



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

Accredited Labs dba 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 2027
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)

Accredited Labs dba Trident Calibration Labs

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CALIBRATION

ISO/IEC 17025 Accreditation Granted: **04 September 2025**

Certificate Number: **AC-1986** Certificate Expiry Date: **11 September 2027**

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	Comparison to Fluke 5730A Multiproduct Calibrator
DC Voltage – Source	Up to 120 mV 120 mV to 1.2 V (1.2 to 12) V (12 to 120) V (120 to 1 020) V	9.4 nV/mV + 0.8 μ V 6.4 μ V/V + 1 μ V 6.2 μ V/V + 10 μ V 8.5 μ V/V + 0.1 mV 8.5 μ V/V + 1 mV	Comparison to Fluke 5560A 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	Comparison to 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	Comparison to Vitretek 4700 High Voltage Multimeter, Vitretek HVL-100 High Voltage Probe

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
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	Comparison to Fluke 5730A Multiproduct Calibrator
DC Current – Source	Up to 120 μ A 120 μ A to 1.2 mA (1.2 to 12) mA (12 to 120) mA 120 mA to 1.2 A (1.2 to 3.1) A (3.1 to 12) A (12 to 30.2) A	0.1 nA/ μ A + 4.7 nA 79 nA/mA + 12 nA 79 nA/mA + 62 nA 79 nA/mA + 0.62 nA 0.13 μ A/A + 7.8 μ A 0.23 mA/A + 0.12 mA 0.23 mA/A + 0.2 mA 0.78 mA/A + 0.4 mA	Comparison to Fluke 5560A Multiproduct Calibrator
DC Current Clamp Meters	(1 to 302) A	0.8 % of reading	Comparison to Fluke 5560A Multiproduct Calibrator, Fluke 55XX/COIL10 10-turn Coil
DC Current Clamp Meters	(10 to 1 510) A	0.7 % of reading	Comparison to Fluke 5560A Multiproduct Calibrator, Fluke 55XX/COIL50 50-turn Coil
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	Comparison to Fluke 8588A 8.5 Digit Multimeter
DC Resistance – Source	Up to 12 Ω (12 to 120) Ω 120 Ω to 1.2 k Ω (1.2 to 12) k Ω (12 to 120) k Ω 120 Ω to 1.2 M Ω (1.2 to 12) M Ω (12 to 120) M Ω (120 to 1 200) M Ω	19 $\mu\Omega/\Omega$ + 0.78 m Ω 19 $\mu\Omega/\Omega$ + 0.78 m Ω 19 m Ω /k Ω + 1.6 m Ω 19 m Ω /k Ω + 16 m Ω 19 m Ω /k Ω + 0.16 Ω 19 Ω /M Ω + 2 Ω 27 Ω /M Ω + 23 Ω 0.33 k Ω /M Ω + 2 k Ω 3.1 k Ω /G Ω + 78 k Ω	Comparison to Fluke 5560A Multiproduct Calibrator

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Resistance – Source (Fixed Points)	1 Ω	99 $\mu\Omega$	Comparison to Fluke 5730A Multiproduct Calibrator
	1.9 Ω	0.1 m Ω	
	10 Ω	94 $\mu\Omega$	
	19 Ω	0.2 m Ω	
	100 Ω	0.26 m Ω	
	190 Ω	0.44 m Ω	
	1 k Ω	6.8 m Ω	
	1.9 k Ω	13 m Ω	
	10 k Ω	67 m Ω	
	19 k Ω	0.13 Ω	
	100 k Ω	0.88 Ω	
	190 k Ω	1.7 Ω	
	1 M Ω	14 Ω	
	1.9 M Ω	36 Ω	
	10 M Ω	0.42 k Ω	
	19 M Ω	0.9 k Ω	
	100 M Ω	11 k Ω	
High Power Resistance – Source (Fixed Artifacts)	1 k Ω	5 m Ω	Comparison to IET VRS-100-9-1K-ROT Resistance Standard Set
	10 k Ω	50 m Ω	
	100 k Ω	1 Ω	
	1 M Ω	10 Ω	
	10 M Ω	100 Ω	
	100 M Ω	2 k Ω	
	1 G Ω	20 k Ω	
	10 G Ω	10 M Ω	
	100 G Ω	40 M Ω	
Resistance – Measure (4 Wire Measurements)	(0 to 1) Ω	14 $\mu\Omega/\Omega + 4 \mu\Omega$	Comparison to Fluke 8588A 8.5 Digit Multimeter
	(1 to 10) Ω	8.7 $\mu\Omega/\Omega + 14 \mu\Omega$	
	(10 to 100) Ω	7.6 $\mu\Omega/\Omega + 50 \mu\Omega$	
	100 Ω to 1 k Ω	7.6 $\mu\Omega/\Omega + 0.5 \text{ m}\Omega$	
	(1 to 10) k Ω	7.7 $\mu\Omega/\Omega + 5 \text{ m}\Omega$	
	(10 to 100) k Ω	8.2 $\mu\Omega/\Omega + 50 \text{ m}\Omega$	
	100 k Ω to 1 M Ω	9.3 $\mu\Omega/\Omega + 1 \Omega$	
	(1 to 10) M Ω	9.7 $\mu\Omega/\Omega + 10 \Omega$	
	(10 to 100) M Ω	21 $\mu\Omega/\Omega + 1 \text{ k}\Omega$	
	100 M Ω to 1 G Ω	0.13 m $\Omega/\Omega + 0.1 \text{ M}\Omega$	
	(1 to 10) G Ω	1.5 m $\Omega/\Omega + 10 \text{ M}\Omega$	

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source	Up to 2.2 mV		Comparison to Fluke 5730A Multiproduct Calibrator
	(10 to 20) Hz	0.39 $\mu\text{V}/\text{mV} + 4 \mu\text{V}$	
	(20 to 40) Hz	0.85 $\mu\text{V}/\text{mV} + 4 \mu\text{V}$	
	40 Hz to 20 kHz	1 $\mu\text{V}/\text{mV} + 4 \mu\text{V}$	
	(20 to 50) kHz	0.32 $\mu\text{V}/\text{mV} + 4 \mu\text{V}$	
	(50 to 100) kHz	0.54 $\mu\text{V}/\text{mV} + 5 \mu\text{V}$	
	(100 to 300) kHz	1.2 $\mu\text{V}/\text{mV} + 10 \mu\text{V}$	
	(300 to 500) kHz	2.1 $\mu\text{V}/\text{mV} + 20 \mu\text{V}$	
	500 kHz to 1 MHz	3.4 $\mu\text{V}/\text{mV} + 20 \mu\text{V}$	
	(2.2 to 22) mV		
	(10 to 20) Hz	0.22 $\mu\text{V}/\text{mV} + 4 \mu\text{V}$	
	(20 to 40) Hz	0.13 $\mu\text{V}/\text{mV} + 4 \mu\text{V}$	
	40 Hz to 20 kHz	0.12 $\mu\text{V}/\text{mV} + 4 \mu\text{V}$	
	(20 to 50) kHz	0.17 $\mu\text{V}/\text{mV} + 4 \mu\text{V}$	
	(50 to 100) kHz	0.4 $\mu\text{V}/\text{mV} + 5 \mu\text{V}$	
	(100 to 300) kHz	0.84 $\mu\text{V}/\text{mV} + 10 \mu\text{V}$	
	(300 to 500) kHz	1.1 $\mu\text{V}/\text{mV} + 20 \mu\text{V}$	
	500 kHz to 1 MHz	2.6 $\mu\text{V}/\text{mV} + 20 \mu\text{V}$	
	(22 to 220) mV		
	(10 to 20) Hz	0.36 $\mu\text{V}/\text{mV} + 12 \mu\text{V}$	
	(20 to 40) Hz	80 nV/mV + 7 μV	
	40 Hz to 20 kHz	60 nV/mV + 7 μV	
	(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 mV/V + 40 μV	
	(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 mV/V + 30 μV	
	(100 to 300) kHz	0.28 mV/V + 80 μV	
	(300 to 500) kHz	0.8 mV/V + 0.2 mV	
	500 kHz to 1 MHz	1.4 mV/V + 0.3 mV	

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source	(2.2 to 22) V (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 (22 to 220) V (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 (0.5 to 1) MHz 220 V to 1 kV (15 to 50) Hz 50 Hz to 1 kHz	0.37 mV/V + 0.4 mV 80 μ V/V + 0.15 mV 40 μ V/V + 50 μ V 54 μ V/V + 0.1 mV 70 μ V/V + 0.2 mV 0.22 mV/V + 0.6 mV 0.78 mV/V + 2 mV 1.2 mV/V + 3.2 mV 0.44 mV/V + 4 mV 76 μ V/V + 1.5 mV 49 μ V/V + 0.6 mV 74 μ V/V + 1 mV 0.15 mV/V + 2.5 mV 0.71 mV/V + 16 mV 3.4 mV/V + 40 mV 6.3 mV/V + 80 mV 0.24 mV/V + 16 mV 67 μ V/V + 3.5 mV	Comparison to Fluke 5730A Multiproduct Calibrator
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 0.48 mV/V + 11 mV 0.47 mV/V + 11 mV 1.8 mV/V + 45 mV	Comparison to Fluke 5730A Multiproduct Calibrator Fluke 5725A Amplifier
AC Voltage – Source	Up to 12 mV (3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	1.9 μ V/mV + 7 μ V 0.68 μ V/mV + 7 μ V 0.12 μ V/mV + 6 μ V 0.3 μ V/mV + 6 μ V 1.2 μ V/mV + 15 μ V 6.2 μ V/mV + 30 μ V	Comparison to Fluke 5560A Multiproduct Calibrator

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source	(12 to 120) mV (3 to 5) Hz	1.9 $\mu\text{V/mV}$ + 7 μV	Comparison to Fluke 5560A Multiproduct Calibrator
	(5 to 10) Hz	0.68 $\mu\text{V/mV}$ + 7 μV	
	10 Hz to 20 kHz	0.11 $\mu\text{V/mV}$ + 6 μV	
	(20 to 50) kHz	0.27 $\mu\text{V/mV}$ + 8 μV	
	(50 to 100) kHz	0.52 $\mu\text{V/mV}$ + 25 μV	
	(100 to 500) kHz	1.6 $\mu\text{V/mV}$ + 30 μV	
	120 mV to 1.2 V (3 to 5) Hz	1.9 $\mu\text{V/V}$ + 75 μV	
	(5 to 10) Hz	0.72 $\mu\text{V/V}$ + 70 μV	
	(10 to 40) Hz	0.39 $\mu\text{V/V}$ + 60 μV	
	40.01 Hz to 20 kHz	0.39 $\mu\text{V/V}$ + 8 μV	
	(20 to 50) kHz	61 $\mu\text{V/V}$ + 14 μV	
	(50 to 100) kHz	1.9 $\mu\text{V/V}$ + 40 μV	
	(100 to 500) kHz	1.8 $\mu\text{V/V}$ + 80 μV	
	(1.2 to 12) V (3 to 5) Hz	1.8 mV/V + 0.8 mV	
	(5 to 10) Hz	1 mV/V + 0.8 mV	
	(10 to 40) Hz	0.16 mV/V + 0.4 mV	
	40.01 Hz to 20 kHz	0.3 mV/V + 50 μV	
	(20 to 50) kHz	0.28 mV/V + 50 μV	
	(50 to 100) kHz	0.55 mV/V + 0.13 mV	
	(100 to 500) kHz	1.6 mV/V + 0.6 mV	
	(12 to 120) V (3 to 5) Hz	1.9 mV/V + 7.5 mV	
	(5 to 10) Hz	0.68 mV/V + 7.5 mV	
	(10 to 40) Hz	0.11 mV/V + 3.5 mV	
	40.01 Hz to 20 kHz	0.11 mV/V + 0.5 mV	
	(20 to 50) kHz	0.23 mV/V + 0.5 mV	
	(50 to 100) kHz	0.54 mV/V + 1.3 mV	
	(120 to 330) V (3 to 5) Hz	1.9 mV/V + 75 mV	
	(5 to 10) Hz	0.68 mV/V + 75 mV	
	10 to 20 kHz	0.11 mV/V + 8 mV	
	(20 to 50) kHz	0.23 mV/V + 8 mV	
	(50 to 100) kHz	1.2 mV/V + 13 mV	
	330 V to 1.02 kV (3 to 5) Hz	1.9 mV/V + 75 mV	
	(5 to 10) Hz	0.68 mV/V + 75 mV	
	10 to 10 kHz	0.13 mV/V + 80 mV	

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure	(1 to 10) mV		Comparison to Fluke 8588A 8.5 Digit Multimeter
	1 Hz to 2 kHz	0.52 $\mu\text{V}/\text{V}$ + 1.1 μV	
	(2 to 10) kHz	0.58 $\mu\text{V}/\text{V}$ + 1.1 μV	
	(10 to 30) kHz	0.59 $\mu\text{V}/\text{V}$ + 1.1 μV	
	(30 to 100) kHz	3.1 $\mu\text{V}/\text{V}$ + 1.1 μV	
	(100 to 300) kHz	10 $\mu\text{V}/\text{V}$ + 4 μV	
	300 kHz to 1 MHz	20 $\mu\text{V}/\text{V}$ + 4 μV	
	(10 to 100) mV		
	1 Hz to 2 kHz	94 $\mu\text{V}/\text{V}$ + 0.5 μV	
	(2 to 10) kHz	0.12 mV/V + 0.5 μV	
	(10 to 30) kHz	0.21 mV/V + 1 μV	
	(30 to 100) kHz	0.51 mV/V + 5 μV	
	(100 to 300) kHz	2.3 mV/V + 30 μV	
	300 kHz to 1 MHz	11 mV/V + 0.1 mV	
	(1 to 2) MHz	20 mV/V + 0.5 mV	
	100 mV to 1 V		
	1 Hz to 2 kHz	85 $\mu\text{V}/\text{V}$ + 5 μV	
	(2 to 10) kHz	0.12 mV/V + 5 μV	
	(10 to 30) kHz	0.22 mV/V + 10 μV	
	(30 to 100) kHz	0.55 mV/V + 50 μV	
	(100 to 300) kHz	2.3 mV/V + 0.3 mV	
	300 kHz to 1 MHz	11 mV/V + 1 mV	
	(1 to 2) MHz	20 mV/V + 5 mV	
	(1 to 10) V		
	1 Hz to 2 kHz	71 $\mu\text{V}/\text{V}$ + 50 μV	
	(2 to 10) kHz	0.1 mV/V + 50 μV	
	(10 to 30) kHz	0.2 mV/V + 0.1 mV	
	(30 to 100) kHz	0.51 mV/V + 0.5 mV	
	(100 to 300) kHz	2 mV/V + 3 mV	
	300 kHz to 1 MHz	10 mV/V + 10 mV	
	(1 to 2) MHz	16 mV/V + 50 mV	
	(10 to 100) V		
	1 Hz to 2 kHz	81 $\mu\text{V}/\text{V}$ + 0.5 mV	
	(2 to 10) kHz	96 $\mu\text{V}/\text{V}$ + 0.5 mV	
	(10 to 30) kHz	0.21 mV/V + 1 mV	
	(30 to 100) kHz	0.5 mV/V + 5 mV	
	(100 to 300) kHz	3.5 mV/V + 50 mV	
	300 kHz to 1 MHz	10 mV/V + 0.2 V	

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure	(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	Comparison to Fluke 8588A 8.5 Digit Multimeter
AC High Voltage – Measure	(1 to 10) kV (50, 60) Hz (10 to 75) kV (50, 60) Hz	0.14 % of reading 0.17 % of reading	Comparison to Vitretek 4700 High Voltage Multimeter, Vitretek HVL-100 High Voltage Probe
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 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 (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	0.37 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 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 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	Comparison to Fluke 5730A Multiproduct Calibrator

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
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	Comparison to Fluke 5730A Multiproduct Calibrator, Fluke 5725A Amplifier
AC Current – Source	Up To 120 μ A (3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz 120 μ A to 1.2 mA (3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (1.2 to 12) mA (3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (12 to 120) mA (3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz 120 mA to 1.2 A (3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (1.2 to 3.1) A (3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.43 nA/ μ A + 7.8 nA 0.43 nA/ μ A + 7.8 nA 0.43 nA/ μ A + 7.8 nA 1 nA/ μ A + 31 nA 3.9 nA/ μ A + 0.8 μ A 0.21 μ A/mA + 78 nA 0.21 μ A/mA + 78 nA 0.21 μ A/mA + 78 nA 1.3 μ A/mA + 78 nA 3.9 μ A/mA + 4 μ A 0.2 μ A/mA + 0.78 μ A 0.2 μ A/mA + 0.78 μ A 0.6 μ A/mA + 0.78 μ A 1.3 μ A/mA + 0.78 μ A 3.1 μ A/mA + 7.8 μ A 0.2 μ A/mA + 7.8 μ A 0.12 μ A/mA + 4 μ A 0.19 μ A/mA + 6.2 μ A 1.2 μ A/mA + 7.8 μ A 3.9 μ A/mA + 78 μ A 0.26 mA/A + 78 μ A 0.2 mA/A + 40 μ A 0.2 mA/A + 62 μ A 1.9 mA/A + 0.23 mA 3.9 mA/A + 0.23 mA 0.58 mA/A + 0.4 mA 0.55 mA/A + 0.23 mA 0.58 mA/A + 0.23 mA 2 mA/A + 0.4 mA	Comparison to Fluke 5560A Multiproduct Calibrator

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source	(3.1 to 12 A) (3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (12 to 30.2) A (3 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz	0.30 mA/A + 0.78 mA 0.25 mA/A + 0.4 mA 0.3 mA/A + 0.62 mA 1.9 mA/A + 0.78 mA 0.78 mA/A + 7.8 mA 0.54 mA/A + 6.2 mA 3.9 mA/A + 6.2 mA	Comparison to Fluke 5560A Multiproduct Calibrator
AC Current Clamp Meters	(50 to 400) Hz (1 to 302) A	0.84 % of reading	Comparison to Fluke 5560A Multiproduct Calibrator, Fluke 55XX/COIL10 10-turn Coil
AC Current Clamp Meters	(50 to 400) Hz (10 to 1 510) A	0.7 % of reading	Comparison to Fluke 5560A Multiproduct Calibrator, Fluke 55XX/COIL50 50-turn Coil
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	Comparison to Fluke 8588A 8.5 Digit Multimeter

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measure	(10 to 100) m A		Comparison to Fluke 8588A 8.5 Digit Multimeter
	1 Hz to 2 kHz	27 μ A/A + 5 μ A	
	(2 to 10) kHz	47 μ A/A + 5 μ A	
	(10 to 30) kHz	62 μ A/A + 5 μ A	
	100 mA to 1 A		
	1 Hz to 2 kHz	0.39 mA/A + 0.1 mA	
	(2 to 10) kHz	0.57 mA/A + 0.1 mA	
	(10 to 30) kHz	0.72 mA/A + 0.1 mA	
	(1 to 10) A		
	10 Hz to 2 kHz	7.2 mA/A + 0.5 mA	
Capacitance – Source (Simulation)	(2 to 10) kHz	7.1 mA/A + 0.5 mA	Comparison to Fluke 5522A/SC1100 Multiproduct Calibrator
	(10 to 30) A		
	10 Hz to 2 kHz	22 mA/A + 12 mA	
	(2 to 10) kHz	28 mA/A + 12 mA	
	Up to 1.2 nF	1.2 pF/nF + 1.6 pF	
	(1.2 to 12) nF	0.9 pF/nF + 4 pF	
	(12 to 120) nF	1 pF/nF + 23 pF	
	120 nF to 1.2 μ F	9 nF/ μ F + 0.23 nF	
	(1.2 to 12) μ F	1.3 nF/ μ F + 2.3 nF	
	(12 to 120) μ F	1.2 nF/ μ F + 19 nF	
Capacitance – Measure	120 μ F to 1.2 mF	1.9 μ F/mF + 0.19 μ F	Comparison to Fluke 8588A 8.5 Digit Multimeter
	(1.2 to 12) mF	1.9 μ F/mF + 2.3 μ F	
	(12 to 120) mF	3.9 μ F/mF + 23 μ F	
	(50 to 60) Hz		
	Up to 1 nF	0.82 nF/F + 0.1 nF	
	(1 to 10) nF	0.73 nF/F + 0.2 nF	
	(10 to 100) nF	0.21 nF/F + 10 pF	
	100 nF to 1 μ F	3.4 nF/F + 0.1 nF	
	(1 to 10) μ F	20 nF/F + 1 nF	
	(10 to 100) μ F	0.28 μ F/F + 10 nF	
	100 μ F to 1 mF	3.1 μ F/F + 0.1 μ F	
	(1 to 10) mF	34 μ F/F + 1 μ F	
	(10 to 100) mF	0.56 mF/F + 0.1 mF	

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Inductance – Source (Variable Artifact)	100 μ H to 1 mH 1 kHz (1 to 10) mH 500 Hz (10 to 100) mH 200 Hz 100 mH to 1 H 100 Hz (1 to 10) H 100 Hz	0.4 μ H 2.1 μ H 17 μ H 0.08 mH 0.57 mH	Comparison to IET 1491-G Standard Decade Inductor
Oscilloscopes Square Wave – Amplitude into 50 Ω load into 1 M Ω load Leveled Sine Wave (Relative to 50 kHz) Time Marker into 50 Ω load Rise Time	10 Hz to 10 kHz ± 1 mVp-p to ± 6.6 Vp-p 10 Hz to 10 kHz ± 1 mVp-p to ± 130 Vp-p 5 mVp-p to 5.5 Vp-p 50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz 5 mVp-p to 3.5 Vp-p 600 MHz to 1.1 GHz Cardinal Points 1 ns to 20 ms Non-Cardinal Points 1 ns to 20 ms Any value in range 50 ms to 5 s 300 ps	2.7 mV/V + 32 μ V 1.3 mV/V + 32 μ V 15 mV/V + 78 μ V 18 mV/V + 78 μ V 34 mV/V + 78 μ V 42 mV/V + 78 μ V 46 ns/s 0.81 μ s/s 0.21 ms/s 9.4 ps	Comparison to Fluke 5522A/SC1100 Multiproduct Calibrator
Electrical Simulation of Thermocouple Indicating Devices – Source/Measure	Type B (600 to 800) $^{\circ}$ C (800 to 1 000) $^{\circ}$ C (1 000 to 1 550) $^{\circ}$ C (1 550 to 1 820) $^{\circ}$ C	0.37 $^{\circ}$ C 0.32 $^{\circ}$ C 0.32 $^{\circ}$ C 0.32 $^{\circ}$ C	Comparison to Fluke 5560A Multiproduct Calibrator

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 C		Comparison to Fluke 5560A Multiproduct Calibrator
	(0 to 150) °C	0.24 °C	
	(150 to 650) °C	0.23 °C	
	(650 to 1 000) °C	0.22 °C	
	(1 000 to 1 800) °C	0.34 °C	
	(1 800 to 2 316) °C	0.51 °C	
	Type D		
	(0 to 150) °C	0.24 °C	
	(150 to 650) °C	0.25 °C	
	(650 to 1 000) °C	0.25 °C	
	(1 000 to 1 800) °C	0.39 °C	
	(1 800 to 2 316) °C	0.63 °C	
	Type E		
	(-250 to -100) °C	0.34 °C	
	(-100 to -25) °C	0.18 °C	
	(-25 to 350) °C	0.17 °C	
	(350 to 650) °C	0.23 °C	
	(650 to 1 000) °C	0.21 °C	
	Type G		
	(0 to 150) °C	0.42 °C	
	(150 to 650) °C	0.32 °C	
	(650 to 1 000) °C	0.25 °C	
	(1 000 to 1 800) °C	0.38 °C	
	(1 800 to 2 316) °C	0.62 °C	
	Type J		
	(-210 to -100) °C	0.27 °C	
	(-100 to -30) °C	0.18 °C	
	(-30 to 150) °C	0.17 °C	
	(150 to 760) °C	0.18 °C	
	(760 to 1 200) °C	0.21 °C	
	Type K		
	(-200 to -100) °C	0.27 °C	
	(-100 to -25) °C	0.18 °C	
	(-25 to 120) °C	0.17 °C	
	(120 to 1 000) °C	0.21 °C	
	(1 000 to 1 372) °C	0.33 °C	
	Type L		
	(-200 to -100) °C	0.28 °C	
	(-100 to 800) °C	0.22 °C	
	(800 to 900) °C	0.17 °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 N		Comparison to Fluke 5560A Multiproduct Calibrator
	(-200 to -100) °C	0.3 °C	
	(-100 to -25) °C	0.23 °C	
	(-25 to 120) °C	0.16 °C	
	(120 to 410) °C	0.16 °C	
	(410 to 1 300) °C	0.21 °C	
	Type R		
	(0 to 250) °C	0.43 °C	
	(250 to 400) °C	0.27 °C	
	(400 to 1 000) °C	0.25 °C	
	(1 000 to 1 767) °C	0.32 °C	
	Type S		
	(0 to 250) °C	0.36 °C	
	(250 to 1 000) °C	0.28 °C	
	(1 000 to 1 400) °C	0.28 °C	
	(1 400 to 1 767) °C	0.37 °C	
	Type T		
	(-250 to -150) °C	0.49 °C	
	(-150 to 0) °C	0.19 °C	
	(0 to 120) °C	0.18 °C	
	(120 to 400) °C	0.16 °C	
	Type U		
	(-200 to 0) °C	0.37 °C	
	(0 to 600) °C	0.17 °C	
	Type BP		
	(0 to 1000) °C	0.34 °C	
	(1000 to 2000) °C	0.51 °C	
	(2000 to 2500) °C	0.68 °C	
	Type XK		
	(-200 to 300) °C	0.26 °C	
	(300 to 800) °C	0.27 °C	
Electrical Simulation of RTD Indicating Devices – Source	Pt 385 (100 Ω)		Comparison to Fluke 5522A/SC1100 Multiproduct Calibrator
	(-200 to -80) °C	0.07 °C	
	(-80 to 0) °C	0.06 °C	
	(0 to 100) °C	0.06 °C	
	(100 to 300) °C	0.1 °C	
	(300 to 400) °C	0.1 °C	
	(400 to 630) °C	0.1 °C	
	(630 to 800) °C	0.2 °C	

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of RTD Indicating Devices – Source	Pt 3916 (100 Ω)		Comparison to Fluke 5522A/SC1100 Multiproduct Calibrator
	(-200 to -190) $^{\circ}\text{C}$	0.21 $^{\circ}\text{C}$	
	(-190 to -80) $^{\circ}\text{C}$	0.09 $^{\circ}\text{C}$	
	(-80 to 0) $^{\circ}\text{C}$	0.1 $^{\circ}\text{C}$	
	(0 to 100) $^{\circ}\text{C}$	0.1 $^{\circ}\text{C}$	
	(100 to 260) $^{\circ}\text{C}$	0.11 $^{\circ}\text{C}$	
	(260 to 300) $^{\circ}\text{C}$	0.11 $^{\circ}\text{C}$	
	(300 to 400) $^{\circ}\text{C}$	0.15 $^{\circ}\text{C}$	
	(400 to 600) $^{\circ}\text{C}$	0.12 $^{\circ}\text{C}$	
	(600 to 630) $^{\circ}\text{C}$	0.2 $^{\circ}\text{C}$	
	Pt 3926 (100 Ω)		
	(-200 to -80) $^{\circ}\text{C}$	0.13 $^{\circ}\text{C}$	
	(-80 to 0) $^{\circ}\text{C}$	0.11 $^{\circ}\text{C}$	
	(0 to 100) $^{\circ}\text{C}$	0.11 $^{\circ}\text{C}$	
	(100 to 360) $^{\circ}\text{C}$	0.10 $^{\circ}\text{C}$	
	(360 to 400) $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$	
	(400 to 630) $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$	
	Pt 385 (200 Ω)		
	(-200 to -80) $^{\circ}\text{C}$	0.06 $^{\circ}\text{C}$	
	(-80 to 0) $^{\circ}\text{C}$	0.11 $^{\circ}\text{C}$	
	(0 to 100) $^{\circ}\text{C}$	0.11 $^{\circ}\text{C}$	
	(100 to 260) $^{\circ}\text{C}$	0.11 $^{\circ}\text{C}$	
	(260 to 300) $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$	
	(300 to 400) $^{\circ}\text{C}$	0.12 $^{\circ}\text{C}$	
	(400 to 600) $^{\circ}\text{C}$	0.13 $^{\circ}\text{C}$	
	(600 to 630) $^{\circ}\text{C}$	0.13 $^{\circ}\text{C}$	
	Pt 385 (500 Ω)		
	(-200 to -80) $^{\circ}\text{C}$	0.05 $^{\circ}\text{C}$	
	(-80 to 0) $^{\circ}\text{C}$	0.09 $^{\circ}\text{C}$	
	(0 to 100) $^{\circ}\text{C}$	0.1 $^{\circ}\text{C}$	
	(100 to 260) $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$	
	(260 to 300) $^{\circ}\text{C}$	0.1 $^{\circ}\text{C}$	
	(300 to 400) $^{\circ}\text{C}$	0.07 $^{\circ}\text{C}$	
	(400 to 600) $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$	
	(600 to 630) $^{\circ}\text{C}$	0.13 $^{\circ}\text{C}$	

Electrical – DC Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of RTD Indicating Devices – Source	Pt 385 (1 000 Ω)		Comparison to Fluke 5522A/SC1100 Multiproduct Calibrator
	(-200 to -80) $^{\circ}\text{C}$	0.05 $^{\circ}\text{C}$	
	(-80 to 0) $^{\circ}\text{C}$	0.09 $^{\circ}\text{C}$	
	(0 to 100) $^{\circ}\text{C}$	0.05 $^{\circ}\text{C}$	
	(100 to 260) $^{\circ}\text{C}$	0.11 $^{\circ}\text{C}$	
	(260 to 300) $^{\circ}\text{C}$	0.07 $^{\circ}\text{C}$	
	(300 to 400) $^{\circ}\text{C}$	0.08 $^{\circ}\text{C}$	
	(400 to 600) $^{\circ}\text{C}$	0.09 $^{\circ}\text{C}$	
	(600 to 630) $^{\circ}\text{C}$	0.2 $^{\circ}\text{C}$	
	Ni 672 (120 Ω)		
	(-80 to 0) $^{\circ}\text{C}$	0.12 $^{\circ}\text{C}$	
	(0 to 100) $^{\circ}\text{C}$	0.09 $^{\circ}\text{C}$	
	(100 to 260) $^{\circ}\text{C}$	0.14 $^{\circ}\text{C}$	
	Cu 427 (10 Ω)		
	(-100 to 260) $^{\circ}\text{C}$	0.24 $^{\circ}\text{C}$	
	Cu 428 (50 Ω)		
	(-180 to 200) $^{\circ}\text{C}$	0.32 $^{\circ}\text{C}$	
	Cu 428 (100 Ω)		
	(-180 to 40) $^{\circ}\text{C}$	0.32 $^{\circ}\text{C}$	
	(40 to 200) $^{\circ}\text{C}$	0.4 $^{\circ}\text{C}$	

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	Comparison to 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	
	(-110 to -100) dB	0.35 dB	
	(-120 to -110) dB	0.42 dB	

Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
RF Power – Source	(16 to 20) dBm		Comparison to Fluke 96270A Reference Source; Leveling Head Output
	(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	
RF Power – Source	(-124 to -85) dBm (10 to 100) MHz (0.1 to 1.4) GHz	0.6 dB 1.4 dB	Comparison to Fluke 96270A Reference Source; Leveling Head Output

Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
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	Comparison to 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	Comparison to Keysight E8257D PSG Analog Signal Generator
RF Power – Measure	(+30 to -10) dBm DC to 50 GHz	3.6 % of reading + 0.004 dB	Comparison to Keysight N5531X Measuring Receiver; HP 11722A, HP 11792A HP 8487A Power Sensors
Power Reference Out	50 MHz 1 mW	2.1 % of reading	Comparison to 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	Comparison to 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	Comparison to Keysight N5531 Measuring Receiver; HP 11722A, HP 11792A, HP 11793A Power Sensors

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	Comparison to 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	2.3 % of reading + 1 Digit	Comparison to Keysight N5531X Measuring Receiver; HP 11722A, HP 11792A, HP 11793A Power Sensors
	(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	Comparison to 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	
	(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	Comparison to 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	Comparison to 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 ¹	Up to 12 in	$(51 + 2.4L) \mu\text{in}$	Comparison to Grade 0 Gage Blocks
Calipers ¹	Up to 12 in	$(130 + 1.7L) \mu\text{in}$	Comparison to Gage Blocks
Height/Depth Gages ¹	Up to 12 in	$(130 + 3.6L) \mu\text{in}$	Comparison to Grade 0 Gage Blocks
Indicators ¹	Up to 4 in	$(52 + 1L) \mu\text{in}$	Comparison to Grade 0 Gage Blocks
Length Standards ¹	Up to 4 in	$(41 + 2.3L) \mu\text{in}$	Measurement with Pratt & Whitney Supermicrometer [®] , Grade 0 Gage Blocks
Feeler Gages	(0.001 to 0.2) in	43 μin	Comparison to Pratt & Whitney Supermicrometer [®] , Grade 0 Gage Blocks
Pin and Plug Gages ¹	Up to 4 in	$(45 + 2.3L) \mu\text{in}$	Comparison to 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 ²	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 ²	300 g to 2 kg (2 to 5) kg	23 mg 87 mg	ASTM E617 Class 2 weights and GIDEP procedure utilized in the calibration of the weighing system.

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Pressure Instruments	(0 to 20) psi (0 to 50) psi (0 to 100) 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	Comparison to 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	Comparison to Condec UPC5200 Pressure Standard
Torque Tools	(2 to 10) lbf-in	0.59 % of reading	Comparison to Mountz EX TORQ III Torque Analyzer
Torque Tools	4 lbf-in to 2 000 lbf-ft	0.31 % of reading	Comparison to CDI 5000-ST Torque Monitor & 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	Comparison to 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
Infrared Thermometers	35 °C (35 to 100) °C (100 to 200) °C (200 to 350) °C 500 °C	0.44 °C 0.62 °C 0.89 °C 1.5 °C 2.1 °C	Comparison to Fluke 4181 Black Body Source (flat plate) $\epsilon = 0.95, \lambda = (8 \text{ to } 14) \mu\text{m}$

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	Comparison to SRS FS725 Frequency Standard; HP 3325B, HP 83650B Signal Generators
Frequency – Measure	DC to 350 MHz	48 mHz	Comparison to HP 53230A Counter, SRS FS725 Frequency Standard
Frequency – Measure	350 MHz to 46 GHz	0.59 Hz	Comparison to 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. L = length in inches.
2. 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.



Jason Stine, Vice President