



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Transcat Biomedical

1228 State Route 487

Paxinos, PA 17860

Fulfills the requirements of

ISO/IEC 17025:2017

and national standard

ANSI/NCSL Z540-1-1994 (R2002)

In the field of

CALIBRATION

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

Jason Stine, Vice President

Expiry Date: 07 September 2027

Certificate Number: AC-2489.19



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory
quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

AND

ANSI/NCSL Z540-1-1994 (R2002)

Transcat Biomedical

1228 State Route 487

Paxinos, PA 17860

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CALIBRATION

ISO/IEC 17025 Accreditation Granted: **29 August 2025**

Certificate Number: **AC-2489.19**

Certificate Expiry Date: **07 September 2027**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measure ¹	Up to 100 μ A		Comparison to Keysight 3458A opt 002 8.5 Digit Multimeter
	(10 to 20) Hz	0.46 % of reading + 35 nA	
	(20 to 45) Hz	0.17 % of reading + 35 nA	
	(45 to 100) Hz	0.072 % of reading + 35 nA	
	100 Hz to 5 kHz	0.072 % of reading + 35 nA	
	(0.1 to 1) mA		
	(10 to 20) Hz	0.46 % of reading + 0.23 μ A	
	(20 to 45) Hz	0.17 % of reading + 0.23 μ A	
	(45 to 100) Hz	0.071 % of reading + 0.23 μ A	
	100 Hz to 5 kHz	0.038 % of reading + 0.23 μ A	
	(1 to 10) mA		
	(10 to 20) Hz	0.46 % of reading + 2.3 μ A	
	(20 to 45) Hz	0.17 % of reading + 2.3 μ A	
	(45 to 100) Hz	0.071 % of reading + 2.3 μ A	
	100 Hz to 5 kHz	0.038 % of reading + 2.3 μ A	
	(10 to 100) mA		
	(10 to 20) Hz	0.48 % of reading + 23 μ A	
	(20 to 45) Hz	0.17 % of reading + 23 μ A	
	(45 to 100) Hz	0.071 % of reading + 23 μ A	
	100 Hz to 5 kHz	0.037 % of reading + 23 μ A	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measure ¹	100 mA to 1 A (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	0.46 % of reading + 0.23 mA 0.19 % of reading + 0.23 mA 0.097 % of reading + 0.23 mA 0.12 % of reading + 0.23 mA	Comparison to Keysight 3458A opt 002 8.5 Digit Multimeter
AC Current – Measure ¹	(1 to 3) A (3 to 5) Hz (5 to 10) Hz 10 Hz to 5 kHz	0.74 % of reading + 1.8 mA 0.24 % of reading + 0.6 mA 0.11 % of reading + 0.6 mA	Comparison to Agilent 34401A 6.5 Digit Multimeter
AC Current – Source ¹	Up to 220 μ A (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (0.22 to 2.2) mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (2.2 to 22) mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (22 to 220) mA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (0.22 to 2.2) A 20 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.022 % of reading + 25 nA 0.036 % of reading + 20 nA 0.016 % of reading + 16 nA 0.06 % of reading + 40 nA 0.16 % of reading + 80 nA 0.072 % of reading + 40 nA 0.036 % of reading + 35 nA 0.015 % of reading + 35 nA 0.06 % of reading + 0.4 μ A 0.16 % of reading + 0.8 μ A 0.073 % of reading + 0.4 μ A 0.037 % of reading + 0.35 μ A 0.017 % of reading + 0.35 μ A 0.061 % of reading + 4 μ A 0.16 % of reading + 8 μ A 0.077 % of reading + 4 μ A 0.036 % of reading + 3.5 μ A 0.015 % of reading + 2.5 μ A 0.06 % of reading + 40 μ A 0.11 % of reading + 80 μ A 0.065 % of reading + 35 μ A 0.075 % of reading + 80 μ A 0.85 % of reading + 0.16 mA	Comparison to Fluke 5700A Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source ¹	(29 to 330) μ A		Comparison to Fluke 5520A Multiproduct Calibrator
	(10 to 20) Hz	0.16 % of reading + 80 nA	
	(10 to 30) kHz	1.2 % of reading + 0.31 μ A	
	(0.33 to 3.3) mA		
	(10 to 20) Hz	0.16 % of reading + 0.12 μ A	
	(10 to 30) kHz	0.78 % of reading + 0.47 μ A	
	(3.3 to 33) mA		
	(10 to 20) Hz	0.14 % of reading + 1.6 μ A	
	(10 to 30) kHz	0.31 % of reading + 3.1 μ A	
	(33 to 330) mA		
	(10 to 20) Hz	0.14 % of reading + 16 μ A	
	(10 to 30) kHz	0.31 % of reading + 0.16 mA	
	(0.33 to 2.2) A		
	(10 to 20) Hz	0.14 % of reading + 78 μ A	
	(2.2 to 3) A		
	(10 to 20) Hz	0.14 % of reading + 78 μ A	
	45 Hz to 1 kHz	0.049 % of reading + 78 μ A	
	(1 to 5) kHz	0.47 % of reading + 0.78 mA	
	(5 to 10) kHz	1.9 % of reading + 3.9 mA	
	(3 to 11) A		
	(10 to 100) Hz	0.049 % of reading + 1.6 mA	
	100 Hz to 1 kHz	0.079 % of reading + 1.6 mA	
	(1 to 5) kHz	2.3 % of reading + 1.6 mA	
	(11 to 20.5) A		
	(10 to 100) Hz	0.095 % of reading + 3.9 mA	
	100 Hz to 1 kHz	0.12 % of reading + 3.9 mA	
	(1 to 5) kHz	2.3 % of reading + 3.9 mA	
AC Power – Source ^{1,2} (10 to 65) Hz PF = 1			Comparison to Fluke 5520A Multiproduct Calibrator
(33 to 330) mV	(3.3 to 9) mA	0.13 % of reading	
(0.33 to 1 020) V	(0.11 to 3) mW	0.077 % of reading	
	3 mW to 9 W		
(33 to 330) mV	(9 to 33) mA	0.089 % of reading	
(0.33 to 1 020) V	(0.3 to 10) mW	0.077 % of reading	
	10 mW to 33 W		
(33 to 330) mV	(33 to 90) mA	0.071 % of reading	
(0.33 to 1 020) V	(1 to 30) mW	0.057 % of reading	
	30 mW to 90 W		

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Power – Source ^{1,2} (10 to 65) Hz PF = 1	(90 to 330) mA		Comparison to Fluke 5520A Multiproduct Calibrator
(33 to 330) mV	(3 to 100) mW	0.089 % of reading	
(0.33 to 1 020) V	100 mW to 300 W	0.078 % of reading	
(0.33 to 0.9) A			
(33 to 330) mV	(11 to 300) mW	0.071 % of reading	
(0.33 to 1 020) V	300 mW to 900 W	0.081 % of reading	
(0.9 to 2.2) A			
(33 to 330) mV	30 mW to 0.72 W	0.089 % of reading	
(0.33 to 1 020) V	0.72 W to 2 kW	0.079 % of reading	
(2.2 to 4.5) A			
(33 to 330) mV	80 mW to 1.4 W	0.088 % of reading	Comparison to Keysight 3458A opt 002 8.5 Digit Multimeter
(0.33 to 1 020) V	1.4 W to 4.5 kW	0.18 % of reading	
(4.5 to 20.5) A			
(33 to 330) mV	(0.15 to 6.7) W	0.17 % of reading	
(0.33 to 1 020) V	6.7 W to 20 kW	0.17 % of reading	
(1 to 10) mV			
(1 to 40) Hz		0.04 % of reading + 3.5 μ V	
40 Hz to 1 kHz		0.03 % of reading + 1.2 μ V	
(1 to 20) kHz		0.04 % of reading + 1.2 μ V	
(20 to 50) kHz		0.15 % of reading + 1.2 μ V	
(50 to 100) kHz		0.59 % of reading + 1.2 μ V	
(100 to 300) kHz		4.6 % of reading + 2.3 μ V	
300 kHz to 1 MHz		1.5 % of reading + 5.8 μ V	
(1 to 4) MHz		8.1 % of reading + 8.1 μ V	
(10 to 100) mV			
(1 to 40) Hz		0.013 % of reading + 4.6 μ V	
40 Hz to 1 kHz		0.009 7 % of reading + 2.3 μ V	
(1 to 20) kHz		0.017 % of reading + 2.3 μ V	
(20 to 50) kHz		0.038 % of reading + 2.3 μ V	
(50 to 100) kHz		0.093 % of reading + 2.3 μ V	
(100 to 300) kHz		0.36 % of reading + 12 μ V	
300 kHz to 1 MHz		1.2 % of reading + 12 μ V	
(1 to 2) MHz		1.8 % of reading + 12 μ V	
(2 to 4) MHz		4.7 % of reading + 81 μ V	
(4 to 8) MHz		4.7 % of reading + 92 μ V	
(8 to 10) MHz		17 % of reading + 0.12 mV	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure ¹	(0.1 to 1) V		Comparison to Keysight 3458A opt 002 8.5 Digit Multimeter
	(1 to 40) Hz	0.008 8 % of reading + 46 μ V	
	40 Hz to 1 kHz	0.008 3 % of reading + 23 μ V	
	(1 to 20) kHz	0.017 % of reading + 23 μ V	
	(20 to 50) kHz	0.036 % of reading + 23 μ V	
	(50 to 100) kHz	0.093 % of reading + 23 μ V	
	(100 to 300) kHz	0.35 % of reading + 0.12 mV	
	300 kHz to 1 MHz	1.2 % of reading + 0.12 mV	
	(1 to 2) MHz	1.8 % of reading + 0.12 mV	
	(2 to 4) MHz	4.6 % of reading + 0.81 mV	
	(4 to 8) MHz	4.6 % of reading + 0.92 mV	
	(8 to 10) MHz	17 % of reading + 1.2 mV	
	(1 to 10) V		
	(1 to 40) Hz	0.009 5 % of reading + 0.46 mV	
	40 Hz to 1 kHz	0.023 % of reading + 0.23 mV	
	(1 to 20) kHz	0.017 % of reading + 0.23 mV	
	(20 to 50) kHz	0.036 % of reading + 0.23 mV	
	(50 to 100) kHz	0.093 % of reading + 0.23 mV	
	(100 to 300) kHz	0.35 % of reading + 1.2 mV	
	300 kHz to 1 MHz	1.2 % of reading + 1.2 mV	
	(1 to 2) MHz	1.8 % of reading + 1.2 mV	
	(2 to 4) MHz	4.6 % of reading + 8.1 mV	
	(4 to 8) MHz	4.6 % of reading + 9.2 mV	
	(8 to 10) MHz	17 % of reading + 12 mV	
	(10 to 100) V		
	(1 to 40) Hz	0.024 % of reading + 4.6 mV	
	40 Hz to 1 kHz	0.024 % of reading + 2.3 mV	
	(1 to 20) kHz	0.024 % of reading + 2.3 mV	
	(20 to 50) kHz	0.041 % of reading + 2.3 mV	
	(50 to 100) kHz	0.14 % of reading + 2.3 mV	
	(100 to 300) kHz	0.46 % of reading + 12 mV	
	300 kHz to 1 MHz	1.7 % of reading + 12 mV	
	(100 to 700) V		
	(1 to 40) Hz	0.048 % of reading + 46 mV	
	40 Hz to 1 kHz	0.048 % of reading + 23 mV	
	(1 to 20) kHz	0.071 % of reading + 23 mV	
	(20 to 50) kHz	0.19 % of reading + 23 mV	
	(50 to 100) kHz	0.35 % of reading + 23 mV	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source ¹	Up to 2.2 mV		Comparison to Fluke 5700A Multiproduct Calibrator
	(10 to 20) Hz	0.11 % of reading + 4.5 μ V	
	(20 to 40) Hz	0.089 % of reading + 4.5 μ V	
	40 Hz to 20 kHz	0.087 % of reading + 4.5 μ V	
	(20 to 50) kHz	0.11 % of reading + 4.5 μ V	
	(50 to 100) kHz	0.15 % of reading + 7 μ V	
	(100 to 300) kHz	0.26 % of reading + 13 μ V	
	(300 to 500) kHz	0.43 % of reading + 25 μ V	
	500 kHz to 1 MHz	0.6 % of reading + 25 μ V	
	(2.2 to 22) mV		
	(10 to 20) Hz	0.063 % of reading + 5 μ V	
	(20 to 40) Hz	0.034 % of reading + 5 μ V	
	40 Hz to 20 kHz	0.017 % of reading + 4 μ V	
	(20 to 50) kHz	0.041 % of reading + 5 μ V	
	(50 to 100) kHz	0.088 % of reading + 7 μ V	
	(100 to 300) kHz	0.11 % of reading + 12 μ V	
	(300 to 500) kHz	0.18 % of reading + 25 μ V	
	500 kHz to 1 MHz	0.36 % of reading + 25 μ V	
	(22 to 220) mV		
	(10 to 20) Hz	0.055 % of reading + 13 μ V	
	(20 to 40) Hz	0.016 % of reading + 25 μ V	
	40 Hz to 20 kHz	0.011 % of reading + 8 μ V	
	(20 to 50) kHz	0.02 % of reading + 7 μ V	
	(50 to 100) kHz	0.085 % of reading + 25 μ V	
	(100 to 300) kHz	0.11 % of reading + 25 μ V	
	(300 to 500) kHz	0.17 % of reading + 35 μ V	
	500 kHz to 1 MHz	0.35 % of reading + 80 μ V	
	(0.22 to 2.2) V		
	(10 to 20) Hz	0.05 % of reading + 80 μ V	
	(20 to 40) Hz	0.016 % of reading + 25 μ V	
	40 Hz to 20 kHz	0.007 % of reading + 6 μ V	
	(20 to 50) kHz	0.012 % of reading + 16 μ V	
	(50 to 100) kHz	0.025 % of reading + 70 μ V	
	(100 to 300) kHz	0.044 % of reading + 0.13 mV	
	(300 to 500) kHz	0.11 % of reading + 0.35 mV	
	500 kHz to 1 MHz	0.23 % of reading + 0.85 mV	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source ¹	(2.2 to 22) V		Comparison to Fluke 5700A Multiproduct Calibrator
	(10 to 20) Hz	0.05 % of reading + 0.8 mV	
	(20 to 40) Hz	0.016 % of reading + 0.25 mV	
	40 Hz to 20 kHz	0.007 7 % of reading + 60 µV	
	(20 to 50) kHz	0.012 % of reading + 0.16 mV	
	(50 to 100) kHz	0.025 % of reading + 0.35 mV	
	(100 to 300) kHz	0.051 % of reading + 1.5 mV	
	(300 to 500) kHz	0.13 % of reading + 4.3 mV	
	500 kHz to 1 MHz	0.28 % of reading + 3.2 mV	
	(22 to 220) V		
	(10 to 20) Hz	0.05 % of reading + 4 mV	
	(20 to 40) Hz	0.016 % of reading + 2.5 mV	
	40 Hz to 20 kHz	0.008 2 % of reading + 0.8 mV	
	(20 to 50) kHz	0.022 % of reading + 3.5 mV	
	(50 to 100) kHz	0.05 % of reading + 8 mV	
AC Voltage – Source ¹	(100 to 300) kHz	0.15 % of reading + 90 mV	Comparison to Fluke 5520A Multiproduct Calibrator
	(300 to 500) kHz	0.47 % of reading + 90 mV	
	500 kHz to 1 MHz	1.2 % of reading + 0.19 V	
	(220 to 250) V		
	(15 to 50) Hz	0.04 % of reading + 16 mV	
	(220 to 1 100) V		
Capacitance – Source ¹ (Simulation)	50 Hz to 1 kHz	0.011 % of reading + 4 mV	Comparison to Fluke 5520A Multiproduct Calibrator
	(220 to 330) V		
	(1 to 10) kHz	0.016 % of reading + 4.7 mV	
	(10 to 20) kHz	0.02 % of reading + 4.7 mV	
	(20 to 50) kHz	0.025 % of reading + 4.7 mV	
	(50 to 100) kHz	0.16 % of reading + 39 mV	
Capacitance – Source ¹ (Simulation)	(330 to 1 020) V		Comparison to Fluke 5520A Multiproduct Calibrator
	(1 to 5) kHz	0.02 % of reading + 7.8 mV	
	(5 to 10) kHz	0.023 % of reading + 7.8 mV	
	(220 to 400) pF		
Capacitance – Source ¹ (Simulation)	10 Hz to 10 kHz	0.4 % of reading + 7.8 pF	Comparison to Fluke 5520A Multiproduct Calibrator
	(0.4 to 1.1) nF		
	10 Hz to 10 kHz	0.4 % of reading + 7.8 pF	
	(1.1 to 3.3) nF		
Capacitance – Source ¹ (Simulation)	10 Hz to 3 kHz	0.4 % of reading + 7.8 pF	Comparison to Fluke 5520A Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance – Source ¹ (Simulation)	(3.3 to 11) nF 10 Hz to 1 kHz	0.21 % of reading + 7.8 pF	Comparison to Fluke 5520A Multiproduct Calibrator
	(11 to 33) nF 10 Hz to 1 kHz	0.2 % of reading + 78 pF	
	(33 to 110) nF 10 Hz to 1 kHz	0.21 % of reading + 78 pF	
	(110 to 330) nF 10 Hz to 1 kHz	0.2 % of reading + 0.23 nF	
	(0.33 to 1.1) μF (10 to 600) Hz	0.21 % of reading + 0.78 nF	
	(1.1 to 3.3) μF (10 to 300) Hz	0.21 % of reading + 2.3 nF	
	(3.3 to 11) μF (10 to 150) Hz	0.2 % of reading + 7.8 nF	
	(11 to 33) μF (10 to 120) Hz	0.32 % of reading + 23 nF	
	(33 to 110) μF (10 to 80) Hz	0.37 % of reading + 78 nF	
	(110 to 330) μF DC to 50 Hz	0.38 % of reading + 0.23 μF	
	(0.33 to 1.1) mF DC to 20 Hz	0.35 % of reading + 0.78 μF	
	(1.1 to 3.3) mF DC to 6 Hz	0.35 % of reading + 2.3 μF	
	(3.3 to 11) mF DC to 2 Hz	0.35 % of reading + 7.8 μF	
	(11 to 33) mF DC to 0.6 Hz	0.58 % of reading + 23 μF	
	(33 to 110) mF DC to 0.2 Hz	0.85 % of reading + 78 μF	
DC Current – Measure ¹	(0 to 100) μA	0.003 3 % of reading + 0.92 nA	Comparison to Keysight 3458A opt 002 8.5 Digit Multimeter
	(0.1 to 1) mA	0.002 9 % of reading + 5.8 nA	
	(1 to 10) mA	0.002 9 % of reading + 58 nA	
	(10 to 100) mA	0.004 6 % of reading + 0.58 μA	
	(0.1 to 1) A	0.013 % of reading + 12 μA	
DC Current – Measure ¹	(1 to 3) A	0.08 % of reading + 0.2 mA	Comparison to Keysight 34401A 6.5 Digit Multimeter

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current – Source ¹	(0 to 220) μ A (0.22 to 2.2) mA (2.2 to 22) mA (22 to 220) mA (0.22 to 2.2) A	0.005 1 % of reading + 8 nA 0.005 1 % of reading + 8 nA 0.005 1 % of reading + 8 nA 0.006 9 % of reading + 0.8 μ A 0.015 % of reading + 25 μ A	Comparison to Fluke 5700A Multiproduct Calibrator
DC Current – Source ¹	(2.2 to 3) A (3 to 11) A (11 to 20.5) A	0.03 % of reading + 31 μ A 0.051 % of reading + 0.39 mA 0.093 % of reading + 0.58 mA	Comparison to Fluke 5520A Multiproduct Calibrator
DC Power – Source ¹ 33 mV to 1 020 V	(0.33 to 330) mA 11 μ W to 1.1 mW (1.1 to 110) mW 110 mW to 110 W (110 to 330) W (0.33 to 3) A 11 μ W to 110 mW 110 mW to 990 W 990 W to 3 kW (3 to 20.5) A (99 to 990) mW 990 mW to 6.8 kW (6.8 to 20.5) kW	0.024 % of reading 0.027 % of reading 0.024 % of reading 0.018 % of reading 0.044 % of reading 0.053 % of reading 0.009 6 % of reading 0.088 % of reading 0.07 % of reading 0.04 % of reading	Comparison to Fluke 5520A Multiproduct Calibrator
DC Resistance – Source ¹ (Fixed Artifacts)	0 Ω 1 Ω 1.9 Ω 10 Ω 19 Ω 100 Ω 190 Ω 1 k Ω 1.9 k Ω 10 k Ω 19 k Ω 100 k Ω 190 k Ω 1 M Ω 1.9 M Ω 10 M Ω 19 M Ω 100 M Ω	50 $\mu\Omega$ 98 $\mu\Omega/\Omega$ 96 $\mu\Omega/\Omega$ 29 $\mu\Omega/\Omega$ 29 $\mu\Omega/\Omega$ 18 $\mu\Omega/\Omega$ 18 $\mu\Omega/\Omega$ 14 $\mu\Omega/\Omega$ 14 $\mu\Omega/\Omega$ 13 $\mu\Omega/\Omega$ 13 $\mu\Omega/\Omega$ 15 $\mu\Omega/\Omega$ 15 $\mu\Omega/\Omega$ 21 $\mu\Omega/\Omega$ 22 $\mu\Omega/\Omega$ 41 $\mu\Omega/\Omega$ 47 $\mu\Omega/\Omega$ 0.13 m Ω/Ω	Comparison to Fluke 5700A Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Resistance – Source ¹ (Simulation)	Up to 11 Ω (11 to 33) Ω (33 to 111) Ω (110 to 330) Ω 330 Ω to 1.1 k Ω (1.1 to 3.3) k Ω (3.3 to 11) k Ω (11 to 33) k Ω (33 to 110) k Ω (110 to 330) k Ω 330 k Ω to 1.1 M Ω (1.1 to 3.3) M Ω (3.3 to 11) M Ω (11 to 33) M Ω (33 to 110) M Ω (110 to 330) M Ω 330 M Ω to 1.1 G Ω	0.003 2 % of reading + 0.78 m Ω 0.002 4 % of reading + 1.2 m Ω 0.002 2 % of reading + 1.1 m Ω 0.002 2 % of reading + 1.6 m Ω 0.002 2 % of reading + 1.6 m Ω 0.002 2 % of reading + 16 m Ω 0.002 2 % of reading + 16 m Ω 0.002 2 % of reading + 0.16 Ω 0.002 2 % of reading + 0.16 Ω 0.002 7 % of reading + 1.6 Ω 0.002 6 % of reading + 1.6 Ω 0.006 6 % of reading + 23 Ω 0.01 % of reading + 39 Ω 0.019 % of reading + 1.9 k Ω 0.041 % of reading + 2.3 k Ω 0.23 % of reading + 78 k Ω 12 % of reading + 0.39 M Ω	Comparison to Fluke 5520A Multiproduct Calibrator
DC Resistance – Source/Measure ¹ (Variable Artifact)	Up to 10 Ω (10 to 100) Ω (0.1 to 1) k Ω (1 to 10) k Ω (10 to 100) k Ω (0.1 to 1) M Ω (1 to 10) M Ω (10 to 100) M Ω (0.1 to 1) G Ω	0.001 8 % of reading + 58 $\mu\Omega$ 0.001 5 % of reading + 0.58 m Ω 0.001 3 % of reading + 0.58 m Ω 0.001 2 % of reading + 5.8 m Ω 0.001 3 % of reading + 58 m Ω 0.002 1 % of reading + 2.3 Ω 0.006 2 % of reading + 0.12 k Ω 0.059 % of reading + 1.2 k Ω 0.82 % of reading + 12 k Ω	Comparison to Keysight 3458A opt 002 8.5 Digit Multimeter, Decade Resistor
PRT/RTD Simulation ¹ (Source)	Pt 385, 100 Ω (-200 to -80) $^{\circ}\text{C}$ (-80 to 0) $^{\circ}\text{C}$ (0 to 100) $^{\circ}\text{C}$ (100 to 300) $^{\circ}\text{C}$ (300 to 400) $^{\circ}\text{C}$ (400 to 630) $^{\circ}\text{C}$ (630 to 800) $^{\circ}\text{C}$	0.039 $^{\circ}\text{C}$ 0.039 $^{\circ}\text{C}$ 0.054 $^{\circ}\text{C}$ 0.07 $^{\circ}\text{C}$ 0.078 $^{\circ}\text{C}$ 0.093 $^{\circ}\text{C}$ 0.18 $^{\circ}\text{C}$	Comparison to Fluke 5520A Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
PRT/RTD Simulation ¹ (Source)	Pt 385, 200 Ω		Comparison to Fluke 5520A Multiproduct Calibrator
	(-200 to -80) °C	0.031 °C	
	(-80 to 0) °C	0.031 °C	
	(0 to 100) °C	0.031 °C	
	(100 to 260) °C	0.039 °C	
	(260 to 300) °C	0.093 °C	
	(300 to 400) °C	0.1 °C	
	(400 to 600) °C	0.11 °C	
	(600 to 630) °C	0.12 °C	
	Pt 385, 500 Ω		
	(-200 to -80) °C	0.031 °C	
	(-80 to 0) °C	0.039 °C	
	(0 to 100) °C	0.039 °C	
	(100 to 260) °C	0.047 °C	
	(260 to 300) °C	0.062 °C	
	(300 to 400) °C	0.062 °C	
	(400 to 600) °C	0.07 °C	
	(600 to 630) °C	0.085 °C	
	Pt 385, 1 000 Ω		
	(-200 to -80) °C	0.023 °C	
	(-80 to 0) °C	0.023 °C	
	(0 to 100) °C	0.031 °C	
	(100 to 260) °C	0.039 °C	
	(260 to 300) °C	0.047 °C	
	(300 to 400) °C	0.054 °C	
	(400 to 600) °C	0.054 °C	
	(600 to 630) °C	0.18 °C	
	Pt 3916, 100 Ω		
	(-200 to -190) °C	0.19 °C	
	(-190 to -80) °C	0.031 °C	
	(-80 to 0) °C	0.039 °C	
	(0 to 100) °C	0.047 °C	
	(100 to 260) °C	0.054 °C	
	(260 to 300) °C	0.062 °C	
	(300 to 400) °C	0.07 °C	
	(400 to 600) °C	0.078 °C	
	(600 to 630) °C	0.018 °C	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
PRT/RTD Indicator Simulation ¹ (Source)	Pt 3926, 100 Ω (-200 to -80) $^{\circ}\text{C}$ (-80 to 0) $^{\circ}\text{C}$ (0 to 100) $^{\circ}\text{C}$ (100 to 300) $^{\circ}\text{C}$ (300 to 400) $^{\circ}\text{C}$ (400 to 630) $^{\circ}\text{C}$ PtNi 385, 120 Ω (-80 to 0) $^{\circ}\text{C}$ (0 to 100) $^{\circ}\text{C}$ (100 to 260) $^{\circ}\text{C}$ Cu 427, 10 Ω (-100 to 260) $^{\circ}\text{C}$	0.039 $^{\circ}\text{C}$ 0.039 $^{\circ}\text{C}$ 0.054 $^{\circ}\text{C}$ 0.07 $^{\circ}\text{C}$ 0.078 $^{\circ}\text{C}$ 0.093 $^{\circ}\text{C}$ 0.062 $^{\circ}\text{C}$ 0.062 $^{\circ}\text{C}$ 0.1 $^{\circ}\text{C}$ 0.23 $^{\circ}\text{C}$	Comparison to Fluke 5520A Multiproduct Calibrator
DC Voltage – Measure ¹	(0 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 500) V (500 to 800) V (800 to 1 000) V	0.000 83 % of reading + 0.58 μV 0.000 53 % of reading + 0.58 μV 0.000 53 % of reading + 0.58 μV 0.000 77 % of reading + 35 μV 0.001 5 % of reading + 0.12 mV 0.001 8 % of reading + 0.12 mV 0.002 1 % of reading + 0.12 mV	Comparison to Keysight 3458A opt 002 8.5 Digit Multimeter
DC Voltage – Source ¹	(0 to 220) mV (0.22 to 2.2) V (2.2 to 11) V (11 to 22) V (22 to 220) V (220 to 1 100) V	9 $\mu\text{V/V}$ + 0.6 μV 7.2 $\mu\text{V/V}$ + 1 μV 7.3 $\mu\text{V/V}$ + 3.5 μV 7.3 $\mu\text{V/V}$ + 6.5 μV 8.6 $\mu\text{V/V}$ + 80 μV 7.8 $\mu\text{V/V}$ + 0.4 mV	Comparison to Fluke 5700A Multiproduct Calibrator
Thermocouple Indicator Simulation ¹ (Source/Measure)	Type B (600 to 800) $^{\circ}\text{C}$ (800 to 1 000) $^{\circ}\text{C}$ (1 000 to 1 550) $^{\circ}\text{C}$ (1 550 to 1 820) $^{\circ}\text{C}$ Type C (0 to 150) $^{\circ}\text{C}$ (150 to 650) $^{\circ}\text{C}$ (650 to 1 000) $^{\circ}\text{C}$ (1 000 to 1 800) $^{\circ}\text{C}$ (1 800 to 2 316) $^{\circ}\text{C}$	0.35 $^{\circ}\text{C}$ 0.28 $^{\circ}\text{C}$ 0.24 $^{\circ}\text{C}$ 0.26 $^{\circ}\text{C}$ 0.24 $^{\circ}\text{C}$ 0.21 $^{\circ}\text{C}$ 0.24 $^{\circ}\text{C}$ 0.39 $^{\circ}\text{C}$ 0.65 $^{\circ}\text{C}$	Comparison to Fluke 5520A Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Thermocouple Indicator Simulation ¹ (Source/Measure)	Type E		Comparison to Fluke 5520A Multiproduct Calibrator
	(-250 to -100) °C	0.39 °C	
	(-100 to -25) °C	0.13 °C	
	(-25 to 350) °C	0.12 °C	
	(350 to 650) °C	0.13 °C	
	(650 to 1 000) °C	0.17 °C	
	Type J		
	(-210 to -100) °C	0.21 °C	
	(-100 to -30) °C	0.13 °C	
	(-30 to 150) °C	0.12 °C	
	(150 to 760) °C	0.14 °C	
	(760 to 1 200) °C	0.18 °C	
	Type K		
	(-200 to -100) °C	0.26 °C	
	(-100 to -25) °C	0.15 °C	
	(-25 to 120) °C	0.13 °C	
	(120 to 1 000) °C	0.21 °C	
	(1 000 to 1 372) °C	0.31 °C	
	Type L		
	(-200 to -100) °C	0.29 °C	
	(-100 to 800) °C	0.21 °C	
	(800 to 900) °C	0.14 °C	
	Type N		
	(-200 to -100) °C	0.31 °C	
	(-100 to -25) °C	0.18 °C	
	(-25 to 120) °C	0.15 °C	
	(120 to 410) °C	0.15 °C	
	(410 to 1 300) °C	0.21 °C	
	Type R		
	(0 to 250) °C	0.46 °C	
	(250 to 400) °C	0.29 °C	
	(400 to 1 000) °C	0.26 °C	
	(1 000 to 1 767) °C	0.32 °C	
	Type S		
	(0 to 250) °C	0.45 °C	
	(250 to 1 000) °C	0.3 °C	
	(1 000 to 1 400) °C	0.29 °C	
	(1 400 to 1 767) °C	0.36 °C	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Thermocouple Indicator Simulation ¹ (Source/Measure)	Type T (-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C Type U (-200 to 0) °C (0 to 600) °C	0.49 °C 0.19 °C 0.13 °C 0.12 °C 0.44 °C 0.21 °C	Comparison to Fluke 5520A Multiproduct Calibrator
Phase – Source ¹	Up to 180° (10 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 200 kHz)	0.11° 0.2° 0.4° 1.9° 3.9° 7.8°	Comparison to Fluke 5520A Multiproduct Calibrator
Oscilloscopes ¹ Amplitude – DC into 50 Ω load into 1 MΩ load Amplitude – Square Wave into 50 Ω load into 1 MΩ load Time Markers into 50 Ω load	 (-6.6 to 6.6) V (-130 to 130) V 10 Hz to 100 kHz 1 mVp-p to 6.6 Vp-p 10 Hz to 1 kHz 1 mVp-p to 130 Vp-p (1 to 10) kHz 1 mVp-p to 130 Vp-p 1 ns to 20 ms 50 ms 0.1 s 0.2 s 0.5 s 1 s 2 s 5 s	 0.22 % of reading + 31 μV 0.12 % of reading + 31 μV 0.22 % of reading + 31 μV 0.14 % of reading + 31 μV 0.22 % of reading + 31 μV 0.000 22 % of reading 0.005 9 % of reading 0.009 8 % of reading 0.018 % of reading 0.041 % of reading 0.08 % of reading 0.16 % of reading 0.39 % of reading	 Comparison to Fluke 55xxA/11 Multiproduct Calibrator with 1.1 GHz Scope Option

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Oscilloscopes ¹			
Rise Time into 50 Ω load	5 mVp-p to 2.5 Vp-p	50 ps	
Rate: 1 kHz to 2 MHz	250 ps (nominal)	50 ps	
Rate: 2 MHz to 10 MHz	250 ps (nominal)	50 ps	
Leveled Sine Wave into 50 Ω load	5 mVp-p to 5.5 Vp-p		
	50 kHz	1.8 % of reading + 0.23 mV	
	50 kHz to 100 MHz	2.8 % of reading + 0.23 mV	
	(100 to 300) MHz	3.2 % of reading + 0.23 mV	
	(300 to 600) MHz	4 % of reading + 0.23 mV	
	5 mVp-p to 3.5 Vp-p (600 to 1 100) MHz	5.5 % of reading + 0.23 mV	
Bandwidth/Flatness (50 kHz Reference) into 50 Ω load	5 mVp-p to 5.5 Vp-p		
	50 kHz to 100 MHz	1.4 % of reading + 78 μ V	
	(100 to 300) MHz	1.8 % of reading + 78 μ V	
	(300 to 600) MHz	3.2 % of reading + 78 μ V	
	5 mVp-p to 3.5 Vp-p (600 to 1 100) MHz	3.9 % of reading + 78 μ V	
Input Impedance – Measure	(40 to 60) Ω	0.082 % of reading	
	(0.5 to 1.5) M Ω	0.081 % of reading	
Input Capacitance – Measure	(5 to 50) pF	3.9 % of reading + 0.39 pF	
Waveform Generator (Sine, Square, Triangle) Amplitude	10 Hz to 10 kHz		
into 50 Ω load	1.8 mVp-p to 2.5 Vp-p	2.3 % of reading + 78 μ V	
into 1 M Ω load	1.8 mVp-p to 55 Vp-p	2.3 % of reading + 78 μ V	
Frequency	10 Hz to 10 kHz	0.001 9 % of reading + 12 mHz	

Comparison to
Fluke 55xxA/11
Multiproduct Calibrator
with 1.1 GHz Scope Option

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Scales and Balances ^{1,3} (SI)	Up to 500 mg (0.5 to 5) g (5 to 10) g (10 to 20) g 20 g to 40 kg	12 µg 40 µg 60 µg 90 µg 0.000 31 % of reading	ASTM E617 Class 1 weights and internal calibration procedure utilized in the calibration of the weighing system.

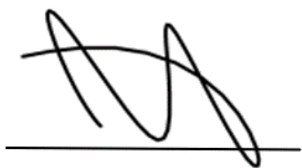
Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Measure ¹	1 Hz to 10 kHz 10 kHz to 10 MHz (10 to 225) MHz 225 MHz to 3 GHz	1 nHz/Hz + 4.7 µHz 1 nHz/Hz + 0.31 mHz 1 nHz/Hz + 6.4 mHz 1.1 nHz/Hz	Comparison to Agilent 53131A Universal Counter, Fluke 910R GPS Frequency Standard
Frequency – Reference ¹	10 MHz	38 µHz	Comparison to Fluke 910R GPS Frequency Standard
Frequency – Source ¹	1 Hz to 80 MHz	58 nHz/Hz	Comparison to Agilent 33250A Function Generator, Fluke 910R GPS Frequency Standard
AC Duty Cycle – Source ¹ Square Wave: < 3.3 Vp-p Freq: 0.1 Hz to 100 kHz	(1 to 10) % Duty Cycle 10 µs to 100 s (10 to 49) % Duty Cycle 10 µs to 100 s 50 % Duty Cycle 10 µs to 100 s (51 to 90) % Duty Cycle 10 µs to 100 s (90 to 99) % Duty Cycle 10 µs to 100 s	0.039 % of reading + 78 ns 0.62 % of reading + 78 ns 0.001 6 % of reading + 78 ns 0.62 % of reading + 78 ns 0.039 % of reading + 78 ns	Comparison to Fluke 5520A Series Multiproduct Calibrator

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 ($k=2$), corresponding to a confidence level of approximately 95%.

Notes:

1. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope. CMC is for a controlled laboratory environment of 18 °C to 28 °C (65 °F to 82 °F), when outside of this environment, larger measurement uncertainties are expected than what is reported on the accredited scope.
2. The stated uncertainty is the laboratory's ability to source a fast rise pulse that is approximately 250 ps. In the typical application of measuring rise time of an oscilloscope, this value is one of the contributing factors, but other factors are derived from the DUT.
3. The CMC for scales and balances is highly dependent upon the resolution of the unit under test. The CMC presented here does not include the resolution of the unit under test. The resolution will be included in the reported measurement uncertainty at the time of calibration.
4. Unless otherwise specified in the far-right column, the calibration procedure or method was written internally.
5. The legal entity of this location is Transcat, Inc.



Jason Stine, Vice President

