



PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

Perry Johnson Laboratory Accreditation, Inc. has assessed the Laboratory of:

UMT Calibration Laboratory
5421 NW 74th Ave, Miami, FL 33166

(Hereinafter called the Organization) and hereby declares that Organization 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 (as outlined by the joint ISO-ILAC-IAF Communiqué dated April 2017):

***Acoustic, Dimensional, Electrical, Mass, Force and Weighing Devices,
Mechanical, Thermodynamic, Time and Frequency Calibration***
(As detailed in the supplement)

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Tracy Szerszen
President

Perry Johnson Laboratory
Accreditation, Inc. (PJLA)
755 W. Big Beaver, Suite 1325
Troy, Michigan 48084

Initial Accreditation Date:

February 26, 2021

Issue Date:

April 10, 2023

Expiration Date:

July 31, 2025

Accreditation No.:

112595

Certificate No.:

L23-302

The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: www.pjilabs.com



Certificate of Accreditation: Supplement

UMT Calibration Laboratory

5421 NW 74th Ave, Miami, FL 33166

Contact Name: Guillermo Blanco Phone: 1-800-222-5771

Accreditation is granted to the facility to perform the following calibrations:

Acoustic

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure Acoustic ^{FO}	94 dB @ 1 kHz	0.27 dB	Acoustic Calibrator CM-1039
	114 dB @ 1 kHz		

Dimensional

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Outside Micrometer ^{FO}	Up to 20 in	(5.4 + 7L) μ in	Gage Blocks Precision Sphere CM-1005
Inside Micrometer ^{FO}	Up to 20 in	(100 + 7L) μ in	Gage Blocks CM-1005
Depth Micrometer ^{FO}	Up to 20 in	(50 + 7L) μ in	Gage Blocks CM-1005
Dial/Digital Caliper ^{FO}	Up to 60 in	(512 + 7L) μ in	Gage Blocks CM-1006
Dial/Digital Indicators ^{FO}	Up to 8 in	(14.1 + 6L) μ in	Gage Blocks CM-1010
Crimp Tools ^{FO}	0.011 to 0.25 in	119 μ in	Plug Gages CM-1011
Wire Stripper ^{FO}			

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure DC Voltage ^{FO}	Up to 300 mV	60 μ V/V + 3 μ V	Fluke 5500A GIDEP
	330 mV to 3.3 V	50 μ V/V + 5 μ V	
	3.3 V to 33 V	50 μ V/V + 50 μ V	
	33 V to 330 V	55 μ V/V + 500 μ V	
	330 V to 1 000 V	55 μ V/V + 1 500 μ V	
Equipment to Measure DC Current ^{FO}	Up to 3.3 mA	0.13 mA/A + 0.05 μ A	
	3.3 mA to 33 mA	0.10 mA/A + 0.25 μ A	
	33 mA to 330 mA	0.10 mA/A + 3.3 μ A	
	330 mA to 2.2 A	0.30 mA/A + 44 μ A	
	2.2 A to 11 A	0.6 mA/A + 330 μ A	



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Equipment to Measure Resistance ^{FO}	Up to 11 Ω	0.12 m Ω / Ω + 8 m Ω	Fluke 5500A GIDEP
	11 Ω to 33 Ω	0.12 m Ω / Ω + 15 m Ω	
	33 Ω to 110 Ω	90 $\mu\Omega$ / Ω + 15 m Ω	
	110 Ω to 330 Ω	90 $\mu\Omega$ / Ω + 15 m Ω	
	330 Ω to 1.1 k Ω	90 $\mu\Omega$ / Ω + 0.06 Ω	
	1.1 k Ω to 3.3 k Ω	90 $\mu\Omega$ / Ω + 0.06 Ω	
	3.3 k Ω to 11 k Ω	90 $\mu\Omega$ / Ω + 0.6 Ω	
	11 k Ω to 33 k Ω	90 $\mu\Omega$ / Ω + 0.6 Ω	
	33 k Ω to 110 k Ω	0.11 m Ω / Ω + 6 Ω	
	110 k Ω to 330 k Ω	0.12 m Ω / Ω + 6 Ω	
	330 k Ω to 1.1 M Ω	0.15 m Ω / Ω + 55 Ω	
	1.1 M Ω to 3.3 M Ω	0.15 m Ω / Ω + 55 Ω	
	3.3 M Ω to 11 M Ω	0.6 m Ω / Ω + 550 Ω	
	11 M Ω to 33 M Ω	1 m Ω / Ω + 550 Ω	
	33 M Ω to 110 M Ω	5 m Ω / Ω + 5.5 k Ω	
110 M Ω to 330 M Ω	5 m Ω / Ω + 16.5 k Ω		
Equipment to Measure Capacitance ^{FO}	0.33 nF to 0.5 nF	5 mF/F + 0.01 nF	
	0.5 nF to 1.1 nF	5 mF/F + 0.01 nF	
	1.1 nF to 3.3 nF	5 mF/F + 0.01 nF	
	3.3 nF to 11 nF	5 mF/F + 0.01 nF	
	11 nF to 33 nF	2.5 mF/F + 0.1 nF	
	33 nF to 110 nF	2.5 mF/F + 0.1 nF	
	110 nF to 330 nF	2.5 mF/F + 0.3 nF	
	0.33 μ F to 1.1 μ F	2.5 mF/F + 1 nF	
	1.1 μ F to 3.3 μ F	3.5 mF/F + 3 nF	
	3.3 μ F to 11 μ F	3.5 mF/F + 10 nF	
	11 μ F to 33 μ F	4 mF/F + 30 nF	
	33 μ F to 110 μ F	5 mF/F + 100 nF	
	110 μ F to 330 μ F	7 mF/F + 300 nF	
	330 μ F to 1.1 mF	1 mF/F + 300 nF	



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Equipment to Measure AC Voltage (At the listed frequencies) ^{FO}			Fluke 5500A GIDEP
10 Hz to 45 Hz	1 mV to 33 mV	1.5 mV/V + 90 μ V	
45 Hz to 10 kHz	1 mV to 33 mV	0.4 mV/V + 90 μ V	
10 kHz to 20 kHz	1 mV to 33 mV	0.6 mV/V + 90 μ V	
20 kHz to 50 kHz	1 mV to 33 mV	1.5 mV/V + 90 μ V	
50 kHz to 100 kHz	1 mV to 33 mV	2.5 mV/V + 90 μ V	
100 kHz to 500 kHz	1 mV to 33 mV	3 mV/V + 90 μ V	
Equipment to Measure AC Voltage (At the listed frequencies) ^{FO}			
10 Hz to 45 Hz	33 mV to 330 mV	1.5 mV/V + 90 μ V	
45 Hz to 10 kHz	33 mV to 330 mV	0.4 mV/V + 90 μ V	
10 kHz to 20 kHz	33 mV to 330 mV	0.6 mV/V + 90 μ V	
20 kHz to 50 kHz	33 mV to 330 mV	1.5 mV/V + 90 μ V	
50 kHz to 100 kHz	33 mV to 330 mV	2 mV/V + 90 μ V	
100 kHz to 500 kHz	33 mV to 330 mV	2 mV/V + 90 μ V	
Equipment to Measure AC Voltage (At the listed frequencies) ^{FO}			
45 Hz to 10 kHz	0.33 V to 3.3 V	0.4 mV/V + 90 μ V	
10 kHz to 20 kHz	0.33 V to 3.3 V	0.6 mV/V + 90 μ V	
Equipment to Measure AC Voltage (At the listed frequencies) ^{FO}			
45 Hz to 10 kHz	3.3 V to 33 V	0.35 mV/V + 2 mV	
10 kHz to 20 kHz	3.3 V to 33 V	0.8 mV/V + 2 mV	
Equipment to Measure AC Voltage (At the listed frequencies) ^{FO}			
45 Hz to 1 kHz	33 V to 329.999 V	1.5 mV/V + 10 mV	
Equipment to Measure AC Voltage (At the listed frequencies) ^{FO}			
45 Hz to 1 kHz	330 V to 1 000 V	1.5 mV/V + 30 mV	
1 kHz to 10 kHz	330 V to 1 000 V	0.7 mV/V + 30 mV	



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Equipment to measure AC Current (At the listed frequencies) ^{FO}			Fluke 5500A GIDEP
10 Hz to 20 Hz	0.03 mA to 0.33 mA	2.5 mA/A + 0.15 μ A	
20 Hz to 45 Hz	0.03 mA to 0.33 mA	1.25 mA/A + 0.15 μ A	
45 Hz to 1 kHz	0.03 mA to 0.33 mA	1.25 mA/A + 0.25 μ A	
1 kHz to 5 kHz	0.03 mA to 0.33 mA	4 mA/A + 0.15 μ A	
5 kHz to 10 kHz	0.03 mA to 0.33 mA	12.5 mA/A + 0.15 μ A	
Equipment to measure AC Current (At the listed frequencies) ^{FO}			
10 Hz to 20 Hz	0.33 mA to 3.3 mA	2 mA/A + 0.3 μ A	
20 Hz to 45 Hz	0.33 mA to 3.3 mA	1 mA/A + 0.3 μ A	
45 Hz to 1 kHz	0.33 mA to 3.3 mA	1 mA/A + 0.3 μ A	
1 kHz to 5 kHz	0.33 mA to 3.3 mA	2 mA/A + 0.3 μ A	
5 kHz to 10 kHz	0.33 mA to 3.3 mA	6 mA/A + 0.3 μ A	
Equipment to measure AC Current (At the listed frequencies) ^{FO}			
10 Hz to 20 Hz	33 mA to 330 mA	2 mA/A + 30 μ A	
20 Hz to 45 Hz	33 mA to 330 mA	1 mA/A + 30 μ A	
45 Hz to 1 kHz	33 mA to 330 mA	0.9 mA/A + 30 μ A	
1 kHz to 5 kHz	33 mA to 330 mA	2 mA/A + 30 μ A	
5 kHz to 10 kHz	33 mA to 330 mA	6 mA/A + 30 μ A	
Equipment to measure AC Current (At the listed frequencies) ^{FO}			
10 Hz to 45 Hz	0.33 mA to 2.2 A	2 mA/A + 300 μ A	
45 Hz to 1 kHz	0.33 mA to 2.2 A	1 mA/A + 300 μ A	
1 kHz to 5 kHz	0.33 mA to 2.2 A	7.5 mA/A + 300 μ A	
Equipment to measure AC Current (At the listed frequencies) ^{FO}			
45 Hz to 65 Hz	2.2 A to 11 A	0.6 mA/A + 2 000 μ A	
65 Hz to 500 Hz	2.2 A to 11 A	1 mA/A + 2 000 μ A	
500 Hz to 1 kHz	2.2 A to 11 A	3.3 mA/A + 2 000 μ A	



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Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type E ^{FO}	-210 ° C to 1 200 ° C	0.6 ° C	Electrical Simulation of Thermocouple Output Fluke 5500A GIDEP
	-200 ° C to 1 375 ° C	0.7 ° C	
	-250 ° C to 400 ° C	0.8 ° C	
	-250 ° C to 1 000 ° C	0.9 ° C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type J ^{FO}	-210 ° C to 1 200 ° C	0.6 ° C	
	-200 ° C to 1 375 ° C	0.7 ° C	
	-250 ° C to 400 ° C	0.8 ° C	
	-250 ° C to 1 000 ° C	0.9 ° C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type K ^{FO}	-210 ° C to 1 200 ° C	0.6 ° C	
	-200 ° C to 1 375 ° C	0.7 ° C	
	-250 ° C to 400 ° C	0.8 ° C	
	-250 ° C to 1 000 ° C	0.9 ° C	
Temperature Calibration, Indication, and Control Equipment used with Thermocouple Type T ^{FO}	-210 ° C to 1 200 ° C	0.6 ° C	
	-200 ° C to 1 375 ° C	0.7 ° C	
	-250 ° C to 400 ° C	0.8 ° C	
	-250 ° C to 1 000 ° C	0.9 ° C	
Temperature Calibration, Indication and Control Equipment Used With RTD Pt 385 100 Ω ^{FO}	-200 ° C to -80 ° C	0.1 ° C	Electrical Simulation of RTD Output Fluke 5500A GIDEP
	-80 ° C to 0 ° C	0.1 ° C	
	Up to 100 ° C	0.14 ° C	
	100 ° C to 300 ° C	0.18 ° C	
	300 ° C to 400 ° C	0.2 ° C	
	400 ° C to 630 ° C	0.24 ° C	
	630 ° C to 800 ° C	0.46 ° C	
Temperature Calibration, Indication and Control Equipment Used With RTD Pt 3916 100 Ω ^{FO}	-200 ° C to -190 ° C	0.5 ° C	
	-190 ° C to -80 ° C	0.08 ° C	
	-80 ° C to 0 ° C	0.1 ° C	
	Up to 100 ° C	0.12 ° C	
	100 ° C to 260 ° C	0.14 ° C	
	260 ° C to 300 ° C	0.16 ° C	
	300 ° C to 400 ° C	0.18 ° C	
	400 ° C to 600 ° C	0.2 ° C	
	600 ° C to 630 ° C	0.46 ° C	



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Temperature Calibration, Indication and Control Equipment Used With RTD Pt 385 200 Ω ^{FO}	-200 ° C to -80 ° C	0.08 ° C	Electrical Simulation of RTD Output Fluke 5500A GIDEP
	-80 ° C to 0 ° C	0.08 ° C	
	Up to 100 ° C	0.08 ° C	
	100 ° C to 260 ° C	0.1 ° C	
	260 ° C to 300 ° C	0.24 ° C	
	300 ° C to 400 ° C	0.26 ° C	
	400 ° C to 600 ° C	0.28 ° C	
Temperature Calibration, Indication and Control Equipment Used With RTD Pt 385 1000 Ω ^{FO}	600 ° C to 630 ° C	0.32 ° C	
	-200 ° C to -80 ° C	0.1 ° C	
	-80 ° C to 0 ° C	0.06 ° C	
	Up to 100 ° C	0.06 ° C	
	100 ° C to 300 ° C	0.08 ° C	
	100 ° C to 260 ° C	0.2 ° C	
	260 ° C to 300 ° C	0.12 ° C	
	300 ° C to 400 ° C	0.14 ° C	
Temperature Calibration, Indication and Control Equipment Used With RTD PtNi 385 120 Ω ^{FO}	400 ° C to 600 ° C	0.14 ° C	
	600 ° C to 630 ° C	0.46 ° C	
	-80 ° C to 0 ° C	0.16 ° C	
Temperature Calibration, Indication and Control Equipment Used With RTD PtNi 385 120 Ω ^{FO}	Up to 100 ° C	0.16 ° C	
	100 ° C to 260 ° C	0.28 ° C	
Temperature Calibration, Indication and Control Equipment Used With RTD Cu 427, 10 Ω ^{FO}	-10 ° C to 260 ° C	0.6 ° C	
	Equipment to Output DC Current Clamp Meters ^{FO}		Fluke 5500A Fluke 9100-200 GIDEP
10 Turn Coil	3.2 A to 32 A	0.6 mA/A + 1.18 mA	
	32 A to 105 A	0.55 mA/A + 9.4 mA	
	105 A to 200 A	0.55 mA/A + 45 mA	
50 Turn Coil	16 A to 160 A	0.6 mA/A + 5.9 mA	
	160 A to 525 A	0.055 mA/A + 47 mA	
	525 A to 1 000 A	0.055 mA/A + 225 mA	



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Equipment to Output DC Voltage ^{FO}	10 nV to 100 mV	10 μ V/V + 0.52 μ V	Keysight 3458A GIDEP	
	100 mV to 1 V	9.3 μ V/V + 1.0 μ V		
	1 V to 10 V	9.3 μ V/V + 7.1 μ V		
	10 V to 100 V	12 μ V/V + 83 μ V		
	100 V to 1 000 V	12 μ V/V + 0.90 mV		
Equipment to Output Resistance ^{FO}	10 μ Ω to 10 Ω	17 μ Ω / Ω + 53 μ Ω		
	10 Ω to 100 Ω	14 μ Ω / Ω + 0.63 m Ω		
	100 Ω to 1 k Ω	12 μ Ω / Ω + 3.7 m Ω		
	1 k Ω to 10 k Ω	12 μ Ω / Ω + 30 m Ω		
	10 k Ω to 100 k Ω	12 μ Ω / Ω + 0.24 Ω		
	100 k Ω to 1 M Ω	17 μ Ω / Ω + 3.7 Ω		
	1 M Ω to 10 M Ω	58 μ Ω / Ω + 0.18 k Ω		
	10 M Ω to 100 M Ω	0.58 m Ω / Ω + 1.2 k Ω		
Equipment to Output DC Current ^{FO}	10 μ A to 100 μ A	23 μ A/A + 1.2 nA		
	100 μ A to 1 mA	23 μ A/A + 8.1 nA		
	1 mA to 10 mA	23 μ A/A + 80 nA		
	10 mA to 100 mA	41 μ A/A + 1.4 μ A		
	100 mA to 1 A	0.13 mA/A + 12 μ A		
	1 A to 3 A	0.14 % of rdg + 0.73 mA		Agilent 34401A GIDEP
	3 A to 6 A	1.2 % of rdg + 4.1 mA		Fluke 179 GIDEP
	6 A to 10 A	1.2 % of rdg + 35.9 mA		
Equipment to Output AC Voltage ^{FO} (At the listed frequencies)			Keysight 3458A GIDEP	
1 Hz to 40 Hz	10 nV to 10 mV	0.03 % of rdg + 4.3 μ V		
40 Hz to 1 kHz	10 nV to 10 mV	0.02 % of rdg + 2.9 μ V		
1 kHz to 20 kHz	10 nV to 10 mV	0.03 % of rdg + 2.9 μ V		
20 kHz to 50 kHz	10 nV to 10 mV	0.12 % of rdg + 2.9 μ V		
100 kHz to 300 kHz	10 nV to 10 mV	4.6 % of rdg + 3.5 μ V		



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Equipment to Output AC Voltage ^{FO} (At the listed frequencies)			Keysight 3458A GIDEP
1 Hz to 40 Hz	10 mV to 100 mV	0.01 % of rdg + 13 μ V	
40 Hz to 1 kHz	10 mV to 100 mV	0.01 % of rdg + 12 μ V	
1 kHz to 20 kHz	10 mV to 100 mV	0.02 % of rdg + 12 μ V	
20 kHz to 50 kHz	10 mV to 100 mV	0.03 % of rdg + 12 μ V	
50 kHz to 100 kHz	10 mV to 100 mV	0.09 % of rdg + 12 μ V	
100 kHz to 300 kHz	10 mV to 100 mV	0.35 % of rdg + 17 μ V	
300 kHz to 1 MHz	10 mV to 100 mV	1.2 % of rdg + 17 μ V	
1 MHz to 2 MHz	10 mV to 100 mV	1.7 % of rdg + 17 μ V	
Equipment to Output AC Voltage ^{FO} (At the listed frequencies)			
1 Hz to 40 Hz	100 mV to 1 V	0.01 % of rdg + 65 μ V	
40 Hz to 1 kHz	100 mV to 1 V	0.01 % of rdg + 52 μ V	
1 kHz to 20 kHz	100 mV to 1 V	0.02 % of rdg + 52 μ V	
20 kHz to 50 kHz	100 mV to 1 V	0.03 % of rdg + 52 μ V	
50 kHz to 100 kHz	100 mV to 1 V	0.09 % of rdg + 52 μ V	
100 kHz to 300 kHz	100 mV to 1 V	0.35 % of rdg + 0.12 mV	
300 kHz to 1 MHz	100 mV to 1 V	1.2 % of rdg + 0.12 mV	
1 MHz to 2 MHz	100 mV to 1 V	1.7 % of rdg + 0.12 mV	
Equipment to Output AC Voltage ^{FO} (At the listed frequencies)			
1 Hz to 40 Hz	1 V to 10 V	0.01 % of rdg + 0.46 mV	
40 Hz to 1 kHz	1 V to 10 V	0.01 % of rdg + 0.23 mV	
1 kHz to 20 kHz	1 V to 10 V	0.02 % of rdg + 0.23 mV	
20 kHz to 50 kHz	1 V to 10 V	0.03 % of rdg + 0.23 mV	
50 kHz to 100 kHz	1 V to 10 V	0.09 % of rdg + 0.23 mV	
100 kHz to 300 kHz	1 V to 10 V	0.35 % of rdg + 1.2 mV	
300 kHz to 1 MHz	1 V to 10 V	1.2 % of rdg + 1.2 mV	
1 MHz to 2 MHz	1 V to 10 V	1.7 % of rdg + 1.2 mV	



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Equipment to Output AC Voltage ^{F0} (At the listed frequencies)			Keysight 3458A GIDEP
1 Hz to 40 Hz	10 V to 100 V	0.02 % of rdg + 4.6 mV	
40 Hz to 1 kHz	10 V to 100 V	0.02 % of rdg + 2.3 mV	
1 kHz to 20 kHz	10 V to 100 V	0.02 % of rdg + 2.3 mV	
20 kHz to 50 kHz	10 V to 100 V	0.04 % of rdg + 2.3 mV	
50 kHz to 100 kHz	10 V to 100 V	0.14 % of rdg + 2.3 mV	
100 kHz to 300 kHz	10 V to 100 V	0.46 % of rdg + 12 mV	
300 kHz to 1 MHz	10 V to 100 V	1.7 % of rdg + 12 mV	
Equipment to Output AC Voltage ^{F0} (At the listed frequencies)			
1 Hz to 40 Hz	100 V to 1 000 V	0.05 % of rdg + 46 mV	
40 Hz to 1 kHz	100 V to 1 000 V	0.05 % of rdg + 23 mV	
1 kHz to 20 kHz	100 V to 1 000 V	0.07% of rdg + 23 mV	
20 kHz to 50 kHz	100 V to 1 000 V	0.14 % of rdg + 23 mV	
50 kHz to 100 kHz	100 V to 1 000 V	0.35 % of rdg + 23 mV	
Equipment to Output AC Current ^{F0} (At the listed frequencies)			
1 Hz to 20 Hz	100 pA to 100 μ A	0.46 % of rdg + 35 nA	
20 Hz to 45 Hz	100 pA to 100 μ A	0.17 % of rdg + 35 nA	
45 Hz to 100 Hz	100 pA to 100 μ A	0.07 % of rdg + 35 nA	
100 Hz to 5 kHz	100 pA to 100 μ A	0.07 % of rdg + 35 nA	
Equipment to Output AC Current ^{F0} (At the listed frequencies)			
1 Hz to 20 Hz	100 μ A to 1 mA	0.46 % of rdg + 0.23 μ A	
20 Hz to 45 Hz	100 μ A to 1 mA	0.17 % of rdg + 0.23 μ A	
45 Hz to 100 Hz	100 μ A to 1 mA	0.07 % of rdg + 0.23 μ A	
100 Hz to 5 kHz	100 μ A to 1 mA	0.03 % of rdg + 0.23 μ A	
5 kHz to 20 kHz	100 μ A to 1 mA	0.07 % of rdg + 0.23 μ A	
20 kHz to 50 kHz	100 μ A to 1 mA	0.46 % of rdg + 0.23 μ A	
50 kHz to 100 kHz	100 μ A to 1 mA	0.64 % of rdg + 0.23 μ A	



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Accreditation is granted to the facility to perform the following calibrations:

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Output AC Current ^{F0} (At the listed frequencies)			Keysight 3458A GIDEP
1 Hz to 20 Hz	1 mA to 10 mA	0.46 % of rdg + 2.3 μ A	
20 Hz to 45 Hz	1 mA to 10 mA	0.17 % of rdg + 2.3 μ A	
45 Hz to 100 Hz	1 mA to 10 mA	0.07 % of rdg + 2.3 μ A	
100 Hz to 5 kHz	1 mA to 10 mA	0.03 % of rdg + 2.3 μ A	
5 kHz to 20 kHz	1 mA to 10 mA	0.07 % of rdg + 2.3 μ A	
20 kHz to 50 kHz	1 mA to 10 mA	0.46 % of rdg + 2.3 μ A	
50 kHz to 100 kHz	1 mA to 10 mA	0.64 % of rdg + 2.3 μ A	
Equipment to Output AC Current ^{F0} (At the listed frequencies)			
1 Hz to 20 Hz	10 mA to 100 mA	0.46 % of rdg + 23 μ A	
20 Hz to 45 Hz	10 mA to 100 mA	0.17 % of rdg + 23 μ A	
45 Hz to 100 Hz	10 mA to 100 mA	0.07 % of rdg + 23 μ A	
100 Hz to 5 kHz	10 mA to 100 mA	0.03 % of rdg + 23 μ A	
5 kHz to 20 kHz	10 mA to 100 mA	0.07 % of rdg + 23 μ A	
20 kHz to 50 kHz	10 mA to 100 mA	0.46 % of rdg + 46 μ A	
50 kHz to 100 kHz	10 mA to 100 mA	0.64 % of rdg + 0.17 mA	
Equipment to Output AC Current ^{F0} (At the listed frequencies)			
1 Hz to 20 Hz	100 mA to 1 A	0.46 % of rdg + 0.23 mA	
20 Hz to 45 Hz	100 mA to 1 A	0.18 % of rdg + 0.23 mA	
45 Hz to 100 Hz	100 mA to 1 A	0.09 % of rdg + 0.23 mA	
100 Hz to 5 kHz	100 mA to 1 A	0.12 % of rdg + 0.23 mA	
5 kHz to 20 kHz	100 mA to 1 A	0.35 % of rdg + 0.23 mA	
20 kHz to 50 kHz	100 mA to 1 A	1.2 % of rdg + 0.46 mA	
Equipment to Output AC Current ^{F0} (At the listed frequencies)			Agilent 34401A GIDEP
3 Hz to 5 Hz	1 A to 3 A	1.3 % of rdg + 2.1 mA	
5 Hz to 10 Hz	1 A to 3 A	0.4 % of rdg + 2.1 mA	
10 Hz to 5 kHz	1 A to 3 A	0.17 % of rdg + 2.1 mA	
Equipment to Output AC Current ^{F0} (At the listed frequencies)			Fluke 179 GIDEP
45 Hz to 1 kHz	3 A to 6 A	1.7 % of rdg + 5 mA	
45 Hz to 1 kHz	6 A to 10 A	1.7 % of rdg + 43 mA	



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Equipment to Measure Resistance – Resistor Based ^{FO}	10 m Ω to 100 m Ω	60 $\mu\Omega/\Omega$ + 0.20 m Ω	QuadTech 1433-29 GIDEP
	100 m Ω to 1 Ω	62 $\mu\Omega/\Omega$ + 0.2 m Ω	
	1 Ω to 10 Ω	44 $\mu\Omega/\Omega$ + 7.2 $\mu\Omega$	
	10 Ω to 100 Ω	35 $\mu\Omega/\Omega$ + 7.2 $\mu\Omega$	
	100 Ω to 1 k Ω	31 $\mu\Omega/\Omega$ + 58 $\mu\Omega$	
	1 k Ω to 10 k Ω	31 $\mu\Omega/\Omega$ + 0.58 m Ω	
	10 k Ω to 100 k Ω	31 $\mu\Omega/\Omega$ + 5.8 m Ω	
	100 k Ω to 1 M Ω	24 $\mu\Omega/\Omega$ + 21 m Ω	IET Labs HRRS-B-5-100k GIDEP
	1 M Ω to 10 M Ω	42 $\mu\Omega/\Omega$ + 61 m Ω	
	10 M Ω to 100 M Ω	0.12 m Ω/Ω + 0.58 Ω	
	100 M Ω to 1 G Ω	0.15 m Ω/Ω + 5.8 Ω	
	1 G Ω to 10 G Ω	0.65 m Ω/Ω + 58 Ω	

Mass, Force, and Weighing Devices

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Analytical Balances ^{FO}	1 mg to 20 mg	0.003 5 mg	Class ASTM 1 Weight CM-1009
	20 mg to 500 mg	0.003 8 mg	
	500 mg to 2 g	0.006 7 mg	
	2 g to 5 g	0.007 6 mg	
	5 g to 10 g	0.010 4 mg	
	10 g to 20 g	0.015 3 mg	
	20 g to 50 g	0.025 2 mg	
	50 g to 100 g	0.05 mg	
	100 g to 200 g	0.1 mg	
	200 g to 500 g	0.25 mg	
Bench Scales/Balances ^{FO}	500 g to 1 kg	0.07 mg	Class ASTM 1 Weight CM-1008
	1 kg to 2 kg	0.51 mg	
	2 kg to 5 kg	1.3 mg	Class ASTM 2 Weight CM-1008
	5 kg to 10 kg	1.3 mg	Class ASTM 1 Weight CM-1008
	10 kg to 20 kg	5.2 mg	
	20 kg to 25 kg	11 mg	
	25 kg to 125 kg	30 mg	Class NIST F Weights CM-1008



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Pipettes ^{FO}	1 μ L to 100 μ L	0.29 μ L	A&D AD-4212B-PT CM-1023
	100 μ L to 1 000 μ L	0.47 μ L	
	1 000 μ L to 10 000 μ L	3.8 μ L	
Equipment to Measure Force – Tension and Compression ^{FO}	0.001 gf to 500 gf	0.001 7 % of rdg + 0.001 8 gf	ASTM Class 1 Weights CM-1015
	0.5 kgf to 25 kgf	0.001 7 % of rdg + 0.000 033 kgf	Morehouse Precision CM-1015
	55 lbf to 1 000 lbf	0.003 8 % of reading + 0.13 lbf	
	1 000 lbf to 25 000 lbf	0.003 0 % of reading + 1.2 lbf	Morehouse Precision CM-1015
Mass Standards ^F	1 mg	0.001 5 mg	Weights, AD4212B-101 Analytical Balance CM-1059
	2 mg	0.001 5 mg	
	5 mg	0.001 5 mg	
	10 mg	0.001 5 mg	
	20 mg	0.001 6 mg	
	50 mg	0.001 6 mg	
	100 mg	0.001 6 mg	
	200 mg	0.001 7 mg	
	500 mg	0.002 1 mg	
	1 g	0.002 0 mg	
	2 g	0.002 8 mg	
	5 g	0.003 8 mg	
	10 g	0.014 mg	
	20 g	0.015 mg	
	50 g	0.030 mg	
	100 g	0.035 mg	
	200 g	0.13 mg	Weights, MC-1000S Mass Comparator CM-1059
	500 g	0.14 mg	
	1 kg	0.15 mg	
	2 kg	1.5 mg	Weights, MC-10KS Mass Comparator CM-1059
5 kg	1.9 mg		
10 kg	2.2 mg		
20 kg	15 mg	Weights, MC-30KS Mass Comparator CM-1059	
25 kg	18 mg		
30 kg	18 mg		



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Mass, Force, and Weighing Devices

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Burettes ^{FO}	5 mL	7.2 μ L	Weights, AD-4212B-PT CM-1060
	10 mL	27 μ L	
	50 mL	51 μ L	
	100 mL	0.15 mL	
Syringes ^{FO}	1 μ L to 5 000 μ L	0.30 μ L	AD-4212B-PT CM-1060
	5 mL to 30 mL	4.9 μ L	
Diluters/Dispensers ^{FO}	1 mL	5.2 μ L	AD-4212B-PT CM-1060
	10 mL	28 μ L	
	50 mL	0.30 mL	
	100 mL	0.61 mL	
Beakers, Graduated Cylinders, Flasks and Test Tubes ^{FO}	0.1 mL to 500 mL	7.2 μ L	Weights, MC-1000S Gravimetric Method CM-1060
	500 mL to 2 L	6.1 mL	Weights, MC-10KS Gravimetric Method CM-1060



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Accreditation is granted to the facility to perform the following calibrations:

Mechanical

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Pressure Gauge and Transducer ^{FO}	-10 inH ₂ O to 10 inH ₂ O	0.006 1 inH ₂ O	Fluke 700P01 CM-1007
	-1 psi to 1 psi	0.000 45 psi	Fluke 718 1G CM-1007
	Up psi to 30 psi	0.023 psi	Fluke 700P05 CM-1007
	-12 psi to 100 psi	0.032 psi	Fluke 700G06 CM-1007
	100 psi to 500 psi	0.12 psi	Fluke 700G07 CM-1007
	500 psi to 2 000 psi	0.41 psi	Fluke 700G10 CM-1007
	2 000 to 10 000 psi	2.2 psi	Fluke 700G31 CM-1007
Torque Wrench and Screwdriver ^F	20 lbf•in to 200 lbf•in	0.12 % of rdg	AKO TSD011/020
	200 lbf•in to 800 lbf•ft	0.2 % of rdg	AKO TSD821 CM-1001
Durometer – Indentor Length ^{FO} Type A, B, C, D, DO, O, OO	Up to 0.1 in	0.004 6 in	Gage Blocks CM-1037
Durometer – Spring Force ^{FO} Type A, B, C, D, DO, O, OO	Up to 5 kgf	1.3 gf	Morehouse Precision CM-1037
Gas Flow Meter ^{FO}	0.05 SCCM to SCCM	0.25 % of rdg + 0.12 SCCM	MC-500SCCM-D CM-1031
	0.5 SLPM to 500 SLPM	0.52 % of rdg + 0.17 SLPM	MCR-500SLPM-D CM-1031



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Thermodynamic

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Temperature Measurement Devices ^{FO}	-196 ° C to 350 ° C	0.02 ° C	GE M2801/IRTD-400 Hart Scientific 7320 Fluke 9103 Fluke 9140 Liquid Nitrogen Cylinder CM-1003
Temperature Sources ^{FO}	-196 ° C to 420 ° C	0.016 ° C	GE M2801/IRTD-400 CM-1002
Infrared Temperature Measurement Devices ^{FO}	50 °C to 500 °C	0.37 °C	Fluke 9132 CM-1042
Humidity Measurement Devices ^{FO}	5 % RH to 30 % RH	0.53 % RH	Vaisala HMP75 Folyon H300 CM-1004
	> 30 % RH to 45 % RH	0.62 % RH	
	> 45 % RH to 60 % RH	0.72 % RH	
	> 60 % RH to 80 % RH	0.82 % RH	
	> 80 % RH to 95 % RH	0.92 % RH	
Humidity Chambers ^{FO}	Up to 30 % RH	0.53 % RH	Vaisala HMP75 CM-1004
	> 30 % RH to 45 % RH	0.62 % RH	
	> 45 % RH to 60 % RH	0.72 % RH	
	> 60 % RH to 80 % RH	0.82 % RH	
	> 80 % RH to 95 % RH	0.92 % RH	

Time and Frequency

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (\pm)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Stopwatch, Timers ^{FO}	Up to 24 h	511 ms	Direct Comparison Method – NIST Audio Time Signal CM-1014
Time Intervals ^{FO}	Up to 24 h	761 ms	Direct Comparison Method – Stopwatch CM-1014
Equipment to Output Frequency ^{FO}	1 Hz to 40 Hz	0.58 mHz/Hz + 50 μ Hz	Keysight 3458A GIDEP
	40 Hz to 1 MHz	0.12 mHz/Hz + 50 μ Hz	
	1 MHz to 100 MHz	0.12 mHz/Hz + 5 Hz	



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Accreditation is granted to the facility to perform the following calibrations:

1. The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represents the smallest measurement uncertainty attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is typically expressed at a confidence level of 95 % using a coverage factor k (usually equal to 2). The actual measurement uncertainty associated with a specific calibration performed by the laboratory will typically be larger than the CMC for the same calibration since capability and performance of the device being calibrated and the conditions related to the calibration may reasonably be expected to deviate from ideal to some degree.
2. The laboratories range of calibration capability for all disciplines for which they are accredited is the interval from the smallest calibrated standard to the largest calibrated standard used in performing the calibration. The low end of this range must be an attainable value for which the laboratory has or has access to the standard referenced. Verification of an indicated value of zero in the absence of a standard is common practice in the procedure for many calibrations but by its definition it does not constitute calibration of zero capacity.
3. The presence of a superscript FO means that the laboratory performs calibration of the indicated parameter both at its fixed location and onsite at customer locations. Example: Outside Micrometer^{FO} would mean that the laboratory performs this calibration at its fixed location and onsite at customer locations.
4. Measurement uncertainties obtained for calibrations performed at customer sites can be expected to be larger than the measurement uncertainties obtained at the laboratories fixed location for similar calibrations. This is due to the effects of transportation of the standards and equipment and upon environmental conditions at the customer site which are typically not controlled as closely as at the laboratories fixed location.
5. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
6. The term R represents radius in inches or millimeters as appropriate to the uncertainty statement.
7. The term T represents temperature in °C or °F as appropriate to the uncertainty statement.