



# CERTIFICATE OF ACCREDITATION

**ANSI National Accreditation Board**  
11617 Coldwater Road, Fort Wayne, IN 46845 USA

This is to certify that

**Premier Scales & Systems, Inc.**  
**4901 N. St. Joseph Avenue**  
**Evansville, IN 47720**  
**(and satellite location as shown on the scope)**

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

**ISO/IEC 17025:2017**

and national standard

**ANSI/NCSL Z540-1-1994 (R2002)**

while demonstrating technical competence in the field of

**CALIBRATION**

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

AC-1222  
Certificate Number

  
ANAB Approval

Certificate Valid Through: 05/17/2020  
Version No. 006 Issued: 05/17/2019



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)**

**Premier Scales & Systems, Inc.**

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Evansville, IN 47720  
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**CALIBRATION**

Valid to: **May 17, 2020**

Certificate Number: **AC-1222**

**Chemical Quantities**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
pH Meters	4 pH 7 pH 10 pH	0.06 pH 0.04 pH 0.05 pH	pH Buffer Solutions NAVAIR 17-20 OEM validated procedures
Conductivity Meters	1 µS/cm 10 µS/cm 100 µS/cm 1 000 µS/cm	0.65 µS/cm 0.56 µS/cm 2.3 µS/cm 6.1 µS/cm	Conductivity Solutions OEM validated procedures
Viscosity Cups	(34 to 124) cSt	1 cSt + 0.43 % of reading	Viscosity Standards, solutions, Stop Watch fluid OEM validated procedures
Volumetric Dispensers	(1 to 100) mL (1 to 1 000) mL	0.063 mL 0.075 mL	Analytical Balance ASTM E 542-01 OEM validated procedures

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Source <sup>1</sup>	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (100 to 1 000) V	1.6 µV 16 µV 0.13 mV 1.3 mV 3.1 mV	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures

**Electrical – DC/Low Frequency**

<b>Parameter/Equipment</b>	<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>	<b>Reference Standard, Method, and/or Equipment</b>
DC Voltage - Measure <sup>1</sup>	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1 000) V	2.4 $\mu$ V 6.4 $\mu$ V 0.052 mV 0.67 mV 9.6 mV	Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
DC Current - Source <sup>1</sup>	Up to 330 $\mu$ A 330 $\mu$ A to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1.1 A (1.1 to 3) A (3 to 11) A (11 to 20.5) A	0.014 $\mu$ A 0.19 $\mu$ A 0.48 $\mu$ A 4.4 $\mu$ A 77 $\mu$ A 0.31 mA 1.5 mA 23 mA	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
DC Current - Source for Clamp on Current Meters <sup>1</sup>	(20 to 200) A (200 to 500) A (500 to 1 000) A	0.41 A 1.1 A 2.1 A	Fluke 5520A Multiproduct Calibrator w/ 50 turn coil. OEM, GIDEP, Met/Cal Sourced Procedures
DC Current - Measure <sup>1</sup>	Up to 100 $\mu$ A 100 $\mu$ A to 1 mA (1 to 10) mA (10 to 100) mA (100 to 400) mA 400 mA to 1 A (1 to 3) A (3 to 10) A	0.018 $\mu$ A 0.67 $\mu$ A 1.7 $\mu$ A 6.7 $\mu$ A 20 $\mu$ A 0.27 mA 1.1 mA 3.5 mA	Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
Resistance - Source <sup>1</sup>	Up to 11 $\Omega$ (11 to 33) $\Omega$ (33 to 110) $\Omega$ (110 to 330) $\Omega$ (0.33 to 1.1) k $\Omega$ (1.1 to 3.3) k $\Omega$ (3.3 to 11) k $\Omega$ (11 to 33) k $\Omega$ (33 to 110) k $\Omega$ (110 to 330) k $\Omega$ (0.33 to 1.1) M $\Omega$ (1.1 to 3.3) M $\Omega$	0.67 m $\Omega$ 1.4 m $\Omega$ 1.7 m $\Omega$ 3.4 m $\Omega$ 9.6 m $\Omega$ 38 m $\Omega$ 96 m $\Omega$ 0.39 $\Omega$ 0.99 $\Omega$ 3.8 $\Omega$ 32 $\Omega$ 79 $\Omega$	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures

**Electrical – DC/Low Frequency**

<b>Parameter/Equipment</b>	<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>	<b>Reference Standard, Method, and/or Equipment</b>
Resistance - Source <sup>1</sup>	(3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ (330 to 1 100) MΩ	0.39 kΩ 3.5 kΩ 13 kΩ 0.29 MΩ 3.7 MΩ	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
Resistance - Measure <sup>1</sup>	Up to 10 Ω (10 to 100) Ω (0.1 to 1) kΩ (1 to 10) kΩ (10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ (10 to 100) MΩ (0.1 to 1) GΩ	2 mΩ 3.6 mΩ 14 mΩ 0.14 Ω 1.4 Ω 14 Ω 3.3 kΩ 60 kΩ 1.4 MΩ	Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
AC Voltage - Source <sup>1</sup>	(1 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	4.7 μV 4.1 μV 4.2 μV 4.8 μV 10 μV 39 μV 15 μV 11 μV 14 μV 15 μV 39 μV 92 μV 0.12 mV 0.086 mV 0.09 mV 0.16 mV 0.28 mV 0.93 mV	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Source <sup>1</sup>	(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 kHz 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	 1.2 mV 1.2 mV 1.7 mV 1.5 mV 3.1 mV  8.7 mV 9.1 mV 11 mV 12 mV 78 mV  73 mV 63 mV 73 mV	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
AC Voltage - Measure <sup>1</sup>	Up to 100 mV (3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 100 mV to 1 V (3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (1 to 10) V (3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	 0.027 mV 0.027 mV 0.027 mV 0.033 mV 0.053 mV 0.33 mV  0.87 mV 0.43 mV 0.24 mV 0.41 mV 0.93 mV 6 mV  8.7 mV 4.3 mV 2.4 mV 4.1 mV 9.3 mV 60 mV	Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures

**Electrical – DC/Low Frequency**

<b>Parameter/Equipment</b>	<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>	<b>Reference Standard, Method, and/or Equipment</b>
AC Voltage - Measure <sup>1</sup>	(10 to 100) V		Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
	(3 to 5) Hz	87 mV	
	(5 to 10) Hz	43 mV	
	10 Hz to 20 kHz	24 mV	
	(20 to 50) kHz	41 mV	
	(50 to 100) kHz	93 mV	
	(100 to 300) kHz	0.6 V	
	(100 to 1 000) V		
	(3 to 5) Hz	0.82 V	
	(5 to 10) Hz	0.38 V	
	10 Hz to 20 kHz	0.19 V	
	(20 to 50) kHz	0.33 V	
	(50 to 100) kHz	0.8 V	
	(100 to 300) kHz	5.2 V	
AC Current - Source <sup>1</sup>	(29 to 330) $\mu$ A		Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
	(10 to 20) Hz	0.11 $\mu$ A	
	(20 to 45) Hz	0.1 $\mu$ A	
	45 Hz to 1 kHz	0.096 $\mu$ A	
	(1 to 5) kHz	0.16 $\mu$ A	
	(5 to 10) kHz	0.29 $\mu$ A	
	(10 to 30) kHz	0.58 $\mu$ A	
	(0.33 to 3.3) mA		
	(10 to 20) Hz	0.55 $\mu$ A	
	(20 to 45) Hz	0.39 $\mu$ A	
	45 Hz to 1 kHz	0.4 $\mu$ A	
	(1 to 5) kHz	0.61 $\mu$ A	
	(5 to 10) kHz	1.4 $\mu$ A	
	(10 to 30) kHz	2.6 $\mu$ A	
	(3.3 to 33) mA		
	(10 to 20) Hz	5.3 $\mu$ A	
	(20 to 45) Hz	3.3 $\mu$ A	
	45 Hz to 1 kHz	3.2 $\mu$ A	
(1 to 5) kHz	3.7 $\mu$ A		
(5 to 10) kHz	7 $\mu$ A		
(10 to 30) kHz	12 $\mu$ A		

**Electrical – DC/Low Frequency**

<b>Parameter/Equipment</b>	<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>	<b>Reference Standard, Method, and/or Equipment</b>
AC Current - Source <sup>1</sup>	(33 to 330) mA		Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
	(10 to 20) Hz	0.055 mA	
	(20 to 45) Hz	0.037 mA	
	45 Hz to 1 kHz	0.03 mA	
	(1 to 5) kHz	0.056 mA	
	(5 to 10) kHz	0.11 mA	
	(10 to 30) kHz	0.22 mA	
	(0.33 to 1.1) A		
	(10 to 45) Hz	0.47 mA	
	45 Hz to 1kHz	0.18 mA	
	(1 to 5) kHz	2 mA	
	(5 to 10) kHz	8.8 mA	
	(1.1 to 3) A		
	(10 to 45) Hz	1.4 mA	
	45 Hz to 1kHz	0.6 mA	
	(1 to 5) kHz	8 mA	
(5 to 10) kHz	22 mA		
(3 to 11) A			
(45 to 100) Hz	2.7 mA		
100 Hz to 1 kHz	3.4 mA		
(1 to 5) kHz	61 mA		
(11 to 20.5) A			
(45 to 100) Hz	17 mA		
100 Hz to 440 Hz	18 mA		
AC Current - Source for Clamp on Current Meters <sup>1</sup>	(20 to 200) A		Fluke 5520A Multiproduct Calibrator w/ 50 turn coil OEM, GIDEP, Met/Cal Sourced Procedures
	(45 to 440) Hz	0.44 A	
	(200 to 500) A		
	(45 to 200) Hz	1.2 A	
(500 to 1 000) A	(45 to 200) Hz	2.5 A	
AC Current – Measure <sup>1</sup>	Up to 100 $\mu$ A		Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
	(3 to 5) Hz	0.29 $\mu$ A	
	(5 to 10) Hz	0.14 $\mu$ A	
	10 Hz to 5 kHz	0.041 $\mu$ A	
	(5 to 10) kHz	0.47 $\mu$ A	
	100 $\mu$ A to 1 mA		
	(3 to 5) Hz	6 $\mu$ A	
	(5 to 10) Hz	0.74 $\mu$ A	
	10 Hz to 5 kHz	0.34 $\mu$ A	
	(5 to 10) kHz	1.8 $\mu$ A	



**Electrical – DC/Low Frequency**

<b>Parameter/Equipment</b>	<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>	<b>Reference Standard, Method, and/or Equipment</b>
AC Current – Measure <sup>1</sup>	(1 to 10) mA		Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
	(3 to 5) Hz	0.12 mA	
	(5 to 10) Hz	0.012 mA	
	10 Hz to 5 kHz	0.005 mA	
	(5 to 10) kHz	0.049 mA	
	(10 to 100) mA		
	(3 to 5) Hz	0.81 mA	
	(5 to 10) Hz	0.13 mA	
	10 Hz to 5 kHz	0.23 mA	
	(5 to 10) kHz	0.18 mA	
	(100 to 400) mA		
	(3 to 5) Hz	0.93 mA	
	(5 to 10) Hz	0.49 mA	
	10 Hz to 1 kHz	0.33 mA	
	(1 to 10) kHz	2 mA	
	400 mA to 1 A		
	(3 to 5) Hz	5.3 mA	
	(5 to 10) Hz	1.7 mA	
	10 Hz to 5 kHz	0.53 mA	
	(5 to 10) kHz	5.6 mA	
(1 to 3) A			
(3 to 5) Hz	8.5 mA		
(5 to 10) Hz	3.5 mA		
10 Hz to 5 kHz	2.3 mA		
(5 to 10) kHz	16 mA		
(3 to 10) A			
(3 to 5) Hz	26 mA		
(5 to 10) Hz	11 mA		
10 Hz to 5 kHz	7.3 mA		
(5 to 10) kHz	54 mA		
Capacitance – Source <sup>1</sup>			Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
10 Hz to 10 kHz	(0.19 to 0.40) nF	0.007 3 nF	
10 Hz to 10 kHz	(0.40 to 1.1) nF	0.009 9 nF	
10 Hz to 3 kHz	(1.1 to 3.3) nF	0.012 nF	
10 Hz to 1 kHz	(3.3 to 11) nF	0.06 nF	
10 Hz to 1 kHz	(11 to 33) nF	0.12 nF	
10 Hz to 1 kHz	(33 to 110) nF	0.6 nF	
10 Hz to 1 kHz	(110 to 330) nF	0.69 nF	
(10 to 600) Hz	(0.33 to 1.1) μF	0.006 1 μF	



**Electrical – DC/Low Frequency**

<b>Parameter/Equipment</b>	<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>	<b>Reference Standard, Method, and/or Equipment</b>
Capacitance – Source <sup>1</sup> (10 to 300) Hz (10 to 150) Hz (10 to 120) Hz (10 to 80) Hz Up to 50 Hz Up to 20 Hz Up to 6 Hz Up to 2 Hz Up to 0.6 Hz Up to 0.2 Hz	(1.1 to 3.3) $\mu$ F (3.3 to 11) $\mu$ F (11 to 33) $\mu$ F (33 to 110) $\mu$ F (110 to 330) $\mu$ F (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	0.006 9 $\mu$ F 0.059 $\mu$ F 0.076 $\mu$ F 0.60 $\mu$ F 0.78 $\mu$ F 0.006 mF 0.012 mF 0.061 mF 0.14 mF 0.38 mF	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
Capacitance – Measure <sup>1</sup>	Up to 1 nF (1 to 10) nF (10 to 100) nF (0.1 to 1) $\mu$ F (1 to 10) $\mu$ F (10 to 100) $\mu$ F (0.1 to 1) mF (1 to 10) mF (10 to 100) mF	0.017 nF 0.041 nF 0.4 nF 0.004 $\mu$ F 0.04 $\mu$ F 0.4 $\mu$ F 0.004 1 mF 0.04 mF 1.6 mF	Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
DC Power to Source <sup>1</sup>	(33 mv to 1 020 V) (0.33 to 330) mA (0.33 to 3) A (3 to 20.5) A	0.052 % of output in Watts 0.45 % of output in Watts 9.8 % of output in Watts	Fluke 5520A Multiproduct Calibrator
Electrical Simulation of Thermocouple Devices <sup>1</sup>	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 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	0.62 $^{\circ}$ C 0.34 $^{\circ}$ C 0.31 $^{\circ}$ C 0.37 $^{\circ}$ C 0.42 $^{\circ}$ C 0.38 $^{\circ}$ C 0.31 $^{\circ}$ C 0.5 $^{\circ}$ C 0.84 $^{\circ}$ C	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures

**Electrical – DC/Low Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Devices <sup>1</sup>	Type E		Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
	(-250 to -100) °C	0.51 °C	
	(-100 to -25) °C	0.16 °C	
	(-25 to 350) °C	0.15 °C	
	(350 to 650) °C	0.17 °C	
	(650 to 1 000) °C	0.21 °C	
	Type J		
	(-210 to -100) °C	0.27 °C	
	(-100 to -30) °C	0.17 °C	
	(-30 to 150) °C	0.14 °C	
	(150 to 760) °C	0.17 °C	
	(760 to 1 200) °C	0.23 °C	
	Type K		
	(-200 to -100) °C	0.34 °C	
	(-100 to -25) °C	0.18 °C	
	(-25 to 120) °C	0.16 °C	
	(120 to 1 000) °C	0.26 °C	
	(1 000 to 1 372) °C	0.4 °C	
	Type L		
	(-200 to -100) °C	0.38 °C	
	(-100 to 800) °C	0.26 °C	
	(800 to 900) °C	0.17 °C	
	Type N		
	(-200 to -100) °C	0.64 °C	
(-100 to -25) °C	0.54 °C		
(-25 to 120) °C	0.19 °C		
(120 to 410) °C	0.19 °C		
(410 to 1 300) °C	0.28 °C		
Type R			
(0 to 250) °C	0.48 °C		
(250 to 400) °C	0.37 °C		
(400 to 1 000) °C	0.37 °C		
(1 000 to 1 767) °C	0.46 °C		
Type S			
(0 to 250) °C	0.49 °C		
(250 to 1000) °C	0.37 °C		
(1 000 to 1 400) °C	0.37 °C		
(1 400 to 1 767) °C	0.46 °C		



ANSI National Accreditation Board

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment	
Electrical Simulation of Thermocouple Devices <sup>1</sup>	Type T		Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures	
	(-250 to -150) °C	0.83 °C		
	(-150 to 0) °C	0.59 °C		
	(0 to 120) °C	0.34 °C		
	(120 to 400) °C	0.33 °C		
Type U	(-200 to 0) °C	0.57 °C		
	(0 to 600) °C	0.3 °C		
	Electrical Simulation of RTD Devices <sup>1</sup>	Pt 385, 100 Ω		Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
		(-200 to -80) °C	0.034 °C	
		(-80 to 0) °C	0.034 °C	
(0 to 100) °C		0.047 °C		
(100 to 300) °C		0.06 °C		
(300 to 400) °C		0.068 °C		
(400 to 630) °C		0.08 °C		
(630 to 800) °C		0.15 °C		
Pt 3926, 100 Ω				
(-200 to -80) °C		0.033 °C		
(-80 to 0) °C		0.036 °C		
(0 to 100) °C		0.047 °C		
(100 to 300) °C		0.06 °C		
(300 to 400) °C	0.067 °C			
(400 to 630) °C	0.08 °C			
Pt 3916, 100 Ω				
(-200 to -190) °C	0.17 °C			
(-190 to -80) °C	0.027 °C			
(-80 to 0) °C	0.03 °C			
(0 to 100) °C	0.04 °C			
(100 to 260) °C	0.05 °C			
(260 to 300) °C	0.05 °C			
(300 to 400) °C	0.06 °C			
(400 to 600) °C	0.07 °C			
(600 to 630) °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 Devices <sup>1</sup>	Pt 385, 200 Ω		Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
	(-200 to -80) °C	0.027 °C	
	(-80 to 0) °C	0.027 °C	
	(0 to 100) °C	0.027 °C	
	(100 to 260) °C	0.034 °C	
	(260 to 300) °C	0.08 °C	
	(300 to 400) °C	0.088 °C	
	(400 to 600) °C	0.094 °C	
	(600 to 630) °C	0.11 °C	
	Pt 385, 500 Ω		
	(-200 to -80) °C	0.027 °C	
	(-80 to 0) °C	0.034 °C	
	(0 to 100) °C	0.034 °C	
	(100 to 260) °C	0.041 °C	
	(260 to 300) °C	0.054 °C	
	(300 to 400) °C	0.053 °C	
	(400 to 600) °C	0.064 °C	
	(600 to 630) °C	0.073 °C	
	Pt 385, 1000 Ω		
	(-200 to -80) °C	0.02 °C	
	(-80 to 0) °C	0.02 °C	
	(0 to 100) °C	0.027 °C	
	(100 to 260) °C	0.033 °C	
	(260 to 300) °C	0.04 °C	
(300 to 400) °C	0.047 °C		
(400 to 600) °C	0.047 °C		
(600 to 630) °C	0.15 °C		
PtNi 385, 120 Ω			
(-80 to 0) °C	0.053 °C		
(0 to 100) °C	0.053 °C		
(100 to 260) °C	0.093 °C		
Cu 427, 10 Ω			
(-100 to 260) °C	0.2 °C		



# ANSI National Accreditation Board

## Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Power – Source <sup>1</sup> @ (45 to 65) Hz, PF = 1	(33 to 330) mV (3.3 to 9) mA (9 to 33) mA (33 to 90) mA (90 to 330) mA (0.33 to 0.9) A (0.9 to 2.2) A (2.2 to 4.5) A (4.5 to 20.5) A 33 mV to 1 020 V (3.3 to 9) mA (9 to 33) mA (33 to 90) mA (90 to 330) mA (0.33 to 0.9) A (0.9 to 2.2) A (2.2 to 4.5) A (4.5 to 20.5) A	0.002 8 % of output in Watts 0.007 3 % of output in Watts 0.028 % of output in Watts 0.073 % of output in Watts 0.26 % of output in Watts 0.53 % of output in Watts 0.001 3 % of output in Watts 0.005 % of output in Watts 0.007 3 % of output in Watts 0.018 % of output in Watts 0.073 % of output in Watts 0.18 % of output in Watts 0.67 % of output in Watts 1.4 % of output in Watts 3.7 % of output in Watts 14 % of output in Watts	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
Oscilloscopes <sup>1</sup>			
Amplitude DC Signal	1 mV to 100 V	0.5 mV ± 40 mV	Fluke 5520-SC600 Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures NAVAIR17-20AW-506 August 2015
DC Voltage (1 MΩ)	5 mV to 5.5 V	8 mV ± 0.33 mV	
Leveled Sine Wave 50 kHz to 600 mHz	10 ns to 5 s	0,000 12 s ± 0.005 s	
Time Markers	100 ns to 20 ms	12 ms	
20 % Duty Cycle	1.8 mV to 55 V	0.031 V ± 1.65 mV	
Wave Generator (1 MΩ)	10 Hz to 10 kHz	0.56 mHz ± 50 mHz	

## Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Gage Balls <sup>2</sup>	(0.039 37 to 2) in	(13 + 0.4L) μin	ULM GIDEP Sourced Procedures

**Length – Dimensional Metrology**

<b>Parameter/Equipment</b>	<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>	<b>Reference Standard, Method, and/or Equipment</b>
Gage Blocks <sup>2</sup>	Up to 4 in	(2.9 + 1.2L) μin	Dual Head Comparator Grade 00 Gage Blocks ASTM Procedure
Plain Ring Gages <sup>2</sup>	(0.4 to 4) in	(10 + 4.3L) μin	ULM XXX Master Rings OEM, GIDEP Sourced Procedures
Micrometers, ID, OD & Depth <sup>1,2</sup>	Up to 6 in (6 to 60) in	(21 + 9.8L) μin (34 + 6L) μin	Gage Blocks Federal Grade 2 / ASME Grade 0 OEM, GIDEP Sourced Procedures
Calipers, ID, OD & Depth <sup>1,2</sup>	Up to 6 in (6 to 84) in	(57 + 0.96L) μin (30 + 3.1L) μin	Gage Blocks Federal Grade 2 / ASME Grade 0 OEM, GIDEP Sourced Procedures
Indicators <sup>1,2</sup>	Up to 2 in	(27 + 1.2L) μin	ULM OEM, GIDEP Sourced Procedures
Pin Gages <sup>2</sup>	Up to 1 in	(11 + 1.5L) μin	ULM OEM, ASME Standards, GIDEP Sourced Procedures
Plain Plug Gages <sup>2</sup>	Up to 2 in (2 to 4) in	(11 + 1.5L) μin (3.5 + 6.5L) μin	ULM, Gage Blocks OEM, ASME Standards, GIDEP Sourced Procedures
Micrometer Standards (End Rods)	(0.5 to 20) in	15 μin	ULM, Gage Blocks OEM, ASME Standards, GIDEP Sourced Procedures
Rulers <sup>1</sup>	Up to 24 in	0.009 6 in	Master Steel Ruler OEM, GIDEP Sourced Procedures
Height Gauges <sup>1,2</sup>	Up to 24 in	(44 + 2.1L) μin	Gage Blocks Federal Grade 2 / ASME Grade 0 OEM, GIDEP Sourced Procedures
Optical Comparators <sup>1</sup> Linearity X-Y Squareness	0 to 10 in	0.000 12 in	OEM, GIDEP Sourced Procedures



Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Optical Comparator <sup>1</sup> Magnification	(10, 20, 31.25, 50, 61.25, and 100) x	25 μin + 0.06 μin	Glass Master, OEM, GIDEP Sourced Procedures
Profilometers <sup>1</sup>	(2 to 250) μin RA	4.8 nm	Roughness Specimen, GIDEP Sourced Procedures
Surface Plates <sup>1</sup> Repeat Readings Overall Flatness	0.002 in	0.000 1 in 0.000 22 in	Repeat -O-Meter Electronic Levels GGG-463 C
Thread Plug Gages Major Diameter Pitch Diameter	Up to 4 in	(3.5 + 6.5L) μin (26 + 13L) μin	ULM, Thread Wires
Extrusion Plastometers <sup>1</sup> Bore Diameter Piston Diameter	(0 to 0.25) in (0 to 1) in	0.003 in 0.001 in	Caliper, Pin Gages, Gage Block

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Class I & Unclassified Balances <sup>1</sup> (resolution)	Up to 100 g (0.01 mg)	0.034 mg	ASTM Class 1 Weights NIST Handbook 44 and WI-09
	Up to 100 g (0.02 mg)	0.036 mg	
	Up to 100 g (0.05 mg)	0.045 mg	
	Up to 200 g (0.1 mg)	0.089 mg	
	Up to 200 g (0.2 mg)	0.13 mg	
	Up to 200 g (0.5 mg)	0.3 mg	
Class II & Unclassified Balances <sup>1</sup> (resolution)	Up to 100 g (0.001 g)	0.58 mg	ASTM Class 1 or 2 Weights NIST Handbook 44 and WI-09
	Up to 200 g (0.002 g)	1.2 mg	
	Up to 500 g (0.005 g)	2.9 mg	
	Up to 1 kg (0.01 g)	5.8 mg	
	Up to 2 kg (0.02 g)	12 mg	
	Up to 5 kg (0.05 g)	29 mg	
	Up to 10 kg (0.1 g)	58 mg	
	Up to 20 kg (0.2 g)	0.12 g	
	Up to 50 kg (0.5 g)	0.29 g	
	Up to 50 kg (1 g)	0.58 g	
	Up to 50 kg (2 g)	1.2 g	
	Up to 50 kg (5 g)	2.9 g	





Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Class III & Unclassified Light Capacity Scales <sup>1</sup> (resolution)	Up to 1 lb (0.0001 lb)	0.026 g	NIST Class F Weights NIST Handbook 44 and WI-09
	Up to 2 lb (0.0002 lb)	0.054 g	
	Up to 5 lb (0.0005 lb)	0.13 g	
	Up to 10 lb (0.001 lb)	0.26 g	
	Up to 20 lb (0.002 lb)	0.54 g	
	Up to 50 lb (0.005 lb)	1.3 g	
	Up to 100 lb (0.01 lb)	2.6 g	
	Up to 200 lb (0.02 lb)	5.4 g	
Class III & Unclassified Medium Capacity Scales <sup>1</sup> (resolution)	Up to 500 lb (0.05 lb)	0.029 lb	NIST Class F Weights NIST Handbook 44 and WI-09
	Up to 1 000 lb (0.1 lb)	0.058 lb	
	Up to 2 000 lb (0.2 lb)	0.12 lb	
	Up to 5 000 lb (0.5 lb)	0.29 lb	
	Up to 10 000 lb (1 lb)	0.58 lb	
	Up to 20 000 lb (2 lb)	1.2 lb	
Class III & Unclassified Heavy Capacity Scales <sup>1</sup> (resolution)	Up to 50 000 lb (10 lb)	5.8 lb	NIST Class F Weights NIST Handbook 44 and WI-09
	Up to 200 000 lb (20 lb)	12 lb	
	Up to 400 000 lb (50 lb)	29 lb	
Class IV & Unclassified Scales <sup>1</sup> (resolution)	Up to 12 000 lb (10 lb)	5.8 lb	NIST Class F Weight NIST Handbook 44 and WI-09s
	Up to 24 000 lb (20 lb)	12 lb	
	Up to 60 000 lb (50 lb)	29 lb	
Mass - Avoirdupois lb	25 lb	0.1 g	NIST Class F Weights NISTIR 6969 SOP 4, SOP 7 or SOP 8
	50 lb	0.13 g	
	250 lb	0.54 g	
	500 lb	6.4 g	
	1 000 lb	7.2 g	
	2 500 lb	50 g	
	3 000 lb	50 g	
5 000 lb	54 g		
Mass - Avoirdupois lb	1 lb	0.16 mg	ASTM Class 4 Weights NISTIR 6969 SOP 4, SOP 7 or SOP 8
	2 lb	0.23 mg	
	3 lb	0.64 mg	
	5 lb	1 mg	
	10 lb	1.5 mg	
	20 lb	8.6 mg	
	30 lb	31 mg	



Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Mass - oz	1/32 oz	3.7 µg	ASTM Class 4 Weights NISTIR 6969 SOP 4, SOP 7 or SOP 8
	1/16 oz	5.1 µg	
	1/8 oz	5.1 µg	
	1/4 oz	13 µg	
	1/2 oz	24 µg	
	1 oz	0.04 mg	
	2 oz	0.034 mg	
	4 oz	0.22 mg	
Mass - Metric	8 oz	0.22 mg	NIST Class F Weights NISTIR 6969 SOP 4, SOP 7 or SOP 8
	20 kg	0.18 g	
	25 kg	0.17 g	
Mass - Metric	200 kg	5.1 g	ASTM Class 0 Weights NISTIR 6969 SOP 4, SOP 7 or SOP 8
	100 g	0.034 mg	
	200 g	0.1 mg	
	300 g	0.1 mg	
	500 g	0.076 mg	
	1 kg	0.19 mg	
	2 kg	0.41 mg	
	3 kg	0.79 mg	
	4 kg	0.68 mg	
	5 kg	0.84 mg	
Mass - Metric	10 kg	38 mg	ASTM Class 0 Weights NISTIR 6969 SOP 4, SOP 7 or SOP 8
	1 mg	1.1 µg	
	2 mg	1.1 µg	
	3 mg	1.1 µg	
	5 mg	1.1 µg	
	10 mg	1.1 µg	
	20 mg	1.1 µg	
	30 mg	1.1 µg	
	50 mg	1.1 µg	
	100 mg	1.1 µg	
	200 mg	1.1 µg	
	300 mg	1.1 µg	
500 mg	1.1 µg		



Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Mass - Metric	1 g 2 g 3 g 5 g 10 g 20 g 30 g 50 g	3.8 µg 2.3 µg 3.3 µg 3.6 µg 7.4 µg 7.6 µg 11 µg 17 µg	ASTM Class 0 Weights NISTIR 6969 SOP 4, SOP 7 or SOP 8
Force <sup>1</sup>	(2 to 200 lbf) (200 to 10 000) lbf (10 000 to 100 000) lbf	0.04 lbf 0.64 lbf 0.24 lbf	Dead Weights Load Cells
Pressure Gauges <sup>1</sup>	Up to 3 000 psi Up to 10 000 psi	0.93 psi 0.91 psi	Pressure Calibrator Fluke 754 with Pressure Module
Vacuum <sup>1</sup>	(-15 to 100) psi	0.074 psi	Pressure Calibrator Fluke 754 with pressure Module
Torque Tools <sup>1</sup>	(Up to 50) lbf·in (50 to 250) lbf·in (250 to 400) lbf·in (400 to 1000) lbf·in (1000 to 2500) lbf·in (Up to 100) lbf·ft (100 to 250) lbf·ft (250 to 600) lbf·ft	0.07 lbf·in 0.44 lbf·in 1.2 lbf·in 2.9 lbf·in 7.2 lbf·in 0.22 lbf·ft 1.7 lbf·ft 4.1 lbf·ft	Torque Transducers
Torque Transducers <sup>1</sup>	2 to 2 000 lbf·ft	0.012 % of Reading	Radius Arms w/Class F Weights
Indirect Verification of Rockwell and Superficial Hardness Testers <sup>1</sup>	HRA 82.9 HRA 84.3 HRB 91.3 HRB 92.9 HRC 25.1 HRC 45.4 HRC 47.3 HRC 64.2	0.97 HRA 0.54 HRA 0.54 HRB 1.5 HRB 1.5 HRC 0.60 HRC 1.4 HRC 0.43 HRC	Hardness Test Blocks ASTM E-18

**Thermodynamic**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Relative Humidity Sensors <sup>1</sup>	(5 to 95) %RH	1.9 %RH	Humidity Chamber w/ Reference Probe Thermohygrometer OEM, GIDEP Sourced Procedures
Temperature -Infrared Non-Contact Measuring Equipment <sup>1</sup>	(35 to 500) °C	1.2 °C	Blackbody Source OEM, GIDEP, Met/Cal, Sourced Procedures $\epsilon = 0.95, \lambda = (8 \text{ to } 14) \mu\text{m}$
Temperature - Measure <sup>1</sup>	(-200 to 660) °C (660 to 1 450) °C	0.044 °C 3.5 °C	Hart 1529 Indicator w/ 5628 PRT Hart 1529 Indicator w/ 5650 Type S Thermocouple Thermohygrometer OEM, GIDEP, Met/Cal, Sourced Procedures
Temperature - Source <sup>1</sup>	(-40 to 660) °C (660 to 1 200) °C	0.028 °C 4.8 °C	Dry Well and Hart 1529 Indicator w/ 5628 PRT Dry Well and Hart 1529 Indicator w/ 5650 Type S Thermocouple OEM, GIDEP, Met/Cal, Sourced Procedures
Extrusion Plastometers Temperature <sup>1</sup>	(100 to 400) °C	0.24 °C	Hart 1529 Indicator w/ 5628 PRT

**Time and Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Stopwatches/Timers <sup>1</sup>	Up to 86 400 s	3.5 s / 24 hours	US National Time Stopwatch NIST SP 960-12



Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Source <sup>1</sup>	(0.01 to 120) Hz (120 to 1200) Hz (1.2 to 12) kHz (12 to 120) kHz (120 to 1200) kHz (1.2 to 2) MHz	0.18 mHz 0.2 mHz 0.059 Hz 0.12 Hz 0.66 Hz 0.058 kHz	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
Frequency – Measure <sup>1</sup>	(3 to 5) Hz (5 to 10) Hz (10 to 40) Hz (40 to 1000) Hz (1 to 300) kHz 300 kHz to 1 MHz	3.6 mHz 6.9 mHz 16 mHz 19 mHz 0.16 kHz 0.16 kHz	Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
Tachometer <sup>1</sup> Non - Contact	500 to 40 000 rpm	.08 % of reading	Monarch PLT 2000

Services performed at satellite location

7133 Global Drive  
Louisville, KY 40258

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Source <sup>1</sup>	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (100 to 1 000) V	1.6 μV 16 μV 0.13 mV 1.3 mV 3.1 mV	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
DC Voltage - Measure <sup>1</sup>	Up to 100 mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1 000) V	2.4 μV 6.4 μV 0.052 mV 0.67 mV 9.6 mV	Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures

**Electrical – DC/Low Frequency**

<b>Parameter/Equipment</b>	<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>	<b>Reference Standard, Method, and/or Equipment</b>
DC Current - Source <sup>1</sup>	Up to 330 $\mu$ A 330 $\mu$ A to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1.1 A (1.1 to 3) A (3 to 11) A (11 to 20.5) A	0.014 $\mu$ A 0.19 $\mu$ A 0.48 $\mu$ A 4.4 $\mu$ A 77 $\mu$ A 0.31 mA 1.5 mA 23 mA	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
DC Current - Source for Clamp on Current Meters <sup>1</sup>	(20 to 200) A (200 to 500) A (500 to 1 000) A	0.41 A 1.1 A 2.1 A	Fluke 5520A Multiproduct Calibrator w/ 50 turn coil. OEM, GIDEP, Met/Cal Sourced Procedures
DC Current - Measure <sup>1</sup>	Up to 100 $\mu$ A 100 $\mu$ A to 1 mA (1 to 10) mA (10 to 100) mA (100 to 400) mA 400 mA to 1 A (1 to 3) A (3 to 10) A	0.018 $\mu$ A 0.67 $\mu$ A 1.7 $\mu$ A 6.7 $\mu$ A 20 $\mu$ A 0.27 mA 1.1 mA 3.5 mA	Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
Resistance - Source <sup>1</sup>	Up to 11 $\Omega$ (11 to 33) $\Omega$ (33 to 110) $\Omega$ (110 to 330) $\Omega$ (0.33 to 1.1) k $\Omega$ (1.1 to 3.3) k $\Omega$ (3.3 to 11) k $\Omega$ (11 to 33) k $\Omega$ (33 to 110) k $\Omega$ (110 to 330) k $\Omega$ (0.33 to 1.1) M $\Omega$ (1.1 to 3.3) M $\Omega$ (3.3 to 11) M $\Omega$ (11 to 33) M $\Omega$ (33 to 110) M $\Omega$ (110 to 330) M $\Omega$ (330 to 1 100) M $\Omega$	0.67 m $\Omega$ 1.4 m $\Omega$ 1.7 m $\Omega$ 3.4 m $\Omega$ 9.6 m $\Omega$ 38 m $\Omega$ 96 m $\Omega$ 0.39 $\Omega$ 0.99 $\Omega$ 3.8 $\Omega$ 32 $\Omega$ 79 $\Omega$ 0.39 k $\Omega$ 3.5 k $\Omega$ 13 k $\Omega$ 0.29 M $\Omega$ 3.7 M $\Omega$	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance - Measure <sup>1</sup>	Up to 10 Ω (10 to 100) Ω (0.1 to 1) kΩ (1 to 10) kΩ (10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ (10 to 100) MΩ (0.1 to 1) GΩ	2 mΩ 3.6 mΩ 14 mΩ 0.14 Ω 1.4 Ω 14 Ω 3.3 kΩ 60 kΩ 1.4 MΩ	Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
AC Voltage - Source <sup>1</sup>	(1 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	4.7 μV 4.1 μV 4.2 μV 4.8 μV 10 μV 39 μV	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
AC Voltage - Source <sup>1</sup>	(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 (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	15 μV 11 μV 14 μV 15 μV 39 μV 92 μV 0.12 mV 0.086 mV 0.09 mV 0.16 mV 0.28 mV 0.93 mV 1.2 mV 1.2 mV 1.7 mV 1.5 mV 3.1 mV	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures





Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Source <sup>1</sup>	(33 to 330) V		Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
	45 Hz to 1 kHz	8.7 mV	
	1 kHz to 10 kHz	9.1 mV	
	(10 to 20) kHz	11 mV	
	(20 to 50) kHz	12 mV	
	(50 to 100) kHz	78 mV	
	(330 to 1 020) V		
	45 Hz to 1 kHz	73 mV	
	(1 to 5) kHz	63 mV	
	(5 to 10) kHz	73 mV	
AC Voltage - Measure <sup>1</sup>	Up to 100 mV		Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
	(3 to 5) Hz	0.027 mV	
	(5 to 10) Hz	0.027 mV	
	10 Hz to 20 kHz	0.027 mV	
	(20 to 50) kHz	0.033 mV	
	(50 to 100) kHz	0.053 mV	
	(100 to 300) kHz	0.33 mV	
	100 mV to 1 V		
	(3 to 5) Hz	0.87 mV	
	(5 to 10) Hz	0.43 mV	
	10 Hz to 20 kHz	0.24 mV	
	(20 to 50) kHz	0.41 mV	
	(50 to 100) kHz	0.93 mV	
	(100 to 300) kHz	6 mV	
	(1 to 10) V		
	(3 to 5) Hz	8.7 mV	
	(5 to 10) Hz	4.3 mV	
	10 Hz to 20 kHz	2.4 mV	
	(20 to 50) kHz	4.1 mV	
	(50 to 100) kHz	9.3 mV	
	(100 to 300) kHz	60 mV	
	(10 to 100) V		
	(3 to 5) Hz	87 mV	
	(5 to 10) Hz	43 mV	
	10 Hz to 20 kHz	24 mV	
	(20 to 50) kHz	41 mV	
	(50 to 100) kHz	93 mV	
(100 to 300) kHz	0.6 V		



# ANSI National Accreditation Board

## Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Measure <sup>1</sup>	(100 to 1 000) V		Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
	(3 to 5) Hz	0.82 V	
	(5 to 10) Hz	0.38 V	
	10 Hz to 20 kHz	0.19 V	
	(20 to 50) kHz	0.33 V	
	(50 to 100) kHz	0.8 V	
(100 to 300) kHz	5.2 V		
AC Current - Source <sup>1</sup>	(29 to 330) $\mu$ A		Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
	(10 to 20) Hz	0.11 $\mu$ A	
	(20 to 45) Hz	0.1 $\mu$ A	
	45 Hz to 1 kHz	0.096 $\mu$ A	
	(1 to 5) kHz	0.16 $\mu$ A	
	(5 to 10) kHz	0.29 $\mu$ A	
	(10 to 30) kHz	0.58 $\mu$ A	
	(0.33 to 3.3) mA		
	(10 to 20) Hz	0.55 $\mu$ A	
	(20 to 45) Hz	0.39 $\mu$ A	
	45 Hz to 1 kHz	0.4 $\mu$ A	
	(1 to 5) kHz	0.61 $\mu$ A	
	(5 to 10) kHz	1.4 $\mu$ A	
	(10 to 30) kHz	2.6 $\mu$ A	
	(3.3 to 33) mA		
	(10 to 20) Hz	5.3 $\mu$ A	
	(20 to 45) Hz	3.3 $\mu$ A	
	45 Hz to 1 kHz	3.2 $\mu$ A	
	(1 to 5) kHz	3.7 $\mu$ A	
	(5 to 10) kHz	7 $\mu$ A	
	(10 to 30) kHz	12 $\mu$ A	
	(33 to 330) mA		
	(10 to 20) Hz	0.055 mA	
	(20 to 45) Hz	0.037 mA	
45 Hz to 1 kHz	0.03 mA		
(1 to 5) kHz	0.056 mA		
(5 to 10) kHz	0.11 mA		
(10 to 30) kHz	0.22 mA		

**Electrical – DC/Low Frequency**

<b>Parameter/Equipment</b>	<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>	<b>Reference Standard, Method, and/or Equipment</b>
AC Current - Source <sup>1</sup>	(0.33 to 1.1) A		Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
	(10 to 45) Hz	0.47 mA	
	45 Hz to 1kHz	0.18 mA	
	(1 to 5) kHz	2 mA	
	(5 to 10) kHz	8.8 mA	
	(1.1 to 3) A		
	(10 to 45) Hz	1.4 mA	
	45 Hz to 1kHz	0.6 mA	
	(1 to 5) kHz	8 mA	
	(5 to 10) kHz	22 mA	
	(3 to 11) A		
	(45 to 100) Hz	2.7 mA	
	100 Hz to 1 kHz	3.4 mA	
	(1 to 5) kHz	61 mA	
(11 to 20.5) A			
(45 to 100) Hz	17 mA		
100 Hz to 440 Hz	18 mA		
AC Current - Source for Clamp on Current Meters <sup>1</sup>	(20 to 200) A		Fluke 5520A Multiproduct Calibrator w/ 50 turn coil OEM, GIDEP, Met/Cal Sourced Procedures
	(45 to 440) Hz	0.44 A	
	(200 to 500) A		
	(45 to 200) Hz	1.2 A	
AC Current – Measure <sup>1</sup>	(500 to 1 000) A		Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
	(45 to 200) Hz	2.5 A	
	Up to 100 µA		
	(3 to 5) Hz	0.29 µA	
	(5 to 10) Hz	0.14 µA	
	10 Hz to 5 kHz	0.041 µA	
	(5 to 10) kHz	0.47 µA	
	100 µA to 1 mA		
	(3 to 5) Hz	6 µA	
	(5 to 10) Hz	0.74 µA	
	10 Hz to 5 kHz	0.34 µA	
	(5 to 10) kHz	1.8 µA	
	(1 to 10) mA		
	(3 to 5) Hz	0.12 mA	
(5 to 10) Hz	0.012 mA		
10 Hz to 5 kHz	0.005 mA		
(5 to 10) kHz	0.049 mA		



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment	
AC Current – Measure <sup>1</sup>	(10 to 100) mA		Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures	
	(3 to 5) Hz	0.81 mA		
	(5 to 10) Hz	0.13 mA		
	10 Hz to 5 kHz	0.23 mA		
	(5 to 10) kHz	0.18 mA		
	(100 to 400) mA			
	(3 to 5) Hz	0.93 mA		
	(5 to 10) Hz	0.49 mA		
	10 Hz to 1 kHz	0.33 mA		
	(1 to 10) kHz	2 mA		
	400 mA to 1 A			
	(3 to 5) Hz	5.3 mA		
	(5 to 10) Hz	1.7 mA		
	10 Hz to 5 kHz	0.53 mA		
	(5 to 10) kHz	5.6 mA		
	(1 to 3) A			
	(3 to 5) Hz	8.5 mA		
	(5 to 10) Hz	3.5 mA		
10 Hz to 5 kHz	2.3 mA			
(5 to 10) kHz	16 mA			
(3 to 10) A				
(3 to 5) Hz	26 mA			
(5 to 10) Hz	11 mA			
10 Hz to 5 kHz	7.3 mA			
(5 to 10) kHz	54 mA			
Capacitance – Source <sup>1</sup>	10 Hz to 10 kHz	(0.19 to 0.40) nF	0.007 3 nF	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
	10 Hz to 10 kHz	(0.40 to 1.1) nF	0.009 9 nF	
	10 Hz to 3 kHz	(1.1 to 3.3) nF	0.012 nF	
	10 Hz to 1 kHz	(3.3 to 11) nF	0.06 nF	
	10 Hz to 1 kHz	(11 to 33) nF	0.12 nF	
	10 Hz to 1 kHz	(33 to 110) nF	0.6 nF	
	10 Hz to 1 kHz	(110 to 330) nF	0.69 nF	
	(10 to 600) Hz	(0.33 to 1.1) μF	0.006 1 μF	
	(10 to 300) Hz	(1.1 to 3.3) μF	0.006 9 μF	
	(10 to 150) Hz	(3.3 to 11) μF	0.059 μF	
	(10 to 120) Hz	(11 to 33) μF	0.076 μF	
	(10 to 80) Hz	(33 to 110) μF	0.60 μF	
	Up to 50 Hz	(110 to 330) μF	0.78 μF	



# ANSI National Accreditation Board

## Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance – Source <sup>1</sup> Up to 20 Hz Up to 6 Hz Up to 2 Hz Up to 0.6 Hz Up to 0.2 Hz	(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	0.006 mF 0.012 mF 0.061 mF 0.14 mF 0.38 mF	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
Capacitance – Measure <sup>1</sup>	Up to 1 nF (1 to 10) nF (10 to 100) nF (0.1 to 1) μF (1 to 10) μF (10 to 100) μF (0.1 to 1) mF (1 to 10) mF (10 to 100) mF	0.017 nF 0.041 nF 0.4 nF 0.004 μF 0.04 μF 0.4 μF 0.004 mF 0.04 mF 1.6 mF	Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures
Oscilloscopes <sup>1</sup>  Amplitude DC Signal  DC Voltage (1 MΩ)  Leveled Sine Wave 50 kHz to 600 mHz  Time Markers  20 % Duty Cycle  Wave Generator (1 MΩ)	  1 mV to 100 V  5 mV to 5.5 V  10 ns to 5 s  100 ns to 20 ms  1.8 mV to 55 V  10 Hz to 10 kHz	  0.5 mV ± 40 mV  8 mV ± 0.33 mV  0.000 12 s ± 0.005 s  12 ms  0.031 V ± 1.65 mV  0.56 mHz ± 50 mHz	           Fluke 5520-SC600 Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures NAVAIR17-20AW-506 August 2015
Electrical Simulation of Thermocouple Devices <sup>1</sup>	Type B (600 to 800) °C (800 to 1 000) °C (1 000 to 1 550) °C (1 550 to 1 820) °C Type C (0 to 150) °C (150 to 650) °C (650 to 1 000) °C (1 000 to 1 800) °C (1 800 to 2 316) °C	0.62 °C 0.34 °C 0.31 °C 0.37 °C 0.42 °C 0.38 °C 0.31 °C 0.5 °C 0.84 °C	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures



# ANSI National Accreditation Board

## Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Devices <sup>1</sup>	Type E		Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
	(-250 to -100) °C	0.51 °C	
	(-100 to -25) °C	0.16 °C	
	(-25 to 350) °C	0.15 °C	
	(350 to 650) °C	0.17 °C	
	(650 to 1 000) °C	0.21 °C	
	Type J		
	(-210 to -100) °C	0.27 °C	
	(-100 to -30) °C	0.17 °C	
	(-30 to 150) °C	0.14 °C	
	(150 to 760) °C	0.17 °C	
	(760 to 1 200) °C	0.23 °C	
	Type K		
	(-200 to -100) °C	0.34 °C	
	(-100 to -25) °C	0.18 °C	
	(-25 to 120) °C	0.16 °C	
	(120 to 1 000) °C	0.26 °C	
	(1 000 to 1 372) °C	0.4 °C	
	Type L		
	(-200 to -100) °C	0.38 °C	
	(-100 to 800) °C	0.26 °C	
	(800 to 900) °C	0.17 °C	
	Type N		
	(-200 to -100) °C	0.64 °C	
	(-100 to -25) °C	0.54 °C	
	(-25 to 120) °C	0.19 °C	
	(120 to 410) °C	0.19 °C	
	(410 to 1 300) °C	0.28 °C	
Type R			
(0 to 250) °C	0.48 °C		
(250 to 400) °C	0.37 °C		
(400 to 1 000) °C	0.37 °C		
(1 000 to 1 767) °C	0.46 °C		
Type S			
(0 to 250) °C	0.49 °C		
(250 to 1000) °C	0.37 °C		
(1 000 to 1 400) °C	0.37 °C		
(1 400 to 1 767) °C	0.46 °C		



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Devices <sup>1</sup>	Type T		Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
	(-250 to -150) °C	0.83 °C	
	(-150 to 0) °C	0.59 °C	
	(0 to 120) °C	0.34 °C	
	(120 to 400) °C	0.33 °C	
Electrical Simulation of RTD Devices <sup>1</sup>	Type U		Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
	(-200 to 0) °C	0.57 °C	
	(0 to 600) °C	0.3 °C	
	Pt 385, 100 Ω		
	(-200 to -80) °C	0.034 °C	
	(-80 to 0) °C	0.034 °C	
	(0 to 100) °C	0.047 °C	
	(100 to 300) °C	0.06 °C	
	(300 to 400) °C	0.068 °C	
	(400 to 630) °C	0.08 °C	
	(630 to 800) °C	0.15 °C	
	Pt 3926, 100 Ω		
	(-200 to -80) °C	0.033 °C	
(-80 to 0) °C	0.036 °C		
(0 to 100) °C	0.047 °C		
(100 to 300) °C	0.06 °C		
(300 to 400) °C	0.067 °C		
(400 to 630) °C	0.08 °C		
Pt 3916, 100 Ω			
(-200 to -190) °C	0.17 °C		
(-190 to -80) °C	0.027 °C		
(-80 to 0) °C	0.03 °C		
(0 to 100) °C	0.04 °C		
(100 to 260) °C	0.05 °C		
(260 to 300) °C	0.05 °C		
(300 to 400) °C	0.06 °C		
(400 to 600) °C	0.07 °C		
(600 to 630) °C	0.2 °C		





ANSI National Accreditation Board

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of RTD Devices <sup>1</sup>	Pt 385, 200 Ω		Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
	(-200 to -80) °C	0.027 °C	
	(-80 to 0) °C	0.027 °C	
	(0 to 100) °C	0.027 °C	
	(100 to 260) °C	0.034 °C	
	(260 to 300) °C	0.08 °C	
	(300 to 400) °C	0.088 °C	
	(400 to 600) °C	0.094 °C	
	(600 to 630) °C	0.11 °C	
	Pt 385, 500 Ω		
	(-200 to -80) °C	0.027 °C	
	(-80 to 0) °C	0.034 °C	
	(0 to 100) °C	0.034 °C	
	(100 to 260) °C	0.041 °C	
	(260 to 300) °C	0.054 °C	
	(300 to 400) °C	0.053 °C	
	(400 to 600) °C	0.064 °C	
	(600 to 630) °C	0.073 °C	
	Pt 385, 1000 Ω		
	(-200 to -80) °C	0.02 °C	
	(-80 to 0) °C	0.02 °C	
	(0 to 100) °C	0.027 °C	
	(100 to 260) °C	0.033 °C	
	(260 to 300) °C	0.04 °C	
	(300 to 400) °C	0.047 °C	
	(400 to 600) °C	0.047 °C	
	(600 to 630) °C	0.15 °C	
	PtNi 385, 120 Ω		
(-80 to 0) °C	0.053 °C		
(0 to 100) °C	0.053 °C		
(100 to 260) °C	0.093 °C		
Cu 427, 10 Ω			
(-100 to 260) °C	0.2 °C		



**Length – Dimensional Metrology**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Micrometers, ID, OD & Depth <sup>1,2</sup>	Up to 6 in (6 to 60) in	(21 + 9.8L) μin (34 + 6L) μin	Gage Blocks Federal Grade 2 / ASME Grade 0 OEM, GIDEP Sourced Procedures
Calipers, ID, OD & Depth <sup>1,2</sup>	Up to 6 in (6 to 84) in	(57 + 0.96L) μin (30 + 3.1L) μin	Gage Blocks Federal Grade 2 / ASME Grade 0 OEM, GIDEP Sourced Procedures
Surface Plates <sup>1</sup> Repeat Readings Overall Flatness	0.002 in	0.000 1 in 0.000 22 in	Repeat -O-Meter Electronic Levels GGG-463 C

**Mass and Mass Related**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Class I & Unclassified Balances <sup>1</sup>	Up to 100 g (0.01 mg) Up to 100 g (0.02 mg) Up to 100 g (0.05 mg) Up to 200 g (0.1 mg) Up to 200 g (0.2 mg) Up to 200 g (0.5 mg)	0.034 mg 0.036 mg 0.045 mg 0.089 mg 0.13 mg 0.3 mg	ASTM Class 1 Weights NIST Handbook 44 and WI-09
Class II & Unclassified Balances <sup>1</sup>	Up to 100 g (0.001 g) Up to 200 g (0.002 g) Up to 500 g (0.005 g) Up to 1 kg (0.01 g) Up to 2 kg (0.02 g) Up to 5 kg (0.05 g) Up to 10 kg (0.1 g) Up to 20 kg (0.2 g) Up to 50 kg (0.5 g) Up to 50 kg (1 g) Up to 50 kg (2 g) Up to 50 kg (5 g)	0.58 mg 1.2 mg 2.9 mg 5.8 mg 12 mg 29 mg 58 mg 0.12 g 0.29 g 0.58 g 1.2 g 2.9 g	ASTM Class 1 or 2 Weights NIST Handbook 44 and WI-093

**Mass and Mass Related**

<b>Parameter/Equipment</b>	<b>Range</b>	<b>Expanded Uncertainty of Measurement (+/-)</b>	<b>Reference Standard, Method, and/or Equipment</b>
Class III & Unclassified Light Capacity Scales <sup>1</sup>	Up to 1 lb (0.0001 lb)	0.026 g	NIST Class F Weights NIST Handbook 44 and WI-09
	Up to 2 lb (0.0002 lb)	0.054 g	
	Up to 5 lb (0.0005 lb)	0.13 g	
	Up to 10 lb (0.001 lb)	0.26 g	
	Up to 20 lb (0.002 lb)	0.54 g	
	Up to 50 lb (0.005 lb)	1.3 g	
	Up to 100 lb (0.01 lb)	2.6 g	
	Up to 200 lb (0.02 lb)	5.4 g	
Class III & Unclassified Medium Capacity Scales <sup>1</sup>	Up to 500 lb (0.05 lb)	0.029 lb	NIST Class F Weights NIST Handbook 44 and WI-09
	Up to 1 000 lb (0.1 lb)	0.058 lb	
	Up to 2 000 lb (0.2 lb)	0.12 lb	
	Up to 5 000 lb (0.5 lb)	0.29 lb	
	Up to 10 000 lb (1 lb)	0.58 lb	
	Up to 20 000 lb (2 lb)	1.2 lb	
	Up to 50 000 lb (5 lb)	2.9 lb	
Class III & Unclassified Heavy Capacity Scales <sup>1</sup>	Up to 50 000 lb (10 lb)	5.8 lb	NIST Class F Weights NIST Handbook 44 and WI-09
	Up to 200 000 lb (20 lb)	12 lb	
	Up to 400 000 lb (50 lb)	29 lb	
Class IV & Unclassified Scales <sup>1</sup>	Up to 12 000 lb (10 lb)	5.8 lb	NIST Class F Weight NIST Handbook 44 and WI-09s
	Up to 24 000 lb (20 lb)	12 lb	
	Up to 60 000 lb (50 lb)	29 lb	
Force <sup>1</sup>	2 to 200 lbf	0.04 lbf	Dead Weights Load Cells
	(200 to 10 000) lbf	0.64 lbf	
	(10 000 to 100 000) lbf	0.24 lbf	
Pressure Gauges <sup>1</sup>	Up to 3 000 psi	0.93 psi	Pressure Calibrator Fluke 754 with Pressure Module
	Up to 10 000 psi	0.91 psi	
Vacuum <sup>1</sup>	(-15 to 100) psi	0.074 psi	Pressure Calibrator Fluke 754 with pressure Module
Torque Tools <sup>1</sup>	(Up to 50) lbf·in	0.07 lbf·in	Torque Transducers
	(50 to 250) lbf·in	0.44 lbf·in	
	(250 to 400) lbf·in	1.2 lbf·in	
	(400 to 1 000) lbf·in	2.9 lbf·in	
	(1 000 to 2 500) lbf·in	7.2 lbf·in	
	(Up to 100) lbf·ft	0.22 lbf·ft	
	(100 to 250) lbf·ft	1.7 lbf·ft	
	(250 to 600) lbf·ft	4.1 lbf·ft	

**Thermodynamic**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Relative Humidity Sensors <sup>1</sup>	(5 to 95) %RH	1.9 %RH	Humidity Chamber w/ Reference Probe Thermohygrometer OEM, GIDEP Sourced Procedures
Temperature - Measure <sup>1</sup>	(-200 to 660) °C (660 to 1 450) °C	0.044 °C 0.051 °C	Hart 1529 Indicator w/ 5628 PRT Hart 1529 Indicator w/ 5650 Type S Thermocouple Thermohygrometer OEM, GIDEP, Met/Cal, Sourced Procedures
Temperature - Source <sup>1</sup>	(-40 to 660) °C (660 to 1 200) °C	0.028 °C 4.8 °C	Dry Well and Hart 1529 Indicator w/ 5628 PRT Dry Well and Hart 1529 Indicator w/ 5650 Type S Thermocouple OEM, GIDEP, Met/Cal, Sourced Procedures

**Time and Frequency**

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Source <sup>1</sup>	(0.01 to 120) Hz (120 to 1 200) Hz (1.2 to 12) kHz (12 to 120) kHz (120 to 1 200) kHz (1.2 to 2) MHz	0.18 mHz 0.2 mHz 0.059 Hz 0.12 Hz 0.66 Hz 0.058 kHz	Fluke 5520A Multiproduct Calibrator OEM, GIDEP, Met/Cal Sourced Procedures
Frequency – Measure <sup>1</sup>	(3 to 5) Hz (5 to 10) Hz (10 to 40) Hz (40 to 1 000) Hz (1 to 300) kHz 300 kHz to 1 MHz	3.6 mHz 6.9 mHz 16 mHz 19 mHz 0.16 kHz 0.16 kHz	Fluke 8846A Multimeter OEM, GIDEP, Met/Cal Sourced Procedures

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 ( $k=2$ ), corresponding to a confidence level of approximately 95%.

Notes:

1. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
2.  $L$  = length in inches.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-1222.



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Vice President

