



National Voluntary Laboratory Accreditation Program



CALIBRATION LABORATORIES

NVLAP LAB CODE 200866-0

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Transcat – St. Louis 527 Mae Court Fenton, MO 63026 Mr. Jim Beckner Phone: 636-349-7722 Fax: 636-349-4590 E-mail: jbeckner@transcat.com URL: www.transcat.com	Parameter(s) of Accreditation Dimensional Electromagnetics – DC/Low Frequency Time and Frequency Mechanical Thermodynamic This laboratory is compliant to ANSI/NCSL Z540-1-1994; Part 1. (NVLAP Code: 20/A01)
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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC)^{Notes 1,2}

Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) ^{Note 3}	Remarks
DIMENSIONAL			
NVLAP Code: 20/D05 LENGTH and DIAMETER; STEP GAGES Micrometers and Calipers Field calibrations available ^{Note 4}	0 in to 12 in	L is length in inches. $3 \mu\text{in} + 23L \mu\text{in}$	Comparison to Gage Blocks
Anvil Flatness Field calibrations available ^{Note 4}	0 in to 1 in	$6.4 \mu\text{in}$	Optical Flats
Dial and Digital Indicators Field calibrations available ^{Note 4}	0 in to 4 in	$5 \mu\text{in} + 14L \mu\text{in}$	Comparison to Gage Blocks
Distance Measuring Equipment	0 ft to 99 999 ft	L is length in feet. $0.0005L \text{ ft}$	Cylindrical Square with Counter

2012-04-01 through 2013-03-31

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
ELECTROMAGNETICS – DC/LOW FREQUENCY				
NVLAP Code: 20/E02 AC RESISTORS and CURRENT AC Current – Measuring Equipment Field calibrations available <small>Note 4</small>	0 μ A to 220 μ A	20 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.019 % + 10 nA 0.015 % + 8 nA 0.03 % + 12 nA 0.11 % + 65 nA	Fluke 5700A-EP
	220 μ A to 2.2 mA	10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.03 % + 40 nA 0.018 % + 35 nA 0.013 % + 35 nA 0.021 % + 110 nA 0.11 % + 650 nA	
	2.2 mA to 22 mA	10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.039 % + 400 nA 0.041 % + 400 nA 0.025 % + 400 nA 0.07 % + 5 μ A 0.16 % + 10 μ A	
	22 mA to 220 mA	10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.033 % + 4 μ A 0.018 % + 3.5 μ A 0.014 % + 2.5 μ A 0.021 % + 3.5 μ A 0.11 % + 10 μ A	
	220 mA to 2.2 A	20 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.027 % + 35 μ A 0.046 % + 80 μ A 0.7 % + 160 μ A	Fluke 5700A with EP/5725A
	2.2 A to 11 A	40 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.05 % + 170 μ A 0.097 % + 380 μ A 0.36 % + 750 μ A	

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
Extended Frequency Ranges Field calibrations Available <small>Note 4</small>	11 A to 20 A 29 μ A to 329.99 μ A 330 μ A to 3.299 mA 3.3 mA to 32.99 mA 29 mA to 329.99 mA	45 Hz to 1 kHz 1 kHz to 5 kHz 10 kHz to 30 kHz	0.095 % + 2 mA 2.3 % + 5 mA 1.2 % + 0.4 μ A 0.78 % + 0.6 μ A 0.31 % + 4 μ A 0.31 % + 0.20 mA	Fluke 5520A Fluke 5520A
Clamp-on Ammeter Toroidal Type Field calibrations Available <small>Note 4</small>	20 A to 150 A 150 A to 1000 A	45 Hz to 65 Hz 65 Hz to 440 Hz 45 Hz to 65 Hz 65 Hz to 440 Hz	0.34 % + 26 mA 0.95 % + 47 mA 0.38 % + 0.12 A 1.2 % + 0.22 A	Fluke 5520A with 5500A/Coil
Clamp-on Ammeter Non-Toroidal Type Field calibrations Available <small>Note 4</small>	20 A to 150 A 150 A to 1000 A	45 Hz to 65 Hz 65 Hz to 440 Hz 45 Hz to 65 Hz 65 Hz to 440 Hz	0.66 % + 0.25 A 1.2 % + 0.25 A 0.68 % + 0.90 A 1.4 % + 0.92 A	Fluke 5520A with 5500A/Coil
AC Current – Measure Field calibrations available <small>Note 4</small>	0 μ A to 100 μ A 100 μ A to 1 mA 1 mA to 10 mA	10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 100 Hz 100 Hz to 5 kHz 10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 100 Hz 100 Hz to 5 kHz 10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 100 Hz 100 Hz to 5 kHz	0.46 % + 30 nA 0.18 % + 30 nA 0.072 % + 30 nA 0.072 % + 30 nA 0.46 % + 200 nA 0.17 % + 200 nA 0.074 % + 200 nA 0.043 % + 200 nA 0.46 % + 2 μ A 0.17 % + 2 μ A 0.071 % + 2 μ A 0.038 % + 2 μ A	Agilent 3458A Opt 002

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
	10 mA to 100 mA	10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 100 Hz 100 Hz to 5 kHz	0.46 % + 20 μ A 0.17 % + 20 μ A 0.07 % + 20 μ A 0.037 % + 20 μ A	
	100 mA to 1 A	10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 100 Hz 100 Hz to 5 kHz	0.46 % + 200 μ A 0.19 % + 200 μ A 0.097 % + 200 μ A 0.12 % + 200 μ A	

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
NVLAP Code: 20/E05 DC RESISTANCE and CURRENT DC Current – Measuring Equipment Field calibrations available <small>Note 4</small>	0 μ A to 220 μ A 220 μ A to 2.2 mA 2.2 mA to 22 mA 22 mA to 220 mA 220 mA to 2.2 A 2.2 A to 11 A 11 A to 20 A	41 μ A/A + 6 nA 36 μ A/A + 7 nA 36 μ A/A + 40 nA 49 μ A/A + 0.7 μ A 84 μ A/A + 12 μ A 410 μ A/A + 480 μ A 820 μ A/A + 750 μ A	Fluke 5700A-EP
Clamp-on Ammeter Non-Toroidal Type Field calibrations Available <small>Note 4</small>	20 A to 150 A 150 A to 1000 A	0.50 % + 0.14 A 0.52 % + 0.54 A	Fluke 5520A with 5500A/Coil
DC Current – Measure	0 μ A to 100 μ A 100 μ A to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 3 A	26 μ A/A + 0.8 nA 26 μ A/A + 5 nA 26 μ A/A + 50 nA 44 μ A/A + 500 nA 130 μ A/A + 10 μ A 0.15% + 0.6 mA	Agilent 3458A opt. 2 HP 34401A

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
DC Resistance – Measuring Equipment and Measure Field calibrations Available <small>Note 4</small>	0.01 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 kΩ 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ 100 MΩ to 1 GΩ	18 μΩ/Ω + 50 μΩ 15 μΩ/Ω + 0.5 mΩ 12 μΩ/Ω + 0.5 mΩ 12 μΩ/Ω + 5 mΩ 12 μΩ/Ω + 50 mΩ 19 μΩ/Ω + 2 Ω 62 μΩ/Ω + 100 Ω 0.059 % + 1 kΩ 0.58 % + 10 kΩ	Agilent 3458A opt. 2
DC Resistance – Measuring Equipment Field calibrations Available <small>Note 4</small>	1 GΩ to 10 GΩ 10 GΩ to 100 GΩ 100 GΩ to 500 GΩ	0.60% 1.20% 4.20%	Biddle 72-6349
NVLAP Code: 20/E06 DC VOLTAGE DC Voltage – Measuring Equipment	0 mV to 220 mV 220 mV to 2.2 V 2.2 V to 11 V 11 V to 22 V 22 V to 220 V 220 V to 1.1 kV	7.6 μV/V + 0.4 μV 5.1 μV/V + 0.7 μV 3.6 μV/V + 2.5 μV 3.6 μV/V + 4 μV 5.5 μV/V + 40 μV 6.9 μV/V + 500 μV	Fluke 5700A-EP
DC Voltage – Measure	0 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 500 V 500 V to 800 V 800 V to 1 kV 1 kV to 2 kV 2 kV to 20 kV 20 kV to 100 kV	7.1 μV/V + 0.5 μV 5 μV/V + 0.5 μV 5.1 μV/V + 0.5 μV 7.6 μV/V + 30 μV 11 μV/V + 100 μV 16 μV/V + 100 μV 21 μV/V + 100 μV 0.05 % + 0.4 V 0.05 % + 4 V 0.09 %	Agilent 3458A opt. 2 Fluke 5700A-EP5725A Vitrek 4600A Hipotronics KVM100-A

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty ($k=2$) ^{Note 3}	Remarks
NVLAP Code: 20/E09 LF AC VOLTAGE AC Voltage – Measuring Equipment Field calibrations available ^{Note 4}	0 mV to 2.2 mV 2.2 mV to 22 mV 22 mV to 220 mV 220 mV to 2.2 V	10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz 10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz 10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz 10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	0.16 % + 4 μ V 0.10 % + 4 μ V 0.077% + 4 μ V 0.12 % + 4.5 μ V 0.17 % + 5 μ V 0.33 % + 10 μ V 0.47 % + 20 μ V 0.58 % + 20 μ V 0.044 % + 4 μ V 0.031 % + 4 μ V 0.015 % + 4 μ V 0.031 % + 5 μ V 0.059 % + 5 μ V 0.12 % + 12 μ V 0.16 % + 20 μ V 0.30 % + 20 μ V 0.028 % + 12 μ V 0.011 % + 7 μ V 0.083 % + 7 μ V 0.021 % + 7 μ V 0.047 % + 17 μ V 0.092 % + 20 μ V 0.14 % + 25 μ V 0.28 % + 45 μ V 0.028 % + 40 μ V 0.01 % + 15 μ V 0.0048 % + 8 μ V 0.0081 % + 10 μ V 0.012 % + 30 μ V	Fluke 5700A-EP

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
AC Voltage – Measure Field calibrations available <small>Note 4</small>	2.2 V to 22 V 22 V to 220 V 220 V to 750 V 220 V to 1100 V 0 mV to 10 mV	100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz 10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz 10 Hz to 20 Hz 20 Hz to 40 Hz 40 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 500 kHz to 1 MHz 30 kHz to 50 kHz 50 kHz to 100 kHz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 30 kHz 1 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz	0.043 % + 80 μ V 0.10 % + 200 μ V 0.18 % + 300 μ V 0.028 % + 0.4 mV 0.012 % + 0.15 mV 0.0049 % + 0.05 mV 0.0083 % + 0.1 mV 0.011 % + 0.2 mV 0.03 % + 0.6 mV 0.10 % + 2 mV 0.17 % + 3.2mV 0.028 % + 4 mV 0.01 % + 1.5 mV 0.0056 % + 0.6 mV 0.0093 % + 1 mV 0.016 % + 2.5 mV 0.0085 % + 16 mV 0.44 % + 40 mV 0.8 % + 40 mV 0.06 % + 11 mV 0.23 % + 45 mV 0.011 % + 4 mV 0.017 % + 6 mV 0.061 % + 11 mV 0.039 % + 3 μ V 0.028 % + 1 μ V 0.038 % + 1 μ V	Fluke 5700A-EP5725A Agilent 3458A opt. 2

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
		20 kHz to 50 kHz	0.15 % + 1 μ V	
		50 kHz to 100 kHz	0.59 % + 1 μ V	
		100 kHz to 300 kHz	4.6 % + 2 μ V	
	10 mV to 100 mV	1 Hz to 40 Hz	0.013 % + 4 μ V	
		40 Hz to 1 kHz	0.0094 % + 2 μ V	
		1 kHz to 20 kHz	0.017 % + 2 μ V	
		20 kHz to 50 kHz	0.037 % + 2 μ V	
		50 kHz to 100 kHz	0.093 % + 2 μ V	
		100 kHz to 300 kHz	0.36 % + 10 μ V	
		300 kHz to 1 MHz	1.1 % + 10 μ V	
		1 MHz to 2 MHz	1.7 % + 10 μ V	
	100 mV to 1 V	1 Hz to 40 Hz	0.0098 % + 40 μ V	
		40 Hz to 1 kHz	0.0094 % + 20 μ V	
		1 kHz to 20 kHz	0.017 % + 20 μ V	
		20 kHz to 50 kHz	0.036 % + 20 μ V	
		50 kHz to 100 kHz	0.093 % + 20 μ V	
		100 kHz to 300 kHz	0.35 % + 100 μ V	
		300 kHz to 1 MHz	1.2 % + 100 μ V	
		1 MHz to 2 MHz	1.7 % + 100 μ V	
	1 V to 10 V	1 Hz to 40 Hz	0.0095 % + 400 μ V	
		40 Hz to 1 kHz	0.0095 % + 200 μ V	
		1 kHz to 20 kHz	0.017 % + 200 μ V	
		20 kHz to 50 kHz	0.036 % + 200 μ V	
		50 kHz to 100 kHz	0.093 % + 200 μ V	
		100 kHz to 300 kHz	0.35 % + 1 mV	
		300 kHz to 1 MHz	1.1 % + 1 mV	
		1 MHz to 2 MHz	1.4 % + 1 mV	
	10 V to 100 V	1 Hz to 40 Hz	0.024 % + 4 mV	
		40 Hz to 1 kHz	0.024 % + 2 mV	
		1 kHz to 20 kHz	0.024 % + 2 mV	
		20 kHz to 50 kHz	0.041 % + 2 mV	
		50 kHz to 100 kHz	0.14 % + 2 mV	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
		100 kHz to 300 kHz 300 kHz to 1 MHz	0.46 % + 10 mV 1.7 % +10 mV	
	100 V to 700 V	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	0.047 % + 40 mV 0.047 % + 20 mV 0.071 % + 20 mV 0.14 %+ 20 mV 0.035 % + 20 mV	
	700 V to 2 kV	20 Hz to 100 Hz 100 Hz to 400 Hz	0.098 % + 2 V 0.47 % + 4 V	Vitrek 4600A
	2 kV to 20 kV	20 Hz to 100 Hz	0.25 % + 20 V	
	20 kV to 80 kV	60 Hz	1.0%	Hipotronics KVM100-A
NVLAP Code: 20/E10 LF CAPACITANCE Capacitance – Measuring Equipment Field calibrations available <small>Note 4</small>	0.19 nF to 1.0999 nF 1.1 nF to 3.2999 nF 3.3 nF to 10.9999 nF 11 nF to 23.9999 nF 33 nF to 109.9999 nF 110 nF to 329.999 nF 0.33 µF to 1.09999 µF 1.1 µF to 3.29999 µF 3.3 µF to 10.9999 µF 11 µF to 32.9999 µF 33 µF to 109.999 µF 110 µF to 329.999 µF 0.33 mF to 1.09999 mF 1.1 mF to 3.2999 mF 33 mF to 10.9999 mF 11 mF to 32.9999 mF	10 Hz to 10 kHz 10 Hz to 3 kHz 10 Hz to 1 kHz 10 Hz to 600 Hz 10 Hz to 300 Hz 10 Hz to 150 Hz 10 Hz to 120 Hz 10 Hz to 80 Hz DC to 50 Hz DC to 20 Hz DC to 6 Hz DC to 2 Hz DC to 0.6 Hz	0.39 %+ 7.8 pF 0.39 %+ 7.8 pF 0.21 %+ 7.8 pF 0.21 %+ 0.78 pF 0.21 %+ 0.78 pF 0.21 %+ 0.23 nF 0.21 %+ 0.78 nF 0.21 %+ 2.3 nF 0.2 %+ 7.8 nF 0.32 %+ 23 nF 0.35 %+ 78 nF 0.35 %+ 0.23 µF 0.35 % + 0.78 µF 0.35 % + 2.3 µF 0.35 % + 7.8 µF 0.58 % + 23 µF	Fluke 5520A

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Measured Parameter or Device Calibrated	Range	Frequency Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
	33 mF to 109.9999 mF	DC to 0.2 Hz	0.85 % + 78 μ F	
NVLAP Code: 20/E15 PHASE METERS LF Phase – Measuring Equipment Referenced to 50 kHz. Field calibrations Available <small>Note 4</small>	0° to 180°	10 Hz to 65 Hz 65 Hz to 500 Hz 500 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 kHz to 20 kHz	0.1° 0.2° 0.37° 1.8° 3.6° 7.3°	Fluke 5520A

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
NVLAP Code: 20/E20 OSCILLOSCOPES Sine Wave Flatness Referenced to 50 kHz. Field calibrations Available <small>Note 4</small>	50 kHz to 100 MHz 100 MHz to 300 MHz 300 MHz to 600 MHz 600 MHz to 1100 MHz	1.7 % + 100 μ V 2.2 % + 100 μ V 4.1 % + 100 μ V 5.1 % + 100 μ V	Fluke 5520A/SC1100
Rise Time Field calibrations Available <small>Note 4</small>	\leq 300 ps	2.6 %	Fluke 5520A/SC1100

TIME and FREQUENCY

NVLAP Code: 20/F01 FREQUENCY DISSEMINATION Frequency Measuring Equipment Uncertainty values of derivatives of 10 MHz will differ due resolution, noise, and gating errors.	10 MHz	5.8×10^{-10}	Rubidium Frequency Standard
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MECHANICAL

NVLAP Code: 20/M08			
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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
MASS			
Scales and Balances	2 kg 1 kg 500 g 200 g 100 g 50 g 20 g 10 g 5 g 2 g 1 g 500 mg 200 mg 100 mg	21 mg 16 mg 12 mg 1.2 mg	ASTM Class 2 Mass Standards
Metric	10 kg 20 kg	0.26 g 0.48 g	Echelon III
Avoirdupois	10 lb 20 lb 50 lb	0.10 g 0.10 g 0.15 g	Echelon III
NVLAP Code: 20/M15 TORQUE			
Torque – Measure Field calibrations Available <small>Note 4</small>	5 lbf-in to 250 lbf-in	1.0 %	CDI 950-DT
Torque Screwdrivers – Measure Field calibrations Available <small>Note 4</small>	5 lbf-in to 50 lbf-in	1.5 %	CDI 950-DT
THERMODYNAMIC			
NVLAP Code: 20/T03 LABORATORY			

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Measured Parameter or Device Calibrated	Range	Uncertainty ($k=2$) <small>Note 3</small>	Remarks
THEMOMETERS, DIGITAL and ANALOG Temperature – Measure Field calibrations Available <small>Note 4</small>	-100 °C to 600 °C	0.018 °C	Hart 5626, 1560, 2560
Temperature – Measuring Equipment Field calibrations Available <small>Note 4</small>	-20 °C to 150 °C 150 °C to 300 °C 300 °C to 600 °C	0.018 °C + 0.10 % 0.12 °C 0.35 °C + 0.005 %	Hart 5626, 1560, 2560, 9122
NVLAP Code: 20/T05 PRESSURE Pressure – Gage Field calibrations Available <small>Note 4</small>	-15 psi to 25 psi 25 psi to 500 psi -22 inH ₂ O to 22 inH ₂ O 22 inH ₂ O to 60 inH ₂ O 60 inH ₂ O to 72 inH ₂ O 72 inH ₂ O to 804 inH ₂ O 500 psi to 15,000 psi	0.0016 psi 0.0075 % 0.0022 inH ₂ O 0.0090 % + 0.00015 inH ₂ O 0.0067 inH ₂ O 0.0090 % + 0.00015 inH ₂ O 0.0084 %	Ruska 7250xi Pressure Controller DHI PPC4 Controller Ametek T-150 Deadweight Tester
Pressure – Absolute Field calibrations Available <small>Note 4</small>	0 psi to 25 psi 25 psi to 500 psi	0.0019 psi 0.0077 % + 0.001 psi	Ruska 7250xi Controller
NVLAP Code: 20/T11 THERMOCOUPLES Field calibrations			

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Available <small>Note 4</small> Thermocouple Type			
Type B	600 °C to 800 °C 800 °C to 1000 °C 1000 °C to 1550 °C 1550 °C to 1820 °C	0.45 °C 0.35 °C 0.32 °C 0.35 °C	Fluke 5520A
Type E	-250 °C to -100 °C -100 °C to -25 °C -25 °C to 350 °C 350 °C to 650 °C 650 °C to 1000 °C	0.51 °C 0.19 °C 0.17 °C 0.19 °C 0.23 °C	
Type J	-210 °C to -100 °C -100 °C to -30 °C -30 °C to 150 °C 150 °C to 760 °C 760 °C to 1200 °C	0.29 °C 0.19 °C 0.17 °C 0.20 °C 0.25 °C	
Type K	-200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 1000 °C 1000 °C to 1372 °C	0.35 °C 0.21 °C 0.19 °C 0.28 °C 0.41 °C	
Type N	-200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 410 °C 410 °C to 1300 °C	0.41 °C 0.24 °C 0.22 °C 0.21 °C 0.29 °C	
Type R	0 °C to 250 °C 250 °C to 400 °C 400 °C to 1000 °C 1000 °C to 1767 °C	0.58 °C 0.36 °C 0.35 °C 0.47 °C	

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Type S	0 °C to 250 °C	0.48 °C	
	250 °C to 1000 °C	0.37 °C	
	1000 °C to 1400 °C	0.38 °C	
	1400 °C to 1767 °C	0.47 °C	
Type T	-250 °C to -150 °C	0.64 °C	
	-150 °C to 0 °C	0.26 °C	
	0 °C to 120 °C	0.19 °C	
	120 °C to 400 °C	0.17 °C	

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 using a coverage factor, $k = 2$, with a level of confidence of approximately 95 %. 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.

2012-04-01 through 2013-03-31

Effective dates

For the National Institute of Standards and Technology