



# CERTIFICATE OF ACCREDITATION

*This is to attest that*

**UL LLC**

12 LABORATORY DRIVE  
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27709, U.S.A.

**Calibration Laboratory CL-167**

has met the requirements of AC204, *IAS Accreditation Criteria for Calibration Laboratories*, and has demonstrated compliance with ISO/IEC Standard 17025:2017, *General requirements for the competence of testing and calibration laboratories*. This organization is accredited to provide the services specified in the scope of accreditation.

Effective Date March 21, 2024

Expiration Date May 1, 2025



A handwritten signature in black ink, reading 'Raj Nathan'.

**President**

# SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | [www.iasonline.org](http://www.iasonline.org)

**UL LLC**

[www.ul.com](http://www.ul.com)

**Contact Name** Scott Cimino

**Contact Phone** +1-631-546-2518

*Accredited to ISO/IEC 17025:2017*

*Effective Date March 21, 2024*

## CALIBRATION AND MEASUREMENT CAPABILITY (CMC)\*

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)	
<b>Dimensional</b>				
Calipers	0 in to 6 in	290 µin	Grade '0' inch gage blocks Procedure CP000010	
Micrometers	0 in to 1 in	58 µin	Grade '0' inch gage blocks Procedure CP000008	
<b>Thermal</b>				
Simulated Temperature Generate <sup>3</sup> Thermocouple Type J	-210 °C to -100 °C -100 °C to -30 °C -30 °C to 150 °C 150 °C to 760 °C 760 °C to 1200 °C	0.22 °C 0.14 °C 0.12 °C 0.14 °C 0.19 °C	Fluke 5522A Procedure VP000044CMC	
Type K	-200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 1000 °C 1000 °C to 1372 °C	0.26 °C 0.15 °C 0.14 °C 0.21 °C 0.33 °C		
Type T	-250 °C to -150 °C -150 °C to 0 °C 0 °C to 120 °C 120 °C to 400 °C	0.49 °C 0.19 °C 0.25 °C 0.25 °C		
Temperature - Generate <sup>3</sup>	35 °C to 375 °C	1.0 x 10 <sup>-3</sup> + 0.35 °C		Hart Scientific 9100S Dry Block Procedure CP000054
Temperature - Measure <sup>4</sup>	-50 °C to 400 °C	0.74 °C		Omega CL25 w/ Type T probe Procedure VP000045CMC

\* If information in this CMC is presented in non-SI units, the conversion factors stated in NIST Special Publication 811 "Guide for the Use of the International System of Units (SI)" apply.

# SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | [www.iasonline.org](http://www.iasonline.org)

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Humidity - Measure <sup>4</sup>	10 %RH to 95 %RH (10 °C to 30 °C)	1.7 %RH	Vaisala MI70 w/ HMP76 Probe Procedure CP000015
	10 %RH to 95 %RH (30 °C to 60 °C)	1.8 %RH	
<b>Electrical – DC/LF</b>			
DC Voltage - Generate <sup>3</sup>	0 mV to 329.9999 mV	$1.5 \times 10^{-5} + 0.77 \mu\text{V}$	Fluke 5522A Procedure VP000040CMC
	0 V to 3.299999 V	$8.5 \times 10^{-6} + 1.5 \mu\text{V}$	
	0 V to 32.99999 V	$9.3 \times 10^{-6} + 15 \mu\text{V}$	
	30 V to 329.9999 V	$1.3 \times 10^{-5} + 0.11 \text{ mV}$	
AC Voltage - Generate <sup>3</sup>	100 V to 1020.000 V	$1.3 \times 10^{-5} + 1.1 \text{ mV}$	Fluke 5522A Procedure: VP000040CMC
	1.0 mV to 32.999 mV (0.01 Hz to 9.99 Hz)	$3.8 \times 10^{-2} + 0.12 \text{ mV}$	
	(10 Hz to 45 Hz)	$6.2 \times 10^{-4} + 4.6 \mu\text{V}$	
	(45 Hz to 10 kHz)	$1.1 \times 10^{-4} + 4.6 \mu\text{V}$	
	(10 kHz to 20 kHz)	$1.5 \times 10^{-4} + 4.6 \mu\text{V}$	
	(20 kHz to 50 kHz)	$7.7 \times 10^{-4} + 4.6 \mu\text{V}$	
	(50 kHz to 100 kHz)	$2.7 \times 10^{-3} + 9.3 \mu\text{V}$	
	(100 kHz to 500 kHz)	$6.2 \times 10^{-3} + 38 \mu\text{V}$	
	33 mV to 329.999 mV (0.01 Hz to 9.99 Hz)	$3.8 \times 10^{-2} + 1.2 \text{ mV}$	
	(10 Hz to 45 Hz)	$2.3 \times 10^{-4} + 6.2 \mu\text{V}$	
	(45 Hz to 10 kHz)	$1.1 \times 10^{-4} + 6.2 \mu\text{V}$	
	(10 kHz to 20 kHz)	$1.2 \times 10^{-4} + 6.2 \mu\text{V}$	
	(20 kHz to 50 kHz)	$2.7 \times 10^{-4} + 6.2 \mu\text{V}$	
	(50 kHz to 100 kHz)	$6.2 \times 10^{-4} + 24 \mu\text{V}$	
	(100 kHz to 500 kHz)	$1.5 \times 10^{-3} + 54 \mu\text{V}$	
	0.33 V to 3.29999 V (0.01 Hz to 9.99 Hz)	$3.8 \times 10^{-2} + 12 \text{ mV}$	
(10 Hz to 45 Hz)	$2.3 \times 10^{-4} + 38 \mu\text{V}$		
(45 Hz to 10 kHz)	$1.1 \times 10^{-4} + 46 \mu\text{V}$		
(10 kHz to 20 kHz)	$1.4 \times 10^{-4} + 46 \mu\text{V}$		
(20 kHz to 50 kHz)	$2.3 \times 10^{-4} + 38 \mu\text{V}$		
(50 kHz to 100 kHz)	$5.4 \times 10^{-4} + 96 \mu\text{V}$		
(100 kHz to 500 kHz)	$1.8 \times 10^{-3} + 0.46 \text{ mV}$		
3.3 V to 32.9999 V (0.01 Hz to 9.99 Hz)	$3.8 \times 10^{-2} + 0.12 \text{ V}$		
(10 Hz to 45 Hz)	$2.3 \times 10^{-4} + 0.50 \text{ mV}$		
(45 Hz to 10 kHz)	$1.1 \times 10^{-4} + 0.46 \text{ mV}$		
(10 kHz to 20 kHz)	$1.8 \times 10^{-4} + 0.46 \text{ mV}$		
(20 kHz to 50 kHz)	$2.7 \times 10^{-4} + 0.46 \text{ mV}$		
(50 kHz to 100 kHz)	$6.9 \times 10^{-4} + 1.2 \text{ mV}$		

# SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | [www.iasonline.org](http://www.iasonline.org)

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
AC Voltage - Generate <sup>3</sup> continued	33 V to 329.999 V (45 Hz to 1 kHz) (1 kHz to 10 kHz) (10 kHz to 20 kHz) (20 kHz to 50 kHz) (50 kHz to 100 kHz)	1.4 x 10 <sup>-4</sup> + 1.5 mV 1.5 x 10 <sup>-4</sup> + 4.6 mV 1.9 x 10 <sup>-4</sup> + 4.6 mV 2.3 x 10 <sup>-4</sup> + 4.6 mV 1.5 x 10 <sup>-3</sup> + 38 mV	Fluke 5522A Procedure: VP000040CMC
	330 V to 1020 V (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz)	2.3 x 10 <sup>-4</sup> + 7.7 mV 1.9 x 10 <sup>-4</sup> + 7.7 mV 2.3 x 10 <sup>-4</sup> + 7.7 mV	
DC Current - Generate <sup>3</sup>	0 µA to 329.999 µA 0 mA to 3.29999 mA 0 mA to 32.9999 mA 0 mA to 329.999 mA 0 A to 1.09999 A 1.1 A to 2.99999 A 0 A to 10.9999 A 11 A to 20.5 A	1.1 x 10 <sup>-4</sup> + 15 nA 7.7 x 10 <sup>-5</sup> + 38 nA 7.7 x 10 <sup>-5</sup> + 0.19 µA 7.7 x 10 <sup>-5</sup> + 1.9 µA 1.5 x 10 <sup>-4</sup> + 31 µA 2.9 x 10 <sup>-4</sup> + 31 µA 3.8 x 10 <sup>-4</sup> + 0.38 mA 7.7 x 10 <sup>-4</sup> + 0.58 mA	Fluke 5522A Procedure: VP000040CMC
	20 A to 120 A	7.8 x 10 <sup>-5</sup> + 4.7 mA	
AC Current - Generate <sup>3</sup>	29.00 µA to 329.99 µA (10 Hz to 20 Hz) (20 Hz to 45 Hz) (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz) (10 kHz to 30 kHz)	1.5 x 10 <sup>-3</sup> + 77 nA 1.1 x 10 <sup>-3</sup> + 77 nA 9.6 x 10 <sup>-4</sup> + 77 nA 2.3 x 10 <sup>-3</sup> + 0.11 µA 6.2 x 10 <sup>-3</sup> + 0.15 µA 1.2 x 10 <sup>-2</sup> + 0.31 µA	Fluke 5522A Procedure: VP000040CMC
	0.33 mA to 3.29999 mA (10 Hz to 20 Hz) (20 Hz to 45 Hz) (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz) (10 kHz to 30 kHz)	1.5 x 10 <sup>-3</sup> + 0.11 µA 9.6 x 10 <sup>-4</sup> + 0.11 µA 7.7 x 10 <sup>-4</sup> + 0.11 µA 1.5 x 10 <sup>-3</sup> + 0.15 µA 3.8 x 10 <sup>-3</sup> + 0.23 µA 7.7 x 10 <sup>-3</sup> + 0.46 µA	
	3.3 mA to 32.9999 mA (10 Hz to 20 Hz) (20 Hz to 45 Hz) (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz) (10 kHz to 30 kHz)	1.3 x 10 <sup>-3</sup> + 1.5 µA 6.9 x 10 <sup>-4</sup> + 1.5 µA 3.1 x 10 <sup>-4</sup> + 1.5 µA 6.2 x 10 <sup>-4</sup> + 1.5 µA 1.5 x 10 <sup>-3</sup> + 2.3 µA 3.1 x 10 <sup>-3</sup> + 3.1 µA	

# SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | [www.iasonline.org](http://www.iasonline.org)

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
AC Current - Generate <sup>3</sup> continued	33 mA to 329.999 mA (10 Hz to 20 Hz) (20 Hz to 45 Hz) (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz) (10 kHz to 30 kHz)	1.3 x 10 <sup>-3</sup> + 15 µA 6.9 x 10 <sup>-4</sup> + 15 µA 3.1 x 10 <sup>-4</sup> + 15 µA 7.7 x 10 <sup>-4</sup> + 38 µA 1.5 x 10 <sup>-3</sup> + 77 µA 3.1 x 10 <sup>-3</sup> + 0.15 mA	Fluke 5522A Procedure: VP000040CMC
	0.33 A to 1.09999 A (10 Hz to 45 Hz) (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz)	1.3 x 10 <sup>-3</sup> + 77 µA 3.8 x 10 <sup>-4</sup> + 77 µA 4.6 x 10 <sup>-3</sup> + 0.77 mA 1.9 x 10 <sup>-2</sup> + 3.8 mA	
	1.1 A to 2.99999 A (10 Hz to 45 Hz) (45 Hz to 1 kHz) (1 kHz to 5 kHz) (5 kHz to 10 kHz)	1.3 x 10 <sup>-3</sup> + 77 µA 4.6 x 10 <sup>-4</sup> + 77 µA 4.6 x 10 <sup>-3</sup> + 0.77 mA 1.9 x 10 <sup>-2</sup> + 3.8 mA	
	3 A to 10.9999 A (45 Hz to 100 Hz) (100 Hz to 1 kHz) (1 kHz to 5 kHz)	4.6 x 10 <sup>-4</sup> + 1.5 mA 7.7 x 10 <sup>-4</sup> + 1.5 mA 2.3 x 10 <sup>-2</sup> + 1.5 mA	
	11 A to 20.5 A (45 Hz to 100 Hz) (100 Hz to 1 kHz) (1 kHz to 5 kHz)	9.3 x 10 <sup>-4</sup> + 3.8 mA 1.1 x 10 <sup>-3</sup> + 3.8 mA 2.3 x 10 <sup>-2</sup> + 3.8 mA	
	20 A to 120 A (50/60 Hz)	1.2 x 10 <sup>-4</sup> + 0.47 A	
DC Voltage - Measure <sup>4</sup>	0 mV to 200 mV 200 mV to 2 V 2 V to 20 V 20 V to 200 V 200 V to 1000 V	4.6 x 10 <sup>-6</sup> + 93 nV 3.1 x 10 <sup>-6</sup> + 0.38 µV 3.1 x 10 <sup>-6</sup> + 3.8 µV 4.6 x 10 <sup>-6</sup> + 38 µV 4.6 x 10 <sup>-6</sup> + 0.93 mV	Fluke 8508A Procedure: VP000040CMC
DC Current - Measure <sup>4</sup>	0 µA to 200 µA 200 µA to 2 mA 2 mA to 20 mA 20 mA to 200 mA 200 mA to 2 A 2 A to 20 A	1.1 x 10 <sup>-5</sup> + 0.31 nA 1.1 x 10 <sup>-5</sup> + 3.1 nA 1.2 x 10 <sup>-5</sup> + 31 nA 3.4 x 10 <sup>-5</sup> + 0.62 µA 1.6 x 10 <sup>-4</sup> + 12 µA 3.5 x 10 <sup>-4</sup> + 0.31 mA	Fluke 8508A Procedure: VP000040CMC

# SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | [www.iasonline.org](http://www.iasonline.org)

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
AC Voltage - Measure <sup>4</sup>	0 mV to 200 mV (10 Hz to 40 Hz)	$1.1 \times 10^{-4} + 3.8 \mu\text{V}$	Fluke 8508A Procedure: VP000040CMC
	(40 Hz to 100 Hz)	$9.7 \times 10^{-5} + 3.8 \mu\text{V}$	
	(100 Hz to 2 kHz)	$9.7 \times 10^{-5} + 1.8 \mu\text{V}$	
	(2 kHz to 10 kHz)	$9.7 \times 10^{-5} + 3.8 \mu\text{V}$	
	(10 kHz to 30 kHz)	$2.6 \times 10^{-4} + 7.7 \mu\text{V}$	
	(30 kHz to 100 kHz)	$5.8 \times 10^{-4} + 18 \mu\text{V}$	
	200 mV to 2 V (10 Hz to 40 Hz)	$9.3 \times 10^{-5} + 18 \mu\text{V}$	
	(40 Hz to 100 Hz)	$7.3 \times 10^{-5} + 18 \mu\text{V}$	
	(100 Hz to 2 kHz)	$5.8 \times 10^{-5} + 18 \mu\text{V}$	
	(2 kHz to 10 kHz)	$7.3 \times 10^{-5} + 18 \mu\text{V}$	
	(10 kHz to 30 kHz)	$1.8 \times 10^{-4} + 38 \mu\text{V}$	
	(30 kHz to 100 kHz)	$4.3 \times 10^{-4} + 0.18 \text{ mV}$	
	(100 kHz to 300 kHz)	$2.3 \times 10^{-3} + 1.8 \text{ mV}$	
	(300 kHz to 1 MHz)	$7.7 \times 10^{-3} + 18 \text{ mV}$	
	2 V to 20 V (10 Hz to 40 Hz)	$9.3 \times 10^{-5} + 0.18 \text{ mV}$	
	(40 Hz to 100 Hz)	$7.3 \times 10^{-5} + 0.18 \text{ mV}$	
	(100 Hz to 2 kHz)	$5.8 \times 10^{-5} + 0.18 \text{ mV}$	
	(2 kHz to 10 kHz)	$7.3 \times 10^{-5} + 0.18 \text{ mV}$	
	(10 kHz to 30 kHz)	$1.8 \times 10^{-4} + 0.38 \text{ mV}$	
	(30 kHz to 100 kHz)	$4.3 \times 10^{-4} + 1.8 \text{ mV}$	
(100 kHz to 300 kHz)	$2.3 \times 10^{-3} + 18 \text{ mV}$		
(300 kHz to 1 MHz)	$7.7 \times 10^{-3} + 0.18 \text{ V}$		
20 V to 200 V (10 Hz to 40 Hz)	$9.3 \times 10^{-5} + 1.8 \text{ mV}$		
(40 Hz to 100 Hz)	$7.3 \times 10^{-5} + 1.8 \text{ mV}$		
(100 Hz to 2 kHz)	$5.8 \times 10^{-5} + 1.8 \text{ mV}$		
(2 kHz to 10 kHz)	$7.3 \times 10^{-5} + 1.8 \text{ mV}$		
(10 kHz to 30 kHz)	$1.8 \times 10^{-4} + 3.8 \text{ mV}$		
(30 kHz to 100 kHz)	$4.3 \times 10^{-4} + 18 \text{ mV}$		
(100 kHz to 300 kHz)	$2.3 \times 10^{-3} + 0.18 \text{ V}$		
(300 kHz to 1 MHz)	$7.7 \times 10^{-3} + 1.8 \text{ V}$		
200 V to 1000 V (10 Hz to 40 Hz)	$1.0 \times 10^{-4} + 38 \text{ mV}$		
(40 Hz to 10 kHz)	$8.5 \times 10^{-5} + 38 \text{ mV}$		
(10 kHz to 30 kHz)	$1.9 \times 10^{-4} + 77 \text{ mV}$		
(30 kHz to 100 kHz)	$4.7 \times 10^{-4} + 0.38 \text{ V}$		
AC Current - Measure <sup>4</sup>	29 $\mu\text{A}$ to 200 $\mu\text{A}$ (10 Hz to 10 kHz)	$4.5 \times 10^{-4} + 18 \text{ nA}$	Fluke 8508A Procedure: VP000040CMC



# SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | [www.iasonline.org](http://www.iasonline.org)

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
AC Current - Measure <sup>4</sup> (continued)	200 µA to 2 mA (10 Hz to 10 kHz)	$2.6 \times 10^{-4} + 0.18 \mu\text{A}$	Fluke 8508A Procedure: VP000040CMC
	2 mA to 20 mA (10 Hz to 10 kHz)	$2.6 \times 10^{-4} + 1.8 \mu\text{A}$	
	20 mA to 200 mA (10 Hz to 10 kHz)	$2.3 \times 10^{-4} + 18 \mu\text{A}$	
	200 mA to 2 A (10 Hz to 2 kHz) (2 kHz to 10 kHz)	$5.4 \times 10^{-4} + 0.18 \text{ mA}$ $6.3 \times 10^{-4} + 0.18 \text{ mA}$	
	2 A to 20 A (10 Hz to 2 kHz) (2 kHz to 10 kHz)	$6.9 \times 10^{-4} + 1.8 \text{ mA}$ $1.9 \times 10^{-3} + 1.8 \text{ mA}$	
DC Resistance - Generate <sup>3</sup>	0 Ω to 10.9999 Ω	$3.1 \times 10^{-5} + 0.77 \text{ m}\Omega$	Fluke 5522A Procedure: VP000040CMC
	11 Ω to 32.9999 Ω	$2.3 \times 10^{-5} + 1.1 \text{ m}\Omega$	
	33 Ω to 109.9999 Ω	$2.1 \times 10^{-5} + 1.0 \text{ m}\Omega$	
	110 Ω to 329.9999 Ω	$2.1 \times 10^{-5} + 1.5 \text{ m}\Omega$	
	330 Ω to 1.099999 kΩ	$2.1 \times 10^{-5} + 1.5 \text{ m}\Omega$	
	1.1 kΩ to 3.299999 kΩ	$2.1 \times 10^{-5} + 15 \text{ m}\Omega$	
	3.3 kΩ to 10.99999 kΩ	$2.1 \times 10^{-5} + 15 \text{ m}\Omega$	
	11 kΩ to 32.99999 kΩ	$2.1 \times 10^{-5} + 0.15 \Omega$	
	33 kΩ to 109.9999 kΩ	$2.1 \times 10^{-5} + 0.15 \Omega$	
	110 kΩ to 329.99999 kΩ	$2.4 \times 10^{-5} + 1.5 \Omega$	
	330 kΩ to 1.099999 MΩ	$2.4 \times 10^{-5} + 1.5 \Omega$	
	1.1 MΩ to 3.299999 MΩ	$4.6 \times 10^{-5} + 23 \Omega$	
	3.3 MΩ to 10.99999 MΩ	$1.0 \times 10^{-4} + 38 \Omega$	
	11 MΩ to 32.99999 MΩ	$1.9 \times 10^{-4} + 1.9 \text{ k}\Omega$	
	33 MΩ to 109.9999 MΩ	$3.8 \times 10^{-4} + 2.3 \text{ k}\Omega$	
110 MΩ to 329.9999 MΩ	$2.3 \times 10^{-3} + 77 \text{ k}\Omega$		
330 MΩ to 1.1 GΩ	$1.1 \times 10^{-2} + 0.38 \text{ M}\Omega$		
DC Resistance - Measure <sup>4</sup>	0 Ω to 2 Ω	$1.4 \times 10^{-5} + 3.8 \mu\Omega$	Fluke 8508A Procedure: VP000040CMC
	2 Ω to 20 Ω	$8.9 \times 10^{-6} + 13 \mu\Omega$	
	20 Ω to 200 Ω	$7.3 \times 10^{-6} + 46 \mu\Omega$	
	200 Ω to 2 kΩ	$7.3 \times 10^{-6} + 0.46 \text{ m}\Omega$	
	2 kΩ to 20 kΩ	$7.3 \times 10^{-6} + 4.6 \text{ m}\Omega$	
	20 kΩ to 200 kΩ	$7.3 \times 10^{-6} + 46 \text{ m}\Omega$	
	200 kΩ to 2 MΩ	$8.1 \times 10^{-6} + 0.93 \Omega$	
	2 MΩ to 20 MΩ	$1.5 \times 10^{-5} + 93 \Omega$	
	20 MΩ to 200 MΩ	$5.8 \times 10^{-5} + 9.3 \text{ k}\Omega$	
	200 MΩ to 2 GΩ	$5.2 \times 10^{-4} + 0.93 \text{ M}\Omega$	
Capacitance - Generate <sup>3,5</sup>	220 pF to 399.9 pF	$3.8 \times 10^{-3} + 7.7 \text{ pF}$	Fluke 5522A Procedure: VP000040CMC
	0.4 nF to 1.0999 nF	$3.8 \times 10^{-3} + 7.7 \text{ pF}$	
	1.1 nF to 3.2999 nF	$3.8 \times 10^{-3} + 7.7 \text{ pF}$	
	3.3 nF to 10.9999 nF	$1.9 \times 10^{-3} + 7.7 \text{ pF}$	

# SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | [www.iasonline.org](http://www.iasonline.org)

MEASURED QUANTITY or DEVICE TYPE CALIBRATED	RANGE	UNCERTAINTY <sup>1,2</sup> (±)	CALIBRATION METHOD OR PROCEDURE, STANDARD EQUIPMENT (OPTIONAL)
Capacitance - Generate <sup>3,5</sup> (continued)	11 nF to 32.9999 nF 33 nF to 109.999 nF 110 nF to 329.999 nF 0.33 µF to 1.09999 µF 1.1 µF to 3.29999 µF 3.3 µF to 10.9999 µF 11 µF to 32.9999 µF 33 µF to 109.999 µF 110 µF to 329.999 µF 0.33 mF to 1.09999 mF 1.1 mF to 3.29999 mF 3.3 mF to 10.9999 mF 11 mF to 32.9999 mF 33 mF to 110 mF	1.9 x 10 <sup>-3</sup> + 77 pF 1.9 x 10 <sup>-3</sup> + 77 pF 1.9 x 10 <sup>-3</sup> + 0.23 nF 1.9 x 10 <sup>-3</sup> + 0.77 nF 1.9 x 10 <sup>-3</sup> + 2.3 nF 1.9 x 10 <sup>-3</sup> + 7.7 nF 3.1 x 10 <sup>-3</sup> + 23 nF 3.4 x 10 <sup>-3</sup> + 77 nF 3.4 x 10 <sup>-3</sup> + 0.23 µF 3.4 x 10 <sup>-3</sup> + 0.77 µF 3.4 x 10 <sup>-3</sup> + 2.3 µF 3.4 x 10 <sup>-3</sup> + 7.7 µF 5.8 x 10 <sup>-3</sup> + 23 µF 8.5 x 10 <sup>-3</sup> + 77 µF	Fluke 5522A Procedure: VP000043CMC
<b>Time and Frequency</b>			
Frequency - Generate <sup>3</sup>	0.01 Hz to 119.99 Hz 120.0 Hz to 1199.9 Hz 1.200 kHz to 11.999 kHz 12.00 kHz to 119.99 kHz 120.0 kHz to 1199.9 kHz 1.200 MHz to 2.000 MHz	1.9 x 10 <sup>-6</sup> + 3.8 µHz 1.9 x 10 <sup>-6</sup> + 3.8 µHz 1.9 x 10 <sup>-6</sup> + 3.8 µHz 1.9 x 10 <sup>-6</sup> + 3.8 µHz 1.9 x 10 <sup>-6</sup> + 3.8 µHz 1.9 x 10 <sup>-6</sup> + 3.8 µHz	Fluke 5522A Procedure: VP000040CMC
Frequency - Measure <sup>4</sup>	10 Hz to 19.52 Hz 19.53 Hz to 195.2 Hz 195.3 Hz to 1.952 kHz 1.953 kHz to 19.52 kHz 19.53 kHz to 195.2 kHz 195.3 kHz to 1 MHz	7.7 x 10 <sup>-6</sup> + 15 µHz 7.7 x 10 <sup>-6</sup> + 0.15 mHz 7.7 x 10 <sup>-6</sup> + 1.5 mHz 7.7 x 10 <sup>-6</sup> + 15 mHz 7.7 x 10 <sup>-6</sup> + 0.15 Hz 7.7 x 10 <sup>-6</sup> + 1.5 Hz	Fluke 8508A Procedure: VP000040CMC
Timer / Stopwatch	Deviation per day	0.040 s/24 h	Helmut Klein Timometer 4500 Procedure CP000020

<sup>1</sup>The uncertainty covered by the Calibration and Measurement Capability (CMC) is expressed as the expanded uncertainty having a coverage probability of approximately 95 %. It is the smallest measurement uncertainty that a laboratory can achieve within its scope of accreditation when performing calibrations of a best existing device. The measurement uncertainty reported on a calibration certificate may be greater than that provided in the CMC due to the behavior of the calibration item and other factors that may contribute to the uncertainty of a specific calibration.

<sup>2</sup>When uncertainty is stated in relative terms (such as percent, a multiplier expressed as a decimal fraction or in scientific notation), it is in relation to instrument reading or instrument output, as appropriate, unless otherwise indicated.

<sup>3</sup>Capability is suitable for the calibration of measuring devices in the stated ranges.

<sup>4</sup>Capability is suitable for the calibration of devices intended to generate the indicated quantity in the stated ranges.

<sup>5</sup>The actual frequency applied by the calibrator cannot be selected and may be dependent on the measurement device under calibration. Approximate frequency ranges for a given capacitance or capacitance range may be found in the Fluke 5522A's published specifications.