CERTIFICATE OF ACCREDITATION

ANSI National Accreditation Board

11617 Coldwater Road, Fort Wayne, IN 46845 USA

This is to certify that

Transcat – New England
230 Ballardvale Street
Wilmington, MA 01887

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

ISO/IEC 17025:2017

and national standards

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-2489.04
Certificate Number

ANAB Approval

Certificate Valid Through: 09/07/2021
Version No. 002 Issued: 03/22/2019

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).

ANSI National Accreditation Board

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017 AND ANSI/NCSL Z540-1-1994 (R2002)

Transcat – New England
230 Ballardvale Street
Wilmington, MA 01887
Jeremy Kraft
978-988-3910

CALIBRATION

Valid to: **September 7, 2021** Certificate Number: **AC-2489.04**

Chemical Quantities

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
pH – Measuring Equipment [1]	4 pH	0.011 pH	Standard Buffer Solutions
	7 pH	0.01 pH	
	10 pH	0.012 pH	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
AC Current Measuring Equipment [1]	0 µA to 220 µA		Fluke 5720A
	10 Hz to 20 Hz	0.031 % + 16 nA	
	20 Hz to 40 Hz	0.019 % + 10 nA	
	40 Hz to 1 kHz	0.015 % + 8 nA	
	1 kHz to 5 kHz	0.03 % + 12 nA	
	5 kHz to 10 kHz	0.11 % + 65 nA	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
AC Current Measuring Equipment [1]	220 µA to 2.2 mA		Fluke 5720A
	10 Hz to 20 Hz	0.03 % + 40 nA	
	20 Hz to 40 Hz	0.018 % + 35 nA	
	40 Hz to 1 kHz	0.014 % + 35 nA	
	1 kHz to 5 kHz	0.021 % + 110 nA	
	5 kHz to 10 kHz	0.11 % + 650 nA	
	2.2 mA to 22 mA		
	10 Hz to 20 Hz	0.039 % + 0.4 µA	
	20 Hz to 40 Hz	0.019 % + 0.35 µA	
	40 Hz to 1 kHz	0.014 % + 0.35 µA	
	1 kHz to 5 kHz	0.021 % + 0.55 µA	
	5 kHz to 10 kHz	0.11 % + 5 µA	
	22 mA to 220 mA		
	10 Hz to 20 Hz	0.033 % + 4 µA	
	20 Hz to 40 Hz	0.018 % + 3.5 µA	
	40 Hz to 1 kHz	0.014 % + 2.5 µA	
	1 kHz to 5 kHz	0.021 % + 3.5 µA	
	5 kHz to 10 kHz	0.11 % + 10 µA	
	220 mA to 2.2 A		
	20 Hz to 1 kHz	0.027 % + 35 µA	
	1 kHz to 5 kHz	0.046 % + 80 µA	
	5 kHz to 10 kHz	0.7 % + 0.16 mA	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
AC Current Measuring Equipment [1]	2.2 A to 11 A		Fluke 5720A w/5725A
	40 Hz to 1 kHz	0.048 % + 0.17 mA	
	1 kHz to 5 kHz	0.096 % + 0.38 mA	
	5 kHz to 10 kHz	0.36 % + 0.75 mA	
	11 A to 20.5 A		
	45 Hz to 100 Hz	0.11 % + 3.9 mA	
	100 Hz to 1 kHz	0.14 % + 3.9 mA	
	1 kHz to 5 kHz	2.7 % + 3.9 mA	
	20.5 A to 40 A		Dual 5520A's in Parallel
	45 Hz to 100 Hz	0.14 % + 11 mA	
	100 Hz to 1 kHz	0.17 % + 11 mA	
	1 kHz to 5 kHz	3.3 % + 11 mA	
	40 A to 100 A		Valhalla 2555A w/Fluke 5520A
	50 Hz to 100 Hz	0.12 % + 0.35 A	
	100 Hz to 400 Hz	0.24 % + 0.47 A	
	400 Hz to 1 kHz	0.35 % + 0.70 A	
Extended Frequency Ranges [1]	29 µA to 330 µA		Fluke 5520A
	10 kHz to 30 kHz	1.5 % + 0.31 µA	
	0.33 mA to 3.3 mA		
	10 kHz to 30 kHz	0.92 % + 0.47 µA	
	3.3 mA to 33 mA		
	10 kHz to 30 kHz	0.37 % + 3.1 µA	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Extended Frequency Ranges [1]	33 mA to 330 mA 10 kHz to 30 kHz	0.37 % + 0.16 mA	Fluke 5520A
Clamp-on Ammeter Toroidal Type [1] Transformer Type	20 A to 150 A 45 Hz to 65 Hz	0.35 % + 0.25 A	Fluke 5520A w/5500A/Coil
	20 A to 150 A 65 Hz to 440 Hz	0.94 % + 0.050 mA	
	150 A to 1 000 A 45 Hz to 65 Hz	0.34 % + 0.13 A	
	150 A to 1 000 A 65 Hz to 440 Hz	1.2 % + 0.23 A	
Clamp-on Ammeter Non- Toroidal Type Hall Effect Sensor	20 A to 150 A 45 Hz to 65 Hz	0.60 % + 0.29 A	Fluke 5520A w/5500A/Coil
	20 A to 150 A 65 Hz to 440 Hz	1.0 % + 0.29 A	
	150 A to 1 000 A 45 Hz to 65 Hz	0.57 % + 1.0 A	
	150 A to 1 000 A 65 Hz to 440 Hz	1.3 % + 1.1 A	
AC Current – Measure [1]	0 µA to 100 µA 10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 100 Hz 100 Hz to 5 kHz	0.46 % + 35 nA 0.18 % + 35 nA 0.072 % + 35 nA 0.072 % + 35 nA	Agilent 3458A opt 002

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
AC Current – Measure [1]	100 µA to 1 mA		Agilent 3458A
	10 Hz to 20 Hz	0.46 % + 0.23 µA	
	20 Hz to 45 Hz	0.17 % + 0.23 µA	
	45 Hz to 100 Hz	0.07 % + 0.23 µA	
	0.1 kHz to 5 kHz	0.038 % +0.23 µA	
	1 mA to 10 mA		
	10 Hz to 20 Hz	0.46 % + 2.3 µA	
	20 Hz to 45 Hz	0.17 % + 2.3 µA	
	45 Hz to 100 Hz	0.07 % + 2.3 µA	
	0.1 kHz to 5 kHz	0.038 % + 2.3 µA	
	10 mA to 100 mA		
	10 Hz to 20 Hz	0.46 % + 23 µA	
	20 Hz to 45 Hz	0.17 % + 23 µA	
	45 Hz to 100 Hz	0.07 % + 23 µA	
	0.1 kHz to 5 kHz	0.037 % + 23 µA	
	0.1 A to 1 A		
	10 Hz to 20 Hz	0.46 % + 0.23 mA	
	20 Hz to 45 Hz	0.19 % + 0.23 mA	
	45 Hz to 100 Hz	0.096 % + 0.23 mA	
	0.1 kHz to 5 kHz	0.12 % + 0.23 mA	
	1 to 3 A		Agilent 3458A opt 002
	40 Hz to 1 kHz	0.18 % + 2.1 mA	
	1 kHz to 5 kHz	0.20 % + 2.1 mA	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
AC Current – Measure [1]	3 to 30 A 40 Hz to 1 kHz 1 kHz to 5 kHz	0.35 % + 2.3 mA 5.8 % + 2.3 mA	Agilent 34330A w/3458A
AC Resistance– Measure [1] 1 kHz	0 Ω to 6.25 Ω	0.70 % + 0.010 Ω	Gen Rad 1689-9700
	6.25 Ω to 100 kΩ	0.024 % + 0.010 Ω	
	100 kΩ to 410 kΩ	0.30 % + 0.010 Ω	
Measuring Equipment and Measure [1]	0 Ω to 1 Ω	42 µΩ/Ω + 30 nΩ	Fluke 1595A
	1 Ω to 10 Ω	16 µΩ/Ω	
	10 Ω to 10 kΩ	13 µΩ/Ω	
	10 kΩ to 40 kΩ	16 µΩ/Ω	
	40 kΩ to 100 kΩ	23 µΩ/Ω	
	100 kΩ to 500 kΩ	81 µΩ/Ω	
	0 Ω to 10 Ω	19 µΩ/Ω + 58 µΩ	HP3458A w/Decade Resistor
	10 Ω to 100 Ω	15 µΩ/Ω + 0.58 mΩ	
	100 Ω to 1 kΩ	12 µΩ/Ω + 0.58 mΩ	
	1 kΩ to 10 kΩ	12 µΩ/Ω + 5.8 mΩ	
	10 kΩ to 100 kΩ	13 µΩ/Ω + 58 mΩ	
	100 kΩ to 1 MΩ	19 µΩ/Ω + 2.3 Ω	
	1 MΩ to 10 MΩ	62 µΩ/Ω + 0.12 kΩ	
	10 MΩ to 100 MΩ	0.059 % + 1.2 kΩ	
	100 MΩ to 1 GΩ	0.58 % + 12 kΩ	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Measuring Equipment [1]	333 µΩ	0.12 %	Guildline 9711A
	1 mΩ	590 µΩ/Ω	
	10 mΩ	140 µΩ/Ω	
	100 mΩ	120 µΩ/Ω	
	1 Ω	120 µΩ/Ω	
Measuring Equipment [1]	10 Ω	120 µΩ/Ω	Guildline 9711A
	100 Ω	120 µΩ/Ω	
	1 kΩ	120 µΩ/Ω	
	10 kΩ	130 µΩ/Ω	
	25 Ω	9.4 µΩ/Ω	IET SRL-25
230 V/100 kΩ maximum 1 kV/1 MΩ maximum 5 kV maximum (up to 1TΩ)	100 kΩ to 1 MΩ	0.18 % + 2.3 Ω	IET HRRS-B-7-100k-5kV
	1 MΩ to 10 MΩ	0.21 % + 120 Ω + 1.2 Ω/V	
	10 MΩ to 100 MΩ	0.22 % + 1.2 kΩ + 12 Ω/V	
	100 MΩ to 1 GΩ	0.30 % + 32 kΩ + 120 Ω/V	
	1 GΩ to 10 GΩ	0.58 % + 480 kΩ + 1.2 kΩ/V	
	10 GΩ to 100 GΩ	1.2 % + 62 MΩ + 23 kΩ/V	
	100 GΩ to 1 TΩ	2.6 % + 15 GΩ + 580 kΩ/V	
DC Current – Measuring Equipment [1]	0 mA to 0.22 mA	41 µA/A + 6 nA	Fluke 5700A w/5725A
	0.22 mA to 2.2 mA	36 µA/A + 7 nA	
	2.2 mA to 22 mA	35 µA/A + 40 nA	
	22 mA to 220 mA	48 µA/A + 0.7 µA	
	220 mA to 2.2 A	197 µA/A + 12 µA	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
DC Current – Measuring Equipment [1]	2.2 A to 11A	400 µA/A + 12 µA	Fluke 5700A w/5725A
	11 A to 20.5 A	840 µA/A + 0.58 mA	Fluke 5520A/SC1100
	20.5 A to 40 A	0.12 % + 0.82 mA	Dual 5520A's in parallel
	40 A to 100 A	0.037 % + 35 mA	Valhalla 2555A w/5520A
DC Current – Measure & Measuring Equipment [1]	0 to 100 µA	26 µA/A + 0.9 nA	HP 3458A with current source
	100 µA to 1 mA	26 µA/A + 5.8 nA	
DC Current – Measure & Measuring Equipment [1]	1 mA to 10 mA	26 µA/A + 58 nA	HP 3458A with current source
	10 mA to 100 mA	43 µA/A + 0.58 µA	
	100 mA to 1 A	0.013 % + 12 µA	
DC Current – Measure [1]	0 to 10 µA	130 µA/A + 58 pA	Guildline 9711A w/ 3458A
	10 µA to 100 µA	120 µA/A + 580 pA	
	100 µA to 1 mA	120 µA/A + 5.8 nA	
	1 mA to 10 mA	120 µA/A + 58 nA	
	10 mA to 100 mA	120 µA/A + 580 nA	
	100 mA to 1 A	120 µA/A + 5.8 µA	
	1 A to 10 A	140 µA/A + 58 µA	
	10 A to 100 A	590 µA/A + 580 µA	
	100 A to 300 A	0.12 % + 0.0017 A	
	300 A to 1000 A	0.12 % + 0.0058 A	Meterman 1000-100 w/3458A
Clamp-on Ammeter Non-Toroidal Type [1] Hall Effect Sensor	20 A to 150 A	0.51 % + 0.14 A	Fluke 5520A w/ 5500A/Coil
	150 A to 1000 A	0.51 % + 0.50 A	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
DC Voltage – Measure [1]	0 mV to 100 mV	7.1 µV/V + 0.58 µV	3458A Opt 002 w/5700A
	0.1 V to 1 V	5.0 µV/V + 0.58 µV	
	1 V to 10 V	5.1 µV/V + 0.58 µV	
	10 V to 100 V	7.6 µV/V + 35 µV	
	100 V to 500 V	11 µV/V + 0.12 mV	
	500 V to 800 V	16 µV/V + 0.12 mV	
	800 V to 1 kV	21 µV/V + 0.12 mV	
DC Voltage – Measure [1]	1 kV to 10 kV	0.054 %	Vitrek 4700
	10 kV to 35 kV	0.093 %	Vitrek 4700 w/HVL-35
	35 kV to 70 kV	0.11 % + 8.1 V	Vitrek 4700 w/HVL-70
	70 kV to 100 kV	0.17 % + 1.3 V	Vitrek 4700 w/HVL-100
DC Voltage - Measuring Equipment [1]	0 V to 0.22 V	8.5 µV/V + 0.40 µV	Fluke 5720A w/5725A
	0.22 V to 2.2 V	5.1 µV/V + 0.70 µV	
	2.2 V to 11 V	4.0 µV/V + 2.5 µV	
	11 V to 22 V	3.9 µV/V + 4.0 µV	
	22 V to 220 V	6.2 µV/V + 40 µV	
	220 V to 1 100 V	7.6 µV/V + 0.40 mV	
AC Voltage – Measure [1]	0 mV to 10 mV 1 Hz to 40 Hz 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz	 0.039 % + 3.5 µV 0.028 % + 1.2 µV 0.038 % + 1.2 µV 0.15 % + 1.2 µV 0.59 % + 1.2 µV 4.6 % + 2.3 µV	Agilent 3458A opt 002

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
AC Voltage – Measure [1]	10 mV to 100 mV		Agilent 3458A opt 002
	1 Hz to 40 Hz	0.013 % + 4.6 µV	
	40 Hz to 1 kHz	0.009 5 % + 2.3 µV	
	1 kHz to 20 kHz	0.017 % + 2.3 µV	
	20 kHz to 50 kHz	0.037 % + 2.3 µV	
	50 kHz to 100 kHz	0.093 % + 2.3 µV	
	100 kHz to 300 kHz	0.36 % + 12 µV	
	300 kHz to 1 MHz	1.2 % + 12 µV	
	100 mV to 1 V		
	1 Hz to 40 Hz	0.009 8 % + 46 µV	
	40 Hz to 1 kHz	0.009 5 % + 23 µV	
	1 kHz to 20 kHz	0.017 % + 23 µV	
	20 kHz to 50 kHz	0.036 % + 23 µV	
	50 kHz to 100 kHz	0.093 % + 23 µV	
	100 kHz to 300 kHz	0.35 % + 0.12 mV	
	300 kHz to 1 MHz	1.2 % + 0.12 mV	
	1 V to 10 V		
	1 Hz to 40 Hz	0.009 5 % + 0.46 mV	
	40 Hz to 1 kHz	0.009 5 % + 0.23 mV	
	1 kHz to 20 kHz	0.017 % + 0.23 mV	
	20 kHz to 50 kHz	0.036 % + 0.23 mV	
	50 kHz to 100 kHz	0.093 % + 0.23 mV	
	100 kHz to 300 kHz	0.35 % + 1.2 mV	
	300 kHz to 1 MHz	1.2 % + 1.2 mV	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
AC Voltage – Measure [1]	10 V to 100 V		Agilent 3458A opt 002
	1 Hz to 40 Hz	0.024 % + 4.6 mV	
	40 Hz to 1 kHz	0.024 % + 2.3 mV	
	1 kHz to 20 kHz	0.024 % + 2.3 mV	
	20 kHz to 50 kHz	0.041 % + 2.3 mV	
	50 kHz to 100 kHz	0.14 % + 2.3 mV	
	100 kHz to 300 kHz	0.46 % + 12 mV	
	300 kHz to 1 MHz	1.7 % + 12 mV	
	100 V to 700 V		
	1 Hz to 40 Hz	0.047 % + 46 mV	
	40 Hz to 1 kHz	0.047 % + 23 mV	
	1 kHz to 20 kHz	0.071 % + 23 mV	
	20 kHz to 50 kHz	0.14 % + 23 mV	
	50 kHz to 100 kHz	0.35 % + 23 mV	
	0.7 kV to 10 kV		Vitrek 4700
	60 Hz	0.14 %	
	10 kV to 30 kV		Vitrek 4700 w/HVL-35
	60 Hz	0.095 % + 17 V	
	30 kV to 50 kV		Vitrek 4700 w/HVL-70
	60 Hz	0.16 % + 4.0 V	
	50 kV to 70 kV		Vitrek 4700 w/HVL-100
	60 Hz	0.23 % + 1.4 V	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
AC Voltage – Measure [1]	0 mV to 1 mV		R&S URE3
	100 kHz to 1 MHz	2.0 % + 2.4 µV	
	1 MHz to 3 MHz	3.8 % + 2.4 µV	
	3 MHz to 10 MHz	10 % + 2.4 µV	
	10 MHz to 20 MHz	25 % + 2.4 µV	
	1 mV to 3 mV		
	100 kHz to 1 MHz	1.0 % + 2 µV	
	1 MHz to 3 MHz	3.8 % +2 µV	
	3 MHz to 10 MHz	11 % + 2 µV	
	10 MHz to 20 MHz	25 % + 2 µV	
	3 mV to 100 mV		
	100 kHz to 1 MHz	0.98 % + 3 µV	
	1 MHz to 3 MHz	1.9 % + 3 µV	
	3 MHz to 10 MHz	3.2 % + 3 µV	
	10 MHz to 20 MHz	7.6 % + 3 µV	
	20 MHz to 30 MHz	16 % + 3 µV	
AC Voltage – Measuring Equipment [1]	0 mV to 2.2 mV		Fluke 5720A
	10 Hz to 20 Hz	0.16 % + 4 µV	
	20 Hz to 40 Hz	0.10 % + 4 µV	
	40 Hz to 20 kHz	0.078 % + 4 µV	
	20 kHz to 50 kHz	0.13 % + 4 µV	
	50 kHz to 100 kHz	0.17 % + 5 µV	
	100 kHz to 300 kHz	0.33 % + 10 µV	
	300 kHz to 500 kHz	0.47 % + 20 µV	
	500 kHz to 1 MHz	0.58 % + 20 µV	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
AC Voltage – Measuring Equipment [1]	2.2 mV to 22 mV		Fluke 5720A
	10 Hz to 20 Hz	0.042 % + 4 µV	
	20 Hz to 40 Hz	0.03 % + 4 µV	
	40 Hz to 20 kHz	0.014 % + 4 µV	
	20 kHz to 50 kHz	0.030 % + 4 µV	
	50 kHz to 100 kHz	0.058 % + 5 µV	
	100 kHz to 300 kHz	0.12 % + 10 µV	
	300 kHz to 500 kHz	0.16 % + 20 µV	
	500 kHz to 1 MHz	0.27 % + 20 µV	
	22 mV to 220 mV		
	10 Hz to 20 Hz	0.028 % + 12 µV	
	20 Hz to 40 Hz	0.011 % + 7 µV	
	40 Hz to 20 kHz	0.008 5 % + 7 µV	
	20 kHz to 50 kHz	0.021 % + 7 µV	
	50 kHz to 100 kHz	0.047 % + 17 µV	
	100 kHz to 300 kHz	0.091 % + 20 µV	
	300 kHz to 500 kHz	0.14 % + 25 µV	
	500 kHz to 1 MHz	0.28 % + 45 µV	
	220 mV to 2.2 V		
	10 Hz to 20 Hz	0.027 % + 40 µV	
	20 Hz to 40 Hz	0.01 % + 15 µV	
	40 Hz to 20 kHz	0.004 8 % + 8 µV	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
AC Voltage – Measuring Equipment [1]	220 mV to 2.2 V		Fluke 5720A
	20 kHz to 50 kHz	0.008 % + 10 µV	
	50 kHz to 100 kHz	0.012 % + 30 µV	
	100 kHz to 300 kHz	0.043 % + 0.08 mV	
	300 kHz to 500 kHz	0.1 % + 0.2 mV	
	500 kHz to 1 MHz	0.18 % + 0.3 mV	
	2.2 V to 22 V		
	10 Hz to 20 Hz	0.028 % + 0.4 mV	
	20 Hz to 40 Hz	0.01 % + 0.15 mV	
	40 Hz to 20 kHz	0.004 9 % + 50 µV	
	20 kHz to 50 kHz	0.008 3 % + 0.1 mV	
	50 kHz to 100 kHz	0.012 % + 0.2 mV	
	100 kHz to 300 kHz	0.03 % + 0.6 mV	
	300 kHz to 500 kHz	0.1 % + 2 mV	
	500 kHz to 1 MHz	0.17 % + 3.2 mV	
	22 V to 220 V		
	10 Hz to 20 Hz	0.028 % + 4 mV	
	20 Hz to 40 Hz	0.01 % + 1.5 mV	
	40 Hz to 20 kHz	0.005 6 % + 0.6 mV	
	20 kHz to 50 kHz	0.009 3 % + 1 mV	
	50 kHz to 100 kHz	0.016 % + 2.5 mV	
	100 kHz to 300 kHz	0.09 % + 16 mV	
	300 kHz to 500 kHz	0.44 % + 40 mV	
	500 kHz to 1 MHz	0.8 % + 80 mV	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
AC Voltage – Measuring Equipment [1]	220 V to 750 V 30 kHz to 50 kHz 50 kHz to 100 kHz	 0.061 % + 11 mV 0.23 % + 45 mV	Fluke 5720A
	220 V to 1100 V 40 Hz to 1 kHz 1 kHz to 20 kHz 20 kHz to 30 kHz	 0.011 % + 4.0 mV 0.017 % + 6.0 mV 0.061 % + 11 mV	Fluke 5720A w/ 5725A
Capacitance Measure [1]	1 pF to 10 pF 1 kHz	 0.47 % + 0.05 pF	GenRad 1689-9700
	10 pF to 100 pF 1 kHz	 0.058 % + 0.05 pF	
	100 pF to 1 µF 1 kHz	 0.024 % + 0.05 pF	
	1 µF to 100 µF 1 kHz	 0.035 %	
	100 µF to 1 mF 1 kHz	 0.24 %	
Capacitance Measure Equipment [1]	0.1 nF to 0.5 nF 0.1 kHz to 1 kHz	 0.58 pF	Arco SS32
	0.5 nF to 1400 nF 0.1 kHz to 1 kHz	 0.12 % + 0.018 pF	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Capacitance Measure Equipment [1]	0.19 nF to 1.1 nF 10 Hz to 10 kHz	0.39 % + 6.1 pF	5520A
	1.1 nF to 3.3 nF 10 Hz to 3 kHz	0.39 % + 6.1 pF	
	3.3 nF to 11 nF 10 Hz to 1 kHz	0.21 % + 6.1 pF	
	11 nF to 110 nF 10 Hz to 1 kHz	0.21 % + 61 pF	
	110 nF to 330 nF 10 Hz to 1 kHz	0.21 % + 0.18 nF	
	0.33 µF to 1.1 µF 10 Hz to 600 Hz	0.2 % + 0.61 nF	
	1.1 µF to 3.3 µF 10 Hz to 300 Hz	0.2 % + 1.9 nF	
	3.3 µF to 11 µF 10 Hz to 150 Hz	0.2 % + 6.1 nF	
	11 µF to 33 µF 10 Hz to 120 Hz	0.32 % + 18 nF	
	33 µF to 110 µF 10 Hz to 80 Hz	0.35 % + 61 nF	
	110 µF to 330 µF DC to 50 Hz	0.35 % + 0.18 µF	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Capacitance Measure Equipment [1]	0.33 mF to 1.1 mF DC to 20 Hz	0.35 % + 0.61 µF	5520A
	1.1 mF to 3.3 mF DC to 6 Hz	0.35 % + 1.8 µF	
	3.3 mF to 11 mF DC to 2 Hz	0.35 % + 6.1 µF	
	11 mF to 33 mF DC to 0.6 Hz	0.58 % + 18 µF	
	33 mF to 110 mF DC to 0.2 Hz	0.85 % + 61 µF	
Inductance Measure [1]	1 mH to 10 mH 1 kHz	0.024 % + 0.10 µH	GenRad 1689-9700
	10 mH to 10 H 1 kHz	0.024 % + 1.4 µH	
Inductance Measuring Equipment [1]	50 mH 1 kHz	0.12 % + 1.4 µH	Standard Inductor
	100 mH 1 kHz	0.12 % + 1.4 µH	Standard Inductor
Electrical Simulation of Thermocouples [1] Type E	-270 °C to -245 °C	2.1 °C	Ectron 1140A
	-245 °C to -195 °C	0.2 °C	
	-195 °C to -155 °C	0.11 °C	
	-155 °C to -90 °C	0.09 °C	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Electrical Simulation of Thermocouples [1] Type E	-90 °C to 0 °C	0.08 °C	Ectron 1140A
	0 °C to 15 °C	0.08 °C	
	15 °C to 890 °C	0.07 °C	
	890 °C to 1000 °C	0.08 °C	
Type J	-210 °C to -180 °C	0.13 °C	
	-180 °C to -120 °C	0.11 °C	
	-120 °C to -50 °C	0.09 °C	
	-50 °C to 990 °C	0.08 °C	
	990 °C to 1200 °C	0.08 °C	
Type K	-270 °C to -255 °C	2.3 °C	
	-255 °C to -195 °C	0.73 °C	
	-195 °C to -115 °C	0.14 °C	
	-115 °C to -55 °C	0.10 °C	
	-55 °C to 1000 °C	0.08 °C	
	1000 °C to 1372 °C	0.09 °C	
Type N	-270 °C to -260 °C	5.1 °C	
	-260 °C to -200 °C	1.1 °C	
	-200 °C to -140 °C	0.25 °C	
	-140 °C to -70 °C	0.16 °C	
	-70 °C to 25 °C	0.13 °C	
	25 °C to 160 °C	0.11 °C	
	160 °C to 1300 °C	0.10 °C	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Electrical Simulation of Thermocouples [1]	-50 °C to -30 °C	0.68 °C	Ectron 1140A
	-30 °C to -45 °C	0.58 °C	
	-45 °C to 160 °C	0.42 °C	
Type R	160 °C to 380 °C	0.31 °C	
	380 °C to 775 °C	0.28 °C	
	775 °C to 1768 °C	0.23 °C	
	-50 °C to -30 °C	0.65 °C	
	-30 °C to 45 °C	0.59 °C	
Type S	45 °C to 105 °C	0.42 °C	
	105 °C to 310 °C	0.35 °C	
	310 °C to 615 °C	0.31 °C	
	615 °C to 1768 °C	0.27 °C	
	-270 °C to -255 °C	1.8 °C	
	-255 °C to -240 °C	0.52 °C	
	-240 °C to -210 °C	0.32 °C	
Type T	-210 °C to -150 °C	0.19 °C	
	-150 °C to -40 °C	0.13 °C	
	-40 °C to 100 °C	0.09 °C	
	100 °C to 400 °C	0.08 °C	
Power Measuring Equipment[1] DC Power 0.33 mA to 330 mA	11 µW to 1.1 mW 1.1 mW to 110 mW 0.11W to 110 W 110 W to 330 W	0.024 % 0.027 % 0.024 % 0.018 %	Fluke 5520A

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Power Measuring Equipment[1]			
DC Power	11 W to 110 mW	0.044 %	
0.33 A to 3 A	0.11 W to 990 W	0.053 %	
	1 W to 3 kW	0.009 6 %	Fluke 5520A
3 A to 20.5 A	0.099 W to 0.99 W	0.088 %	
	0.99 W to 6.8 kW	0.07 %	
	6.8 W to 20.5 kW	0.04 %	
AC Power [4] (PF=1)			
10 Hz to 65 Hz			
3.3 mA to 9 mA	0.11 mW to 3.0 mW	0.13%	
	3.0 mW to 9.0 W	0.077%	
9 mA to 33 mA	0.3 mW to 10 mW	0.089 %	
	10 mW to 33W	0.077%	
33 mA to 90 mA	1 mW to 30 mW	0.071 %	
	30 mW to 90 W	0.057 %	
90 mA to 330 mA	3 mW to 100 mW	0.089 %	Fluke 5520A
	100 mW to 300 W	0.078 %	
0.33 A to 0.9 A	11 mW to 300 mW	0.071 %	
	300 mW to 900 W	0.081 %	
0.9 A to 2.2 A	30 mW to 720 mW	0.089 %	
	720 mW to 2 kW	0.079 %	
2.2 A to 4.5 A	80 mW to 1.4 W	0.088 %	
	1.4 W to 4.5 kW	0.18 %	
4.5 A to 20.5 A	150 mW to 6.7 W	0.17 %	
	6.7 W to 20 kW	0.17 %	

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Phase Meters – Measure Equipment [1]	0° to 180° 10 Hz to 65 Hz 65 Hz to 500 Hz 500 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 kHz to 20 kHz	 0.11° 0.20° 0.40° 1.9° 3.9° 7.8°	Fluke 5520A
Oscilloscopes [1] Amplitude DC[1] into 50 Ω Load into 1 MΩ Load Amplitude Square Wave[1] into 50 Ω Load Rate: 10 Hz to 10 kHz into 1 MΩ Load Rate: 10 Hz to 1 kHz Rate: 1 kHz to 10 kHz	 (-6.6 to 6.6) V (-130 to 130) V 1 $mV_{(pk-pk)}$ to 6.6 $V_{(pk-pk)}$ 1 $mV_{(pk-pk)}$ to 6.6 $V_{(pk-pk)}$ 1 $mV_{(pk-pk)}$ to 6.6 $V_{(pk-pk)}$	 0.2% + 31 µV 0.039% + 31 µV 0.19% + 31 µV 0.078% + 31 µV 0.19% + 31 µV	Fluke 5520A/SC1100
Timing - Generate[1] 50 Ω Load	5 s 2 s 1 s 500 ms 200 ms 100 ms 50 ms 20 mS to 1 nS	0.30 % 0.12 % 0.062 % 0.032 % 0.014 % 0.0076 % 0.0046 % 0.00022 %	Fluke 5520A/SC1100
Rise Time – Generate[1,4] 50 Ω Load 5.0 $mV_{(pk-pk)}$ to 2.5 $V_{(pk-pk)}$ Rate: 1 kHz to 2 MHz Rate: 2 MHz to 10 MHz	 250 ps (nominal) 250 ps (nominal)	 50 ps 50 ps	Fluke 5520A/SC1100

Electrical – DC/Low Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Leveled Sine Wave Generate[1]			Fluke 5520A/SC1100
50 Ω Load			
5.0 $mV_{(pk-pk)}$ to 5.5 $V_{(pk-pk)}$	50 kHz	1.8 % + 230 µV	
	50 kHz to 100 MHz	2.8 % + 230 µV	
	100 MHz to 300 MHz	3.2 % + 230 µV	
	300 MHz to 600 MHz	4.0 % + 230 µV	
5.0 $mV_{(pk-pk)}$ to 3.5 $V_{(pk-pk)}$	600 MHz to1 GHz	5.5 % + 230 µV	
Bandwidth/Flatness Measure[1]			Fluke 5520A/SC1100
50 Ω			
(50 kHz Reference)			
5.0 $mV_{(pk-pk)}$ to 5.5 $V_{(pk-pk)}$	50 kHz to 100 MHz	1.4 % + 78 µV	
	100 MHz to 300 MHz	1.8 % + 78 µV	
	300 MHz to 600 MHz	3.2 % + 78 µV	
5.0 $mV_{(pk-pk)}$ to 3.5 $V_{(pk-pk)}$	600 MHz to 1.1 GHz	4.0 % + 78 µV	
Input Impedance Measure[1]			Fluke 5520A/SC1100
50 Ω	40 Ω to 60 Ω	0.082 %	
1 MΩ	500 kΩ to 1.5 MΩ	0.081 %	
Input Capacitance Measure[1]	5 pF to 50 pF	3.9 % + 0.39 pF	Fluke 5520A/SC1100
Wave Generator – Source[1]			Fluke 5520A/SC1100
Amplitude (10 Hz to 10 kHz)			
Sine, Square, Triangle			
50 Ω Load	1.8 $mV_{(pk-pk)}$ to 2.5 $V_{(pk-pk)}$	2.3 % + 78 $µV_{(pk-pk)}$	
1 MΩ Load	1.8 $mV_{(pk-pk)}$ to 55 $V_{(pk-pk)}$	2.3 % + 78 $µV_{(pk-pk)}$	
Wave Generator – Source[1]			Fluke 5520A/SC1100
Frequency			
Sine, Square, Triangle	10 Hz to 10 kHz	0.001 9% + 0.012 Hz	

Length – Dimensional Metrology

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [5]	Reference Standard, Method and/or Equipment
Angle	< 90 °	12 arc seconds	Sine Bar, surface plate
	90°	3.7 arc seconds	Granite Square, surface plate
Micrometers & Calipers – Outside, Inside, Depth [1]	0.01 in to 0.4 in	(9.5 + 0.6*L*) µin	Comparison to Gage Blocks
	0.4 in to 1.0 in	(9.2 + 1.4*L*) µin	
	1 in to 9 in	(5 + 4.1*L*) µin	
	9 in to 40 in	(7.9 + 4.3*L*) µin	
Anvil Flatness [1]	0 in to 4 in	5 µin	Optical Flats
Anvil Parallelism [1]	0 in to 1 in	16 µin	Optical Parallels
Bore Gages	0.04 in to 1 in	83 µin	Characterized Rings
	1 in to 5 in	(82 + 1.9*L*) µin	
Digital/Dial Indicators, LVDT's, Gage amplifiers	0 in to 1 in	(6.1 + 1.1*L*) µin	Pratt & Whitney Labmaster
	1 in to 2 in	(4.2 + 3*L*) µin	
	2 in to 6 in	(0.9 + 4.8*L*) µin	
Single Axis - Outside	0 in to 1 in	(3.7 + 2*L*) µin	Pratt & Whitney Labmaster
	1 in to 2 in	(2.1 + 3.6*L*) µin	
	2 in to 4 in	(1.6 + 4.3*L*) µin	
	4 in to 12 in	(0.7 + 5*L*) µin	
	12 in to 24 in	(1+ 5.8*L*) µin	Pratt & Whitney Supermic
Micrometer Heads	0 in to 1 in	29 µin	Gaging amplifier/Blocks
	1 in to 2 in	31 µin	
Height Measuring Equipment	0 in to 12 in	(63 + 2*L*) µin	Gage Blocks/Surface Plate
	12 in to 24 in	(37 + 4.2*L*) µin	

Length – Dimensional Metrology

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [5]	Reference Standard, Method and/or Equipment
Parallelism & Straightness	0 in to 36 in	89 µin	Gage Amp/Surface Plate
Crimp Tools – Crimp Height	0 in to 1 in	0.001 in	Crimp Height Micrometer
Squareness	90 °	(160 + 4.8*L*) µin	Granite square, surface plate w/gage amplifier
Length Measuring Equipment – Linear Displacement	0 ft to 12 ft	(1 + 2.1*L*) µin	Laser Interferometer
Thread Wire Sets	2 TPI to 120 TPI	12 µin	ULM
Plug Gages – Outer Diameter	0 in to 5 in	(8.8 + 2.9*L*) µin	ULM
Ring Gage – Inner Diameter	0.04 in to 0.5 in	(8.1 + 1.5*L*) µin	ULM
	0.5 in to 1 in	(8.5 + 1*L*) µin	
	1 in to 3 in	(1.5 + 8.4*L*) µin	
	3 in to 11 in	(16.6 + 4.2*L*) µin	
Laser Micrometers	0.011 in to 1 in	(13 + 1.8*L*) µin	Master Pins
Rulers	0 in to 12 in	(200 + 50*L*) µin	OGP Smartscope Flash 302
	12 in to 18 in	(210 + 71*L*) µin	
Thread Plug Gages Pitch Diameter 60° Thread	0 in to 4 in	83 µin	ULM
Major Diameter	0 in to 4 in	(8.8 + 2.9*L*) µin	ULM
Thread Ring Gage Inner Pitch Diameter	0 in to 4 in	83 µin	Master Plug Uncertainty
Gauges/Fixtures Two Axis (X-Y)	0 in to 12 in	(85 + 50*L*) µin	OGP Smartscope Flash 302
	12 in to 18 in	(120 + 71*L*) µin	
Z Axis	0 in to 10 in	(140 + 75*L*) µin	
Angle	0 to 12 in	0.003 3 °	
	12 in to 18 in	0.004 5 °	

Length – Dimensional Metrology

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [5]	Reference Standard, Method and/or Equipment
Gauges/Fixtures Two Axis Perpendicularity	0 in to 12 in	(120 + 48*L*) µin	OGP Smartscope Flash 302
	12 in to 18 in	(123 + 71*L*) µin	
Radius	0 in to 5 in	(440 + 50*L*) µin	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method, and/or Equipment
Durometer (Spring Force)	Type A, B, E, O	0.57 duro	Durometer Calibrator
	Type D, C, DO	0.51 duro	
Durometer (Indenter length)	0 to 1 in	(85 + 50*L*) µin	OGP Flash 302
Force Measuring Equipment [1]	0.5 lb to 100 lb	0.025 %	NIST Class F
Torque Measure [1]	3.2 ozf·in to 80 ozf·in	1.2 % + 0.002 3 ozf·in	Torque Calibrator
	2 lbf·in to 10 lbf·in	1.4 %	
	10 lbf·in to 812 lbf·ft	1 %	
Torque – Measuring Equipment	2.5 ozf·in to 50 lbf·ft	0.12 %	Torque wheels & NIST Class F Weights
Balances & Scales [1]	25 kg	210 mg	ASTM Class 2
	10 kg	163 mg	
	5 kg	11 mg	
	2 kg	11 mg	
	1 kg	0.76 mg	
	500 g	0.78 mg	
	200 g	0.21 mg	ASTM Class 1
	100 g	0.29 mg	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method, and/or Equipment
Balances & Scales [1]	50 g	0.15 mg	ASTM Class 1
	20 g	50 µg	
	10 g	62 µg	
	5 g	23 µg	
	2 g	27 µg	
	1 g	23 µg	
	500 mg	20 µg	
	200 mg	20 µg	
	100 mg	20 µg	
	50 mg	20 µg	
	20 mg	20 µg	
	10 mg	20 µg	
	5 mg	20 µg	
	2 mg	20 µg	
	1 mg	20 µg	
Avoirdupois - Variable Points	1 lb to 100 lb	0.016 %	NIST Class F
	100 lb to 200 lb	0.027 %	
	200 lb to 300 lb	0.036 %	
Fixed Points	10 lb	0.000 97 lb	ASTM Class 5
	20 lb	0.002 4 lb	
Mass Standards - Metric	25 kg	0.32 g	Echelon III
	20 kg	0.29 g	

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method, and/or Equipment
Mass Standards - Metric	10 kg	0.29 g	
Mass Standards – Avoirdupois	50 lb	0.32 g	Echelon III
	25 lb	0.29 g	
	20 lb	0.29 g	
Absolute Pressure Source - Pneumatic	0 psia to 25 psia	0.0019 psia	Ruska 7250xi
	25 psia to 500 psia	0.006 6 % + 0.001 psia	
Absolute Pressure Source - Hydraulic	50 psia to 150 psia	0.012 % + 0.012 psi	Ametek T150 w/7250xi
	150 psia to 15 000 psia	0.012 % + 0.002 psi	
Gage Pressure - Pneumatic	-36 inH_2O to -22 inH_2O	0.009 % + 150 μinH_2O	DHI PPC4-ui
	-22 inH_2O to 22 inH_2O	0.002 inH_2O	
	22 inH_2O to 60 inH_2O	0.009 % + 150 μinH_2O	
	60 inH_2O to 72 inH_2O	0.006 5 inH_2O	
	72 inH_2O to 804 inH_2O	0.009 % + 150 μinH_2O	
	-15 psig to 25 psig	0.001 7 psi	Ruska 7250xi
	25 psig to 500 psig	0.006 5 %	
Pressure - Hydraulic	50 psig to 150 psig	0.012 % + 0.012 psi	Ametek T150
	150 psig to 15 000 psig	0.012 %	

Thermodynamic

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Relative Humidity Generate (-10°C to 15°C)	(10 to 75) %RH (75 to 95) %RH	0.50 % RH 0.65 % RH	Humidity Generator

Thermodynamic

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-) [2]	Reference Standard, Method and/or Equipment
Relative Humidity (15°C to 35°C) (35°C to 70°C)	(10 to 95) %RH (10 to 50) %RH (50 to 75) %RH (75 to 95) %RH	0.5 % RH 0.5 % RH 0.7 % RH 0.85 % RH	Humidity Generator
Measure[1] (10°C to 60°C)	(10 to 90) %RH	1.3 % RH	Vaisala HMI41
Temperature – Measure [1]	-195 °C to 0 °C	7.2 mK + 0.002 7 %	Hart 5628 w/Black Stack
	0 °C to 660 °C	10 mK + 0.002 7 %	
	660 °C to 1200 °C	2.9 °C + 0.46 %	DPI 620 w/GeoCorp 2-120N1U1
SPRT Calibration by Comparison	-195 °C	5.4 mK	1595A w/LN2 Comparator
	-78	4.4 mK	1595A w/Precision bath
	-38.8	4.0 mK	
	0.01	2.9 mK	TPW fixed point
	29.8	3.3 mK	1595A w/Precision bath
	100 °C	3.9 mK	
	156 °C	7.6 mK	
	232 °C	8.2 mK	
	300 °C	8.8 mK	1595A w/Precision bath
	420 °C	9.9 mK	
	500 °C	14 mK	
	-85°C to 500 °C	2.9 mK to 21 mK	

Time and Frequency

Parameter / Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method and/or Equipment
Frequency Dissemination Source and Measure	10 MHz	5.8×10^{-10}	Rubidium Standard
Rise Time (Measure)	≥ 700 ps	140 ps	TDS 3052C
Time – Measure	Up to 599 sec/month	0.058 sec/day	Timometer

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. Values listed with percent (%) are percent of reading or generated value unless otherwise noted.
3. The uncertainties shown are for the most favorable conditions. There is an increase in uncertainty that corresponds to the laboratory's AC voltage and current uncertainties at different frequencies other than the ones shown. Power factors (PF) other than the one shown contribute to the power uncertainty. PF is related to the cosine of phase. Therefore, uncertainties track the laboratory's phase uncertainty closely at PF near one, but are magnified heavily as PF approaches zero. The lab may also report reactive power, apparent power, and power factor under this accreditation. If needed, contact laboratory for more information regarding uncertainties at frequency and power factor combinations other than the ones shown.
4. The stated uncertainty is the laboratory's ability to source a fast rise pulse that is approximately 250 ps. In the typical application of measuring rise time of an oscilloscope, this value is one of the contributing factors, but other factors are derived from the DUT. The known source rise time is mathematically removed from the total measured rise time measured on the DUT.
5. L = length in inches.
6. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-2489.04.

Vice President