



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Trident Calibration Labs
1725 E. Robin Lane
Phoenix, AZ 85024

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: 11 September 2025
Certificate Number: AC-1986



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)

Trident Calibration Labs

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Phoenix, AZ 85024

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CALIBRATION

Valid to: **September 11, 2025**

Certificate Number: **AC-1986**

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Source	Up to 220 mV 220 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V 220 V to 1.1 kV	7.4 nV/mV + 0.5 μ V 4.7 μ V/V + 0.5 μ V 3.3 μ V/V + 3 μ V 3.3 μ V/V + 0.5 μ V 4.7 μ V/V + 50 μ V 6.5 μ V/V + 0.4 mV	Fluke 5730A Multiproduct Calibrator
DC Voltage – Measure	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V 100 V to 1 kV	7.4 nV/mV + 0.2 μ V 2.9 μ V/V + 0.3 μ V 2.5 μ V/V + 0.5 μ V 4 μ V/V + 30 μ V 4 μ V/V + 0.5 mV	Fluke 8588A 8.5 Digit Multimeter
DC High Voltage – Measure	(1 to 10) kV (10 to 100) kV	0.05 % of reading 0.13 % of reading	Vitrek 4700 High Voltage Multimeter, Vitrek HVL-100 High Voltage Probe
DC Current – Source	Up to 220 μ A 220 μ A to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A	0.03 nA/ μ A + 5.7 nA 29 nA/mA + 5.4 nA 28 nA/mA + 31 nA 37 nA/mA + 0.54 nA 86 μ A/A + 9 μ A	Fluke 5730A Multiproduct Calibrator
DC Current – Source	(2.2 to 11) A (11 to 20.5) A	0.42 mA/A + 0.39 mA 0.86 mA/A + 0.58 mA	Fluke 5522A/SC1100 Multiproduct Calibrator



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DC Current – Measure	(1 to 10) μ A (10 to 100) μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA (1 to 30) A	33 nA/A + 0.4 nA 5 nA/A + 0.4 nA 5 nA A/A + 4 nA 5 nA/A + 40 nA 10 μ A/A + 1 μ A 0.49 mA/A + 1.5 mA	Fluke 8588A 8.5 Digit Multimeter
DC Resistance – Source	Up to 11 Ω (11 to 33) Ω (33 to 110) 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 1 100 G Ω	38 $\mu\Omega/\Omega$ + 0.78 m Ω 25 $\mu\Omega/\Omega$ + 1.2 m Ω 23 $\mu\Omega/\Omega$ + 1.1 m Ω 22 $\mu\Omega/\Omega$ + 1.6 m Ω 22 m Ω /k Ω + 1.6 m Ω 22 m Ω /k Ω + 16 m Ω 22 m Ω /k Ω + 16 m Ω 22 m Ω /k Ω + 0.16 Ω 22 m Ω /k Ω + 0.16 Ω 25 m Ω /k Ω + 1.6 Ω 26 Ω /M Ω + 1.6 Ω 48 Ω /M Ω + 23 Ω 0.1 k Ω /M Ω + 39 Ω 0.22 k Ω /M Ω + 1.9 k Ω 0.45 k Ω /M Ω + 2.3 k Ω 2.3 k Ω /M Ω + 78 k Ω 12 k Ω /M Ω + 0.39 M Ω	Fluke 5522A/SC1100 Multiproduct Calibrator
DC Resistance – Source (Fixed Points)	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	99 $\mu\Omega$ 0.1 m Ω 94 $\mu\Omega$ 0.2 m Ω 0.26 m Ω 0.44 m Ω 6.8 m Ω 13 m Ω 67 m Ω 0.13 Ω 0.88 Ω 1.7 Ω 14 Ω 36 Ω 0.42 k Ω 0.9 k Ω 11 k Ω	Fluke 5730A Multiproduct Calibrator



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High Power Resistance – Source (Fixed Artifacts)	1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ 1 GΩ 10 GΩ 100 GΩ	5 mΩ 50 mΩ 1 Ω 10 Ω 100 Ω 2 kΩ 20 kΩ 10 MΩ 40 MΩ	IET VRS-100-9-1K-ROT Resistance Standard Set
Resistance – Measure (4 Wire Measurements)	(0 to 1) Ω (1 to 10) Ω (10 to 100) Ω 100 Ω to 1 kΩ (1 to 10) kΩ (10 to 100) kΩ 100 kΩ to 1 MΩ (1 to 10) MΩ (10 to 100) MΩ 100 MΩ to 1 GΩ (1 to 10) GΩ	14 μΩ/Ω + 4 μΩ 8.7 μΩ/Ω + 14 μΩ 7.6 μΩ/Ω + 50 μΩ 7.6 μΩ/Ω + 0.5 mΩ 7.7 μΩ/Ω + 5 mΩ 8.2 μΩ/Ω + 50 mΩ 9.3 μΩ/Ω + 1 Ω 9.7 μΩ/Ω + 10 Ω 21 μΩ/Ω + 1 kΩ 0.13 mΩ/Ω + 0.1 MΩ 1.5 mΩ/Ω + 10 MΩ	Fluke 8588A 8.5 Digit Multimeter
AC Voltage – Source	Up to 2.2 mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz (2.2 to 22) mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	0.39 μV/mV + 4 μV 0.85 μV/mV + 4 μV 1 μV/mV + 4 μV 0.32 μV/mV + 4 μV 0.54 μV/mV + 5 μV 1.2 μV/mV + 10 μV 2.1 μV/mV + 20 μV 3.4 μV/mV + 20 μV 0.22 μV/mV + 4 μV 0.13 μV/mV + 4 μV 0.12 μV/mV + 4 μV 0.17 μV/mV + 4 μV 0.4 μV/mV + 5 μV 0.84 μV/mV + 10 μV 1.1 μV/mV + 20 μV 2.6 μV/mV + 20 μV	Fluke 5730A Multiproduct Calibrator



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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source	(22 to 220) mV		Fluke 5730A Multiproduct Calibrator
	(10 to 20) Hz	0.36 $\mu\text{V}/\text{mV} + 12 \mu\text{V}$	
	(20 to 40) Hz	80 $\text{nV}/\text{mV} + 7 \mu\text{V}$	
	40 Hz to 20 kHz	60 $\text{nV}/\text{mV} + 7 \mu\text{V}$	
	(20 to 50) kHz	0.1 $\mu\text{V}/\text{mV} + 7 \mu\text{V}$	
	(50 to 100) kHz	0.26 $\mu\text{V}/\text{mV} + 17 \mu\text{V}$	
	(100 to 300) kHz	0.53 $\mu\text{V}/\text{mV} + 20 \mu\text{V}$	
	(300 to 500) kHz	1.1 $\mu\text{V}/\text{mV} + 25 \mu\text{V}$	
	500 kHz to 1 MHz	2.2 $\mu\text{V}/\text{mV} + 45 \mu\text{V}$	
	220 mV to 2.2 V		
	(10 to 20) Hz	0.51 $\text{mV}/\text{V} + 40 \mu\text{V}$	
	(20 to 40) Hz	73 $\mu\text{V}/\text{V} + 15 \mu\text{V}$	
	40 Hz to 20 kHz	38 $\mu\text{V}/\text{V} + 8 \mu\text{V}$	
	(20 to 50) kHz	54 $\mu\text{V}/\text{V} + 10 \mu\text{V}$	
	(50 to 100) kHz	0.11 $\text{mV}/\text{V} + 30 \mu\text{V}$	
	(100 to 300) kHz	0.28 $\text{mV}/\text{V} + 80 \mu\text{V}$	
	(300 to 500) kHz	0.8 $\text{mV}/\text{V} + 0.2 \text{mV}$	
	500 kHz to 1 MHz	1.4 $\text{mV}/\text{V} + 0.3 \text{mV}$	
	(2.2 to 22) V		
	(10 to 20) Hz	0.37 $\text{mV}/\text{V} + 0.4 \text{mV}$	
	(20 to 40) Hz	80 $\mu\text{V}/\text{V} + 0.15 \text{mV}$	
	40 Hz to 20 kHz	40 $\mu\text{V}/\text{V} + 50 \mu\text{V}$	
	(20 to 50) kHz	54 $\mu\text{V}/\text{V} + 0.1 \text{mV}$	
	(50 to 100) kHz	70 $\mu\text{V}/\text{V} + 0.2 \text{mV}$	
	(100 to 300) kHz	0.22 $\text{mV}/\text{V} + 0.6 \text{mV}$	
	(300 to 500) kHz	0.78 $\text{mV}/\text{V} + 2 \text{mV}$	
	500 kHz to 1 MHz	1.2 $\text{mV}/\text{V} + 3.2 \text{mV}$	
	(22 to 220) V		
(10 to 20) Hz	0.44 $\text{mV}/\text{V} + 4 \text{mV}$		
(20 to 40) Hz	76 $\mu\text{V}/\text{V} + 1.5 \text{mV}$		
40 Hz to 20 kHz	49 $\mu\text{V}/\text{V} + 0.6 \text{mV}$		
(20 to 50) kHz	74 $\mu\text{V}/\text{V} + 1 \text{mV}$		
(50 to 100) kHz	0.15 $\text{mV}/\text{V} + 2.5 \text{mV}$		
(100 to 300) kHz	0.71 $\text{mV}/\text{V} + 16 \text{mV}$		
(300 to 500) kHz	3.4 $\text{mV}/\text{V} + 40 \text{mV}$		
(0.5 to 1) MHz	6.3 $\text{mV}/\text{V} + 80 \text{mV}$		
220 V to 1 kV			
(15 to 50) Hz	0.24 $\text{mV}/\text{V} + 16 \text{mV}$		
50 Hz to 1 kHz	67 $\mu\text{V}/\text{V} + 3.5 \text{mV}$		



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AC Voltage – Source	220 V to 1 kV (1 to 20) kHz (20 to 30) kHz (220 to 750) V (30 to 50) kHz (50 to 100) kHz	13 mV/V + 6 mV 0.47 mV/V + 11 mV 0.47 mV/V + 11 mV 1.8 mV/V + 45 mV	Fluke 5730A Multiproduct Calibrator Fluke 5725A Amplifier
AC Voltage – Measure	(1 to 10) mV 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (10 to 100) mV 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz 100 mV to 1 V 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz (1 to 10) V 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz	0.52 μV/V + 1.1 μV 0.58 μV/V + 1.1 μV 0.59 μV/V + 1.1 μV 3.1 μV/V + 1.1 μV 10 μV/V + 4 μV 20 μV/V + 4 μV 94 μV/V + 0.5 μV 0.12 mV/V + 0.5 μV 0.21 mV/V + 1 μV 0.51 mV/V + 5 μV 2.3 mV/V + 30 μV 11 mV/V + 0.1 mV 20 mV/V + 0.5 mV 85 μV/V + 5 μV 0.12 mV/V + 5 μV 0.22 mV/V + 10 μV 0.55 mV/V + 50 μV 2.3 mV/V + 0.3 mV 11 mV/V + 1 mV 20 mV/V + 5 mV 71 μV/V + 50 μV 0.1 mV/V + 50 μV 0.2 mV/V + 0.1 mV 0.51 mV/V + 0.5 mV 2 mV/V + 3 mV 10 mV/V + 10 mV 16 mV/V + 50 mV	Fluke 8588A 8.5 Digit Multimeter



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AC Voltage – Measure	(10 to 100) V 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz	81 μ V/V + 0.5 mV 96 μ V/V + 0.5 mV 0.21 mV/V + 1 mV 0.5 mV/V + 5 mV 3.5 mV/V + 50 mV 10 mV/V + 0.2 V	Fluke 8588A 8.5 Digit Multimeter
	(100 to 1 000) V 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.1 mV/V + 25 mV 0.1 mV/V + 25 mV 0.21 mV/V + 25 mV 0.5 mV/V + 0.1 V	
AC High Voltage – Measure	(1 to 10) kV (50, 60) Hz	0.14 % of reading	Vitretek 4700 High Voltage Multimeter, Vitretek HVL-100 High Voltage Probe
	(10 to 75) kV (50, 60) Hz	0.17 % of reading	
AC Current – Source	(1 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	0.37 mA/A + 16 nA 0.12 mA/A + 10 nA 80 μ A/A + 8 nA 0.22 mA/A + 12 nA 0.9 mA/A + 65 nA	Fluke 5730A Multiproduct Calibrator
	220 μ A 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	0.33 mA/A + 40 nA 0.16 mA/A + 35 nA 0.13 mA/A + 35 nA 0.19 mA/A + 0.11 μ A 0.9 mA/A + 0.65 μ A 0.33 mA/A + 0.4 μ A 0.12 mA/A + 0.35 μ A 80 μ A/A + 0.35 μ A 0.16 mA/A + 0.55 μ A 0.9 mA/A + 5 μ A	

Electrical – DC Low Frequency

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AC Current – Source	(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 220 mA to 2.2 A 20 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.34 mA/A + 4 μ A 0.12 mA/A + 3.5 μ A 80 μ A/A + 2.5 μ A 0.16 mA/A + 3.5 μ A 0.9 mA/A + 10 μ A 0.21 mA/A + 35 μ A 0.37 mA/A + 80 μ A 5.5 mA/A + 0.16 mA	Fluke 5730A Multiproduct Calibrator
AC Current – Source	(2.2 to 11) A (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.4 mA/A + 0.17 mA 0.76 mA/A + 0.38 mA 2.9 mA/A + 0.75 mA	Fluke 5730A Multiproduct Calibrator / 5725A Amplifier
AC Current – Source	(11 to 20.5) A (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.96 mA/A + 3.9 mA 1.2 mA/A + 3.9 mA 23 mA/A + 3.9 mA	Fluke 5522A/SC1100 Multiproduct Calibrator
AC Current – Measure	(1 to 10) μ A 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (10 to 100) μ A 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz 100 μ A to 1 mA 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (1 to 10) mA 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	20 nA/A + 2.5 nA 20 nA/A + 2.5 nA 20 nA/A + 2.5 nA 4.7 nA/A + 5 nA 5.9 nA/A + 5 nA 7.6 nA/A + 5 nA 33 nA/A + 10 nA 0.27 μ A/A + 50 nA 0.47 μ A/A + 50 nA 0.62 μ A/A + 50 nA 3.3 μ A/A + 0.1 μ A 2.7 μ A/A + 0.5 μ A 4.7 μ A/A + 0.5 μ A 6.2 μ A/A + 0.5 μ A 33 μ A/A + 1 μ A	Fluke 8588A 8.5 Digit Multimeter



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AC Current – Measure	(10 to 100) mA 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz 100 mA to 1 A 1 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (1 to 10) A 10 Hz to 2 kHz (2 to 10) kHz (10 to 30) A 10 Hz to 2 kHz (2 to 10) kHz	27 μ A/A + 5 μ A 47 μ A/A + 5 μ A 62 μ A/A + 5 μ A 0.39 mA/A + 0.1 mA 0.57 mA/A + 0.1 mA 0.72 mA/A + 0.1 mA 7.2 mA/A + 0.5 mA 7.1 mA/A + 0.5 mA 22 mA/A + 12 mA 28 mA/A + 12 mA	Fluke 8588A 8.5 Digit Multimeter
Capacitance – Source (Simulation) 10 Hz to 10 kHz 10 Hz to 3 kHz (0.01 to 1) kHz (0.01 to 1) kHz (0.01 to 1) kHz (10 to 600) Hz (10 to 300) Hz (10 to 150) Hz (10 to 120) Hz (10 to 80) Hz (10 to 50) Hz (10 to 20) Hz DC to 6 Hz DC to 2 Hz DC to 0.6 Hz DC to 0.2 Hz	190 pF to 1.1 nF (1.1 to 3.3) nF (3.3 to 11) nF (11 to 110) nF (110 to 330) nF 330 nF to 1.1 μ F (1.1 to 3.3) μ F (3.3 to 11) μ F (11 to 33) μ F (33 to 110) μ F (110 to 330) μ F 330 μ F to 1.1 mF (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	5 pF/nF + 7.8 pF 4 pF/nF + 7.8 pF 2 pF/nF + 7.8 pF 7 pF/nF + 78 pF 2.1 pF/nF + 0.23 nF 2.1 nF/ μ F + 0.78 nF 2 nF/ μ F + 2.3 nF 2.1 nF/ μ F + 7.8 nF 3.2 nF/ μ F + 23 nF 3.7 nF/ μ F + 78 nF 3.7 nF/ μ F + 0.23 μ F 3.7 μ F/mF + 0.78 μ F 3.7 μ F/mF + 2.3 μ F 3.5 μ F/mF + 7.8 μ F 5.9 μ F/mF + 23 μ F 8.5 μ F/mF + 78 μ F	Fluke 5522A/SC1100 Multiproduct Calibrator
Capacitance – Measure	(50 to 60) Hz Up to 1 nF (1 to 10) nF (10 to 100) nF 100 nF to 1 μ F (1 to 10) μ F (10 to 100) μ F 100 μ F to 1 mF (1 to 10) mF (10 to 100) mF	0.82 nF/F + 0.1 nF 0.73 nF/F + 0.2 nF 0.21 nF/F + 10 pF 3.4 nF/F + 0.1 nF 20 nF/F + 1 nF 0.28 μ F/F + 10 nF 3.1 μ F/F + 0.1 μ F 34 μ F/F + 1 μ F 0.56 mF/F + 0.1 mF	Fluke 8588A 8.5 Digit Multimeter



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Inductance – Source (Variable Artifact)	100 μ H to 1 mH	0.2 μ H/H	IET 1491-G Standard Decade Inductor
	1 kHz		
	(1 to 10) mH	2 μ H/H	
	500 Hz		
	(10 to 100) mH	20 μ H/H	
	200 Hz		
	100 mH to 1 H	0.2 mH/H	
Oscilloscopes	100 Hz	2 mH/H	Fluke 5522A/SC1100 Multiproduct Calibrator
	10 Hz to 10 kHz	2.7 mV/V + 32 μ V	
	± 1 mVp-p to ± 6.6 Vp-p		
	into 50 Ω load		
	10 Hz to 10 kHz	1.3 mV/V + 32 μ V	
	± 1 mVp-p to ± 130 Vp-p		
	into 1 M Ω load		
5 mVp-p to 5.5 Vp-p	15 mV/V + 78 μ V		
Leveled Sine Wave (Relative to 50 kHz)	50 kHz to 100 MHz	18 mV/V + 78 μ V	
	(100 to 300) MHz	34 mV/V + 78 μ V	
	(300 to 600) MHz	42 mV/V + 78 μ V	
Time Marker into 50 Ω load	5 mVp-p to 3.5 Vp-p		
	600 MHz to 1.1 GHz		
	Cardinal Points	46 ns/s	
	1 ns to 20 ms		
Rise Time	Non-Cardinal Points	0.81 μ s/s	
	1 ns to 20 ms		
	Any value in range	0.21 ms/s	
	50 ms to 5 s		
	300 ps	9.4 ps	



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Electrical – DC Low Frequency

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Electrical Simulation of Thermocouple Indicating Devices – Source/Measure	Type B		Fluke 5522A/SC1100 Multiproduct Calibrator
	(600 to 800) °C	0.46 °C	
	(800 to 1 000) °C	0.39 °C	
	(1 000 to 1 550) °C	0.37 °C	
	(1 550 to 1 820) °C	0.38 °C	
	Type C		
	(0 to 150) °C	0.33 °C	
	(150 to 650) °C	0.32 °C	
	(650 to 1 000) °C	0.34 °C	
	(1 000 to 1 800) °C	0.54 °C	
	(1 800 to 2 316) °C	0.85 °C	
	Type E		
	(-250 to -100) °C	0.52 °C	
	(-100 to -25) °C	0.22 °C	
	(-25 to 350) °C	0.2 °C	
	(350 to 650) °C	0.25 °C	
	(650 to 1 000) °C	0.25 °C	
	Type J		
	(-210 to -100) °C	0.33 °C	
	(-100 to -30) °C	0.22 °C	
	(-30 to 150) °C	0.2 °C	
(150 to 760) °C	0.23 °C		
(760 to 1 200) °C	0.27 °C		
Type K			
(-200 to -100) °C	0.36 °C		
(-100 to -25) °C	0.23 °C		
(-25 to 120) °C	0.22 °C		
(120 to 1 000) °C	0.29 °C		
(1 000 to 1 372) °C	0.44 °C		
Type N			
(-200 to -100) °C	0.43 °C		
(-100 to -25) °C	0.29 °C		
(-25 to 120) °C	0.23 °C		
(120 to 410) °C	0.22 °C		
(410 to 1 300) °C	0.3 °C		

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices – Source/Measure	Type R (0 to 250) °C (250 to 400) °C (400 to 1 000) °C (1 000 to 1 767) °C Type S (0 to 250) °C (250 to 1 000) °C (1 000 to 1 400) °C (1 400 to 1 767) °C 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	0.59 °C 0.38 °C 0.36 °C 0.44 °C 0.49 °C 0.39 °C 0.39 °C 0.5 °C 0.65 °C 0.26 °C 0.22 °C 0.19 °C 0.6 °C 0.31 °C	Fluke 5522A/SC1100 Multiproduct Calibrator
Electrical Simulation of RTD Indicating Devices – Source	Pt Ni 385 (120 Ω) (-80 to 0) °C (0 to 100) °C (100 to 260) °C Cu 427 (10 Ω) (-100 to 260) °C Pt 395 (100 Ω) (-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C Pt 3926 (100 Ω) (-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.13 °C 0.1 °C 0.17 °C 0.31 °C 0.07 °C 0.07 °C 0.08 °C 0.11 °C 0.11 °C 0.13 °C 0.25 °C 0.1 °C 0.1 °C 0.11 °C 0.13 °C 0.16 °C 0.15 °C	Fluke 5522A/SC1100 Multiproduct Calibrator

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of RTD Indicating Devices – Source	Pt 3916 (100 Ω)		Fluke 5522A/SC1100 Multiproduct Calibrator
	(-200 to -190) °C	0.28 °C	
	(-190 to -80) °C	0.09 °C	
	(-80 to 0) °C	0.11 °C	
	(0 to 100) °C	0.12 °C	
	(100 to 260) °C	0.1 °C	
	(260 to 300) °C	0.14 °C	
	(300 to 400) °C	0.15 °C	
	(400 to 600) °C	0.14 °C	
	(600 to 630) °C	0.26 °C	
	Pt 385 (200 Ω)		
	(-200 to -80) °C	0.06 °C	
	(-80 to 0) °C	0.11 °C	
	(0 to 100) °C	0.11 °C	
	(100 to 260) °C	0.12 °C	
	(260 to 300) °C	0.16 °C	
	(300 to 400) °C	0.15 °C	
	(400 to 600) °C	0.16 °C	
	(600 to 630) °C	0.17 °C	
	Pt 385 (500 Ω)		
	(-200 to -80) °C	0.06 °C	
	(-80 to 0) °C	0.09 °C	
	(0 to 100) °C	0.1 °C	
	(100 to 260) °C	0.09 °C	
	(260 to 300) °C	0.12 °C	
	(300 to 400) °C	0.09 °C	
	(400 to 600) °C	0.1 °C	
	(600 to 630) °C	0.14 °C	
	Pt 385 (1 000 Ω)		
	(-200 to -80) °C	0.05 °C	
(-80 to 0) °C	0.09 °C		
(0 to 100) °C	0.06 °C		
(100 to 260) °C	0.12 °C		
(260 to 300) °C	0.07 °C		
(300 to 400) °C	0.1 °C		
(400 to 600) °C	0.11 °C		
(600 to 630) °C	0.25 °C		

Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
RF Attenuation – Tuned RF Power Measure 100 kHz to 26.5 GHz	(-10 to 0) dB	0.02 dB	Keysight N5531X Measuring Receiver; HP 11722A, HP 11792A, HP 11793A Power Sensors
	(-20 to -10) dB	0.06 dB	
	(-30 to -20) dB	0.08 dB	
	(-40 to -30) dB	0.11 dB	
	(-50 to -40) dB	0.14 dB	
	(-60 to -50) dB	0.16 dB	
	(-70 to -60) dB	0.2 dB	
	(-80 to -70) dB	0.23 dB	
	(-90 to -80) dB	0.25 dB	
	(-100 to -90) dB	0.27 dB	
RF Power – Source	(-110 to -100) dB	0.35 dB	Fluke 96270A Reference Source; Leveling Head Output
	(-120 to -110) dB	0.42 dB	
	(16 to 20) dBm		
	(0.2 to 100) kHz	0.023 dB	
	(0.1 to 125) MHz	0.045 dB	
	(3 to 16) dBm		
	(0.2 to 100) kHz	0.023 dB	
	(0.1 to 150) MHz	0.043 dB	
	(0.25 to 1.4) GHz	0.16 dB	
	(-17 to 3) dBm		
	(0.2 to 100) kHz	0.024 dB	
	(0.1 to 300) MHz	0.047 dB	
	(0.3 to 1.4) GHz	0.16 dB	
	(1.4 to 4.0) GHz	0.26 dB	
	(-47 to -17) dBm		
	(0.2 to 100) kHz	0.024 dB	
	(0.1 to 300) MHz	0.047 dB	
	(0.3 to 1.4) GHz	0.16 dB	
	(1.4 to 3.5) GHz	0.24 dB	
	(3.5 to 4.0) GHz	0.4 dB	
(-66 to -47) dBm			
(0.1 to 10) MHz	0.16 dB		
(10 to 300) MHz	0.083 dB		
(0.3 to 1.4) GHz	0.31 dB		
(1.4 to 4.0) GHz	0.41 dB		
(-85 to -66) dBm			
(0.1 to 10) MHz	0.56 dB		
(10 to 150) MHz	0.41 dB		
(0.15 to 1.5) GHz	0.82 dB		
(1.5 to 4.0) GHz	0.8 dB		



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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
RF Power – Source	(-124 to -85) dBm (10 to 100) MHz (0.1 to 1.4) GHz	0.6 dB 1.4 dB	Fluke 96270A Reference Source; Leveling Head Output
RF Power – Source	(-120 to 24) dBm Up to 100 MHz (0.1 to 1) GHz (1 to 2.4) GHz (2.4 to 8) GHz (8 to 12) GHz (12 to 18) GHz (18 to 22) GHz (22 to 26.5) GHz	0.43 % of reading + 0.004 dB 0.57 % of reading + 0.006 dB 0.7 % of reading + 0.007 dB 0.88 % of reading + 0.009 dB 1 % of reading + 0.01 dB 1.2 % of reading + 0.012 dB 1.6 % of reading + 0.016 dB 2.5 % of reading + 0.025 dB	Fluke 92670A Reference Source Characterized Microwave Output; Agilent 11667B Splitter
RF Power – Source	(-110 to +21) dBm (26.5 to 40) GHz (40 to 50) GHz	2.3 dB 2.9 dB	Keysight E8257D PSG Analog Signal Generator
RF Power – Measure	(+30 to -10) dBm DC to 50 GHz	3.6 % of reading + 0.004 dB	Keysight N5531X Measuring Receiver; HP 11722A, HP 11792A HP 8487A Power Sensors
Power Reference Out	50 MHz 1 mW	2.1 % of reading	HP 432A Power Meter, HP 3458A 8.5 Digit Multimeter; HP 8478A Power Sensor
Phase Modulation – Measure	100 kHz to 3.6 GHz (3.6 to 17.1) GHz (17.1 to 34.5) GHz (34.5 to 50) GHz	4.8 % of reading + 1 Digit 3.7 % of reading + 1 Digit 2.7 % of reading + 1 Digit 1.8 % of reading + 1 Digit	Keysight N5531 Measuring Receiver; HP 11722A, HP 11792A, HP 11793A Power Sensors
Amplitude Modulation – Measure	150 kHz to 3.6 GHz Rate: 50 Hz to 10 kHz Depths: 5 % to 99 % 150 kHz to 3.6 GHz Rate: 20 Hz to 10 kHz Depths: to 99 % (3.6 to 13.6) GHz Rate: 50 Hz to 50 kHz Depths: 5 % to 99 %	3.5 % of reading + 1 Digit 2.3 % of reading + 1 Digit 3.5 % of reading + 1 Digit	Keysight N5531 Measuring Receiver; HP 11722A, HP 11792A, HP 11793A Power Sensors



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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Amplitude Modulation – Measure	(3.6 to 13.6) GHz Rate: 20 Hz to 100 kHz Depths: to 99 %	1.2 % of reading + 1 Digit	Keysight N5531 Measuring Receiver; HP 11722A, HP 11792A, HP 11793A Power Sensors
	(13.6 to 26.5) GHz Rate: 20 Hz to 100 kHz Depths: 5 % to 99 %	3.5 % of reading + 1 Digit	
	(13.6 to 26.5) GHz Rate: 20 Hz to 100 kHz Depths: to 99 %	1.7 % of reading + 1 Digit	
	(26.5 to 34.5) GHz Rate: 20 Hz to 100 kHz Depths: 5 % to 99 %	2.9 % of Reading + 1 Digit	
	(26.5 to 34.5) GHz Rate: 20 Hz to 100 kHz Depths: to 99 %	1.2 % of reading + 1 Digit	
	(34.5 to 50) GHz Rate: 20 Hz to 100 kHz Depths: 5 % to 99 %	2.3 % of reading + 1 Digit	
	(34.5 to 50) GHz Rate: 20 Hz to 100 kHz Depths: to 99 %	2.0 % of reading + 1 Digit	
	Frequency Modulation – Measure	100 kHz to 3.6 GHz Rate: 20 Hz to 10 kHz Dev.: ≤ 40 kHz peak	
(3.6 to 8.4) GHz Rate: 50 Hz to 100 kHz Dev.: ≤ 400 kHz peak		2.3 % of reading + 1 Digit	
(3.6 to 8.4) GHz Rate: 50 Hz to 100 kHz Dev.: ≤ 400 kHz peak		1.2 % of reading + 1 Digit	
(8.4 to 13.6) GHz Rate: 20 Hz to 200 kHz Dev.: ≤ 400 kHz peak		3.5 % of reading + 1 Digit	
(8.4 to 13.6) GHz Rate: 50 Hz to 100 kHz Dev.: ≤ 400 kHz peak		1.2 % of reading + 1 Digit	
(13.6 to 17.1) GHz Rate: 20 Hz to 10 kHz Dev.: ≤ 400 kHz peak		5.8 % of reading + 1 Digit	

Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency Modulation – Measure	(13.6 to 17.1) GHz Rate: 50 Hz to 100 kHz Dev.: ≤ 400 kHz peak	1.2 % of reading + 1 Digit	Keysight N5531X Measuring Receiver; HP 11722A, HP 11792A, HP 11793A Power Sensors
	(17.1 to 26.5) GHz Rate: 20 Hz to 200 kHz Dev.: ≤ 400 kHz peak	4.1 % of reading + 1 Digit	
	(17.1 to 26.5) GHz Rate: 50 Hz to 100 kHz Dev.: ≤ 400 kHz peak	1.2 % of reading + 1 Digit	
	(26.5 to 34.5) GHz Rate: 20 Hz to 10 kHz Dev.: ≤ 400 kHz peak	4.1 % of reading + 1 Digit	
	(26.5 to 34.5) GHz Rate: 50 Hz to 100 kHz Dev.: ≤ 400 kHz peak	1.2 % of reading + 1 Digit	
	(34.5 to 50) GHz Rate: 20 Hz to 200 kHz Dev.: ≤ 400 kHz peak	5.2 % of reading + 1 Digit	
	(34.5 to 50) GHz Rate: 50 Hz to 100 kHz Dev.: ≤ 400 kHz peak	1.2 % of reading + 1 Digit	
RF Power Sensors Calibration Factor	100 Hz to 10 MHz 10 MHz to 10 GHz (> 10 to 18) GHz	1.1 % Cal Factor 1.2 % Cal Factor 1.5 % Cal Factor	Tegam 1830A RF Thermistor Power Meter, Tegam 2505A Feedthrough Thermistor Standard
RF Power Sensors Calibration Factor	(10 to 40) MHz 50 MHz to 12 GHz (> 12 to 17.5) GHz (> 17.5 to 26.5) GHz (> 26.5 to 44) GHz (> 44 to 50) GHz	1.8 % Cal Factor 2.3 % Cal Factor 3.1 % Cal Factor 3.7 % Cal Factor 4.9 % Cal Factor 7.5 % Cal Factor	Tegam 1830A RF Thermistor Power Meter, Tegam 2510A RF Power Transfer Standard

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Micrometers ²	Up to 12 in	(51 + 2.4L) μin	Grade 0 Gage Blocks

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Calipers ²	Up to 12 in	(126 + 1.7L) μin	Grade 0 Gage Blocks
Height/Depth Gages ²	Up to 12 in	(120 + 2L) μin	Grade 0 Gage Blocks
Indicators ²	Up to 4 in	(52 + 1L) μin	Grade 0 Gage Blocks
Length Standards ²	Up to 4 in	(41 + 2.3L) μin	Pratt & Whitney Supermicrometer®, Grade 0 Gage Blocks
Feeler Gages	(0.001 to 0.2) in	42 μin	Pratt & Whitney Supermicrometer®, Grade 0 Gage Blocks
Pin and Plug Gages ²	Up to 4 in	(45 + 2.3L) μin	Pratt & Whitney Supermicrometer®, Grade 0 Gage Blocks

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Scales and Balances ³	Up to 500 mg 500 mg to 50 g (50 to 300) g	83 μg 0.96 mg 9.1 mg	ASTM E617 Class 1 weights and GIDEP procedure utilized in the calibration of the weighing system.
Scales and Balances ³	300 g to 2 kg (2 to 5) kg	23 mg 1.6 g	ASTM E617 Class 2 weights and GIDEP procedure utilized in the calibration of the weighing system.
Pressure Instruments	(0 to 20) psi (0 to 50) psi (0 to 1 00) psi (0 to 200) psi (0 to 500) psi (0 to 1 000) psi	0.018 psi 0.046 psi 0.061 psi 0.3 psi 0.34 psi 0.6 psi	Condec UPC5000 Pressure Standard
Pressure Instruments	(0 to 2 000) psi (0 to 5 000) psi (0 to 10 000) psi	1.1 psi 3.5 psi 6.1 psi	Condec UPC5200 Pressure Standard
Torque Tools	(2 to 10) lbf-in	0.59 % of reading	Mountz EX TORQ III Torque Analyzer

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Torque Tools	4 lbf·in to 600 lbf·ft	0.31 % of reading	CDI 5000-ST Torque Monitor; CDI 2000-400-02, CDI 2000-12-02 Torque Cells

Thermodynamics

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Relative Humidity – Measure (Chambers, Room, etc.)	(10 to 90) %RH	1.6 %RH	Comparison to Vaisala HMI41/HMP46 Temp/Humidity Indicator/Probe
Relative Humidity – Generate	(10 to 20) %RH (20 to 50) %RH (50 to 80) %RH (80 to 95) %RH	0.7 %RH 0.6 %RH 0.61 %RH 0.58 %RH	Thunder Scientific 2500 Two-Pressure Humidity Generator
Temperature – Measure (Chambers, Room, Ovens, Sensors, etc.)	(-200 to -39) °C (-39 to 0) °C (0 to 232) °C (232 to 420) °C	0.04 °C 0.06 °C 0.08 °C 0.15 °C	Comparison to Fluke 5627A SPRT, Fluke 1524 Digital Thermometer System

Time and Frequency


Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Time Interval, Stopwatches	1 s to 24 hr	38 ms	Comparison to HP 53230A Universal Counter
Frequency – Source	10 MHz DC to 20 MHz 20 MHz to 50 GHz	7.5 mHz 58 mHz 0.88 Hz	SRS FS725 Frequency Standard; HP 3325B, HP 83650B Signal Generators
Frequency – Measure	DC to 350 MHz	48 mHz	HP 53230A Counter, SRS FS725 Frequency Standard

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Measure	350 MHz to 46 GHz	0.59 Hz	HP 53152A Counter, SRS FS725 Frequency Standard

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.
 2. L = length in inches.
 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. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1986.



Jason Stine, Vice President

