remarks
		100 kHz to 300 kHz	4.6 % + 2.3 µV	
	10 mV to 100 mV	1 Hz to 40 Hz	0.013 % + 4.6 µV	
		40 Hz to 1 kHz	0.0094 % + 2.3 µV	
		1 kHz to 20 kHz	0.017 % + 2.3 µV	
		20 kHz to 50 kHz	0.037 % + 2.3 µV	
		50 kHz to 100 kHz	0.093 % + 2.3 µV	
		100 kHz to 300 kHz	0.36 % + 12 µV	
		300 kHz to 1 MHz	1.2 % + 12 µV	
		1 MHz to 2 MHz	1.9 % + 12 µV	
		2 MHz to 4 MHz	4.7 % + 81 µV	
		4 MHz to 8 MHz	4.7 % + 92 µV	
		8 MHz to 10 MHz	17 % + 120 µV	
	100 mV to 1 V	1 Hz to 40 Hz	0.0098 % + 46 µV	
		40 Hz to 1 kHz	0.0094 % + 23 µV	
		1 kHz to 20 kHz	0.017 % + 23 µV	
		20 kHz to 50 kHz	0.036 % + 23µV	
		50 kHz to 100 kHz	0.093 % + 23 µV	
		100 kHz to 300 kHz	0.35 % + 120 µV	
		300 kHz to 1 MHz	1.2 % + 120 µV	
		1 MHz to 2 MHz	1.9 % + 120 µV	
		2 MHz to 4 MHz	4.7 % + 810 µV	
		4 MHz to 8 MHz	4.7 % + 920 µV	
		8 MHz to 10 MHz	17 % + 1.2 mV	
	1 V to 10 V	1 Hz to 40 Hz	0.0095 % + 0.46 mV	
		40 Hz to 1 kHz	0.0095 % + 0.23 mV	
		1 kHz to 20 kHz	0.017 % + 0.23 mV	
		20 kHz to 50 kHz	0.036 % + 0.23 mV	
		50 kHz to 100 kHz	0.093 % + 0.23 mV	
		100 kHz to 300 kHz	0.35 % + 1.2 mV	
		300 kHz to 1 MHz	1.2 % + 1.2 mV	
		1 MHz to 2 MHz	1.8 % + 1.2 mV	
		2 MHz to 4 MHz	4.7 % + 8.1 mV	
		4 MHz to 8 MHz	4.7 % + 9.2 mV	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty (*k*=2) Notes 3, 5	Remarks
		8 MHz to 10 MHz	17 % + 12 mV	
	10 V to 100 V	1 Hz to 40 Hz	0.024 % + 4.6 mV	
		40 Hz to 1 kHz	0.024 % + 2.3 mV	
		1 kHz to 20 kHz	0.024 % + 2.3 mV	
		20 kHz to 50 kHz	0.041 % + 2.3 mV	
		50 kHz to 100 kHz	0.14 % + 2.3 mV	
		100 kHz to 300 kHz	0.46 % + 12 mV	
		300 kHz to 1 MHz	1.7 % + 12 mV	
	100 V to 700 V	1 Hz to 40 Hz	0.047 % + 47 mV	
		40 Hz to 1 kHz	0.047 % + 23 mV	
		1 kHz to 20 kHz	0.07 % + 23 mV	
		20 kHz to 50 kHz	0.14 % + 23 mV	
		50 kHz to 100 kHz	0.35 % + 23 mV	
AC Voltage – Generate	1 mV to 32.999 mV	10 Hz to 45 Hz	0.065 % + 4.7 µV	Fluke 5520A
		45 Hz to 10 kHz	0.014 % + 4.7 µV	
		10 kHz to 20 kHz	0.017 % + 4.7 µV	
		20 kHz to 50 kHz	0.079 % + 4.7 µV	
		50 kHz to 100 kHz	0.27% + 9.3 µV	
		100 kHz to 500 kHz	0.62 % + 39 µV	
	33 mV to 329.99 mV	10 Hz to 45 Hz	0.027 % + 6.2 µV	
		45 Hz to 10 kHz	0.012 % + 6.2 µV	
		10 kHz to 20 kHz	0.013 % + 8 µV	
		20 kHz to 50 kHz	0.027 % + 8 µV	
		50 kHz to 100 kHz	0.063 % + 25 µV	
		100 kHz to 500 kHz	0.16 % + 54µV	
	0.33 V to 3.29999 V	10 Hz to 45 Hz	0.027 % + 39 µV	
		45 Hz to 10 kHz	0.012 % + 47 µV	
		10 kHz to 20 kHz	0.015 % + 47 µV	
		20 kHz to 50 kHz	0.024 % + 39 µV	
		50 kHz to 100 kHz	0.054 % + 97 µV	
		100 kHz to 500 kHz	0.19 % + 470 µV	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty (*k*=2) Notes 3, 5	Remarks
	3.3 V to 32.9999 V	10 Hz to 45 Hz	0.027 % + 505 µV	
		45 Hz to 10 kHz	0.012 % + 466 µV	
		10 kHz to 20 kHz	0.019 % + 466 µV	
		20 kHz to 50 kHz	0.027 % + 466 µV	
		50 kHz to 100 kHz	0.07 % + 1.2 mV	
	33 V to 329.999 V	45 Hz to 1 kHz	0.015 % + 1.6 mV	
		1 kHz to 10 kHz	0.016 % + 4.7 mV	
		10 kHz to 20 kHz	0.02 % + 4.7 mV	
		20 kHz to 50 kHz	0.029 % + 4.7 mV	
		50 kHz to 100 kHz	0.016 % + 39 mV	
	330 V to 1020 V	45 Hz to 1 kHz	0.023 % + 7.7 mV	
		1 kHz to 5 kHz	0.02 % + 7.7 mV	
		5 kHz to 10 kHz	0.023 % + 7.7 mV	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty (*k*=2) Notes 3, 5	Remarks
LOW FREQUENCY CAPACITANCE (20/E10)				
Capacitance Measuring Equipment	0 pF to 190 pF	1 kHz	0.06 % + 5 pF	Decade Capacitor
	0.19 nF to 1.0999 nF	10 Hz to 10 kHz	0.4 % + 6.1 pF	Fluke 5520A
	1.1 nF to 3.2999 nF	10 Hz to 3 kHz	0.39 % + 6.1 pF	
	3.3 nF to 10.9999 nF	10 Hz to 1 kHz	0.20 % + 6.1 pF	
	11 nF to 109.999 nF	10 Hz to 1 kHz	0.20 % + 61 pF	
	110 nF to 329.999 nF	10 Hz to 1 kHz	0.20 % + 0.18 nF	
	0.33 µF to 1.09999 µF	10 Hz to 600 Hz	0.20 % + 0.61 nF	
	1.1 µF to 3.2999 µF	10 Hz to 300 Hz	0.20 % + 1.9 nF	
	3.3 µF to 10.9999 µF	10 Hz to 150 Hz	0.20 % + 6.1 nF	
	11 µF to 32.9999 µF	10 Hz to 120 Hz	0.32 % + 18 nF	
	33 µF to 109.9999 µF	10 Hz to 80 Hz	0.35 % + 61 nF	
	110 µF to 329.999 µF	DC to 50 Hz	0.35 %+ 0.18 µF	
	0.33 mF to 1.09999 mF	DC to 20 Hz	0.35 % + 0.61 µF	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty (k=2) Notes 3, 5	Remarks
	1.1 mF to 3.299999 mF	DC to 6 Hz	0.35 % + 1.8 µF	
	3.3 mF to 10.9999 mF	DC to 2 Hz	0.35 % + 6.1 µF	
	11 mF to 32.9999 mF	DC to 0.6 Hz	0.58 % + 18 µF	
	33 mF to 110 mF	DC to 0.2 Hz	0.85 % + 61 µF	
LF POWER/ENERGY (20/E12)				
Power – Measuring Equipment (current range)				
DC Power				
0.33 mA to 330 mA	11 µW to 1.1 mW	DC	0.024 %	Fluke 5520A
	1.1 mW to 110 mW	DC	0.027 %	
	0.11W to 110 W	DC	0.024 %	
	110 W to 330 W	DC	0.018 %	
0.33 A to 3 A	11 W to 110 mW	DC	0.044 %	
	0.11 W to 990 W	DC	0.053 %	
	1 W to 3 kW	DC	0.0096 %	
3 A to 20.5 A	0.099 W to 0.99 W	DC	0.088 %	
	0.99 W to 6.8 kW	DC	0.07 %	
	6.8 W to 20.5 kW	DC	0.04 %	
AC Power Note 8 (PF = 1)				
3.3 mA to 9 mA	0.11 mW to 3 mW	10 Hz to 65 Hz	0.13 %	
	3 mW to 9 W	10 Hz to 65 Hz	0.077 %	
9 mA to 33 mA	0.3 mW to 10 mW	10 Hz to 65 Hz	0.089 %	
	10 mW to 33 W	10 Hz to 65 Hz	0.077 %	
33 mA to 90 mA	1 mW to 30 mW	10 Hz to 65 Hz	0.071 %	
	30 mW to 90 W	10 Hz to 65 Hz	0.057 %	
90 mA to 330 mA	3.0 mW to 100 mW	10 Hz to 65 Hz	0.089 %	
	100 mW to 300 W	10 Hz to 65 Hz	0.078 %	
0.33 A to 0.9 A	11 mW to 300 mW	10 Hz to 65 Hz	0.071 %	

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	300 mW to 900 W	10 Hz to 65 Hz	0.081 %	
0.9 A to 2.2 A	30 mW to 720 mW	10 Hz to 65 Hz	0.089 %	
	720 mW to 2 kW	10 Hz to 65 Hz	0.079 %	
2.2 A to 4.5 A	80 mW to 1.4 W	10 Hz to 65 Hz	0.088 %	
	1.4 W to 4.5 kW	10 Hz to 65 Hz	0.18 %	
4.5 A to 20.5 A	150 mW to 6.7 W	10 Hz to 65 Hz	0.17 %	
	6.7 W to 20 kW	10 Hz to 65 Hz	0.17 %	
PHASE METERS (20/E15)				
LF Phase – Generate	0° to 179.99°	10 Hz to 65 Hz	0.10°	Fluke 5520A
		65 Hz to 500 Hz	0.20°	
		500 Hz to 1 kHz	0.40°	
		1 kHz to 5 kHz	1.9°	
		5 kHz to 10 kHz	3.9°	
		10 kHz to 20 kHz	7.8°	

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TIME AND FREQUENCY			
FREQUENCY DISSEMINATION (20/F01)			
Frequency – Measuring Equipment and Measure Note 9	10 MHz	5.8×10^{-10}	Rubidium Oscillator
PULSE WAVEFORM (20/F04)			
Rise Time – Generate	≥ 300 ps	2.9 %	Fluke 5520A/SC600
MECHANICAL			
MASS (20/M08)			
Mass – Metric	10 kg	3.4 mg	Echelon II
	5 kg	1.7 mg	
	3 kg	1.3 mg	
	2 kg	0.98 mg	

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	1 kg	0.33 mg	
	500 g	0.17 mg	
	300 g	0.13 mg	
	200 g	100 µg	
	100 g	35 µg	
	50 g	17 µg	
	30 g	13 µg	
	20 g	12 µg	
	10 g	8.6 µg	
	5 g	5.2 µg	
	3 g	4.3 µg	
	2 g	4.3 µg	
	1 g	4.3 µg	
	500 mg	1.7 µg	
	300 mg	1.7 µg	
	200 mg	1.7 µg	
	100 mg	1.7 µg	
	50 mg	1.7 µg	
	30 mg	1.7 µg	
	20 mg	1.7 µg	
	10 mg	1.7 µg	
	5 mg	1.7 µg	
	3 mg	1.7 µg	
	2 mg	1.7 µg	
	1 mg	1.7 µg	
	25 kg	0.23 g	Echelon III
	20 kg	0.23 g	
	10 kg	8.3 mg	
	5 kg	4.1 mg	
	3 kg	2.4 mg	
	2 kg	1.9 mg	
	1 kg	0.83 mg	
	500 g	0.41 mg	
	300 g	0.27 mg	
	200 g	0.20 mg	

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Measured Parameter or Device Calibrated	Range	Uncertainty (k=2) Notes 3, 5	Remarks
	100 g	84 µg	
	50 g	41 µg	
	30 g	26 µg	
	20 g	26 µg	
	10 g	18 µg	
	5 g	12 µg	
	3 g	11 µg	
	2 g	11 µg	
	1 g	11 µg	
	500 mg	3.6 µg	
	300 mg	3.6 µg	
	200 mg	3.6 µg	
	100 mg	3.6 µg	
	50 mg	3.6 µg	
	30 mg	3.6 µg	
	20 mg	3.6 µg	
	10 mg	3.6 µg	
	5 mg	3.6 µg	
	3 mg	3.6 µg	
	2 mg	3.6 µg	
	1 mg	3.6 µg	
WEIGHING INSTRUMENTS (20/M16)			
Balances – Metric	10 kg	3.9 mg	ASTM Class 1 Weights
	5 kg	2.6 mg	
	3 kg	2.3 mg	
	2 kg	2.2 mg	
	1 kg	2.0 mg	
	500 g	2.0 mg	
	300 g	2.0 mg	
	200 g	2.0 mg	
	100 g	39 µg	
	50 g	24 µg	
	30 g	22 µg	
	20 g	22 µg	
	10 g	8.4 µg	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) [Notes 1,2]

Measured Parameter or Device Calibrated	Range	Uncertainty (*k*=2) [Notes 3, 5]	Remarks
	5 g	5.2 µg	
	3 g	5.2 µg	
	2 g	5.2 µg	
	1 g	5.2 µg	
	500 mg	1.7 µg	
	200 mg	1.7 µg	
	100 mg	1.7 µg	
	50 mg	1.7 µg	
	30 mg	1.7 µg	
	20 mg	1.7 µg	
	10 mg	1.7 µg	
	5 mg	1.7 µg	
	3 mg	1.7 µg	
	2 mg	1.7 µg	
	1 mg	1.7 µg	
Balances – Avoirdupois	50 lb	2.3 g	ASTM Class 4 Weights
	30 lb	1.4 g	
	20 lb	0.91 g	
	10 lb	0.46 g	
	5 lb	0.23 g	
	3 lb	0.14 g	
	2 lb	91 mg	
	1 lb	46 mg	
	8 oz	23 mg	
	4 oz	12 mg	
	2 oz	5.7 mg	
	1 oz	2.9 mg	
	0.5 oz	1.4 mg	
ELECTROMAGNETICS – RF/MICROWAVE			
RF/MICROWAVE POWER (20/R17)			
Sine Wave Flatness	50 kHz to 100 MHz	1.9 % + 100 µV	Fluke 5520A/SC600
	100 MHz to 300 MHz	2.3 % + 100 µV	
	300 MHz to 600 MHz	4.1 % + 100 µV	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) [Notes 1,2]

Measured Parameter or Device Calibrated	Range	Uncertainty (*k*=2) [Notes 3, 5]	Remarks
THERMODYNAMIC			
HUMIDITY (20/T02)			
Relative Humidity	10 % to 95 %	0.60 %	Thunder Scientific 2500
PRESSURE (20/T05)			
Absolute Pressure – Source	0 psia to 25 psia 25 psia to 500 psia	0.0019 psia 0.0065 % + 0.001 psia	Ruska 7250xi
Gage Pressure – Pneumatic	-15 psi to 25 psi 25 psi to 500 psi	0.0016 psi 0.0065 %	Ruska 7250xi
	-36 inH_2O to -22 inH_2O -22 inH_2O to 22 inH_2O 22 inH_2O to 60 inH_2O 60 inH_2O to 72 inH_2O 72 inH_2O to 804 inH_2O	0.0090 % + 150 µinH_2O 0.0020 inH_2O 0.0090 % + 150 µinH_2O 0.0065 inH_2O 0.0090 % + 150 µinH_2O	DHI PPC 4 Controller
Gage Pressure – Hydraulic	100 psi to 15 000 psi	0.0090 %	Ametek T-150 Deadweight Tester
LABORATORY THERMOMETERS (20/T03)			
Temperature – Generate	-30 °C to 125 °C	0.036 °C	Liquid Bath with Indicator and SPRT
Temperature – Measure	-195 °C to 0 °C 0 ºC to 420 ºC 420 ºC to 660 ºC	0.012 °C + 0.001 % 0.024 °C + 0.001 % 0.035 °C + 0.001 %	SPRT with Indicator

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) [Notes 1,2]

Measured Parameter or Device Calibrated	Type	Range	Uncertainty (*k*=2) [Note 3]	Remarks
TEMPERATURE INDICATORS (20/T08)				
Electrical Calibration of Thermocouple Devices	J K T	-210 °C to 1200 °C -270 °C to 1372 °C -270 °C to 400 °C	0.10 ºC 0.10 ºC 0.10 ºC	Thermocouple Half Junctions

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Measured Parameter or Device Calibrated	Type	Range	Uncertainty (k=2) Note 3	Remarks
	E	-270 °C to 1000 °C	0.10 ºC	
	R	0 °C to 250 °C	0.44 ºC	Fluke 5520A
		250 ºC to 400 ºC	0.27 ºC	
		400 ºC to 1000 ºC	0.26 ºC	
		1000 ºC to 1767 ºC	0.31 ºC	
	S	0 °C to 250 °C	0.44 ºC	
		250 ºC to 1000 ºC	0.28 ºC	
		1000 ºC to 1400 ºC	0.29 ºC	
		1400 ºC to 1767 ºC	0.36 ºC	
	N	-200 ºC to -100 ºC	0.31 ºC	
		-100 ºC to -25 ºC	0.17 ºC	
		-25 ºC to 120 ºC	0.15 ºC	
		120 ºC to 410 ºC	0.14 ºC	
		410 ºC to 1300 ºC	0.21 ºC	
END				

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Notes
Note 1: A Calibration and Measurement Capability (CMC) is a description of the best result of a calibration or measurement (result with the smallest uncertainty of measurement) that is available to the laboratory's customers under normal conditions, when performing more or less routine calibrations of nearly ideal measurement standards or instruments. The CMC is described in the laboratory's scope of accreditation by: the measurement parameter/device being calibrated, the measurement range, the uncertainty associated with that range (see note 3), and remarks on additional parameters, if applicable.
Note 2: Calibration and Measurement Capabilities are traceable to the national measurement standards of the U.S. or to the national measurement standards of other countries and are thus traceable to the internationally accepted representation of the appropriate SI (Système International) unit.
Note 3: The uncertainty associated with a measurement in a CMC is an expanded uncertainty with a level of confidence of approximately 95 %, typically using a coverage factor of $k = 2$. However, laboratories may report a coverage factor different than $k = 2$ to achieve the 95 % level of confidence. Units for the measurand and its uncertainty are to match. Exceptions to this occur when marketplace practice employs mixed units, such as when the artifact to be measured is labeled in non-SI units and the uncertainty is given in SI units (Example: 5 lb weight with uncertainty given in mg).
Note 3a: The uncertainty of a specific calibration by the laboratory may be greater than the uncertainty in the CMC due to the condition and behavior of the customer's device and specific circumstances of the calibration. The uncertainties quoted do not include possible effects on the calibrated device of transportation, long term stability, or intended use.
Note 3b: As the CMC represents the best measurement results achievable under normal conditions, the accredited calibration laboratory shall not report smaller uncertainty of measurement than that given in a CMC for calibrations or measurements covered by that CMC.
Note 3c: As described in Note 1, CMCs cover calibrations and measurements that are available to the laboratory's customers under *normal conditions.* However, the laboratory may have the capability to offer special tests, employing special conditions, which yield calibration or measurement results with lower uncertainties. Such special tests are not covered by the CMCs and are outside the laboratory's scope of accreditation. In this case, NVLAP requirements for the labeling, on calibration reports, of results outside the laboratory's scope of accreditation apply. These requirements are set out in Annex A.1.h. of NIST Handbook 150, Procedures and General Requirements.
Note 4: Uncertainties associated with field service calibration may be greater as they incorporate on-site environmental contributions, transportation effects, or other factors that affect the measurements. (This note applies only if marked in the body of the scope.)
Note 5: Values listed with percent (%) are percent of reading or generated value unless otherwise noted.
Note 6: NVLAP accreditation is the formal recognition of specific calibration capabilities. Neither NVLAP nor NIST guarantee the accuracy of individual calibrations made by accredited laboratories.
Note 7: See NIST Handbook 150 for further explanation of these notes.
Note 8: The uncertainties shown are for the most favorable conditions. There is an increase in uncertainty that corresponds to the laboratory's AC voltage and current uncertainties at different frequencies other than the ones shown. Power factors (PF) other than the one shown contribute to the power uncertainty. PF is related to the cosine of phase. Therefore, uncertainties track the laboratory's phase uncertainty closely at PF near one, but are magnified heavily as PF approaches zero. The lab may also report reactive power, apparent power, and power factor under this accreditation. If needed, contact laboratory for more information regarding uncertainties at frequency and power factor combinations other than the ones shown.
Note 9: Uncertainty values of derivatives of 10 MHz will differ due to resolution, noise and gating errors.

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