SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

SAFETECH CALIBRATION & INSPECTION OF PRECISION EQUIPMENT CO WLL.
#2,3,4-Ground Floor, Ahmadi Corner Mall (Bldg 77)
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CALIBRATION

Valid to: March 31, 2021 Certificate Number: 5265.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations[1, 6]:

I. Dimensional

Parameter/Equipment	Range	CMC[2] (±)	Comments
Calipers	Up to 150 mm 0.01 mm Resolution 0.02 mm Resolution	 5.8 µm 12 µm	Gage block set (Grade 0)
Micrometers	Up to 25 mm Up to 100 mm	0.61 µm 5.8 µm	Gage block set (Grade 0)

II. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
DC Voltage – Generate	(0 to 330) mV (0 to 3.3) V (0 to 33) V (3 to 330) V (100 to 1000) V	1.2 µV 4.8 µV 48 µV 0.59 mV 6.5 mV	Fluke-5522A

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Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
DC Voltage – Measure	(0 to 200) mV 200 mV to 2 V (2 to 20) V (20 to 200) V (200 to 1000) V	0.72 µV 4.4 µV 44 µV 580 µV 5.9 mV	8.5-digit multimeter (Fluke-8508A)
DC Current – Generate	(0 to 330) µA (0 to 3.3) mA (0 to 33) mA (0 to 330) mA (0 to 1.1) A (1.1 to 3) A (0 to 11) A	20 nA 150 nA 1.4 µA 13 µA 240 µA 260 µA 3.3 mA	Fluke-5522A
Clamp-On Meters	Up to 10 A Up to 500 A Up to 1000 A	91 mA 3 A 5.1 A	Fluke-5522 with 50 turn coil
DC Current – Measure	(0 to 200) µA 200 µA to 2 mA (2 to 20) mA (20 to 200) mA 200 mA to 2 A (2 to 20) A	2.7 nA 27 nA 0.27 µA 5.6 µA 150 µA 6 mA	8.5-digit multimeter
Capacitance – Generate	(0 to 11) nF 11 nF to 1.1 µF (1.1 to 110) µF	36 pF 3.6 nF 0.55 µF	Fluke-5522A
Resistance – Generate	(0 to 11) Ω (11 to 110) Ω 110 Ω to 1.1 kΩ (1.1 to 11) kΩ (11 to 110) kΩ 110 kΩ to 1.1 MΩ (1.1 to 11) MΩ (11 to 110) MΩ (110 to 1100) MΩ	1.4 mΩ 4.3 mΩ 30 mΩ 0.3 Ω 3 Ω 35 Ω 1.4 kΩ 55 kΩ 16 MΩ	Fluke-5522A

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Resistance – Measure	(0 to 2) Ω (2 to 20) Ω (20 to 200) Ω (200 to 2) kΩ (2 to 20) kΩ (20 to 200) kΩ 200 kΩ to 2 MΩ (2 to 20) MΩ (20 to 200) MΩ 200 MΩ to 2 GΩ	65 µΩ 0.2 mΩ 1.5 mΩ 15 mΩ 150 mΩ 1.6 Ω 19 Ω 680 Ω 210 kΩ 3.2 MΩ	8.5-digit multimeter (Fluke-8508A)
Electrical Simulation of Temperature Instruments – Generate			
Pt 100	(-200 to 0) °C (0°C to 800) °C	0.006 °C 0.01 °C	Fluke-5522A
J Type TC K Type TC T Type TC	(-200 to 1200) °C (-200 to 1350) °C (0 to 400) °C	0.27 °C 0.40 °C 0.17 °C	
Electrical Simulation of Temperature Instruments – Measure			
Pt 100	(-200 to 0) °C (0 to 800) °C	0.1 °C 0.24 °C	Fluke-5522A & 8.5-digital multimeter (Fluke-8508A)
J Type TC K Type TC T Type TC	(-200 to 1200) °C (-200 to 1350) °C (0 to 400) °C	0.27 °C 0.40 °C 0.17 °C	Fluke-5522A

Parameter/Range	Frequency	CMC[2, 4] (±)	Comments
AC Voltage – Generate			
(1 to 330) mV	10 Hz 20 kHz 50 kHz 100 kHz 300 kHz	20 µV 24 µV 43 µV 0.11 mV 0.27 mV	Fluke-5522A
(0.33 to 3.3) V	10 Hz 20 kHz 50 kHz 100 kHz 300 kHz	0.14 mV 0.25 mV 0.35 mV 0.83 mV 3 mV	
(3.3 to 33) V	10 Hz 20 kHz 50 kHz 100 kHz 300 kHz	1.5 mV 3.0 mV 4.1 mV 11 mV 7.8 mV	
(33 to 330) V	45 Hz 20 kHz 50 kHz 100 kHz	21 mV 31 mV 36 mV 86 mV	
1000 V	45 Hz 1 kHz 10 kHz 20 kHz 50 kHz	90 mV 310 mV 87 mV 87 mV 100 mV	
AC Voltage – Measure			
(100 to 200) mV	55 Hz 1 kHz 10 kHz 100 kHz	15 µV 13 µV 15 µV 91 µV	8.5-digit multimeter (Fluke-8508A)
200 mV to 2V	55 Hz 1 kHz 10 kHz 100 kHz	110 µV 86 µV 110 µV 710 µV	
(2 to 20) V	55 Hz 1 kHz 10 kHz 100 kHz	1 mV 0.85 mV 1 mV 7 mV	

Parameter/Range	Frequency	CMC[2, 4] (±)	Comments
AC Voltage – Measure (cont)			
(20 to 200) V	55 Hz 1 kHz 10 kHz 100 kHz	11 mV 8.5 mV 11 mV 71 mV	8.5-digit multimeter (Fluke-8508A)
(200 to 1000) V	55 Hz 1 kHz	0.13 V 0.13 V	
AC Current – Generate			
(33 to 330) µA	10 Hz 5 kHz 10 kHz	120 nA 160 nA 210 nA	Fluke-5522A
(0.3 to 3.3) mA	10 Hz 5 kHz 10 kHz	500 nA 520 nA 570 nA	
(3.3 to 33) mA	10 Hz 5 kHz 10 kHz	5.2 µA 5.2 µA 5.7 µA	
(33 to 330) mA	45 Hz 5 kHz 10 kHz	49 µA 67 µA 110 µA	
(0.33 to 1.1) A	45 Hz 5 kHz 10 kHz	0.81 mA 1.4 mA 5 mA	
(1.1 to 3.0) A	45 Hz 1 kHz 10 kHz	1.3 mA 1.2 mA 5.2 mA	
(3 to 11) A	(10 to 45) Hz 45 Hz to 1 kHz	10 mA 10 mA	
Clamp-On-Meters			
Up to 500 A Up to 1000 A	50 Hz 50 Hz	3.8 A 6 A	Fluke-5522 with 50 turn coil

Parameter/Range	Frequency	CMC[2, 4] (±)	Comments
AC Current – Measure			
(10 to 200) µA	55 Hz 1 kHz 10 kHz	69 nA 69 nA 69 nA	8.5-digit multimeter (Fluke-8508A)
200 µA to 2 mA	55 Hz 1 kHz 10 kHz	490 nA 490 nA 490 nA	
(2 to 20) mA	55 Hz 1 kHz 10 kHz	4.9 µA 4.9 µA 4.9 µA	
(20 to 200) mA	55 Hz 1 kHz 10 kHz	46 µA 46 µA 46 µA	
200 mA to 2 A	55 Hz 1 kHz 10 kHz	0.81 mA 0.81 mA 0.92 mA	
(2 to 20) A	55 Hz 1 kHz	17 mA 17 mA	

III. Mechanical

Parameter/Equipment	Range	CMC[2] (±)	Comments
Scales and Balances	1 mg to 220 g 220 g to 32 kg	0.37 mg 70 mg	OIML E2 class weight set
Torque Tools	Up to 25 Nm Up to 100 Nm Up to 500 Nm Up to 1000 Nm Up to 3000 Nm	0.28 Nm 0.38 Nm 0.81 Nm 9.2 Nm 11 Nm	Norbar torque tester with transducer

Parameter/Equipment	Range	CMC[2, 3, 5] (±)	Comments
Pressure – Measure and Measuring Equipment	(-1 to 0) Bar (0.03 to 2) Bar (1 to 70) Bar (20 to 1400) Bar	0.59 mBar 0.61 mBar 7 mBar 0.10 Bar	Fluke dead weight testers P3116 P3023 P3031
Gas Monitors and Detectors	NH_3 Ammonia CL_2 Chlorine H_2S Hydrogen Sulfate CO Carbon Monoxide LEL Methane O_2 Oxygen	5 % 5 % 5 % 5 % 5 % 5 %	Standard SRMs

IV. Thermodynamics

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Temperature – Measure	(-40 to 50) °C (50 to 150) °C (150 to 300) °C (150 to 660) °C	0.06 °C 0.06 °C 0.04 °C 0.07 °C	Temperature read out (Fluke-1529) & RTD probe (Fluke-5628)
Humidity – Measure	(7 to 80) % RH (80 to 95) % RH	0.57 % RH 0.65 % RH	Humidity generator (5128A)
Infrared Thermometers	(35 to 500) °C	2.4 °C	IR calibrator (Fluke-4818)

V. Time and Frequency

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Frequency – Measure	10 Hz to 350 MHz	1.2 parts in 10^7	Frequency counter (Keysight-53220A)

[1] This laboratory offers commercial calibration service.

[2] Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMCs represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

[3] In the statement of CMC, percentage refers to percent of reading.

[4] The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMC are expressed as either a specific value that covers the full range or as a fraction/percentage of the reading plus a fixed floor specification.

[5] The type of instrument or material being calibrated is defined by the parameter. This indicates the laboratory is capable of calibrating instruments that measure or generate the values in the ranges indicated for the listed measurement parameter.

[6] This scope meets A2LA's *P112 Flexible Scope Policy*.