

PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

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

Mid-South Calibration

8221 Macon Road, Cordova, TN 38018

(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):

Calibration of Dimensional, Electrical, Mechanical, Thermodynamics, Mass, Force & Weighing Devices, and Time & Frequency Instruments (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:	Issue Date:	Expiration Date:
July 15, 2003	October 5, 2019	October 5, 2021
Revision Date:	Accreditation No.:	Certificate No.:
October 2, 2020	59185	L19-500-R1

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.pjlabs.com



Mid-South Calibration

8221 Macon Road, Cordova, TN 38018 Contact Name: Will Page Phone: 901-509-3174

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

Dimensional MEASURED INSTRUMENT, RANGE OR NOMINAL CALIBRATION AND CALIBRATION QUANTITY OR GAUGE DEVICE SIZE AS MEASUREMENT EQUIPMENT APPROPRIATE CAPABILITY EXPRESSED AND REFERENCE AS AN UNCERTAINTY (±) STANDARDS USED Micrometers OD FO 0.05 in to 1 in Mitutoyo 00 Block Set, $(120 + 4.2L) \mu in$ Mitutovo Long Blocks 1 in to 6 in $(220 + 4.2L) \mu in$ MSC-M-1001-1 6 in to 12 in $(270 + 4.2L) \mu in$ 12 in to 18 in $(280 + 20L) \mu in$ 18 in to 24 in $(300 + 20L) \mu in$ 24 in to 30 in (310 + 20L) µin 30 in to 36 in $(320 + 20L) \mu in$ 36 in to 40 in (330 + 20L) µin Micrometers Depth FO 0.05 in to 6 in Mitutoyo 00 Block Set, $(220 + 20L) \mu in$ Surface Plate 6 in to 40 in $(250 + 20L) \mu in$ 33K6-4-17-1 $(560 + 20L) \mu in$ Mitutoyo 00 Block Set, Calipers Vernier, Dial, 6 in to 12 in Digital FO Surface Plate 12 in to 40 in $(880 + 20L) \mu in$ MSC-C-1001-1 Height Gauges FO 0.5 in to 30 in $(100 + 20L) \mu in$ MSC-H-1001-1 0.01 in to 72 in Mitutoyo 00 Block Set, Steel Rules and Tape $(0.016 + 250L) \mu in$ Measures FO Mitutoyo Long Blocks CP2006 Indicator Plunger Type FO 0.05 in to 4 in $(100 + 20L) \mu in$ Mitutoyo 00 Block Set Surface Plate Indicator Quill Type FO 0.05 in to 1 in $(40 + 20L) \mu in$ MSC-I-1000-1 Surface Plates -12 in to 153.7 in DL 50 µin Repeat-O-Meter Repeatability FO (Diagonal Line) + STARRETT 715 33K6-4-2696-1 Surface Pate - Flatness FO 12 in to 153.7 in DL $(12 + 5L) \mu in$ Federal EAS-1338 (Diagonal Line) **Differential Electronic** Level 33K6-4-2696-1 0.05 in to 12 in Gage Blocks F $(3 + 2L) \mu in$ Federal 130B-16 with Mituroyo 00 Block Set 33K6-4-1-1 Cylindrical Pins F 0.01 in to 23 in $(25 + 3.2L) \mu in$ Easson EX-100 ULM MSC-PG-1001-1 Angle Blocks F 5 $^{\circ}$ to 90 $^{\circ}$ 0.15° Mitutoyo Profile Projector 33K6-4-2847-1 Levels FO 0.25 ° to 90 ° 0.052 ° Angle Blocks Surface Plate TB 9-5210-213-50 Crimp Tools FO 0.011 in to 0.75 in Mitutovo PH- 3500 PIN 320 µin Gauge Set PHY0009-17 & MFG DATA



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Dimensional

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Cylindrical Ring, Plug Gages, Setting Rings ^F	0.4 in to 9 in	(25 + 3.2L) μin	Easson EX-100 ULM MSC-R-1001-1
Length Standards ^F	0.5 in to 4 in	(25 + 3.2L) µin	
Feeler/Thickness Gages ^F	0.01 in to 1 in	30 µin	Easson EX-100 ULM 17-20MD-15
Thread Plugs Simple Pitch Diameter ^F	0.15 in to 4 in	(82 µin + 6.8 µin/in)	3 Wire Method w/ Easson EX-100 ULM 33K6-4-203-1
Major Diameter ^F	0.15 in to 4 in	$(22 \mu in + 5 \mu in/in)$	Easson EX-100 ULM 33K6-4-203-1

Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature Calibration,	-250 ° C to - 100 °C	0.67 °C	Fluke 5500A
Indication and Control	-100 °C to – 25 °C	0.39 °C	Electrical Simulation of Thermoneter
Thermocouple Type E FO	-25 °C to 350 ° C	0.37 °C	33K5-4-222-1
	350 °C to 650 °C	0.38 °C	
	650 °C to 1 000 °C	0.41 °C	
Temperature Calibration,	-210 °C to -100 °C	0.43 °C	
Indication and Control	-100 °C to -30 °C	0.35 °C	
Thermocouple Type J FO	-30 °C to 150 °C	0.33 °C	
Thermotouple Type	150 °C to 760 °C	0.35 °C	
	760 °C to 1 200 °C	0.4 °C	
Temperature Calibration,	-2 200 °C to -100 °C	0.48 °C	
Indication and Control	-100 °C to -25 °C	0.36 °C	
Thermocouple Type K ^{FO}	-25 °C to 120 °C	0.35 °C	
	120 °C to 1 000 °C	0.42 °C	
	1 000 °C to 1 372 °C	0.55 °C	
Temperature Calibration,	0 °C to 250 °C	0.67 °C	
Indication and Control	250 °C to 400 °C	0.56 °C	
Thermocouple Type S FO	400 °C to 1 000 °C	0.57 °C	
	1 000 °C to 1 767 °C	0.66 °C	
Temperature Calibration,	-150 °C to 0 °C	0.44 °C	
Indication and Control	0 °C to 120 °C	0.36 °C	
Thermocouple Type T ^{FO}	120 °C to 400 °C	0.34 °C	

This supplement is in conjunction with certificate #L19-500-R1



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	APPROPRIATE	CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	AND REFERENCE STANDARDS USED
Temperature Calibration,	-200 °C to -80 °C	0.1 °C	Fluke 5500A
Indication and Control	-80 °C to 0 °C	0.1 °C	Electrical Simulation of
RTD Pt 385, 100 Ω^{FO}	0 °C to 100 °C	0.1 °C	- KIDP1-100 Output 33K5-4-222-1
	100 °C to 300 °C	0.12 °C	
	300 °C to 400 °C	0.13 °C	
	400 °C to 630 °C	0.15 °C	
	630 °C to 800 °C	0.28 °C	
Temperature Calibration,	-80 °C to 0 °C	0.1 °C	
Indication and Control	0 °C to 100 °C	0.1 °C	
RTD Pt 3926, 100 Ω^{FO}	100 °C to 300 °C	0.12 °C	-
	300 °C to 400 °C	0.13 °C	
	400 °C to 610 °C	0.15 °C	
Temperature Calibration,	-80 °C to 0 °C	0.1 °C	
Indication and Control	0 °C to 100 °C	0.1 °C	
RTD Pt 3926, 120 Ω^{O}	100 °C to 260 °C	0.12 °C	
Equipment to Measure AC V	Voltage		Fluke 5500A
(at the listed frequencies) FO	1 1/ 22 1/		33K1-4-2522-1
10 Hz to 45 Hz	1 mV to 33 mV	2 mV + 1.4 mV/V	-
45 Hz to 10 kHz	1 mV to 33 mV	0.2 mV + 1.6 mV/V	-
10 kHz to 20 kHz	1 mV to 33 mV	0.2 mV + 2 mV/V	
20 kHz to 50 kHz	1 mV to 33 mV	0.2 mV + 2.2 mV/V	
50 kHz to 100 kHz	1 mV to 33 mV	19 mV + 2.5 mV/V	
100 kHz to 500 kHz	1 mV to 33 mV	4.5 mV + 7.2 mV/V	
Equipment to Measure AC V (at the listed frequencies) ^{FO}	Voltage		
10 Hz to 45 Hz	33 mV to 330 mV	0.14 mV + 2.7 mV/V	
45 Hz to 10 kHz	33 mV to 330 mV	0.18 mV + 0.5 mV/V	
10 kHz to 20 kHz	33 mV to 330 mV	0.18 mV + 1 mV/V	
20 kHz to 50 kHz	33 mV to 330 mV	0.3 mV + 3 mV/V	
50 kHz to 100 kHz	33 mV to 330 mV	0.5 mV + 8 mV/V	



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Equipment to Measure AC	Voltage		Fluke 5500A
(at the listed frequencies) ^{FC}			33K1-4-2522-1
10 Hz to 45 Hz	3.3 V to 33 V	5 mV + 1 mV/V	
45 Hz to 10 kHz	3.3 V to 33 V	4.5 mV + 0.8 mV/V	
10 kHz to 20 kHz	3.3 V to 33 V	5 mV + 1 mV/V	
20 kHz to 50 kHz	3.3 V to 33 V	10 mV + 2.5 mV/V	
50 kHz to 100 kHz	3.3 V to 33 V	20 mV + 3 mV/V	
Equipment to Measure AC (at the listed frequencies) ^{FC}	Voltage		_
45 Hz to 1 kHz	33 V to 330 V	22 mV + 1 mV/V	7
1 kHz to 10 kHz	33 V to 330 V	5 mV + 0.4 mV/V	1
10 kHz to 20 kHz	33 V to 330 V	40 mV + 1 mV/V	1
Equipment to Measure AC (at the listed frequencies) ^{FC}	Voltage	Q	_
45 Hz to 1 kHz	330 V to 1 020 V	0.16 V + 0.5 mV/V	7
1 kHz to 5 kHz	330 V to 1 020 V	0.2 V + 2 mV/V	7
5 kHz to 10 kHz	330 V to 1 020 V	0.7 V + 2.5 mV/V	7
Equipment to Output AC V (at the listed frequencies) ^{FC}	oltage		Agilent 34401 A NA-17-20AH-78
3 Hz to 5 Hz	1 mV to 100 mV	$0.066 \ 1 \ mV + 3.2 \ \mu V/mV$	
5 Hz to 10 Hz	1 mV to 100 mV	$0.066 \ 2 \ mV + 4.6 \ \mu V/mV$	1
10 Hz to 20 kHz	1 mV to 100 mV	$0.022.2 \text{ mV} + 1.3 \mu \text{V/mV}$	1
20 kHz to 50 kHz	1 mV to 100 mV	$0.022 \ 8 \ mV + 3 \ \mu V/mV$	7
50 kHz to 100 kHz	1 mV to 100 mV	$0.037 \text{ mV} + 7.1 \mu \text{V/mV}$	1
100 kHz to 300 kHz	1 mV to 100 mV	$0.501 \text{ mV} + 41 \mu \text{V/mV}$	1
Equipment to Output AC V (at the listed frequencies) ^{FO}	oltage		_
3 Hz to 5 Hz	0.1 V to 1 V	1.02 V + 0.3 mV/V	
5 Hz to 10 Hz	0.1 V to 1 V	0.37 V + 0.3 mV/V	7
10 Hz to 20 kHz	0.1 V to 1 V	0.08 V + 0.3 mV/V	1
20 kHz to 50 kHz	0.1 V to 1 V	0.14 V + 0.5 mV/V	1
50 kHz to 100 kHz	0.1 V to 1 V	0.62 V + 0.8 mV/V	1
100 kHz to 300 kHz	0.1 V to 1 V	4.02 V + 5 mV/V	1



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Equipment to Output AC	C Voltage		Agilent 34401 A
(at the listed frequencies) ^{FO}		NA-17-20AH-78
3 Hz to 5 Hz	1 V to 10 V	0.011 V + 9.96 mV/V	
5 Hz to 10 Hz	1 V to 10 V	0.006 6 V + 3.9 mV/V	
10 Hz to 20 kHz	1 V to 10 V	0.005 2 V + 1.3 mV/V	
20 kHz to 50 kHz	1 V to 10 V	0.008 8 V + 2.7 mV/V	
50 kHz to 100 kHz	1 V to 10 V	0.022 V + 3.7 mV/V	
100 kHz to 300 kHz	1 V to 10 V	0.07 V + 41 mV/V	
Equipment to Output AC (at the listed frequencies	C Voltage) ^{FO}		
3 Hz to 5 Hz	10 V to 100 V	0.099 V + 12 mV/V	
5 Hz to 10 Hz	10 V to 100 V	0.046 V + 4 mV/V	
10 Hz to 20 kHz	10 V to 100 V	0.036 V + 1.3 mV/V	
20 kHz to 50 kHz	10 V to 100 V	0.063 V + 2 mV/V	
50 kHz to 100 kHz	10 V to 100 V	0.103 V + 6.9 mV/V	
100 kHz to 300 kHz	10 V to 100 V	0.61 V + 45 mV/V	
Equipment to Measure	0.07 mV to 330 mV	0.006 % of Reading + 3 μ V	Fluke 5500A-SC300
DC Voltage ^F	0.51 mV to 3.3 V	0.005 % of Reading + 5 μV	33K1-4-2522-1
	0.65 mV to 33 V	0.005 % of Reading + 50 μ V	-
	30 V to 330 V	0.005 5 % of Reading + 0.5 mV	
	100 V to 1 000 V	0.005 5 % of Reading + 1.5 mV	-
Equipment to Output	100 µV to 100 mV	$3.24 \ \mu V + 1.25 \ \mu V/mV$	Agilent 34401A
DC Voltage ^{FO}	100 mV to 1 V	$0.3 \text{ mV} + 0.4 \mu \text{V/mV}$	NA-17-20AH-78
	1 V to 10 V	$0.35 \text{ mV} + 25 \mu \text{V/V}$	
	10 V to 100 V	$0.6\ mV + 46\ \mu V/V$	
	100 V to 1 000 V	0.06 V + 0.4 mV/V	
	1 000 V to 35 kV	19.2 V + 0.74 V/kV	



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Capacitance Measure ^F	0.33 nF to 0.5 nF	0.061 nF + 0.008 nF/nF	Fluke 5500A-SC300
1 kHz to 50 kHz	0.5 nF to 1.1 nF	0.079 nF + 0.008 nF/nF	33K2-4-359-1
	1.1 nF to 3.3 nF	0.084 nF + 0.008 nF/nF	
	3.3 nF to 11 nF	0.101 nF + 0.008 nF/nF	-
	11 nF to 33 nF	0.353 nF + 0.007 nF/nF	
	33 nF to 110 nF	0.351 nF + 0.007 nF/nF	
	110 nF to 330 nF	1.005 nF + 0.007 nF/nF	
	0.33 μF to 1.1 μF	0.071 2 μF + 0.02 μF/μF	
	1.1 μF to 3.3 μF	0.183 6 μF + 0.078 μF/μF	
	3.3 µF to 11 µF	$0.184.9 \ \mu F + 0.01 \ \mu F/\mu F$	
	11 μF to 33 μF	0.185 6 μF + 0.01 μF/μF	
	33 μF to 110 μF	0.271 μF + 0.011 μF/μF	
	110 µF to 330 µF	0.357 μF + 0.006 μF/μF	
	330 µF to 1.1 nF	$0.185 2 \mu F + 0.02 \mu F/\mu F$	
Oscilloscope	-6.6 V to 6.6 V	0.25 % of Reading + 40 μV	Fluke 5500A-SC300
Square wave			NA17-20AW-480
$50 \Omega \log^{1}$	120 V to 120 V	0.05% of Panding $\pm 40.0\%$	_
Square wave	-150 V 10 150 V	0.05 % of Reading + 40 µ V	
$1 \text{ M}\Omega \text{ load }^{\text{F}}$			
Osciloscope	50 ms to 5 s	$(20 + 1\ 000t)\ \mu s/s$	
Time Marker,	1 ns to 20 ms	2.5 μs/s	
Oscilloscope Leveled Si	ne Flatness- (Relative to 50 kH	Iz)	
Edge Rise Time into 50	Ω load ^F	,	
5 mV to 5.5 V	50 kHz to 100 MHz	1.5 % of Reading + 100 μ V	
5 mV to 5.5 V	100 MHz to 300 MHz	3 % of Reading + 100 μ V	
Equipment to Measure	11 A to 50 A	0.75 % of Reading	High Current DC
DC Current ^{FO}	50 A to 100 A	0.8 % of Reading	Supply with Load Bank
	75 A to 150 A	0.8 % of Reading	Shunt 50A/50mV with
	150 A to 300 A	0.8 % of Reading	Agilent 34401A
			MSC-DCC-1002-1
Equipment to Measure	0.0/ H to 10 H	2.3 % of Reading + 0.5 μ H	1E1LS-400 33K2-4-359-1
mauounoo	10 mH	10 μH	General Radio 1482-H
			33K2-4-359-1

Issue: 10/2019



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Equipment to output	0.2Ω to 10.99 Ω	0.08 Ω	Fluke 5500A/SC300
Resistance	11 Ω to 109.99 Ω	0.96 Ω	MSC-ER-1001-1
	110 Ω to 329.99 Ω	0.19 Ω	
	330 Ω to 1.099 kΩ	0.48 Ω	
	1.1 kΩ to 3.299 kΩ	0.77 Ω	
	3.3 kΩ to 10.99 kΩ	1.6 Ω	
	11 kΩ to 32.99 kΩ	3.6 Ω	
	33 kΩ to 109.99 kΩ	23 Ω	
	110 kΩ to 329.99 kΩ	29 Ω	
	330 kΩ to 3.299 MΩ	55 Ω	
	3.3 MΩ to 20 MΩ	260 Ω	
	10 MΩ	130 Ω	Precision resistor
	100 ΜΩ	1.2 kΩ	MSC-ER-1001-1
	1 GΩ	150 kΩ]
	10 GΩ	130 ΜΩ]

Mechanical

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MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Positive Pressure Oil Free ^F	0.1 psi to 10 psi	0.02 psi	DMA MPS28 SCP-P-001
	10 psi to 5 000 psi	0.05 psi	DH Inst. PPCK-P6 SCP-P-001
Pressure Oil ^{FO}	50 psi to 5 000 psi	13 psi	Ashcroft 1305D SCP-P-001
Pressure ^{FO}	5 000 psi to 20 000 psi	120 psi	Wika 332.30 SCP-P-001
Vacuum ^F	0.87 psi to -14.5 psi	0.05 psi	Dama MPS28 33K6-4-430-1
	35 mbar to 1 355 mbar	0.28 mbar	Druck ADTS403 33K6-4-430-1
Torque Wrench ^F	5 lbf·in to 50 lbf·in	1 % of Reading + 0.1 lbf·in	AMS TT-QC-50i MSC-T-1002-1
	100 lbf·in to 1 000 lbf·in	0.75 % of Reading + 1.2 lbf in	CDI 10002-1-ETT MSC-T-1002-1
	60 lbf·in to 600 lbf·in	0.75 % of Reading + 1 lbf·in	CDI 6004-F-ETT MSC-T-1002-1

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Torque Testers ^F	30 lbf·in to 400 lbf·in	0.32 % of Reading + 100 lbf·in	CDI 2000-152 Butterfly Wheel w/ Class F Weights 17-20MD-03
	40 lbf·ft to 1200 lbf·ft	0.35 % of Reading + 100 lbf·in	Skywater Torque Arm w/ Class F Weights 17-20MD-03
Pipettes ^F	100 µL to 200 µL	0.14 μL	AD4212B-101
	200 µL to 500 µL	0.22 μL	MSC-P-1001-1
	500 µL to 1 000 µL	0.52 μL	
	1000 µL to 5 000 µL	8 μL	
	5,000 µL to 10 000 µL	9.8 μL	
	10,000 µL to 50 000 µL	17 μL	
	50 000 µL to 100 000 µL	29 μL	

Thermodynamic

MEASURED INSTRUMENT,	RANGE OR NOMINAL	CALIBRATION AND	CALIBRATION
QUANTITY OR GAUGE	DEVICE SIZE AS	MEASUREMENT	EQUIPMENT
	APPROPRIATE	CAPABILITY EXPRESSED	AND REFERENCE
		AS AN UNCERTAINTY (±)	STANDARDS USED
Equipment to Measure	5 % RH to 95 % RH	4 % RH	Control 4085 and
Humidity ^{FO}			Humidity Chamber
			NA17-20MH-27
IR Temperature ^{FO}	20 °C to 100°C	1.2 °C	Reed BX-500 Black body
	100 °C to 200 °C	2.2 °C	MSC-IR-1001-1
	200 °C to 500 °C	3.4 °C	

Mass, Force, and Weighing Devices

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Force Gages Compression ^{FO}	1 lb to 500 lb	(0.2 lb + 0.78 lb) 50 lb	Class F Weight Set 33K6-4-3196-1
	1 000 lb to 10 000 lb	0.29 % of Reading + 17.38 lb	Omega LC1001-10K W/ DP41-S 33K6-4-3196-1
	10 000 lb to 100 000 lb	0.29 % of Reading + 98.3 lb	Amcells LPDCT/DIN3 33K6-4-3196-1



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Force Gages Tension FO	1 lb to 500 lb	(0.2lb + 0.78lb) 50 lb	Class F Weight Set 33K6-4-476-1
	1 000 lb to 10 000 lb	0.29 % of Reading + 17.38 lb	Omega LC1001-10K W/ DP41-S 33K6-4-476-1
Mass Measurements F	1 g	0.000 11 g	Troemner Class 1
	2 g	0.000 88 g	MSC-W-1001-1
	5 g	0.000 92 g	
	10 g	0.000 98 g	
	20 g	0.001 1 g	
	50 g	0.001 4 g	-
	100 g	0.002 2 g	-
	200 g	0.004 1 g	
	500 g	0.053 g	-
	1 kg	0.050 g	-
	2 kg	0.055	-
Bench Scales FO	1 lb	0.081 lb	Class F Weight Set
Floor Scales	5 lb	0.088 lb	MSC-W-1001-1
	20 lb	0.076 lb	
· · · · · · · · · · · · · · · · · · ·	50 lb	0.078 lb	-
Bench Scales FO	1 g to 2 000 g (Resolution = 0.01 g)	$(1.16 \text{ x } 10^{-2} + 1.3 \text{ x } 10^{-6} \text{Wt}) \text{ g}$	Troemner Class 1 Weights MSC-W-1001-1
	0.002 lb to 1 lb (Resolution = 0.000 1 lb)	(2 x 10 ⁻⁴ + 9.29 x 10 ⁻⁵ Wt) lb	Class F Weights MSC-W-1001-1
Bench Scales,	1.0 lb to 500 lb	$(5.8 \text{ x } 10^{-3} + 9.79 \text{ x } 10^{-5} \text{Wt}) \text{ lb}$	Class F Weights
Floor Scales ^{FO}	(Resolution = 0.005 lb)		MSC-W-1001-1
Bench Scales	1 mg to 500 mg (Resolution = 0.04 mg)	$(1.15 \times 10^{-1} + 8.3 \times 10^{-5} \text{ Wt}) \text{ g}$	Onaus Class 6 Weights MSC-W-1001-1



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

Time & Frequency			
MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Frequency Measure ^F	0.9 Hz to 10 kHz	0.3 Hz	Fluke 5500A- SC300 NA17-20AF-166
	10 kHz to 2 MHz	5.7 Hz	
	2 MHz to 200 MHz	41 Hz	HP 8660C w/ HP 86603A NA17-20AF-166
	10 ns to 100 s	0.2 ns	HP5335A
	200 MHz to 18 GHz	0.25 kHz	NA17-20AF-166
Stopwatches and Timers ^F	1 hr to 24 hr	0.08 s	NIST ST960-12 HP5335A

- 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 F means that the laboratory performs calibration of the indicated parameter at its fixed location. Example: Outside Micrometer^F would mean that the laboratory performs this calibration at its fixed location.
- 4. 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.

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- 5. 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.
- 6. The term D represents diameter in inches or millimeters as appropriate to the uncertainty statement.
- 7. The term L represents length in inches or millimeters as appropriate to the uncertainty statement.
- 8. The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.

