



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

E2b Calibration, LLC

521 Fifth Avenue

Chardon, OH 44024

has been assessed by ANAB
and meets the requirements of international standard

ISO/IEC 17025:2005

and national standard

ANSI/NCSL Z540-1-1994

while demonstrating technical competence in the field of

CALIBRATION

Refer to the accompanying Scope of Accreditation for information regarding the types of calibrations to which this accreditation applies.

AC-1287

Certificate Number


ANAB Approval

Certificate Valid: 02/20/2017-02/23/2019
Version No. 005 Issued: 02/20/2017



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. 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 January 2009).



ANSI-ASQ National Accreditation Board

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005 AND ANSI/NCSL Z540-1-1994

E2b Calibration, LLC

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CALIBRATION

Valid to: February 23, 2019

Certificate Number: AC-1287

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
* 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	1 μ V 8 μ V 75 μ V 1.3 mV 13 mV	Wavetek 1281
	(1 to 60) kV	87 V	Ross VD60, HP3457A
* DC Voltage - Source	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V 330 V to 1 kV	20 μ V/V + 1 μ V 11 μ V/V + 2 μ V 12 μ V/V + 20 μ V 18 μ V/V + 0.15 mV 18 μ V/V + 1.5 mV	Fluke 5520A
* DC Current - Measure	Up to 100 μ A 100 μ A to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	2.4 μ A 2.5 μ A 3.6 μ A 19 μ A 0.28 mA	Wavetek 1281
	(1 to 11) A (11 A to 20.5) A	2.1 mA 4.3 mA	ISOTec Shunt
* DC Current - Source	Up to 330 μ A 330 μ A to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1.09 A (1.1 to 10.9) A (10.9 to 20.5) A	0.15 mA/A + 20 nA 0.1 mA/A + 50 nA 0.1 mA/A + 0.25 μ A 0.1 mA/A + 2.5 μ A 0.2 mA/A + 40 μ A 0.5 mA/A + 0.5 mA 1 mA/A + 0.75 mA	Fluke 5520A



Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
*AC Voltage - Measure	Up to 100 mV (1 to 10) Hz (10 to 40) Hz (40 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	51 μ V 51 μ V 30 μ V 30 μ V 32 μ V 58 μ V 0.15 mV	Wavetek 1281
	100 mV to 100 V (45 to 100) Hz 100 Hz to 2 kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz 100 V to 1 kV 45 Hz to 10 kHz	3.3 mV 7.6 mV 7.6 mV 7.7 mV 61 mV 20 mV	
	(1 to 42) kV 60Hz	0.26 kV	Ross VD60, HP3457A
* AC Voltage - Source	Up 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 330 mV 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 (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	0.8 mV/V + 6 μ V 0.15 mV/V + 6 μ V 0.2 mV/V + 6 μ V 1 mV/V + 6 μ V 3.5 mV/V + 12 μ V 8 mV/V + 50 μ V 0.3 mV/V + 8 μ V 0.15 mV/V + 8 μ V 0.16 mV/V + 8 μ V 0.35 mV/V + 8 μ V 0.8 mV/V + 32 μ V 2 mV/V + 70 μ V 0.3 mV/V + 50 μ V 0.15 mV/V + 60 μ V 0.19 mV/V + 60 μ V 0.3 mV/V + 50 μ V 0.7 mV/V + 0.13 mV 2.4 mV/V + 0.6 mV 0.3 mV/V + 0.65 mV 1.5 mV/V + 0.6 mV 0.24 mV/V + 0.6 mV 0.35 mV/V + 0.6 mV 0.9 mV/V + 1.6 mV	Fluke 5520A

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
* AC Voltage - Source	(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 V to 1.02 kV 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.19 mV/V + 2 mV 0.2 mV/V + 6 mV 0.25 mV/V + 6 mV 0.3 mV/V + 6 mV 2 mV/V + 50 mV 0.3 mV/V + 10 mV 0.25 mV/V + 10 mV 0.3 mV/V + 10 mV	Fluke 5520A
* AC Current - Source	(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 330 μ A 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 (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 330 mA 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	2 mA/A + 0.1 μ A 1.5 mA/A + 0.1 μ A 1.3 mA/A + 0.1 μ A 3 mA/A + 0.15 μ A 8 mA/A + 0.2 μ A 16 mA/A + 0.4 μ A 2 mA/A + 0.15 μ A 1.3 mA/A + 0.1 μ A 1 mA/A + 0.15 μ A 2 mA/A + 0.2 μ A 5 mA/A + 0.3 μ A 10 mA/A + 0.6 μ A 1.8 mA/A + 2 μ A 0.9 mA/A + 2 μ A 0.4 mA/A + 2 μ A 0.8 mA/A + 2 μ A 2 mA/A + 3 μ A 4 mA/A + 4 μ A 1.8 mA/A + 20 μ A 0.9 mA/A + 20 μ A 0.4 mA/A + 20 μ A 1 mA/A + 50 μ A 2 mA/A + 0.1 mA 4 mA/A + 0.2 mA 1.8 mA/A + 0.1 mA 0.5 mA/A + 0.1 mA 6 mA/A + 1 mA 25 mA/A + 5 mA 1.8 mA/A + 0.1 mA 0.6 mA/A + 0.1 mA 6 mA/A + 1 mA 25. mA/A + 5 mA	Fluke 5520A



Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment	
* AC Current - Source	(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	0.6 mA/A + 2 mA 1 mA/A + 2 mA 30 mA/A + 2 mA 1.2 mA/A + 5 mA 1.5 mA/A + 5 mA 30 mA/A + 5 mA	Fluke 5520A	
* AC Current - Measure	Up to 100 μ A 10 Hz to 5 kHz 100 μ A to 1 mA 10 Hz to 5 kHz (1 to 10) mA 10 Hz to 5 kHz (10 to 100) mA 10 Hz to 5 kHz 100 mA to 1 A 10 Hz to 1 kHz (1 to 5) kHz	1.1 μ A 6 μ A 26 μ A 0.35 mA 0.56 mA 0.72 A	Wavetek 1281	
	(1.1 to 3) A (10 to 45) Hz (45 to 400) Hz (3 to 11) A (45 to 100) Hz (100 to 400) Hz (11 to 20.5) A (45 to 100) Hz (100 to 400) Hz	0.13 A 0.13 A 0.13 A 0.13 A 0.13 A 0.13 A	Wavetek 1281 with IsoTec Shunt	
* Inductance - Source	50 μ H 1 000 μ H 5 H	0.32 μ H 2 μ H 0.014 H	GenRad Fixed Inductors	
* Inductance - Measure	100 μ H to 1 mH (1 to 10) mH (10 to 100) mH 100 mH to 1 H (1 to 10) H	0.20 nH 2.4 μ H 2.4 μ H 0.24 mH 2.4 mH	RLC GenRad 1689	
* Capacitance - Measure	Up to 1 nF (1 to 10) nF (10 to 100) nF 100 nF to 1 μ F (1 to 1.111) μ F	0.2 pF 2.4 pF 24 pF 0.24 nF 0.29 nF	RLC GenRad 1689	
* Capacitance - Source	20 Hz to 1 kHz 20 Hz to 1 kHz 20 Hz to 1 kHz 20 Hz to 1 kHz	100 pF to 1 nF (1 to 10) nF (10 to 100) nF 100 nF to 1 μ F	1.3 pF 0.013 nF 0.14 nF 1.3 nF	1423A Decade Box

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
* Capacitance - Source 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 (10 to 50) Hz (10 to 20) Hz (0 to 6) Hz (0 to 2) Hz (0 to 0.6) Hz (0 to 0.2) Hz	(190 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 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 mF/F + 0.01 nF 5 mF/F + 0.01 nF 5 mF/F + 0.01 nF 2.5 mF/F + 0.01 nF 2.5 mF/F + 0.1 nF 2.5 mF/F + 0.1 nF 2.5 mF/F + 0.3 nF 2.5 mF/F + 1 nF 2.5 mF/F + 3 nF 2.5 mF/F + 10 nF 2.5 mF/F + 30 nF 4 mF/F + 0.1 μ F 4.5 mF/F + 0.3 μ F 4.5 mF/F + 1 μ F 4.5 mF/F + 3 μ F 4.5 mF/F + 10 μ F 7.5 mF/F + 30 μ F 11 mF/F + 0.1 mF	Fluke 5520A
* 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 MHz to 1.1 G Ω	40 $\mu\Omega/\Omega$ + 1 m Ω 30 $\mu\Omega/\Omega$ + 1.5 m Ω 28 $\mu\Omega/\Omega$ + 1.4 m Ω 28 $\mu\Omega/\Omega$ + 2 m Ω 28 $\mu\Omega/\Omega$ + 2 m Ω 28 $\mu\Omega/\Omega$ + 20 m Ω 28 $\mu\Omega/\Omega$ + 20 m Ω 28 $\mu\Omega/\Omega$ + 0.2 Ω 28 $\mu\Omega/\Omega$ + 0.2 Ω 32 $\mu\Omega/\Omega$ + 2 Ω 32 $\mu\Omega/\Omega$ + 2 Ω 60 $\mu\Omega/\Omega$ + 30 Ω 0.13 m Ω/Ω + 50 Ω 0.25 m Ω/Ω + 2.5 k Ω 0.5 m Ω/Ω + 3 k Ω 3 m Ω/Ω + 0.1 M Ω 15 m Ω/Ω + 0.5 M Ω	Fluke 5520A
* DC Resistance - Measure	Up to 10 Ω (10 to 100) Ω 100 Ω to 1 k Ω (1 to 10) k Ω (10 to 100) k Ω 100 k Ω to 1 M Ω (1 to 10) M Ω	1.6 m Ω 4.4m Ω 29 m Ω 0.29 Ω 3 Ω 40 Ω 1.4 k Ω	Wavetek 1281

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
<p>* Oscilloscopes ² Amplitude - DC 50 Ω 1 MΩ</p> <p>Amplitude - Square Wave 50 Ω 1 MΩ</p> <p>Leveled Sine Wave Relative to 50 kHz</p> <p>Amplitude</p> <p>Flatness</p> <p>Time Marker</p> <p>Rise Time</p>	<p>(-6.6 to 6.6) V (-130 to 130) V</p> <p>1 mV to 6.6 V (p-p) 1 mV to 130 V (p-p)</p> <p>50 kHz reference</p> <p>50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz</p> <p>50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz</p> <p>5 S to 50 mS 20 mS to 2 nS</p> <p>≤ 300 pS</p>	<p>6.5 mV/V + 40 μV 6 mV/V + 40 μV</p> <p>6.5 mV/V + 40 μV 6.1 mV/V + 40 μV</p> <p>21 mV/V + 0.3 mV</p> <p>36 mV/V + 0.3 mV 40 mV/V + 0.3 mV 60 mV/V + 0.3 mV</p> <p>16 mV/V + 0.1 mV 21 mV/V + 0.1 mV 40 mV/V + 0.1 mV</p> <p>(3 800 + 1 000t) μS/S 3.8 mS/S</p> <p>3.8 mS/S</p>	<p>Fluke 5520A/SC600</p>
<p>* Electrical Simulation of Thermocouple Indicators</p>	<p>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</p> <p>Type C (0 to 150) $^{\circ}$C (150 to 650) $^{\circ}$C (650 to 1 000) $^{\circ}$C (1 000 to 1 800) $^{\circ}$C (1 800 to 2 316) $^{\circ}$C</p> <p>Type E (-250 to -100) $^{\circ}$C (-100 to -25) $^{\circ}$C (-25 to 350) $^{\circ}$C (350 to 650) $^{\circ}$C (650 to 1 000) $^{\circ}$C</p> <p>Type J (-210 to -100) $^{\circ}$C (-100 to -30) $^{\circ}$C (-30 to 150) $^{\circ}$C (150 to 760) $^{\circ}$C (760 to 1 200) $^{\circ}$C</p>	<p>0.27 $^{\circ}$C 0.21 $^{\circ}$C 0.18 $^{\circ}$C 0.2 $^{\circ}$C</p> <p>0.18 $^{\circ}$C 0.16 $^{\circ}$C 0.19 $^{\circ}$C 0.3 $^{\circ}$C 0.5 $^{\circ}$C</p> <p>0.3 $^{\circ}$C 0.1 $^{\circ}$C 0.09 $^{\circ}$C 0.1 $^{\circ}$C 0.13 $^{\circ}$C</p> <p>0.16 $^{\circ}$C 0.1 $^{\circ}$C 0.09 $^{\circ}$C 0.11 $^{\circ}$C 0.14 $^{\circ}$C</p>	<p>Fluke 5520A</p>

Electromagnetic - DC/Low Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (±)]	Reference Standard or Equipment
Electrical Simulation of Thermocouple Indicators	Type K (-200 to -100) °C	0.2 °C	Fluke 5520A
	(-100 to -25) °C	0.11 °C	
	(-25 to 120) °C	0.1 °C	
	(120 to 1 000) °C	0.16 °C	
	(1 000 to 1 372) °C	0.24 °C	
	Type L (-200 to -100) °C	0.22 °C	
	(-100 to 800) °C	0.16 °C	
	(800 to 900) °C	0.11 °C	
	Type N (-200 to -100) °C	0.24 °C	
	(-100 to -25) °C	0.13 °C	
	(-25 to 120) °C	0.12 °C	
	(120 to 410) °C	0.11 °C	
	(410 to 1 300) °C	0.16 °C	
	Type R (0 to 250) °C	0.34 °C	
	(250 to 400) °C	0.21 °C	
	(400 to 1 000) °C	0.2 °C	
	(1 000 to 1 767) °C	0.24 °C	
	Type S (0 to 250) °C	0.28 °C	
	(250 to 1 000) °C	0.22 °C	
	(1 000 to 1 400) °C	0.22 °C	
(1 400 to 1 767) °C	0.28 °C		
Type T (-250 to -150) °C	0.38 °C		
(-150 to 0) °C	0.15 °C		
(0 to 120) °C	0.1 °C		
(120 to 400) °C	0.09 °C		
Type U (-200 to 0) °C	0.34 °C		
(0 to 600) °C	0.16 °C		
* Phase Angle - Source (0 to 360)°	(10 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.17 ° 0.33 ° 0.61 ° 3 ° 6 ° 12 °	Fluke 5520A

Electromagnetic - RF/Microwave

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (±)]	Reference Standard or Equipment
* RF Power - Measure Up to 18 GHz	(-60 to +30) dBm	0.23 dBm	Boonton 4200 with Boonton 4200-4E and Boonton 4200- 6E Sensors



Electromagnetic - RF/Microwave

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
* Amplitude Modulation - Measure	150 kHz to 10 MHz 10 MHz to 1.3 GHz	2.4 %Depth 1.2 %Depth	HP 8902A
* Frequency Modulation - Measure	150 kHz to 10 MHz 10 MHz to 1.3 GHz	2.4 % of reading 1.2 % of reading	
* Phase Modulation - Measure	150 kHz to 10 MHz 10 MHz to 1.3 GHz	3.6 % of reading 3.6 % of reading	
* Tuned RF Level Attenuation - Measure	2.5 MHz to 1.3 GHz (0 to -10) dBm (-10 to -40) dBm (-40 to -50) dBm (-50 to -80) dBm (-80 to -90) dBm (-90 to -110) dBm (-110 to -120) dBm	0.02 dB 0.08 dB 0.14 dB 0.2 dB 0.26 dB 0.3 dB 0.4 dB	HP 8902A with HP 11722A
* Harmonics - Measure	30 Hz to 6.5 GHz	1 dBm	HP 8561E
* AM Distortion - Measure	20 Hz to 20 kHz (20 to 100) kHz	1.2 dB 2.4 dB	HP 8903B
* FM Distortion - Measure	20Hz to 20 kHz (20 to 100) kHz	1.2 dB 2.4 dB	

Time and Frequency

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
* Frequency - Source	(0 to 1.056) GHz	7 parts in 10^{10} of output + 1 Hz	Fluke 6080A Locked to Datum LPRO Rubidium Freq Std
* Frequency - Measure	(0 to 225) MHz 225 MHz to 26.5 GHz	7 parts in 10^{10} of reading + 1 Hz	Agilent 53131A HP 5348A

Thermodynamic

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
* Humidity - Measure	(0 to 90) %RH (90 to 100) %RH	1.3 %RH 2.2 %RH	Vaisala HMP-363 Transmitter
* Humidity - Source	11.3 %RH 32.9 %RH 75.4 %RH 96.7 %RH	1.3 %RH 1.3 %RH 1.3 %RH 2.2 %RH	Vaisala HMP-363 Transmitter, Saturated Salt Solutions

Thermodynamic

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
* Temperature - Measure	(-200 to 0) °C (0 to 200) °C (200 to 600) °C	28 mK (0.028 °C) 36 mK (0.036 °C) 56 mK (0.056 °C)	Fluke 5628, SPRT, HP 3457A
* Temperature - Source	(0 to 125) °C	36 mK (0.036 °C)	Ametek ETC-125, Fluke 5628, SPRT, HP 3457A

Mechanical

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
* Pressure Gages & Transducers	(0 to 300) psia	0.015 psi	Druck DPI-145
	(50 to 15 000) psi	0.03 % of reading	TD-4000N Deadweight Tester
* Vacuum	(0.5 to 19) psia	0.012 psi	Druck DPI-145
* Mass Flow	(5 to 500) SCCM	0.3 % of reading	ML-800-10 ML-800-45 Cox 16-064 Sonic Nozzle Cox 16-121 Sonic Nozzle Cox 16-228 Sonic Nozzle
	(500 to 50 000) SCCM	0.3 % of reading	
	(0 to 7) SCFM	0.61 % of reading	
	(7 to 35) SCFM	0.65 % of reading	
* Pipettes	(35 to 90) SCFM	0.67 % of reading	A&D 4212B-101 Balance and Software
	Up to 10 uL	0.06 μ L	
	(10 to 20) uL	0.08 μ L	
	(20 to 50) uL	0.1 μ L	
	(50 to 100) uL	0.1 μ L	
	(100 to 200) uL	0.17 μ L	
* Torque Transducers	(200 to 500) uL	0.42 μ L	F-Class Weights, 10 in Torque Arm
	(500 to 1 000) uL	0.53 μ L	
* Torque Tools	(0 to 100) lbf·ft	0.06 % of reading	F-Class Weights, 4 ft Torque Arm
	(100 to 1 000) lbf·ft	0.6 % of reading	HIOS H-100
* Torque Tools	(0 to 90) lbf·in	0.61 % of reading	Norbar Pro Test – 350 in·lb Norbar Pro Test – 110 ft·lb Norbar Pro Test – 1 100 ft·lb
	(90 to 350) lbf·in	0.79 % of reading	
	(30 to 60) lbf·ft	0.8 % of reading	
	(60 to 110) lbf·ft	0.6 % of reading	
* Force - Compression & Tension	(110 to 1 100) lbf·ft	0.32 % of reading	Interface - 50 lbf Interface - 1 000 lbf Interface - 10 000 lbf Interface - 50 000 lbf
	(0 to 50) lbf	0.01 lbf	
	(50 to 1 000) lbf	0.31 lbf	
	(1 000 to 10 000) lbf	2.5 lbf	
	(10 000 to 50 000) lbf	13 lbf	

Mechanical

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
Laboratory Balances Capacity (resolution)	Up to 2 g (0.0001 mg) Up to 20 g (0.001 mg) Up to 100 g (0.01 mg) Up to 1 000 g (1 mg) Up to 3 000 g (1 mg) Up to 5 000 g (0.01 g) Up to 25 000 g (0.01 g) Up to 25 000 g (0.1 g) Up to 40 000 g (0.1 g)	0.002 mg 0.01 mg 0.05 mg 1.7 mg 2.2 mg 16 mg 25 mg 160 mg 190 mg	Class 1 Weights
Scales Capacity (resolution)	Up to 250 lb (0.05 lb) Up to 600 lb (0.1 lb)	0.08 g 0.18 g	Class F Weights

Dimensional

Parameter/ Equipment	Range	Calibration and Measurement Capability [Expressed as Uncertainty (\pm)]	Reference Standard or Equipment
* Calipers	(0 to 4) in (4 to 24) in (24 to 60) in	(93 + 37L) μ in (37 + 55L) μ in (180 + 48L) μ in	Gage Blocks and Length Standards
*Micrometers	(0 to 1) in (1-4) in (Up to 42) in	(77 + 17L) μ in (51 + 41L) μ in (620 + 37L) μ in	
*Dial Indicators	Up to 1 in (0.00005in) Up to 4 in (0.001in)	(74 + 44L) μ in (1 400 + 87L) μ in	

- Notes:**
1. Calibration and Measurement Capabilities (Expanded Uncertainties) are based on approximately a 95% confidence interval, using a coverage of $k=2$.
 2. On-site calibration service is available for parameter marked with an asterisk (*), 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
 3. L = length in inches, t = time in seconds
 4. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1287



 Vice President