



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

ARREGA TECNOLOGÍA, SAPI, DE CV
dba ARREGA INDUSTRIAL
Blvd. Tercera Oeste No. 17524, Fracc. Garita de Otay
Tijuana, Baja California Mexico

Fulfills the requirements of

ISO/IEC 17025:2017

and national standard

ANSI/NCSL Z540-1-1994 (R2002)

In the fields of

CALIBRATION and DIMENSIONAL MEASUREMENT

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 2026
Certificate Number: ACT-2077



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)

ARREGA TECNOLOGÍA, SAPI, DE CV dba ARREGA INDUSTRIAL

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CALIBRATION AND DIMENSIONAL MEASUREMENT

Valid to: September 7, 2026

Certificate Number: ACT-2077

CALIBRATION

Chemical Quantities

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
pH Meters ⁵	4 pH 7 pH 10 pH	0.019 pH 0.028 pH 0.025 pH	Accredited Buffer Solutions
Conductivity Meters ⁵	10 µS/cm 100 µS/cm 1 200 µS/cm 1 413 µS/cm	0.34 µS/cm 3 µS/cm 31 µS/cm 32 µS/cm	Accredited Conductivity Solutions

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Source ¹	Up to 330 mV (0.33 to 3.3) V (3.3 to 33) V (30 to 330) V (100 to 1 100) V	16 µV/V + 0.78 µV 9 µV/V + 1.6 µV 9.8 µV/V + 16 µV 15 µV/V + 0.12 mV 15 µV/V + 1.2 mV	Fluke 5522A Multiproduct Calibrator



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Measure ¹	(10 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1 000) V	9.2 $\mu\text{V/V} + 0.3 \mu\text{V}$ 8 $\mu\text{V/V} + 0.3 \mu\text{V}$ 8 $\mu\text{V/V} + 0.5 \mu\text{V}$ 10 $\mu\text{V/V} + 30 \mu\text{V}$ 10 $\mu\text{V/V} + 0.1 \text{ mV}$	Agilent 3458A Opt. 002 8.5 Digit Multimeter
DC High Voltage – Measure ¹	Up to 5 kV (5 to 10) kV (10 to 20) kV (20 to 30) kV (30 to 40) kV (40 to 50) kV	80 $\mu\text{V/V} + 1.6 \text{ V}$ 80 $\mu\text{V/V} + 2.5 \text{ V}$ 80 $\mu\text{V/V} + 1.6 \text{ V}$ 80 $\mu\text{V/V} + 5.9 \text{ V}$ 0.1 $\text{mV/V} + 19 \text{ V}$ 0.1 $\text{mV/V} + 30 \text{ V}$	Vitrek 4700 High Voltage Meter
DC Current – Source ¹	(0 to 330 μA) (0.33 to 3.3) mA (3.3 to 33) mA (33 to 330) mA (0.33 to 1.1) A (1.1 to 3) A	0.12 mA/A + 16 nA 79 $\mu\text{A/A} + 39 \text{ nA}$ 79 $\mu\text{A/A} + 0.19 \mu\text{A}$ 82 $\mu\text{A/A} + 1.9 \mu\text{A}$ 0.16 mA/A + 31 μA 0.31 mA/A + 31 μA	Fluke 5522A Multiproduct Calibrator
DC Current – Source ¹	(3 to 11) A (11 to 20.5) A	0.4 mA/A + 0.39 mA 0.79 mA/A + 0.58 mA	Fluke 5522A Multiproduct Calibrator
DC Current Clamp Meters ¹	(10 to 550) A (550 to 1 025) A	2 mA/A + 0.13 A 2 mA/A + 0.13 A	Fluke 5522A Multiproduct Calibrator, Fluke 5500A/COIL 50-turn Coil
DC Current – Measure ¹	Up to 100 μA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	20 $\mu\text{A/A} + 0.53 \text{ nA}$ 19 $\mu\text{A/A} + 3.3 \text{ nA}$ 20 $\mu\text{A/A} + 33 \text{ nA}$ 40 $\mu\text{A/A} + 0.33 \mu\text{A}$ 89 $\mu\text{A/A} + 6.7 \mu\text{A}$	Agilent 3458A Opt. 002 8.5 Digit Multimeter
DC Current – Measure ¹	Up to 18 A (18 to 30) A (30 to 650) A	6.6 $\mu\text{A/A} + 0.36 \text{ mA}$ 67 $\mu\text{A/A} + 0.71 \text{ mA}$ 1.9 mA/A + 0.21 A	Agilent 3458A Opt. 002 8.5 Digit Multimeter, Empro B-1000-100 Shunt

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Source ¹ (Simulated-Fixed Values)	2 Ω	0.85 mΩ	Fluke 5522A Multiproduct Calibrator
	11 Ω	1.1 mΩ	
	11.9 Ω	1.5 mΩ	
	19 Ω	1.6 mΩ	
	30 Ω	1.9 mΩ	
	33 Ω	2 mΩ	
	109 Ω	3.5 mΩ	
	119 Ω	4.2 mΩ	
	190 Ω	5.8 mΩ	
	300 Ω	8.3 mΩ	
	330 Ω	9 mΩ	
	1.09 kΩ	26 mΩ	
	1.19 kΩ	43 mΩ	
	1.9 kΩ	59 mΩ	
	3 kΩ	85 mΩ	
	3.3 kΩ	92 mΩ	
	10.9 kΩ	0.27 Ω	
	11.9 kΩ	0.44 Ω	
	19 kΩ	0.6 Ω	
	30 kΩ	0.85 Ω	
	33 kΩ	0.92 Ω	
	109 kΩ	2.7 Ω	
	119 kΩ	4.6 Ω	
	190 kΩ	6.5 Ω	
	300 kΩ	9.3 Ω	
	330 kΩ	10 Ω	
	1.09 MΩ	71 Ω	
	1.19 MΩ	79 Ω	
	1.9 MΩ	0.12 kΩ	
	3 MΩ	0.17 kΩ	
	3.3 MΩ	0.19 kΩ	
	10.9 MΩ	1.2 kΩ	
11.9 MΩ	4.4 kΩ		
19 MΩ	5.7 kΩ		
30 MΩ	8.1 kΩ		
33 MΩ	9 kΩ		
109 MΩ	46 kΩ		
119 MΩ	0.36 MΩ		
290 MΩ	0.8 MΩ		
400 MΩ	5.1 MΩ		
640 MΩ	7.9 MΩ		
1.09 GΩ	13 MΩ		



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Source ¹ (Variable Artifact)	(1 to 10) Ω (10 to 100) Ω (100 to 1 000) Ω (1 to 10) kΩ (10 to 100) kΩ (100 to 1 000) kΩ (1 to 10) MΩ	0.92 mΩ/Ω 0.92 mΩ/Ω 0.92 mΩ/Ω 0.92 mΩ/Ω 0.92 mΩ/Ω 0.9 mΩ/Ω 0.93 mΩ/Ω	General Radio 1433-33 Decade Resistor
Resistance – Measure ¹	Up to 10 Ω (10 to 100) Ω (0.1 to 1) kΩ (1 to 10) kΩ (1 to 10) kΩ (10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ (10 to 100) MΩ	17 μΩ/Ω + 50 μΩ 15 μΩ/Ω + 0.5 mΩ 12 μΩ/Ω + 0.5 mΩ 12 μΩ/Ω + 5 mΩ 13 μΩ/Ω + 50 mΩ 17 μΩ/Ω + 2 Ω 52 μΩ/Ω + 0.1 kΩ 52 μΩ/Ω + 0.1 kΩ 0.53 mΩ/Ω + 1 kΩ	Agilent 3458A Opt. 002 8.5 Digit Multimeter
AC Voltage – Source ¹	1 mV to 33 mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (33 to 330) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (0.33 to 3.3) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.63 mV/V + 4.7 μV 0.14 mV/V + 4.7 μV 0.17 mV/V + 4.7 μV 0.79 mV/V + 4.7 μV 2.7 mV/V + 9.3 μV 6.3 mV/V + 39 μV 0.24 mV/V + 6.2 μV 0.12 mV/V + 6.2 μV 0.13 mV/V + 6.2 μV 0.28 mV/V + 6.2 μV 0.63 mV/V + 25 μV 1.7 mV/V + 54 μV 0.24 mV/V + 40 μV 0.12 mV/V + 50 μV 0.15 mV/V + 50 μV 0.24 mV/V + 40 μV 0.55 mV/V + 0.1 mV 1.9 mV/V + 0.47 mV	Fluke 5522A Multiproduct Calibrator



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source ¹	(3.3 to 33) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (33 to 330) V 45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (330 to 1 020) V 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.24 mV/V + 0.47 mV 0.12 mV/V + 0.47 mV 0.19 mV/V + 0.47 mV 0.28 mV/V + 0.47 mV 0.71 mV/V + 1.2 mV 0.15 mV/V + 1.6 mV 0.16 mV/V + 4.7 mV 0.21 mV/V + 4.7 mV 0.27 mV/V + 4.7 mV 1.6 mV/V + 39 mV 0.24 mV/V + 7.8 mV 0.2 mV/V + 7.8 mV 0.24 mV/V + 7.8 mV	Fluke 5522A Multiproduct Calibrator
AC Voltage – Measure ¹	Up to 10 mV 40 Hz to 1 kHz (1 to 20) kHz (20 to 100) kHz (100 to 300) kHz (10 to 100) mV 40 Hz to 1 kHz (1 to 20) kHz (20 to 100) kHz (100 to 300) kHz (0.1 to 1) V 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz	0.34 mV/V + 1.1 μV 0.42 mV/V + 1.1 μV 5.1 mV/V + 1.1 μV 41 mV/V + 2 μV 91 μV/V + 2 μV 0.16 mV/V + 2 μV 0.9 mV/V + 2 μV 3.1 mV/V + 10 μV 86 μV/V + 20 μV 0.16 mV/V + 20 μV 0.33 mV/V + 20 μV 0.83 mV/V + 20 μV 3 mV/V + 0.1 mV 10 mV/V + 0.1 mV	Agilent 3458A Opt. 002 8.5 Digit Multimeter

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure ¹	(1 to 10) V (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz (10 to 100) V 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 1 000) V (50 to 60) Hz (100 to 450) Hz	87 μ V/V + 0.4 mV 85 μ V/V + 0.2 mV 0.16 mV/V + 0.2 mV 0.33 mV/V + 0.2 mV 0.82 mV/V + 60 μ V 3 mV/V + 1 mV 3.4 mV/V + 1 mV 10 mV/V + 1 mV 0.22 mV/V + 2 mV 0.23 mV/V + 2 mV 0.38 mV/V + 2 mV 1.3 mV/V + 2 mV 1 mV/V + 0.4 V 25 mV/V + 0.4 V	Agilent 3458A Opt. 002 8.5 Digit Multimeter
AC High Voltage – Measure ¹	(1 to 9) kV (50 to 60) Hz	1 mV/V + 0.4 V	Vitrek 4700 High Voltage Meter
AC Current – Source ¹	(29 to 330) μ A (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (0.33 to 3.3) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (3.3 to 33) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	1.6 mA/A + 80 nA 1.2 mA/A + 80 nA 0.98 mA/A + 80 nA 2.3 mA/A + 0.12 μ A 6.2 mA/A + 0.16 μ A 12 mA/A + 0.31 μ A 1.6 mA/A + 0.12 μ A 0.98 mA/A + 0.12 μ A 0.78 mA/A + 0.12 μ A 1.6 mA/A + 0.16 μ A 3.9 mA/A + 0.23 μ A 7.8 mA/A + 0.47 μ A 1.4 mA/A + 1.6 μ A 0.71 mA/A + 1.6 μ A 0.32 mA/A + 1.6 μ A 0.64 mA/A + 1.6 μ A 1.6 mA/A + 2.3 μ A 3.1 mA/A + 3.1 μ A	Fluke 5522A Multiproduct Calibrator



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source ¹	(33 to 330) mA (10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz (0.33 to 1.1) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (1.1 to 3) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (3 to 11) A (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz (11 to 20.5) A (45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	1.4 mA/A + 16 μA 0.71 mA/A + 16 μA 0.32 mA/A + 16 μA 0.79 mA/A + 39 μA 1.6 mA/A + 78 μA 3.2 mA/A + 0.16 mA 1.4 mA/A + 78 μA 0.4 mA/A + 78 μA 4.7 mA/A + 0.78 mA 20 mA/A + 3.9 mA 1.4 mA/A + 78 μA 0.55 mA/A + 78 μA 4.7 mA/A + 0.78 mA 19 mA/A + 3.9 mA 0.52 mA/A + 1.6 mA 0.81 mA/A + 1.6 mA 2.4 mA/A + 1.6 mA 0.96 mA/A + 3.9 mA 1.2 mA/A + 3.9 mA 24 mA/A + 3.9 mA	Fluke 5522A Multiproduct Calibrator
AC Current Clamp Meters ¹	(16.5 to 55) A (45 to 65) Hz (65 to 440 Hz) (55 to 150) A (45 to 65) Hz (65 to 440) Hz (150 to 550) A (45 to 65) Hz (65 to 440) Hz (550 to 1 000) A (45 to 65) Hz (65 to 440) Hz	2.9 mA/A + 0.39 A 2.8 mA/A + 0.39 A 3.1 mA/A + 0.39 A 2.8 mA/A + 0.39 A 2.7 mA/A + 0.4 A 2.9 mA/A + 0.4 A 2.8 mA/A + 0.43 A 2.9 mA/A + 0.43 A	Fluke 5522A Multiproduct Calibrator, Fluke 5500A/COIL 50-turn Coil



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measure ¹	Up to 10 μ A 1 kHz	0.95 mA/A + 3 nA	Agilent 3458A Opt. 002 8.5 Digit Multimeter
	(10 to 100) μ A 1 kHz	0.62 mA/A + 30 nA	
	(0.1 to 1) mA 1 kHz	0.32 mA/A + 0.2 μ A	
	(1 to 10) mA 1 kHz	0.32 mA/A + 2 μ A	
	(10 to 100) mA 1 kHz	0.32 mA/A + 20 μ A	
	(0.1 to 1) A 1 kHz	1 mA/A + 0.2 mA	
	Up to 1 000 A (60 to 100) Hz	0.62 mA/A + 0.61 A	
Electrical Simulation of Thermocouple Indicating Devices – Source/Measure ¹	Type B (600 to 800) $^{\circ}$ C	0.52 $^{\circ}$ C	Fluke 5522A Multiproduct Calibrator
	(800 to 1 000) $^{\circ}$ C	0.46 $^{\circ}$ C	
	(1 000 to 1 550) $^{\circ}$ C	0.36 $^{\circ}$ C	
	(1 550 to 18 20) $^{\circ}$ C	0.37 $^{\circ}$ C	
	Type C (0 to 150) $^{\circ}$ C	0.36 $^{\circ}$ C	
	(150 to 650) $^{\circ}$ C	0.22 $^{\circ}$ C	
	(650 to 1 000) $^{\circ}$ C	0.26 $^{\circ}$ C	
	(1 000 to 1 800) $^{\circ}$ C	0.42 $^{\circ}$ C	
	(1 800 to 2 316) $^{\circ}$ C	0.67 $^{\circ}$ C	
	Type E (-250 to -100) $^{\circ}$ C	0.41 $^{\circ}$ C	
	(-100 to -25) $^{\circ}$ C	0.17 $^{\circ}$ C	
	(-25 to 350) $^{\circ}$ C	0.16 $^{\circ}$ C	
	(350 to 650) $^{\circ}$ C	0.17 $^{\circ}$ C	
(650 to 1 000) $^{\circ}$ C	0.2 $^{\circ}$ 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 ¹	Type J		Fluke 5522A Multiproduct Calibrator
	(-210 to -100) °C	0.24 °C	
	(-100 to -30) °C	0.17 °C	
	(-30 to 150) °C	0.16 °C	
	(150 to 760) °C	0.18 °C	
	(760 to 1 200) °C	0.21 °C	
	Type K		
	(-200 to -100) °C	0.29 °C	
	(-100 to -25) °C	0.2 °C	
	(-25 to 120) °C	0.19 °C	
	(120 to 1 000) °C	0.25 °C	
	(1 000 to 1 372) °C	0.34 °C	
	Type L		
	(-200 to -100) °C	0.31 °C	
	(-100 to 800) °C	0.23 °C	
	(800 to 900) °C	0.18 °C	
	Type N		
	(-200 to -100) °C	0.39 °C	
	(-100 to -25) °C	0.29 °C	
	(-25 to 120) °C	0.28 °C	
	(120 to 410) °C	0.27 °C	
	(410 to 1 300) °C	0.32 °C	
	Type R		
	(0 to 250) °C	0.6 °C	
	(250 to 400) °C	0.35 °C	
	(400 to 1 000) °C	0.34 °C	
	(1 000 to 1767) °C	0.38 °C	
	Type S		
(0 to 250) °C	0.43 °C		
(250 to 1 000) °C	0.36 °C		
(1 000 to 1400) °C	0.37 °C		
(1 400 to 1767) °C	0.42 °C		
Type T			
(-250 to -150) °C	0.52 °C		
(-150 to 0) °C	0.25 °C		
(0 to 120) °C	0.15 °C		
(120 to 400) °C	0.13 °C		
Type U			
(-200 to 0) °C	0.46 °C		
(0 to 600) °C	0.22 °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 ¹	Pt 385, 100 Ω		Fluke 5522A Multiproduct Calibrator
	(-200 to -80) °C	0.053 °C	
	(-80 to 0) °C	0.055 °C	
	(0 to 100) °C	0.066 °C	
	(100 to 300) °C	0.082 °C	
	(300 to 400) °C	0.089 °C	
	(400 to 630) °C	0.11 °C	
	(630 to 800) °C	0.19 °C	
	Pt 385, 200 Ω		
	(-200 to -80) °C	0.047 °C	
	(-80 to 0) °C	0.048 °C	
	(0 to 100) °C	0.049 °C	
	(100 to 260) °C	0.055 °C	
	(260 to 300) °C	0.11 °C	
	(300 to 400) °C	0.12 °C	
	(400 to 600) °C	0.13 °C	
	(600 to 630) °C	0.14 °C	
	Pt 3926, 100 Ω		
	(-200 to -80) °C	0.053 °C	
	(-80 to 0) °C	0.054 °C	
	(0 to 100) °C	0.066 °C	
	(100 to 300) °C	0.081 °C	
	(300 to 400) °C	0.089 °C	
	(400 to 630) °C	0.11 °C	
	Pt 385, 500 Ω		
	(-200 to -80) °C	0.047 °C	
	(-80 to 100) °C	0.055 °C	
	(0 to 100) °C	0.056 °C	
	(100 to 260) °C	0.064 °C	
	(260 to 300) °C	0.076 °C	
(300 to 400) °C	0.078 °C		
(400 to 600) °C	0.088 °C		
(600 to 630) °C	0.1 °C		
Pt 385, 1 000 Ω			
(-200 to -80) °C	0.043 °C		
(-80 to 100) °C	0.044 °C		
(0 to 100) °C	0.049 °C		
(100 to 260) °C	0.057 °C		
(260 to 300) °C	0.063 °C		
(300 to 400) °C	0.07 °C		
(400 to 600) °C	0.073 °C		
(600 to 630) °C	0.19 °C		



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance – Source ¹ (Simulation) 10 Hz to 10 kHz 10 Hz to 10 kHz 10 Hz to 3 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz (10 to 600) Hz (10 to 300) Hz (10 to 150) Hz (10 to 120) Hz (10 to 80) Hz DC to 50 Hz DC to 20 Hz DC to 6 Hz DC to 2 Hz DC to 0.6 Hz DC to 0.2 Hz	(220 to 400) pF 400 pF to 1.1 nF (1.1 to 3.3) nF (3.3 to 11) nF (11 to 33) nF (33 to 110) nF (110 to 330) nF 330 nF to 1.1 μF (1.1 to 3.3) μF (3.3 to 11) μF (11 to 33) μF (33 to 110) μF (110 to 330) μF (0.33 to 1.1) mF (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	5.6 mF/F + 7.8 pF 4.3 mF/F + 7.8 pF 4.2 mF/F + 7.8 pF 2 mF/F + 7.8 pF 2 mF/F + 7.8 pF 2 mF/F + 7.8 pF 2 mF/F + 23 pF 2 mF/F + 0.8 nF 2 mF/F + 2.3 nF 2.1 mF/F + 7.8 nF 3.2 mF/F + 23 nF 3.7 mF/F + 78 nF 3.7 mF/F + 0.23 μF 3.7 mF/F + 0.78 μF 3.6 mF/F + 2.3 μF 3.5 mF/F + 2.3 μF 5.8 mF/F + 24 μF 8.5 mF/F + 78 μF	Fluke 5522A Multiproduct Calibrator
Capacitance – Source ¹ (Variable Artifact)	(10 to 100) pF (100 to 1 000) pF (1 to 10) nF (10 to 100) nF (100 to 1 000) nF	0.3 mF/F + 0.12 pF 0.9 mF/F + 0.074 pF 0.82 mF/F + 1.3 pF 0.89 mF/F + 4.9 pF 0.91 mF/F + 34 pf	General Radio 1412-BC Decade Capacitor
Capacitance – Measure ¹ (1 kHz)	(10 to 100) pF (100 to 1 000) pF (1 to 100) nF (0.1 to 1) μF	3.1 mF/F + 0.1 pF 3.1 mF/F + 1 pF 3.6 mF/F + 0.01 nF 2.5 mF/F + 0.1 nF	Fluke PM6303 RCL Meter
Inductance – Source ¹ (Fixed Artifacts) (100 Hz to 10 kHz)	100 μH 1 mH 100 mH	0.41 μH 1.2 μH 0.1 mH	GenRad 1482B, 1482E, 1482L Standard Inductors
DC Power – Source ¹	Up to 3 050 W (3.05 to 20.4) kW	0.33 mW/W + 0.03 W 0.87 mW/W + 0.6 W	Fluke 5522A Multiproduct Calibrator



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Power – Source ¹	(45 to 65) Hz Up to 336.6 W (0.336 to 1.12) kW (1.12 to 3.06) kW (3.06 to 11.22) kW (11.2 to 20.91) kW	0.4 mW/W + 0.3 W 0.47 mW/W + 2.2 W 0.6 mW/W + 2.2 W 0.57 mW/W + 2.7 W 0.99 mW/W + 4.5 W	Fluke 5522A Multiproduct Calibrator
	(1 to 5) kHz Up to 336.6 W (0.336 to 1.12) kW (1.12 to 3.06) kW (3.06 to 11.22) kW (11.2 to 20.91) kW	1.6 mW/W + 0.31 W 19 mW/W + 4.5 W 19 mW/W + 4.5 W 20 mW/W + 2.7 W 23 mW/W + 4.5 W	
Phase Angle – Source ¹	Up to 90 ° (65 to 500) Hz (500 to 1) kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	1.5 ° 1.5 ° 2.5 ° 4.2 ° 7.9 °	Fluke 5522A Multiproduct Calibrator
Oscilloscopes ¹ Amplitude Square Wave into 50 Ω load	1 kHz: Up to 5 mV (5 to 11) mV (11 to 45) mV (45 to 110) mV (0.11 to 0.45) V (0.45 to 1.09) V	2.3 mV/V + 25 μV 2 mV/V + 55 μV 2 mV/V + 0.23 mV 2 mV/V + 0.55 mV 2 mV/V + 2.3 mV 2 mV/V + 5.5 mV	Fluke 5502A/3 Multiproduct Calibrator with 300 MHz Scope Option
Leveled Sine Wave	10 Hz: (1.09 to 2.2) V	1.9 mV/V + 22 mV	
	100 Hz: (1.09 to 2.2) V	1.9 mV/V + 11 mV	
	1 kHz: (1.09 to 2.2) V	2 mV/V + 11 mV	



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Oscilloscopes ¹ Amplitude Square Wave into 1 MΩ load	1 kHz: Up to 5 mV (5 to 20) mV (20 to 89) mV (89 to 219) mV (219 to 890) mV (0.89 to 6.5) V 10 Hz: (6.5 to 55) V 100 Hz: (6.5 to 55) V 1 kHz: (6.5 to 55) V 10 kHz: (6.5 to 55) V	2.3 mV/V + 30 μV 2 mV/V + 0.1 mV 2 mV/V + 0.45 mV 1.9 mV/V + 1.1 mV 1.9 mV/V + 4.5 mV 1.9 mV/V + 33 mV 2 mV/V + 0.55 V 1.9 mV/V + 0.28 V 1.9 mV/V + 0.28 V 3.9 mV/V + 0.28 V	Fluke 5502A/3 with 300 MHz Scope Option
Leveled Sine Wave Flatness (50 kHz Reference)	10 mV to 5.5 V 50 kHz to 100 MHz (100 to 300) MHz	28 mV/V + 0.23 mV/V 34 mV/V + 0.23 mV/V	
Time Marker into 50 Ω load	2 ns to 50 ms 50 ms to 5 s	20 μs/s 58 μs/s	

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Calipers ^{1,2}	Up to 12 in (12 to 40) in (40 to 80) in	(290 + 2.9L) μin (200 + 9.6L) μin (110 + 12L) μin	ASME Grade 0 Gage Blocks, Length Standards, Ring Gauges
OD Micrometers ^{1,2}	Up to 12 in	(35 + 9.8L) μin	ASME Grade 0 Gage Blocks, Length Standards

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
ID Micrometers ^{1,2}	Up to 12 in (12 to 40) in	(43 + 10L) μin (173 + 8.8L) μin	ASME Grade 0 Gage Blocks, Length Standards, Ring Gauges
Dial Indicators ^{1,2}	Up to 4 in	(27 + 7.4L) μin	ASME Grade 0 Gage Blocks
Test Indicators ^{1,2}	Up to 0.05 in	(29 + 0.12L) μin	ASME Grade 0 Gage Blocks
Height Gages ^{1,2}	Up to 12 in (12 to 40) in	(290 + 3.2L) μin (330 + 6.5L) μin	ASME Grade 0 Gage Blocks, Length Standards, Surface Plate
Optical Comparators ^{1,2}	Up to 50 mm Up to 200 mm	(0.73 + 0.25L) μm (0.45 + 0.25L) μm	Mitutoyo Glass Scales
Microscopes ^{1,2}	Up to 50 mm Up to 2 in	(0.73 + 0.25L) μm (22 + 260L) μin	Mitutoyo Glass Scales
Protractor/Angle ^{1,2}	(30 to 90)°	1.8'	Angle Block Set
Outside Diameter ²	(0.5 to 25) mm (25 to 60) mm	(2.6 + 0.005D) μm (9.3 - 0.039D) μm	Laser Micrometer
Laser Micrometers ^{1,2}	(0.5 to 25) mm	0.3 μm	Cylindrical Plug Gages per ASME B.89.1.5-1998 Class XX
Laser Micrometers ^{1,2}	1 mm 60 mm	0.23 μm 0.5 μm	Mitutoyo Calibration Gage Set 02AGD170
Gage Blocks ²	Up to 2 in (2 to 4) in (4 to 6) in (6 to 12) in	(3.4 + 1.3L) μin (6 + 0.9L) μin (9.6 + 0.5L) μin (13 + 0.9L) μin	P&W Labmaster® Universal, ASME Grade 00 Gage Blocks
Length Standards ²	Up to 2 in (2 to 4) in (4 to 6) in (6 to 12) in	(4 + 1.5L) μin (7 + 0.9L) μin (11 + 0.6L) μin (14 + 0.9L) μin	P&W Labmaster® Universal, ASME Grade 00 Gage Blocks
Cylindrical Pin/Plug Gages ²	Up to 1 in (1 to 2) in (2 to 4) in	(4.2 + 0.7L) μin (4.9 + 0.7L) μin (6.4 + 0.5L) μin	P&W Labmaster® Universal, ASME Grade 00 Gage Blocks
Cylindrical Pin/Plug Gages ²	Up to 1 in	(12 + 2.5L) μin	Laser Micrometer, XX Plug Gages

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Cylindrical Ring Gages (Plain)	Up to 0.5 in (0.5 to 1) in (1 to 2) in (2 to 4) in	$(17 + 0.15L) \mu\text{in}$ $(17 + 1.1L) \mu\text{in}$ $(17 + 1.2L) \mu\text{in}$ $(20 + 1.2L) \mu\text{in}$	P&W Labmaster® Universal, ASME Grade 00 Gage Blocks, XX Ring Gages
Thread Wires (4 – 80) TPI	Up to 0.5 in	$(3.5 + 2.7L) \mu\text{in}$	P&W Labmaster® Universal, ASME Grade 0 Gage Blocks
Thread Plug Gages, 60° Threads Major Diameter	Up to 0.5 in (0.5 to 1) in (1 to 2) in (2 to 4) in	$(20 + 0.3L) \mu\text{in}$ $(19 + 0.1L) \mu\text{in}$ $(19 + 0.21L) \mu\text{in}$ $(20 + 0.2L) \mu\text{in}$	P&W Labmaster® Universal, ASME Grade 00 Gage Blocks, Thread Wires
Pitch Diameter	Up to 0.5 in (0.5 to 1) in (1 to 2) in (2 to 4) in	$(16 + 0.4L) \mu\text{in}$ $(16 + 0.12L) \mu\text{in}$ $(16 + 0.26L) \mu\text{in}$ $(17 + 0.23L) \mu\text{in}$	
Fixed Internal Thread Ring Gages Minor Diameter	Up to 0.5 in (0.5 to 1) in (1 to 2) in (2 to 4) in	$(25 + 0.25L) \mu\text{in}$ $(25 + 0.08L) \mu\text{in}$ $(25 + 0.17L) \mu\text{in}$ $(25 + 0.16L) \mu\text{in}$	P&W Labmaster® Universal, ASME Grade 00 Gage Blocks
Pitch Diameter	Up to 0.5 in (0.5 to 1) in (1 to 2) in (2 to 4) in	$(25 + 0.24L) \mu\text{in}$ $(25 + 0.08L) \mu\text{in}$ $(25 + 0.16L) \mu\text{in}$ $(25 + 0.15L) \mu\text{in}$	
Coordinate Measuring Machines (CMMs) ^{1,2}	Up to 2 in (2 to 4) in (4 to 6) in (6 to 12) in (12 to 20) in	$(3.7 + 6.3L) \mu\text{in}$ $(4.1 + 5.8L) \mu\text{in}$ $(19 + 4.6L) \mu\text{in}$ $(13 + 5.4L) \mu\text{in}$ $(20 + 5.4L) \mu\text{in}$	Check Master per ISO 10360-2.

Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Vision Measuring System ^{1,2} Linear Measurement (Axis X, Axis Y, Axis Z)	Up to 2 in (2 to 4) in (4 to 6) in (6 to 12) in (12 to 20) in	(3.7 + 6.3L) μin (4.1 + 5.8L) μin (19.0 + 4.6L) μin (13.0 + 5.4L) μin (20 + 5.4L) μin	ASME Grade 00 Gage Blocks, Grade 0 Long Gage Blocks, Glass Scale Up to 50 mm, Glass Scale Up to 2 in, Glass Scale Up to 200 mm
	Up to 50 mm Up to 2 in Up to 200 mm	(0.4 + 0.26L) μm (16 + 257L) μin (0.3 + 0.26L) μm	
Stage Micrometer, Glass Scales ²	Up to 50 mm (50 to 200) mm	(1.1 to 0.013L) μm (1.2 + 0.016L) μm	Mitutoyo QVT1-L404Z1L-D Quick Vision Active
	Up to 2 in	(10.1 + 42L) μin	
Rulers, Tape Measures	Up to 12 in	(97 + 24L) μin	Mitutoyo QVT1-L404Z1L-D Quick Vision Active Gage Blocks
	Up to 80 in	(9 000 + 3.7L) μin	
Roughness Testers ¹	Ra 0.43 μm Rz 1.6 μm	0.065 μm 0.26 μm	Roughness Specimens
	Ra 3 μm Rz 11.6 μm	0.065 μm 0.34 μm	
Granite Surface Plates Local Area Flatness	Up to 0.001 in	51 μin	Repeat-o-Meter

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Torque Tools ¹	(5 to 50) ozf·in	0.13 % of reading	CDI Torque Transducers, Readout
	(5 to 50) lbf·in	0.12 % of reading	
	(40 to 400) lbf·in	0.13 % of reading	
	(100 to 1 000) lbf·in	0.21 % of reading	
	(25 to 250) lbf·ft	0.14 % of reading	
	(100 to 1 000) lbf·ft	0.13 % of reading	



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Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Torque Calibration Systems	(5 to 50) ozf·in (5 to 50) lbf·in (40 to 400) lbf·in (100 to 1 000) lbf·in (25 to 250) lbf·ft (100 to 1 000) lbf·ft	0.13 % of reading 0.068 % of reading 0.049 % of reading 0.046 % of reading 0.039 % of reading 0.034 % of reading	CDI Torque Calibration Radius Arms, Hangers, Weights
Force Gauges – Tension	Up to 100 lbf (100 to 200) lbf (200 to 300) lbf (300 to 400) lbf (400 to 500) lbf	0.77 % of reading 0.44 % of reading 0.26 % of reading 0.31 % of reading 0.31 % of reading	Futek Indicator, 500 lbf Load Cell
Force Gauges – Tension	Up to 200 lbf (200 to 400) lbf (400 to 600) lbf (600 to 800) lbf (800 to 1 000) lbf	1.1 % of reading 0.39 % of reading 0.32 % of reading 0.15 % of reading 0.11 % of reading	Futek Indicator, 1 000 lbf Load Cell
Force Gauges – Tension	Up to 1 000 lbf (1 000 to 2 000) lbf (2 000 to 3 000) lbf (3 000 to 4 000) lbf (4 000 to 5 000) lbf	0.44 % of reading 0.22 % of reading 0.19 % of reading 0.16 % of reading 0.17 % of reading	Futek Indicator, 5 000 lbf Load Cell
Force Gauges – Compression	Up to 100 lbf (100 to 200) lbf (200 to 300) lbf (300 to 400) lbf (400 to 500) lbf	0.78 % of reading 0.51 % of reading 0.17 % of reading 0.17 % of reading 0.15 % of reading	Futek Indicator, 500 lbf Load Cell
Force Gauges – Compression	Up to 200 lbf (200 to 400) lbf (400 to 600) lbf (600 to 800) lbf (800 to 1 000) lbf	0.72 % of reading 0.57 % of reading 0.27 % of reading 0.39 % of reading 0.3 % of reading	Futek Indicator, 1 000 lbf Load Cell
Force Gauges – Compression	Up to 1 000 lbf (1 000 to 2 000) lbf (2 000 to 3 000) lbf (3 000 to 4 000) lbf (4 000 to 5 000) lbf	1.3 % of reading 0.59 % of reading 0.5 % of reading 0.34 % of reading 0.25 % of reading	Futek Indicator, 5 000 lbf Load Cell
Analytical Scales ^{1,3}	Up to 100 g (100 to 200) g (200 to 1 000) g	60 µg 0.3 mg 1.4 mg	ASTM E617 Class 1 Weights and internal calibration 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
Scales / Balances ^{1,3}	Up to 50 g (50 to 200) g (200 to 500) g 500 g to 1 kg (1 to 5) kg (5 to 10) kg (10 to 25) kg (25 to 100) kg (100 to 300) kg (300 to 500) kg	1.3 mg 6.2 mg 7.1 mg 7.3 mg 1.5 g 3 g 10 g 35 g 150 g 270 g	NIST Class F Weights and internal calibration procedure utilized in the calibration of the weighing system.
Mass Determination (SI Units)	1 mg 2 mg 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 20 kg 25 kg	0.17 mg 0.18 mg 0.23 mg 0.27 mg 0.33 mg 0.43 mg 0.52 mg 0.64 mg 0.84 mg 1.1 mg 1.3 mg 1.8 mg 2.3 mg 4.7 mg 12 mg 23 mg 46 mg 81 mg 4 mg 0.23 g 21 mg 0.18 g 0.19 g	Electronic Balances, NIST Class F Weights, OIML Class F1 Weights

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Mass Determination (Avoirdupois)	1/32 oz 1/16 oz 1/8 oz 1/4 oz 1/2 oz 1 oz 2 oz 4 oz 8 oz 1 lb 2 lb 5 lb 10 lb 20 lb	1 mg 1.3 mg 1.5 mg 2 mg 3.3 mg 6.3 mg 13 mg 27 mg 52 mg 81 mg 0.11 g 0.27 g 0.52 g 0.6 g	Electronic Balances, NIST Class F Weights
Pressure Gauges ¹ (Pneumatic)	(-12 to 300) psi	0.08 psi	Fluke 3130 Pressure Calibrator
Pressure Gauges ¹ (Pneumatic)	(-1 to 1) psi	0.000 5 psi	Meriam Instruments ZM1004-DN0001 Digital Manometer
Low Pressure Gauges and Measure (Pneumatic)	(-13.75 to 0) psi Up to 36 psi	0.007 5 psi 0.041 % of reading + 0.001 8 psi	Fluke 721-3603 (PORT 1) Pressure Calibrator
High Pressure Gauges (Pneumatic/Hydraulic)	Up to 1 000 psi Up to 3 000 psi	0.77 psi 0.42 psi	Comparison to Fluke 750 Process Calibrator, Fluke 750 Series Pressure Modules, Fluke 2700G-G20M Pressure Gauge
High Pressure Gauges (Pneumatic/Hydraulic)	Up to 10 000 psi	1.2 psi	Dead Weight Pressure Generation (Piston Cylinder and Masses), Fluke 2700G-G70M Pressure Gauge
Volumetric Flow Meters ²	(3 to 30) sccm (30 to 300) sccm (0.1 to 1) slpm (1 to 10) slpm	(0.058 + 0.001 8X) sccm (0.18 + 0.002 7X) sccm (0.001 2 + 0.002 5X) slpm (0.007 + 0.002 6X) slpm	CME DIVISION 60B-75-.03-1000(SP) Flowmeter



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Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Flow/Leak Masters ²	(3 to 30) sccm (30 to 300) sccm (0.1 to 1) slpm (1 to 10) slpm	(0.029 + 0.008 5X) sccm (0.3 + 0.008 4X) sccm (0.001 1 + 0.008 1X) slpm (0.011 + 0.008 6X) slpm	Comparison to CME DIVISION 60B-75-.03-1000(SP) Flowmeter
Rockwell Hardness Testing Machines ¹	HRC Low Medium High	0.42 HRC 0.42 HRC 0.36 HRC	Indirect Verification per ASTM E18 using Rockwell Hardness Test Blocks.

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Humidity – Measuring Devices	(11 to 91) %RH	1.5 % RH	Comparison to Vaisala HMP77B Thermo-hygrometer
Dewpoint – Measure ¹	(-40 to -10.4) °C	2.5 °C	Vaisala DMP74A Dewpoint/Temperature Probe
Temperature – Measure ¹	(-40 to 40) °C	0.26 °C	Vaisala HMP77B Thermo-hygrometer
Temperature – Radiation Thermometers	(35 to 100) °C (100 to 200) °C (200 to 350) °C (350 to 500) °C	1.1 °C 1.9 °C 3.1 °C 4.5 °C	Fluke 4181 IR Calibrator (Flat Plate) $\lambda = (8 \text{ to } 14) \mu\text{m}$, $\epsilon = \sim 0.95$
Digital Thermometers, Bimetallic Thermometers, Temperature Probes	(-45 to 100) °C (100 to 300) °C (300 to 420) °C (429 to 650) °C	0.05 °C 0.095 °C 0.15 °C 0.19 °C	Comparison to Fluke 5628 PRT, Fluke 1523 Readout using Fluke 9144 Dry Well, Fluke 9170 Dry Well
Temperature – Measure	(-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 420) °C (429 to 650) °C	0.054 °C 0.055 °C 0.065 °C 0.12 °C 0.13 °C	Fluke 5628 PRT, Fluke 1523 Readout



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Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Thermocouple Calibration	(-45 to 100) °C (100 to 300) °C (300 to 420) °C (429 to 650) °C	0.11 °C 0.14 °C 0.18 °C 0.22 °C	Comparison to Fluke 5628 PRT, Fluke 1523 Readout; Fluke 9144 Dry Well, Fluke 9170 Dry Well; Fluke 5522A as Thermocouple Readout

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Stopwatch	(1 to 86 400) s	73 ms	Agilent 53132A Frequency Counter
Linear Velocity Measure ¹	Up to 4 in/min Up to 40 in/min	0.01 in/min 0.14 in/min	Digital Stopwatch, Caliper
Frequency – Measure ^{2,4}	1 Hz to 1 MHz	5.8 μHz/Hz + 31 μHz	Agilent 3458A 8.5 Digit Multimeter
Frequency – Measure ^{2,4}	(1 to 225) MHz 225 MHz to 3 GHz	2.6 mHz 61 mHz	Agilent 53132A Frequency Counter
Frequency – Measure ^{2,4}	(3 to 26.5) GHz	0.37 nHz/Hz + 8.5 Hz	HP 53151A Microwave Frequency Counter
Frequency – Source ¹	10 mHz to 100 kHz	2 μHz/Hz + 4 μHz	Fluke 5522A Multi-Product Calibrator
Frequency – Source ¹	50 kHz 500 kHz 5 MHz 50 MHz 300 MHz	1.3 Hz 13 Hz 0.13 kHz 1.3 kHz 7.5 kHz	Fluke 5502A/3 Multi-Product Calibrator with 300 MHz Scope Option

DIMENSIONAL MEASUREMENT

3 Dimensional

Specific Tests and / or Properties Measured	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
3D Dimensional – Measurement	X = Up to 320 mm Y = Up to 320 mm Z = Up to 150 mm	5.3 μ m	Mitutoyo QVT1-L404Z1L-D Quick Vision Active, CNC Vision Measuring System, Customer Drawings
3D Dimensional – Measurement ¹	Up to 1.8 m	52 μ m	Faro Articulated Arm Coordinate Measuring Machines (AACMM), Customer Drawings

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. D = diameter in millimeters, L = length in inches or millimeters, R = resolution of unit under test, X = indicated value, ' = arc-minute.
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. The Best Measurement Capability presented here does not include Resolution of the Measurand. $0.6R$ will be added at the time of calibration, where R = resolution.
5. The value shown in the Range column is a nominal value. The actual certified value will be utilized during the calibration with the associated measurement uncertainty.
6. This scope is formatted as part of a single document including Certificate of Accreditation No. ACT-2077.



Jason Stine, Vice President